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Abstract

The Heckhausen and Kuhl (1985) goal typology provided the conceptual foundation for this research, which examined the independent and integrated effects of achievement orientation and goal setting approaches on trainees' self-regulatory activity. Using a complex computer-based simulation, the authors examined the effects of three training design factors cutting across these two theoretical domains – goal frame, goal content, and goal proximity – on the nature, focus, and quality of the self-regulatory activities of 524 trainees. Results revealed that all three factors had a significant influence on self-regulation, with goal content exhibiting the greatest influence. In line with expectations, congruent learning frame and content relative to congruent performance frame and content was beneficial for trainees' self-regulatory activity, incongruent combinations of goal frame and content were better than congruent performance frames and content, and effects for the incongruent combinations cutting across the domains were asymmetrical. Theoretical extensions for further disentangling these distinct domains and training design implications are discussed.

Disentangling Achievement Orientation and Goal Setting:

Effects on Self-Regulatory Processes

Over the last decade or so, training research has examined a variety of interventions designed to influence the nature, focus, and quality of self-regulatory processes which, in turn, have been shown to have beneficial effects on trainee motivation, learning, and performance. As a result, this type of research has advanced understanding with respect to how to design effective interventions for training complex skills (Salas & Cannon-Bowers, 2001). One limitation of this work, however, is that it has drawn upon related but distinctly different theoretical foundations such that the source of effects on self-regulatory processes is not entirely clear.

One approach draws on trait-based *achievement orientation* theory to design *inductions* that influence the nature and focus of trainee regulatory processes. This work has generally examined cues or manipulations that differentially frame training as oriented toward learning or task performance (Ames, 1992; Ames & Archer, 1988; Archer, 1994). For example, framing has been used to prompt a task vs. ego focus (Dweck, 1986; Nicholls, 1984); influence conceptions of ability as malleable vs. fixed (Wood & Bandura, 1989); or emphasize exploration, learning from errors, and task mastery vs. outcome achievement, minimizing errors, and demonstrating performance (e.g., Frese, 1991; Ivancic & Hesketh, 1995/1996; Stevens & Gist, 1997).

A related, but distinct, line of work has been *goal-based*, focusing on qualitatively different goals and how distinctive *goal content* influences the focus of self-regulatory processes. This line of work generally manipulates goal content to set either learning and skill goals or performance goals (e.g., Barron & Harackiewicz, 2001; Harackiewicz, Baron, Carter, Lehto, & Elliott, 1997; Winters & Latham, 1996). Another aspect of this work has focused on whether such goals are presented as a more proximal sequence or as a distal terminal goal, the notion being that proximal goals are better standards of progress and thus facilitate self-regulation (e.g., Bandura & Schunk, 1981; Kozlowski, Gully, Brown, Salas, Smith, & Nason, 2001; Latham & Seijts, 1999; Manderlink & Harackiewicz, 1984; Winters & Latham, 1996).

Although this work has advanced training design for complex skill acquisition (Kozlowski, Toney, Mullins, Brown, Weissbein, & Bell, 2001), it has also tended to blend conceptions across the two domains. Investigators have developed a variety of interventions that work, but the distinct source of effects is often unclear. A theoretical integration of the goal-setting and

achievement orientation domains and a disentangling of their distinct effects are needed. Initial efforts include Kanfer's insightful conceptual analysis (1990), the integration of motivational traits and skills (Kanfer & Heggestad, 1997), the effects of achievement orientation traits on goal setting (Phillips & Gully, 1997) and goal states (Chen, Gully, Whiteman, & Kilcullen, 2000), and the distinct effects of achievement orientation traits and goal content manipulations on learning and performance (e.g., Kozlowski, Gully et al., 2001; Seijts, Latham, Tasa, & Latham, 2004).

The purpose of this research is to build on this initial work toward integration. Because our focus is on improving training design, we focus on achievement orientation inductions (as distinct from traits) and externally set goals. There are several expected contributions of this effort. First, examining these approaches simultaneously but distinctly enables determination of the relative effects of the different approaches on self-regulatory processes. This allows identification of the sources responsible for observed effects and, hence, interventions that are likely to have the greatest utility. Second, disentangling these approaches empirically provides a better understanding of the mechanisms for their effects. This will facilitate theory building and also provide information that can be used to improve training design. Finally, and perhaps most central to our perspective, is the fact that disentangling these approaches allows one to examine how effects differ depending on their combination.

Consistent with Kanfer (1990), we use the Heckhausen and Kuhl (1985) goal typology as a framework for integrating these related, but distinctive, lines of work. The framework is used to map achievement orientation inductions and goal setting to a common conceptual foundation. We then use that foundation to posit common and distinctive effects on self-regulatory processes across the domains, examine the unique effects of congruent and incongruent combinations of achievement orientation and goal-setting factors, and consider the effects of self-regulatory processes on learning and performance. This effort is intended to build on initial efforts, yield a step toward a clearer delineation of theoretical similarities and unique differences, and enhance training intervention design.

Theoretical Foundation

Hierarchical Goal Structure

From a training perspective, achievement orientation and goal-setting have common underpinnings in that they are designed to influence the nature, focus, and quality of self-

regulation as individuals strive to learn and achieve goals in a novel task domain. The Heckhausen and Kuhl (1985) goal hierarchy is useful for identifying theoretical parallels and distinctions across the domains (Kanfer, 1990). As illustrated in Figure 1, the hierarchy posits (a) three levels of molar "endstates," (b) in ascending order of specificity and potency, (c) that influence the focus of self-regulation: (1) *action* as spontaneous activity that is pursued for intrinsic interest and enjoyment, (2) learning *outcomes* that are pursued for self-improvement and the positive affect that accrues from task mastery, and (3) performance *consequences* that are contingent upon particular levels of performance. Learning and performance reference qualitatively distinct levels of the goal hierarchy with learning as more task focused, less specific, and less potent, whereas performance is more focused on external consequences, more specific, and more potent.

The goal hierarchy provides a means to conceptualize *achievement orientation*, in terms of learning or performance orientation, as a *goal frame* induction that influences intentions and, thus, how individuals approach achievement situations, select goals and aspiration levels, and react to progress. This situational framing is conceptually distinct from *goal-setting* approaches that focus on different *goal content*, in terms of specific learning outcomes versus performance consequences, and *goal proximity*, in terms of sequenced versus terminal objectives (Kanfer, 1990). The effects of achievement orientation inductions are indirect via the translation of intentions to goals to action, whereas goal-setting approaches shape attention and action directly. Accordingly, goal-setting approaches should be more potent than achievement orientation approaches for influencing self-regulatory processes.

Self-Regulation

Our interest is to better understand how these factors – *goal frame, goal content, and goal proximity* – representing distinctive theoretical approaches influence the nature, focus, and quality of self-regulatory processes during learning. Although there are numerous models of self-regulation, most contain three interdependent activities: self-monitoring, self-evaluation, and self-reaction (Kanfer & Ackerman, 1989). *Self-monitoring* refers to the self-observation of thoughts, actions, behaviors, or events. It is a cognitive process and successful self-monitoring requires that one attend to behaviors corresponding to one's goals. *Self-evaluation* involves the comparison of current performance to a desired goal or standard. In the current study we

assess individuals' self-monitoring and self-evaluation activities by examining several cognitive self-regulatory processes. These include the focus of attention and cognitive effort directed toward goal achievement in terms of general withdrawal of attention and effort (i.e., off-task thoughts); the extent to which attention follows a logical sequence of development from declarative to procedural to strategic skills (i.e., cognitive focus); effort directed toward reflection on feedback (i.e., self-evaluation activity), and the extent to which trainees utilize practice as an opportunity to explore the task (i.e., practice focus). The final component of self-regulation is *self-reactions*, which are important because they stimulate the reallocation of attention and effort or their withdrawal. There are two types of self-reactions. The first type involves self-satisfactions and the second type involves perceptions of task-specific capabilities (Kanfer & Ackerman, 1989). In the current study we examine both of these affect-based self-reactions through an examination of trainees' negative affect and self-efficacy throughout learning. Generally, more self-efficacy, less negative affect, fewer off-task thoughts, more focused cognitive attention, more self-evaluation, and greater task exploration are indicative of better quality self-regulatory processes when learning complex tasks.

Integrating Achievement Orientation and Goal-Setting Approaches

Achievement Orientation

Achievement orientation is conceptualized as a perceptual-cognitive framework that influences how individuals approach, interpret, and respond to achievement activities (Brett & VandeWalle, 1999; Dweck & Leggett, 1988; Elliot & Harackiewicz, 1996). Dweck (1986, 1989) identified two distinct achievement goal orientations: (a) learning orientation, which focuses on the development of competence and task mastery, and (b) performance orientation, which focuses on the demonstration of one's ability relative to others. In the goal hierarchy, a learning orientation implicates outcome goals because task accomplishment is seen as an end in itself (Kanfer, 1990). In contrast, a performance orientation implicates consequence goals because performance is viewed as a means of demonstrating one's ability (Kanfer, 1990). A performance orientation should be more potent than a learning orientation given the higher-order goals they implicate within the goal hierarchy. Further, the two mental frameworks lead to different patterns of self-regulation. Learning orientation leads to an adaptive pattern characterized by challenge seeking, intrinsic motivation, and persistence, whereas performance orientation leads to a

maladaptive pattern, evidenced by challenge avoidance, low intrinsic motivation, and task withdrawal (Ames, 1992; Church, Elliot, & Gable, 2001; Dweck, 1986).

Inducing achievement orientation: Goal frames. The type of orientation an individual adopts in an achievement situation is influenced by both dispositional and situational influences that are independent (Archer, 1994; Boyle & Klimoski, 1995; Chen et al., 2000; Kozlowski, Gully et al., 2001). Although the dispositional aspect of achievement orientation is relatively stable, research indicates that situational cues can cause individuals with a particular achievement orientation to "…adopt a different or less acute response pattern for a particular situation" (Button, Mathieu, & Zajac, 1996, p. 28). Researchers have used a variety of interventions to induce achievement orientations that generally involve manipulating cues to frame training (Kozlowski, Toney et al., 2001). Cues or instructions that emphasize self-referenced improvement, malleability of ability, and errors as learning opportunities induce a learning orientation, whereas cues that focus attention on demonstrating competence, the fixed nature of ability, and error avoidance induce a performance orientation (e.g., Ames, 1992; Archer, 1994; Frese et al., 1988; Ivancic & Hesketh, 1995/1996; Kozlowski, Gully et al., 2001; Martocchio, 1992, 1994; Meece, 1994; Wood & Bandura, 1989). Consistent with the trait achievement orientation literature, research has generally shown that a learning frame promotes an adaptive pattern of self-regulation (e.g., enhanced cognitive focus, higher self-efficacy, less negative affect), whereas a performance frame leads to a more negative pattern of self-regulation (see meta-analyses by Rawsthorne & Elliot, 1999; Utman, 1997).

Hypothesis 1: A *learning frame* is expected to yield improved self-regulatory processes relative to a *performance frame*.

Goal-Setting

Unlike the achievement orientation approach, goal setting theory does not distinguish between different motivations underlying task engagement (Kanfer, 1990). Locke, Shaw, Saari, and Latham (1981) identified goal attributes in terms of intensity, difficulty, and specificity. Most research has focused on the difficulty and specificity of the standard being targeted. One of the most consistent findings from this large and systematic body of research is that difficult and specific performance goals are beneficial for performance on straightforward tasks for which

individuals possess the ability to perform effectively and performance, therefore, is determined by their motivation to implement their ability (Locke & Latham, 2002; Seijts et al., 2004).

      Goal content. However, when a task requires learning, or the acquisition of knowledge, research suggests that setting a specific high performance goal may not be prudent (Earley, Connolly, & Ekegren, 1989; Seijts & Latham, 2001, Winters & Latham, 1996). Performance goals can be detrimental for knowledge and skill acquisition because they shift attention away from learning activities (Kanfer & Ackerman, 1989; Seijts et al., 2004; Locke, 2000). The suggested antidote in these situations is to provide individuals with learning goals, which focus individuals' attention on discovering strategies and mastering a task rather than performing well (Locke & Latham, 2002; Seijts & Latham, 2005; Seijts et al., 2004).

      The Heckhausen and Kuhl (1985) framework is useful for highlighting differences between performance and learning goals, and drawing parallels to achievement orientation. Difficult and specific performance goals represent consequence goals. Although the goal is defined in terms of attaining a specific standard of proficiency on a specific task, performance accomplishments are viewed as a means of attaining specific *external* consequences, such as the demonstration of ability to others or attaining a reward (Kanfer, 1990). In contrast, learning goals represent *internal* outcome goals because competence development and task mastery are viewed as an end in themselves. In addition, the relative position of these two types of goals within the goal hierarchy also leads to inherent differences in specificity. To illustrate, we highlight the example used by Seijts and Latham (2004) of learning the game of golf. A performance goal in this situation would be to achieve a specific score (e.g., 70) in a round. In contrast, a learning goal would be to master the proper grip of the club, placement of the feet, and the swing. The performance goal is more specific than the learning goals because the standard used to judge goal progress is more evident and clearly defined than those used to judge progress toward the learning goals. This fundamental difference between performance and learning goals should have important implications in complex learning situations. Earley et al. (1989) suggest that in complex tasks where there are a large number of possible strategies, specific goals may interfere with meta-strategy, a method of learning a good approach to the task. Kanfer (1990) also suggests that less specific goals may be beneficial for learning because they are more likely to emphasize an internal, self-referenced, learning orientation.

A small body of research has examined the differential effects of learning versus performance goal content on learning, skill acquisition, and performance. For example, Winters and Latham (1996) compared the effectiveness of learning and performance goals on a simple versus a complex version of a scheduling task, with the expectation that learning goals would be superior for complex tasks. On the simple scheduling task, no significant difference between learning and performance goals was found. On the complex version of the task, however, learning goals led to a greater number of effective task strategies than performance goals. Similarly, Seijts and Latham (2001) and Seijts et al. (2004) demonstrated that learning goals lead to higher levels of performance, self-efficacy, and information search on skill acquisition tasks. Overall, the research shows that goal content can have a potent influence on the nature and focus of self-regulatory processes. Relative to performance goal content, the research suggests that learning goal content should positively influence affective self-regulatory processes in the form of higher self-efficacy and positive affect, and cognitive self-regulatory processes in the form of greater and better attention focused on learning the task, more of an exploratory practice focus, and more attention devoted to learning from feedback.

Hypothesis 2: *Learning goal content* is expected to yield improved self-regulatory processes relative to *performance goal content*.

Goal proximity. During complex skill acquisition, the level of goal difficulty – indexed by a terminal standard – changes during learning. The terminal goal will be very difficult, perhaps impossible, early in learning and will become less difficult as new knowledge and skills are acquired. The very large goal-performance discrepancies early in learning may undermine self-efficacy, produce high levels of anxiety and frustration, and lead to the withdrawal of resources and effort, while very easy goals later in learning may fail to maintain effort and attention (Bandura, 1986; Kanfer, 1990; Seijts & Latham, 2001). Accordingly, self-regulation may be enhanced on learning tasks by using proximal subgoals, as opposed to distal terminal goals, that keep goal difficulty calibrated relative to current skills and constant over time (Bandura, 1986; Bandura & Schunk, 1981; Earley et al., 1989; Kozlowski, Gully et al., 2001; Winters & Latham, 1996). In skill acquisition settings, proximal goals may offer numerous benefits, such as providing a structure for learning activities, creating opportunities for self-challenges, and reducing the risk of negative self-reactions that can occur when current accomplishments are

gauged against a distal goal (Kanfer, 1990; Latham & Seijts, 1999). As Seijts and Latham (2001, p. 293) noted, "… on tasks where learning has yet to occur, a distal goal, without proximal goals, is typically too far removed in time to serve as a marker of progress to facilitate high self-efficacy regarding goal attainment, or to suggest strategic behaviors to attain it."

Research comparing proximal and distal goals during learning is limited, although there is some support for these arguments. Latham and Seijts (1999) found that participants who received proximal goals exhibited higher self-efficacy relative to trainees who received a distal or 'do your best' goal. However, Seijts & Latham (2001) failed to find a direct relationship between goal proximity and training performance or self-efficacy. They suggested that a direct effect of goal proximity may "…be limited to tasks where learning is required in a context of environmental uncertainty" (p. 304). Thus, although there is some suggestive evidence that proximal goals yield enhanced self-regulation by providing a greater ability to monitor progress and more positive self-evaluation and affect, additional research is needed on this issue.

Hypothesis 3: *Proximal, sequenced goals* are expected to yield improved self-regulatory processes relative to *distal, terminal goals*.

Disentangling Achievement Orientation and Goal-Setting Approaches

The hypotheses for achievement orientation goal frame, goal content, and goal proximity are consistent with a substantial body of theory and research. Although they are relevant to the current investigation, they are not the primary focus of this research because they do not bring us closer to understanding the interplay between the achievement orientation and goal setting approaches. Rather, our focus is on examining both approaches in concert to better disentangle the motivational processes implicated by each domain. We expect different combinations of goal frame, goal content, and goal proximity to have distinctive effects on the focus and quality of self-regulatory processes that influence learning and performance outcomes.

This effort to examine the intersection of the achievement orientation and goal setting domains presents some unique conceptual challenges. One of particular interest concerns congruence relative to incongruent combinations that are motivationally inconsistent across the domains. The literature has tended to focus within domains -- on either goal frames *or* different goal content -- where congruence is not an issue. However, incongruence is possible and potentially more revealing of differences across the domains (Seijts et al., 2004). Beyond the

effects of congruence-incongruence, there are additional complexities associated with goal proximity. Thus, our effort to disentangle the domains first considers the effects of congruent goal frames and goal content, next turns attention to motivationally incongruent combinations of goal frames and goal content, and finally considers the role of goal proximity.

Congruent goal frame and goal content. Given the parallel effects hypothesized for goal frames and goal content that reference the same level of the goal hierarchy, theory and research, respectively, have suggested that deliberate efforts to induce a particular orientation and the adoption of learning or performance goals should combine congruent goal frames and goal content (i.e., learning frames and goals that focus on outcomes vs. performance frames and goals that focus on consequences; Kozlowski, Toney et al., 2001; Kozlowski, Gully et al., 2001). The assumption is that consistent combinations should be mutually reinforcing because they link parallel intentions (goal frame) with the potency of tangible goals (goal content). Learning frames induce an adaptive mindset wherein people view the task as an opportunity for self improvement. They self-set challenging goals for learning, explore different strategies to improve comprehension, and view feedback as self-diagnostic (Ames & Archer, 1988; Pintrich & Garcia, 1991; Stevens & Gist, 1997). The addition of learning goals adds potency and sets a standard for monitoring learning progress. In contrast, performance frames induce a mindset for demonstrating competence relative to others. Individuals self-set easy performance goals, focus on narrow surface aspects of the task that directly link to performance consequences, and view negative feedback as undesirable because it reveals a lack of ability (Kozlowski, Gully, et al., 2001; Martocchio, 1994; Meece, 1994). The addition of performance goal content exacerbates these negative effects. Specific and difficult performance goals relative to easy self-set goals increase the magnitude of discrepancies, thereby increasing negative affect and undermining self-efficacy. Thus, we expect congruent combinations of goal frame and goal content to be consistent with research showing the superiority of learning outcomes relative to performance consequences during complex skill acquisition:

Hypothesis 4a: Congruent *learning* goal frames and content will have more positive effects on self-regulatory processes relative to congruent *performance* goal frames and content.

Congruent and incongruent goal frame and goal content. Congruence is not a given in training settings, making the question of incongruence of theoretical and practical importance.

Instructors often provide cues that inadvertently induce a goal frame (Ames & Archer, 1988) that is inconsistent with goal content (i.e., performance frame with learning goals or vice versa). For example, we have observed training – the purpose of which was to develop complex skills – in which trainers and leaders induced a strong performance frame. They emphasized high performance, the demonstration of superiority relative to other trainee groups, and were intolerant of errors. Feedback debriefing sessions were characterized by a focus on mistakes and failures and notably silent trainees, relative to training groups where framing cues emphasized skill development, learning from mistakes, and constructive feedback.

The anecdote is suggestive and raises the question: What are the consequences of an inconsistent alignment across the achievement orientation and goal setting domains? The research and theoretical logic supporting hypothesis H4a would lead one to conclude that the mutually reinforcing aspects of congruent combinations of goal frame and content should constitute the best and worse domain combinations. Incongruent combinations are expected to fall in between because incongruent combinations of goal frame and content set up an interference or fluctuation of attention between qualitatively different endstates at different levels of the goal hierarchy (Heckhausen & Kuhl, 1985). Thus, such combinations should not be as good as consistent learning outcomes nor as bad as consistent performance consequences, as the focus of self-regulation fluctuates between the different endstates:

> *Hypothesis 4b*: Congruent *learning goal frame and content* will have more positive effects on self-regulatory processes relative to inconsistent combinations of goal frame and content.
>
> *Hypothesis 4c*: Congruent *performance goal frame and content* will have more negative effects on self-regulatory processes relative to inconsistent combinations of goal frame and content.

Incongruent goal frame and goal content. Further revealing of the interplay between the achievement orientation and goal setting domains is the potential for asymmetrical effects for the two incongruent forms. Disentangling this issue requires consideration of the (a) effects of activating different levels of the goal hierarchy and (b) the potency and specificity of goal content relative to goal frame inductions. With respect to the first issue, Heckhausen and Kuhl (1985) assert that the activation of higher-order goals *generally* subsume lower levels, a concept they label "lower order inclusion." Thus, all other things being equal, performance

consequences drive the focus of self-regulatory processes relative to learning outcomes. However, they also discuss situations in which lower-order endstates can temporarily "overlap" with higher-order goals, as when a person strives to achieve an outcome goal (i.e., *learning* to surf) that also provides a pathway to a desirable future consequence (i.e., *winning* a surfing competition). In such cases, the endstates are coherent because the learning outcome is a direct pathway to a desired performance consequence. In other words, the consequence goal does not predominate nor is there a misalignment. Rather, this is a meaningful means-end combination where one has to acquire relevant skills before one can demonstrate one's ability. Finally, goals at different levels of the hierarchy can become strongly activated, thereby creating a fluctuation of attention as both endstates compete for the focus of self-regulation. Thus, the key to the first issue is whether activation of learning *and* performance endstates yields a coherent means-ends overlap vs. inclusion (where consequences dominate) or fluctuation.

With respect to the second issue, goal content is presumed to have greater potency relative to achievement orientation traits on self-regulatory processes and outcomes (e.g., Locke & Latham, 1990, 2003; Locke, Shaw, Saari, & Latham, 1981; Seijts et al., 2004). We infer that goal content should also have greater potency for influencing the focus and quality of self-regulation relative to goal frames. Goal frames are situational cues (Ames & Archer, 1988; Kozlowski, Toney et al., 2001) that induce an intention along the hierarchy. Internal motivational processes then have to translate intentions into goal content selection, a level of aspiration, and goal striving behavior (Heckhausen and Kuhl, 1985). Thus, the endstates and standards for monitoring progress that are induced by goal frames can be vague and subject to interpretation or revision (Kanfer, 1990). In contrast, external goals (specific, difficult goals) bypass this translation process and set specific standards for monitoring progress toward goal accomplishment (Kanfer, 1990). Thus, we expect goal content to be more potent and to induce greater specificity in its effects on self-regulatory processes relative to goal frame inductions.

We can integrate across the domains by acknowledging the general dominance of performance consequence goals (relative to learning outcome goals), the potency of content goals (relative to frame inductions), and the superiority of a learning orientation (relative to performance) for complex skill acquisition. This allows inferences to be drawn about asymmetries that result from different incongruent goal frame and content combinations.

The combination of a learning frame and performance goal content is expected to prime a temporary higher-order overlap that forms a meaningful means-end pathway such that the person focuses on learning outcomes as a means to achieve the desired consequences of performance. The performance content goal is potent and sets a specific standard for self-regulation, while the learning frame emphasizes the means to accomplish the consequence endstate (Heckhausen & Kuhl, 1985; Kanfer, 1990). The specific standard for monitoring progress coupled with a learning frame should yield more focused cognitive effort and more self-evaluation activity because these are consequential pathways for the means-ends overlap. On the other hand, the unambiguous specificity of the performance standard should prompt less exploration during practice, and greater negative affect and less self-efficacy because discrepancies should be large and salient. Because the goal frame is not sufficiently potent to activate a competing goal, but rather provides a direct pathway to goal attainment, this combination represents a coherent alignment (Heckhausen & Kuhl, 1985; Kanfer, 1990).

In contrast, the combination of learning goal content and a performance frame is expected to activate competing endstates. Learning goal content is potent and sets standards for monitoring learning progress (Seijts et al., 2004). At the same time, the performance frame activates a consequence endstate at the highest level of the hierarchy. Although the consequence level is more potent than the learning level, the performance frame is not sufficiently strong, relative to goal content, to prime "lower order inclusion." Thus, attention fluctuates across both activated endstates (Heckhausen & Kuhl, 1985; Kanfer, 1990). The performance frame cues distal consequences and maladaptive response styles that are not directly coupled to the more potent learning (outcome) goals, thereby creating interference with self-regulatory processes that are focused on learning outcomes. Thus, the combination of a learning frame with performance goals should be better than the combination of learning goals with a performance frame because the former sets up a temporary higher order overlap that provides a coherent means-ends pathway, whereas the latter activates competing endstates.

Hypothesis 4d: A learning goal frame coupled with performance goal content will have greater positive effects on self-regulatory processes relative to a performance goal frame coupled with learning goal content.

Goal proximity. The review presented previously provided some support for the notion that goal proximity enhances self-regulation in knowledge acquisition paradigms by keeping goal difficulty more calibrated to current skills and constant over time (e.g., Bandura & Schunk, 1981; Bandura & Simon, 1977; Earley et al., 1989; Latham & Seijts, 1999; Manderlink & Harackiewicz, 1984). However, this research has been conducted almost entirely with difficult and specific *performance* goals. Whether proximal goals will be beneficial in learning goal situations is unknown; the research evidence on this issue is mixed. There is reason to believe that proximal learning goals will have the same beneficial effects as proximal performance goals on individuals' self-evaluation activities. Kanfer (1990) suggests that the advantages of a proximal goal assignment on cognitively loaded tasks may derive from the explicit provision of an elaborated goal structure. One might expect such learning effects to be particularly beneficial when goals are focused on learning rather than performance. In support of this, Kozlowski, Gully et al. (2001) showed that trainees with sequenced learning goals had more coherent, better organized knowledge structures relative to those with sequenced performance goals. Similarly, Seijts and Latham (2001) found that trainees who received proximal learning goals implemented more strategies than those who received distal learning goals.

On the other hand, there is also reason to speculate that a series of proximal learning goals may have a negative effect on the focus of trainees' self-regulation. For example, one key benefit of learning goals is that they stimulate exploratory, trial and error learning and allow individuals to shape the best task solution through experience (Earley et al., 1989; Meese, 1994). Thus, there is the risk that proximal goals may be overly restrictive, limiting the scope of this exploratory activity. Some indirect evidence indicates that proximal goals reduce intrinsic task interest over time (Manderlink & Harackiewicz, 1984), suggesting that as competence develops with practice the controlling features of proximal goal assignments may become more salient and reduce intrinsic interest. Therefore, we posit that proximal goal assignments may interfere with some of the benefit of learning goals, whereas proximal goals will be beneficial under performance goal conditions:

> *Hypothesis 5*: *Distal*, congruent learning goal frames and content will have greater positive effects on self-regulatory processes relative to *proximal*, congruent learning goal frames and content.

Hypothesis 6: *Proximal*, congruent performance goal frames and content will have greater

positive effects on self-regulatory processes relative to *distal*, congruent performance goal

frames and content.

Finally, extrapolating the logic underlying hypothesis 4a – that congruent learning goal content

and goal frames will be superior to congruent performance goal content and frames – with the

logic underlying hypotheses 5 and 6 we posit that the best combination of factors is:

Hypothesis 7: *Distal*, congruent *learning* goal frame and content will have greater positive

effects on self-regulatory processes relative to *sequenced*, congruent *performance* goal

frame and content.

Method

Participants

Participants were 542 undergraduates in psychology courses at a large Midwestern

university, who were given course credit for participating in the study. Fifty-eight percent of the

participants were female and most (87 percent) were between 18 and 21 years old.

Task

The task used in this research was a version of TANDEM (Dwyer, Hall, Volpe, Cannon-

Bowers, & Salas, 1992; Kozlowski & DeShon, 2004), a PC-based radar-tracking simulation that

presents participants with multiple contacts on the computer screen. It is a complex and

dynamic task that requires trainees to learn both basic and strategic skills. With respect to basic

skills, participants had to learn to "hook" contacts, collect information, make 3 subdecisions to

classify the contact, and then make an overall decision (take action/clear). Trainees received

points for correct decisions and lost points for incorrect decisions. They also needed to learn

strategic skills, which involved preventing contacts from crossing two defense perimeters.

Individuals needed to learn how to identify the perimeters, monitor contacts approaching the

perimeters, and determine their priority. Contacts that crossed perimeters cost points.

Procedure

Training on the radar simulation was conducted in a three-hour session with groups of

one to 12 participants. Trainees within sessions were randomly assigned to one of eight

experimental conditions in a 2 (goal frame: learning vs. performance) x 2 (goal content: learning

vs. performance) x 2 (goal proximity: proximal vs. distal) fully-crossed between-subjects design.

Trainees were first presented with a brief demonstration of the simulation that outlined its features and decision rules. They were then shown how to use an on-line instruction manual that contained complete information about the simulation. After this brief demonstration, trainees had an opportunity to study the on-line instruction manual for two minutes and familiarize themselves with the task in a five-minute trial. They were then told that they would progress through nine study, practice, and feedback cycles, followed by an opportunity to demonstrate how much they had learned on a more difficult and complex version of the task.

Participants were given nine 8.5-minute training trials. Each training trial consisted of a cycle of study, practice, and feedback. They had two-minutes to study the on-line task manual, five minutes of hands-on practice, and one-and-a-half minutes to review feedback. Veridical feedback on all aspects of the task relevant to both basic and strategic performance was provided immediately following the completion of each practice trial. All trainees received the same feedback. Before each block of three trials participants completed measures of goal commitment and indicated their plan for the upcoming practice session. Following the third and ninth practice trials, participants completed measures of self-efficacy, negative affect, and off-task thoughts. They were also given a 5-minute break following the third trial and ninth trial. After the second 5-minute break, participants were presented with a 10-minute generalization task that was more difficult and complex than the scenario they had practiced.

Manipulations

Goal frame. Following the familiarization trial, trainees were given instructions for the training session framed so as to induce either a learning or performance orientation. Drawing on prior research that has combined sets of cues, learning instructions framed task mastery as acquirable knowledge and skill, and that trainees should use practice as an opportunity to develop their capabilities. They were encouraged to use errors and feedback as learning opportunities and to focus on task mastery rather than outcome achievement (Frese et al., 1988; Kozlowski et al., 2001; Martocchio, 1994; Stevens & Gist, 1997; Tabernero & Wood, 1999; Wood & Bandura, 1989). Performance instructions framed task performance as a demonstration of competence. Participants were encouraged to avoid mistakes and to use their score and feedback to gauge their ability. These instructions were reinforced through verbal

reminders provided prior to each block of training trials and through written reminders provided periodically on the computer screen following the presentation of task feedback.

Goal content. Individuals were provided either learning or performance goals during training depending on their condition. Trainees were given a sheet that listed their goals and the experimenter reviewed the goals aloud. The goals were designed to be consistent with prior research comparing learning and performance goals (e.g., Kozlowski et al., 2001; Winters & Latham, 1996; Seijts & Latham, 2001; Seijts et al., 2004). The learning goals focused on skills needed to develop proficiency and on the deep principles and strategies embodied in the task and its performance context. Each learning goal was listed on the goal sheet along with a short (one sentence) description of the goal (e.g., Learn how to make correct TYPE decisions; Learn how to determine whether a contact is an airplane, submarine, or surface vessel.). Learning goals focused trainee attention on learning important skills and concepts, but all relevant task information was contained in the training manual and was accessible by trainees in both goal conditions. Performance goals focused trainees' attention on achieving a specific performance score (e.g., Your goal is to achieve a single trial score of 950 or higher).

Goal proximity. The third manipulation determined whether goal content was proximal or distal (Latham & Seijts, 1999). New proximal goals were provided before each block of three training trials, whereas the distal goal condition provided the same terminal goals across the three blocks. Proximal goals were set to be attainable within the trial block, to calibrate goal difficulty to a particular stage of skill acquisition. Proximal performance goals were set at the 85th percentile for each trial block based on pilot data: (1) 70, (2) 640, (3) 950 (Earley et al., 1989; Kozlowski, Gully et al., 2001; Latham & Seijts, 1999). Proximal learning goals were set to focus on basic skills early in training and more complex skills in the later blocks based on prior research using this task (Bell & Kozlowski, 2002; Kozlowski, Gully et al., 2001) and consistent with other research on proximal goals (Seijts & Latham, 2001).

Trainees in the distal goal condition received a sheet before the first training block that outlined their overall training goal(s). Trainees in the distal performance goal condition received the final score goal (i.e., 950) for all three trial blocks. Participants were told they should work to achieve this score by the end of training. Individuals in the distal learning goal condition were

given all the learning goals. These were the same goals provided to individuals in the proximal learning goal condition, except that they were not linked to stages of skill acquisition.

Measures of Control Variables

Cognitive ability. Participants provided their SAT or ACT scores at the beginning of the experimental session. The scores were standardized using national means and standard deviations published by the Educational Testing Service (ETS) and ACT. The standardized scores served as a measure of individuals' general cognitive ability (Frey & Detterman, 2004).

Trait goal orientation. At the beginning of the experimental session, trait learning, performance-prove, and performance-avoid orientations were measured using three scales developed by VandeWalle (1997) as work domain goal orientation instruments. Thus, the items were adapted to the current study by removing the word "work" where appropriate. All scales employed a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The learning orientation scale consisted of 5 items (α = .80). A sample item is "I am willing to select a challenging assignment that I can learn a lot from." Performance-prove orientation was measured with 4 items (α = .86). A sample item is "I try to figure out what it takes to prove my ability to others." Finally, the performance-avoid orientation scale utilized 4 items (α = .84). A sample item is "Avoiding a show of low ability is more important to me than learning a new skill."

Measures of Affective Self-Regulatory Processes

Self-efficacy. Following the third and ninth practice trials, self-efficacy was assessed using an 8-item task specific self-report measure appropriate for the simulation (Ford, Smith, Weissbein, Gully, & Salas, 1998; Kozlowski, Gully et al., 2001). This measure assesses self-efficacy with a Likert scale rather than with ratings of confidence about particular aspects of the task (Hysong & Quinones, 1997; Lee & Bobko, 1994). A sample item is "I am confident that I can cope with this simulation if it becomes more complex" (1 *strongly disagree* to 5 *strongly agree*; αs = .92 for time 1 and .95 for time 2).

Negative affect. Following the third and ninth practice trials, participants completed a four-item measure of negative affect developed by Kanfer, Ackerman, Murtha, Dugdale, and Nelson (1994). This is a self-report questionnaire that asks participants to report the extent to which they experienced affective thoughts during the task trials. A sample item is "I got mad at myself during the task" (1 *never* to 5 *constantly*; αs = .80 for time 1 and .81 for time 2).

Measures of Cognitive Self-Regulatory Processes

       Off-task thoughts. Trainees completed a 6-item measure to assess their off-task thoughts following the third and ninth practice trials. This measure was adapted from Kanfer et al. (1994) and is designed to measure the frequency of off-task cognitions. Higher scores on this measure indicate greater frequency of off-task thoughts. A sample item is "I lost interest in the task for short periods" (1 *never* to 5 *constantly*; αs = .69 for time 1 and .78 for time 2).

       Cognitive focus. To determine whether trainees focused their cognitive effort on appropriate instructional material during the course of training, we analyzed the time trainees spent studying the on-line instruction manual during the study sessions. The data collected by the on-line instruction manual provided information concerning what each participant studied, and when during the training they studied the material. For the first training block (time 1) and third training block (time 2), we calculated the amount of time a trainee spent studying the relevant parts of the manual and used this to determine the degree to which the trainee was effectively focusing their cognitive effort. Relevant material at Time 1 was information relating to basic aspects of the task, including decision-making procedures, cue information, and basic task functions. At Time 2, appropriate pages of the manual included those focused on strategic task elements, including defensive perimeters, prioritizing contacts, and making trade-offs among contacts. The optimal cognitive focus at different stages of learning on this task has been established in prior research (Bell & Kozlowski, 2002).

       Self-evaluation activity. The extent to which trainees engaged in self-evaluation was assessed by the amount of time they spent reviewing feedback. Following each of the practice trials, trainees received performance feedback on all aspects of the task relevant to basic and strategic performance. Software automatically assessed trainees' practice activities and presented this information on the computer screen. The amount of time trainees spent reviewing the feedback was recorded by the software, and served as a measure of self-evaluation activity. The time spent reviewing feedback following the first three trials was used to measure self-evaluation activity early in training and time spent reviewing feedback following the last three trials was used to measure self-evaluation activity later in training.

       Practice focus. Prior to each training block trainees reported what they planned to focus on during the upcoming three practice trials. The question was an open-ended to avoid

interfering with the induced goal frames; trainees could list up to three items on which they planned to focus attention and activities during practice. Each statement was rated on a three-point scale in terms of the level of exploration in planned practice activities. A rating of 1 was used for statements that indicated a systematic focus on practicing specific content areas or skills (e.g., type decisions) or working toward specific standards (e.g., prosecuting 5 contacts). A 2 rating was given to statements that focused on more general content domains (e.g., making decisions) or outcomes (e.g., improving score). Finally, a 3 rating was given to statements that were relatively unsystematic, broader, and more exploratory in nature (e.g., get better). This conceptualization of exploratation is consistent with problem-solving research that distinguishes systematic-linear and more unsystematic-exploratory learning activities (Vollmeyer & Burns, 2002; Vollmeyer et al., 1996). Practice focus at time 1 and time 2 were based on participants' responses prior to the first three trials and the last three trials, respectively.[1]

Outcome Measures

Knowledge. Following the completion of the ninth practice trial, participants completed tests of basic and strategic knowledge. The basic knowledge test consisted of thirteen multiple-choice items focusing on the extent to which declarative knowledge (e.g., target characteristics; basic operating features of the task) about the task had been acquired. The strategic knowledge test consisted of fourteen multiple-choice items focusing on the extent to which strategic knowledge (e.g., locating the perimeters, identifying high priority targets) about the task had been acquired. These measures have been established in previous research (Bell & Kozlowski, 2002) and a confirmatory factor analysis (CFA) further confirmed that these two scales were indeed measuring different aspects of knowledge (χ^2(64, $\underline{N}$ = 542) = 142.88, $\underline{p}$ < .01; χ^2/df = 2.23; GFI = .96; AGFI = .95; CFI = .94; and RMSEA = .048 (.037, .058)).

Performance. A final 10-minute generalization trial assessed performance on both basic and strategic aspects of the task. This trial was more difficult, complex, and dynamic than the practice trials. It was longer in duration (10 vs. 5 minutes), comprised more contacts (60 vs. 22), had more dynamic pop-ups, and included more contacts that threatened perimeters. In addition, rules were modified so that a greater number of points were deducted when targets crossed the visible inner perimeter (175 points) and the invisible outer perimeter (125). To achieve high levels of basic and strategic performance on this final trial, participants needed to adapt their

strategies and generalize their skills. Indicators of a participant's basic performance consisted of the number of correct and incorrect decisions. These are the two fundamental components of trainees' score and performance on these two aspects of the task is driven by knowledge of basic task components (e.g., decision-making cues and procedures). Strategic performance was composed of the number of times participants zoomed out, the number of markers hooked in an effort to identify the location of an invisible outer perimeter, and the number of high priority contacts that were processed. These elements capture the two major components of strategic performance – contact prioritization and perimeter defense. To examine whether the relevant performance indicators could be combined to create separate basic and strategic performance composite variables, we conducted an exploratory principal components factor analysis using varimax rotation. Two factors emerged from these analyses. The first component consisted of the strategic performance indicators and the second component consisted of the basic performance indicators (Component 1: eigenvalue = 2.78, variance = 55.66%; Component 2: eigenvalue 1.39, variance = 27.82). The indicators for each factor were standardized and combined using unit weights to create the basic and strategic performance composites.

Manipulation Checks

To provide a check of the goal content manipulation, we assessed trainees' goal commitment prior to each of three blocks of training trials. Goal commitment was assessed using a single-item taken from Hollenbeck, Williams, & Klein (1989). The item is "I am strongly committed to pursuing the goals I have been given" (1 *strongly disagree* to 5 *strongly agree*). Analyses revealed that trainees were committed to their assigned goals (means of 4.09, 4.05, and 4.11 for training blocks 1, 2, and 3, respectively). There were no significant differences in goal commitment across conditions, nor did goal commitment significantly interact with goal content in the prediction of knowledge or performance.

We evaluated whether the goal frame manipulation induced the appropriate goal focus at the end of training. Participants completed two items (1 *strongly disagree* to 5 *strongly agree*): "I tried to perform better than other people" (consequence focus) and "I didn't really worry about how well I was doing relative to others, I focused on improving my own skills" (outcome focus, reverse coded). As expected, participants in the performance frame condition (*M* = 2.87, *SD* =

.85) exhibited higher levels of consequence focus than participants in the learning frame

condition (*M* = 2.67, *SD* = .88), *t* (540) = 2.61*, p* < .01.

Results

Overall Analyses

Table 1 presents the means, standard deviations, and intercorrelations among all

variables included in this study. Our first set of analyses examined the omnibus effects of the

three training manipulations and time on the affective and cognitive self-regulatory measures

using an RM-MANCOVA, with cognitive ability and the three dimensions of trait goal orientation

as covariates. The within-subject results revealed a significant overall effect for time, ($\underline{F}(6, 525)$

$= 14.99$, $\underline{p} < .01$, $\eta^2 = .15$). However, there were no significant two-, three-, or four-way

interactions between time and the training manipulations. This finding indicates that the effects

of the manipulations were constant across time. Thus, trainees' scores on the self-regulatory

indicators measured early and later in training were combined to create overall measures.

These combined measures are reported in Table 1 and the cell means for the effects of the

different conditions on these self-regulatory variables are shown in Table 2.

Using Wilk's criterion, the between-subjects effects from the RM-MANCOVA are

reported in Table 3 revealing that cognitive ability and the three dimensions of trait goal

orientation all had significant overall effects, accounting for 32% of the variance. Each of the

three training manipulations had a significant overall effect on the self-regulatory processes and

there was a significant three-way interaction among the manipulations. After controlling for the

individual differences, the manipulations accounted for an additional 22% of the variance. It is

interesting to note that goal content had the largest overall effect, explaining almost twice as

much variance in self-regulatory activity as each of the other two factors.

We examined the direct effects of the manipulations to test our first three overall

hypotheses. Hypothesis 1 predicted that learning goal frame would yield improved affective and

cognitive self-regulatory processes relative to a performance goal frame. Results revealed that

goal frame had a significant effect on negative affect ($\underline{F}(1, 530) = 5.46$, $\underline{p} < .05$, $\eta^2 = .01$), with a

learning frame having significantly less negative affect relative to a performance frame. Frame

also had a significant effect on trainees' cognitive self-regulatory activity such that trainees with

a learning frame exhibited significantly more self-evaluation activity ($\underline{F}$(1, 530) = 11.16, $\underline{p}$ < .01, η^2 = .02).

Hypothesis 2 predicted that learning goal content would result in improved self-regulatory activity compared to performance goal content. Goal content had a significant effect on negative affect, such that trainees who received learning goals reported significantly lower levels of negative affect, ($\underline{F}$(1, 530) = 10.45, $\underline{p}$ < .01, η^2 = .02). Goal content also had a significant effect on trainees' practice focus ($\underline{F}$(1, 530) = 43.15, $\underline{p}$ < .01, η^2 = .08). As expected, trainees with learning goals reported a more exploratory practice focus than trainees with performance goals.

Hypothesis 3 predicted that proximal, sequenced goals would yield enhanced affective and cognitive self-regulatory processes relative to distal, terminal objectives. While goal proximity did not influence trainees' self-efficacy, it did have a significant effect on their negative affect ($\underline{F}$(1, 530) = 11.39, $\underline{p}$ < .01, η^2 = .02). Contrary to expectations, however, an examination of means revealed that trainees who received proximal goals reported higher levels of negative affect than trainees who received distal goals. With respect to cognitive processes, goal proximity had a significant effect on the focus of trainees' cognitive effort ($\underline{F}$(1, 530) = 4.77, $\underline{p}$ < .05, η^2 = .01). As expected, trainees who received proximal goals exhibited more focused cognitive attention.

Planned Contrasts

The significant 3-way interaction among the manipulations supported our effort to disentangle the effects using theoretically derived planned contrasts. Planned contrasts are an effective means of testing predicted patterns in analysis of variance designs (e.g., Rosnow & Rosenthal, 1995, 1996) and we used them to decompose the effects of three manipulations (H4-H7). A summary of the contrasts performed and their results is presented in Table 4.

Our first contrast focused on the effects of congruent learning and performance goal frames and goal content. Extending research conducted within the achievement orientation and goal setting domains, Hypothesis 4a predicted that congruent learning frame and goal content would be more adaptive for trainees' self-regulatory processes than congruent performance frame and goal content. The planned contrasts revealed that congruent learning frame and goals was largely superior to congruent performance frame and goals. Trainees who received

congruent learning conditions exhibited higher levels of self-efficacy ($t(534) = 2.76$, $p < .01$, d = .34), less negative affect ($t(534) = -4.29$, $p < .01$, d = .54), greater self-evaluation activity ($t(534) = 2.87$, $p < .01$, d = .34), and a more exploratory practice focus ($t(534) = 5.51$, $p < .01$, d = .70). The contrast did not reveal any significant advantage for learning congruence on off-task thoughts or cognitive focus.

The next set of contrasts aimed to examine the effects of an inconsistent alignment across the achievement orientation and goal setting domains. Heckhausen and Kuhl (1985) suggest that incongruent combinations of goal frame and content create an interference or fluctuation of attention between different endstates at different levels of the goal hierarchy. Thus, in Hypothesis 4b we predicted that congruent learning goal frames and content (the optimal domain combination) would have a more positive effect on self-regulatory processes than incongruent combinations. The results revealed that trainees who received congruent learning conditions had less negative affect ($t(534) = -2.60$, $p < .01$, d = .28) and a more exploratory practice focus ($t(534) = 2.69$, $p < .01$, d = .27) than trainees who received incongruent frame and goals. It is interesting to note that while learning congruence yielded a few benefits over incongruence, the benefits of learning congruence were much clearer when compared to performance congruence. However, in Hypothesis 4c we suggested that incongruent frame and goals would be more beneficial than congruent performance conditions (the worse domain combination). The results of this analysis revealed that incongruent frame and goals was generally better than congruent performance frame and goals. Specifically, incongruence yielded higher levels of self-efficacy ($t(534) = 2.34$, $p < .05$, d = .25), lower levels of negative affect ($t(534) = -2.32$, $p < .05$, d = .26), and a more exploratory practice focus ($t(534) = 3.65$, $p < .01$, d = .40) when compared to performance congruence. These results show that it is impossible to draw simple conclusions about the benefits or drawbacks of frame and goal congruence. Congruence appears positive when dealing with learning content, but blending learning and performance content appears to be more beneficial than performance congruence.

Our next set of contrasts set out to more precisely tease apart the effects of frame and goal incongruence. Based on the Heckhausen and Kuhl (1985) framework, we predicted that incongruent combinations may yield asymmetrical effects. In particular, learning goal frame combined with performance goal content creates a temporary high-order overlap that forms a

meaningful means-end pathway, but performance frame combined with learning goals activates competing endstates and subsequent fluctuation of attention. Hence, Hypothesis 4d predicted that learning goal frame combined with performance goal content would yield more positive effects on self-regulatory processes than performance goal frame combined with learning goal content. Consistent with expectations, learning frame x performance goals yielded significantly more focused cognitive effort (t(534) = 1.97, p < .05, d = .25). However trainees who received a learning frame and performance goals had a less exploratory practice focus (t(534) = -3.93, p < .01, d = .47) than trainees who received performance frame and learning goals. There were no significant differences across these conditions in terms of the affective processes or off-task thoughts.

Our next set of contrasts examined the implications of goal proximity across learning and performance content. While research clearly suggests that proximal performance goals are superior to distal performance goals, the evidence for learning goals is more mixed. Evidence suggests that the controlling features of proximal goal assignments may undermine some of the benefits of learning goals (e.g., Earley et al., 1989; Manderlink & Harackiewicz, 1984). Therefore, Hypothesis 5 predicted that distal, congruent learning goal frames and content would have greater positive effects on self-regulatory processes and learning relative to proximal, congruent learning goal frames and content. Consistent with expectations distal, congruent learning conditions resulted in significantly higher levels of self-efficacy (t(534) = 2.66, p < .01, d = .50), less negative affect (t(534) = -2.36, p < .05, d = .45), and fewer off-task thoughts (t(534) = -2.89, p < .01, d = .51). Hypothesis 6 predicted that proximal, congruent performance goal frames and content would have greater positive effects on self-regulatory processes and learning relative to distal, congruent performance goal frames and content. The planned contrasts revealed no significant differences between proximal and distal performance goals on the cognitive and affective self-regulatory processes. Thus, Hypothesis 6 was not supported.

Our final contrast integrated the logic underlying the previous hypotheses to identify the optimal combination of factors. This test provides insight into how training interventions may be designed to elicit maximum impact. In particular, Hypothesis 7 predicted that the combination of learning frame and distal, learning goals would lead to improved self-regulatory activity relative to the combination of performance frame and proximal, performance goals. This contrast

revealed that the learning configuration was largely superior to the performance configuration condition. Trainees in the learning configuration had higher levels of self-efficacy (t(534) = 3.99, p < .01, d = .64), lower levels of negative affect (t(534) = -5.37, p < .01, d = .88), and more exploratory practice focus (t(534) = 4.56, p < .01, d = .72).

Relationship of Self-Regulatory Indicators with Knowledge and Performance

Our final set of analyses was designed to examine the relationship between trainees' self-regulatory activities and their knowledge and performance. Essentially, these analyses illustrate the importance of trainees' self-regulatory processes and learning activities for their learning and performance. The results of these analyses are reported in Table 5. Table 5 reveals that after controlling for the individual differences and training manipulations, the self-regulatory processes had a significant overall effect on each of the learning outcomes, explaining between 6% and 21% of the variance in trainees' knowledge and performance. Self-efficacy had a significant, positive relationship with trainees' basic knowledge and performance, but was not significantly related to their strategic knowledge and performance. Negative affect exhibited a significant, negative relationship with trainees' basic knowledge and performance, but did not influence the strategic outcomes. These results suggest that trainees' affective self-regulatory processes have important implications for basic knowledge and performance, but are not as important for developing strategic knowledge and skills. Off-task thoughts exhibited a negative relationship with knowledge and basic performance, and focused cognitive effort led to higher levels of knowledge. Trainees who had a more exploratory practice focus had higher knowledge and strategic performance. Finally, self-evaluation activity had the most pervasive effects. Trainees who spent more time engaged in self-evaluation activities had higher levels of basic and strategic knowledge and performance.

Discussion

The current research was designed to build on initial work addressing the theoretical interface of achievement orientation and goal setting approaches (Heckhausen & Kuhl, 1985; Kanfer, 1990) with the purpose of disentangling their effects on trainees' self-regulatory activity during complex skill acquisition. We examined the independent and integrated effects of three training design factors (goal frame, goal content, goal proximity) across these two theoretical domains on the nature, focus, and quality of learners' self-regulatory activities. One advantage

of disentangling these training design factors is that it allowed us to examine the relative effects of the different approaches on self-regulatory processes. This more precise examination of the effects of the three training design elements not only facilitates theory building but also provides information that is useful for guiding the design of future interventions. In this final section, we provide a summary of our key findings and discuss the potential implications of these results for advancing theory in this area as well as for improving training design.

Key Findings

Relative effect of different factors. The Heckhausen and Kuhl (1985) hierarchy provided a common conceptual foundation for distinguishing and integrating the achievement orientation and goal setting approaches to complex skill acquisition. One important distinction between the approaches is that of potency. Internal motivational processes have to translate goal frame inductions into goal content selection, a level of aspiration, and goal striving behavior. Moreover, the standards for monitoring progress that are induced by goal frames can be vague and subject to interpretation (Kanfer, 1990). In contrast, difficult, specific, and accepted external goals go directly to action and set specific standards for monitoring progress toward goal accomplishment (Kanfer, 1990). Thus, goal content was expected to be more potent than goal frames in its effects on self-regulatory processes. Another important distinction between the domains is that of specificity and predominance. Learning and performance frames and goal content reference qualitatively different endstates in the hierarchy with inherent differences in specificity, such that higher level endstates are more specific and predominant. However, learning and performance endstates in each domain reference common levels of the hierarchy. Thus, when goal frame and goal content aligned, they were expected to be mutually reinforcing in terms of their effects on self-regulatory processes. Consistent with the literature, learning frames aligned with learning goals were expected to be more adaptive for self-regulation than performance frames coupled with performance goals. The effects for proximity were expected to be more complex, but in general the provision of more proximal subgoals was expected to enhance self-regulatory processes relative to distal terminal goals.

The results of our overall analyses revealed that all three training factors – goal frame, goal content, and goal proximity – had a significant effect on trainees' self-regulatory activities, over and above the effects of cognitive ability and trait goal orientation. At a general level and

consistent with prior work and expectations (e.g., Kozlowski, Gully, et al., 2001; Seijts et al., 2004), our results indicated that a learning frame coupled with learning goals was more effective than a performance frame coupled with performance goals. Results for goal proximity were somewhat mixed and are better revealed in the findings from the planned contrasts discussed below. It is also clear that proximity effects necessitate further disentangling.

All three training design elements had a significant overall effect, although there were differences in the magnitude of these effects. As expected, goal content is more potent than goal frame, explaining more than twice as much variance in trainees' self-regulatory activities (10%) than either goal frame (4%) or goal proximity (4%). This finding supports the assertion that goal content is a more powerful driver of self-regulatory activity than frame or goal proximity. Although the effect for frame and proximity appear modest, it is important to bear in mind that when an integrated intervention is decomposed into its fundamental elements one can expect each individual element to lose some of its potency due to the potential loss of synergies and the introduction of conflicts. It is critical, therefore, to examine the effects that arise from different combinations of elements. This was the second focus of our study.

Goal frame-goal content congruence. One key issue that must be considered when combining different training design elements involves the effects of alignment or congruency. The rise of the systems perspective in the field of training has focused considerable attention on the external alignment of training, or ensuring that training is consistent with organizational goals and strategy (e.g., Barron, 2003; Kozlowski & Salas, 1997; Tannenbaum, 2002). However, whether or not internal alignment or congruency is critical for training success has received less attention. An examination of the effects of combining different training frames and goals did not provide evidence to support a pure congruence or alignment effect. Instead, the results appeared to be driven by whether the focus was on learning or performance. Learning and performance frames and goal content reference common levels of the hierarchy. Thus, when goal frame and goal content are aligned they mutually reinforce effects on self-regulatory processes. Consistent with this rationale, congruent learning frame and goals were more beneficial for self-regulation than either congruent performance frame and goals or a mix of different frame and goals. But, incongruent frames and goals were more effective for self-regulation than congruent performance conditions. This finding suggests that focusing training

design on creating an outcome, or learning, focus – even to a small or partial degree – is more important than congruence per se.

More useful for disentangling the approaches are the potential asymmetrical effects for the motivationally incongruent combinations that reference qualitatively different endstates. Performance or consequence goals, predominant at the highest level of the hierarchy, provide specific standards and in general are expected drive the focus of self-regulation relative to learning or outcome goals that are lower in the hierarchy. Moreover, goal content is more potent than goal frames. Thus, when a performance frame is coupled with learning goal content, the potency of the learning goal competes with the dominance of the performance consequence frame thereby activating both endstates and creating a fluctuation of attention. In contrast, when a learning frame is coupled with a performance goal, the learning frame, being less potent than the goal, is not strong enough to create a competing endstate. Instead, coupling a learning frame with a performance consequence creates a "temporary higher level overlap" that provides a coherent means-ends pathway where learning is a step toward achieving the performance consequence. Based on this theoretical rationale, we expected an asymmetrical effect such that the latter incongruent combination would be better than the former one.

Our results provided some evidence that a learning frame combined with performance goals has a more positive effect on cognitive self-regulatory processes than a performance frame combined with learning goals. Specifically, trainees who received a learning frame with performance goals had more focused cognitive effort. This finding is consistent with our earlier observation that a learning goal frame coupled with specific performance goals provides more specific standards for evaluation of one's progress and, therefore, yields more focused cognitive effort. On the other hand, one downside of this coupling is that it leads to a less exploratory practice focus. This finding is consistent with Manderlink and Harackiewicz (1984) who indicted that as the controlling features of goals become more salient there is a reduction in intrinsic motivation, which has been positively linked to task exploration (Wood, Kakebeeke, Debowski, & Frese, 2000). However, while our results provide insight into how different combinations of frame and goals may influence various self-regulatory mechanisms, clear evidence did not emerge for the utility of one type of incongruence over the other for influencing trainees' self-regulation. Below we discuss the need for future research to further disentangle this issue.

Goal proximity. Although some research has supported the benefits of providing individuals with proximal relative to distal goals, as noted earlier, most of this research has been conducted using difficult and specific performance goals. Thus, we examined whether the effects of providing learning and performance goals is dependent on whether those goals are proximal or distal. Our results revealed that distal learning goals were generally more effective than proximal learning goals. This finding suggests that proximal learning goals may detract from the positive effects that a learning focus has on trainees' affective and cognitive self-regulatory processes. However, we did not find evidence that proximal performance goals either enhanced or detracted from trainees' self-regulatory activities. It may be that given the nature of the current task (complex/dynamic environment, performance driven by strategies) performance goals were less effective regardless of whether they were proximal or distal.

Effects of self-regulatory processes. A final issue examined in this study concerned the relationship between trainees' self-regulatory activities and their learning and performance. All of the self-regulatory processes emerged as important predictors of the training outcomes, which is consistent with prior work. However, several patterns emerged from these data that are interesting and worth noting. It appears that the affective self-regulatory processes, self-efficacy and negative affect, were significant predictors of trainees' basic knowledge and performance, but did not impact the more strategic outcomes. One explanation for this finding is that these affective processes primarily influence trainees' motivation, or the quantity of effort devoted to learning the task. Learning the strategic elements of a task requires a qualitatively different learning process and effort alone is not sufficient to achieve high levels of strategic knowledge and performance. The cognitive self-regulatory processes, such as self-evaluation activity and practice focus, appear to be key to developing strategic knowledge and skills. These findings are consistent with the recent work of Seijts et al. (2004), who found that when the goal of training is the development of task strategies necessary to perform novel or complex tasks then the focus of training design needs to be on influencing the learning process, not simply enhancing trainee motivation. In addition, our findings demonstrate that even in complex task domains individuals must often learn a number of both basic and strategic skills and this focus on both types of outcomes allows one to more fully understand the role of different self-regulatory processes in learning.

Training Design Implications

The findings highlighted above have several important implications for the design of future interventions aimed at influencing trainees' self-regulatory processes. First, it appears that if one had to choose only one of the three approaches examined in this study, the greatest impact would be achieved by manipulating the content of trainees' goals. Learning frame also had beneficial effects, particularly in combination with learning goals, whereas the appropriate utilization of goal proximity is more complex. Clearly, the combination of training components into an effective intervention design necessitates careful theoretical guidance (Kozlowski, Toney et al., 2001). Second, our findings support recent research that suggests that providing a goal frame and content focused on learning rather than performance is beneficial for trainees' self-regulatory activity (Kozlowski, Gully et al., 2001; Seijts et al. 2004). It is important to recognize, however, a learning focus may not be optimal in every training situation. The learning situation in this study possessed many of the attributes (e.g., complex and dynamic task) that have been shown to characterize an environment conducive for a focus on learning rather than performance. One may argue that as the jobs people need to perform become increasingly complex and dynamic, such learning situations are more the norm than the exception. Third, our results support the importance of adopting a systems perspective when designing training. For example, our results suggest that if training designers focus on providing learning goals but inadvertently create a performance frame (or vice versa), some of the positive benefits of learning goals may be lost. Similarly, providing learning goals in a proximal versus a distal fashion may detract from the benefits of the learning focus. In addition to highlighting these issues of internal fit, a systems perspective focuses attention on the importance of the broader organizational context. An organization may, for example, inadvertently create a particular training frame through information they communicate to trainees about the purpose of training or through the process they use to determine training assignments (Martocchio, 1992; Quiñones, 1997). Future research is needed to identify not only other training design elements but also contextual factors that play a role in orienting trainees toward learning or performance.

Boundary Conditions and Limitations

This research possesses boundary conditions and limitations that should be noted. The synthetic task used in this research is based on a cognitive task analysis of a real world task

(Dwyer et al., 1992). It also possesses psychological fidelity in that key psychological constructs and processes relevant to self-regulation are central to task learning and performance for the simulation (Kozlowski & DeShon, 2004). In addition, the instructional paradigm utilized in the current study enabled us to conduct a detailed and rigorous decomposition of the effects of the different training design factors and was appropriate for our theoretical focus on disentangling the achievement orientation and goal setting domains. However, the use of a student population with the synthetic task limits the generalizability of our findings to other trainee populations, tasks, and learning situations. It is important for future research to extend these findings to other populations and instructional situations. A second and related boundary condition concerns our focus on learning in a rather complex and dynamic task domain. We do not expect that our findings would generalize to tasks where performance is determined primarily by effort and persistence. Yet, we believe that the complexity and dynamic nature of the task utilized in this study is representative of type of tasks employees' are increasingly being faced with in today's work place. In addition, our focus on the acquisition of both basic and strategic skills provides some insight into how our results may translate across different task domains. Third, while the overall effects of our goal manipulations and the effects of the congruent combinations were comparable to those reported in previous research (e.g., Kozlowski, Gully, et al., 2001; Seijts et al., 2004), our effort to disentangle different goal-related mechanisms yielded, in some instances, subtle effects. In particular, smaller effect sizes emerged when examining *incongruent* combinations of goal elements, as the synergies that emerge from a congruent, integrated training intervention are lost in these instances. On the other hand, it is quite likely that training inadvertently incorporates incongruent combinations of goal frames (e.g., instructor or situational cues) and goal content (e.g., instructional goals) with some frequency. Thus, research should focus further attention on how to leverage synergies among the elements to maximize the potency of goal-related training interventions.

Extensions and Future Research Directions

This study has provided another step toward a much needed integration and elaboration of the achievement orientation and goal setting approaches to training design. In general, we would conclude that the Heckhausen and Kuhl hierarchy provided a useful theoretical foundation for disentangling common and distinctive effects driven by the different approaches,

although there are still some issues that necessitate further disentangling. Thus, this examination has not only provided valuable insight on several important issues but has also highlighted the need for future research in this area. One unresolved issue involves the utility of one type of frame-goal incongruence over the other for influencing trainees' self-regulation. A second issue involves identifying the conditions that determine whether goal proximity is beneficial or detrimental for self-regulation. In both cases, there appears to be a trade-off between enhancing the cognitive focus of self-regulation relative to inhibiting an exploratory orientation. We suspect that the crux of the issue may hinge on task complexity. For example, in simpler tasks where effective task strategies are more surface level, one would expect that better cognitive focus and evaluation would be desirable (e.g., Seijts & Latham, 2001). In contrast, for tasks that contain embedded strategies and necessitate deeper levels of comprehension, learning is likely to be enhanced by an exploratory focus that allows the learner to discover the task through varied experiences. This possibility should be addressed in future research that manipulates surface and deep structure task complexity. We are hopeful that future research that builds on the current study by examining these and other issues will contribute to a theory of active, self-regulated learning and a science of learner centered design to help guide the design of future training interventions to meet the learning needs of today's organizations.

Author Notes

Endnotes

[1] The self-report of practice plans was coded by both Bradford S. Bell and an assistant. Bell provided the assistant with a written coding guide, explained the coding system, and trained the assistant on a random sample of questionnaires until the assistant appeared proficient with the coding scheme. Next, they independently scored a random sample of 59 questionnaires (10.8% of the total sample) to assess interrater reliability. Interrater reliabilities were, on average, .91 for first session and .92 for the third session (intraclass correlation coefficient – ICC [3,2] - for averaging the scores). Any disagreements in ratings were resolved through discussion. The remaining questionnaires were then equally and randomly split between Bell and the assistant for coding.

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Table 1

Means, Standard Deviations, and Intercorrelations

Variable	M	SD	1	2	3	4	5	6
1. Goal frame	0.48	0.50	--					
2. Goal content	0.50	0.50	.02	--				
3. Goal proximity	0.50	0.50	-.04	-.04	--			
4. Cognitive ability	0.55	0.76	.03	.04	-.04	--		
5. Learning orientation	3.81	0.55	.07	.03	.01	.04	--	
6. Performance-prove orient.	3.30	0.81	-.08	.02	-.07	.08	.09*	--
7. Performance-avoid orient.	2.66	0.78	-.07	-.02	-.04	.00	-.26**	.38**
8. Self-efficacy	3.54	0.74	.08	.10*	-.05	.23**	.37**	.09*
9. Negative affect	2.56	0.80	-.13**	-.14**	.14**	-.23**	-.02	.12**
10. Off-task thoughts	1.93	0.65	-.01	-.02	.05	-.18**	-.20**	-.05
11. Cognitive focus	282.29	76.36	.07	-.06	.09*	.04	.00	-.01
12. Self-evaluation activity	236.13	69.26	.15**	.03	.04	.09*	.03	.01
13. Practice focus	2.42	0.49	.05	.28**	-.10*	.14**	.08	.07
14. Basic knowledge	10.97	2.23	-.04	-.04	-.08	.36**	.11*	.04
15. Strategic knowledge	7.90	2.93	.00	.07	.06	.47**	.03	.03
16. Basic performance	0.00	1.00	-.07	-.09*	.04	.43**	.01	.04
17. Strategic performance	0.00	1.00	.02	.02	.04	.31**	.06	.03

Note: Process variables reported in this table are overall measures created by collapsing early training and late training assessments.

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at 0.01 level (2-tailed).

Table 1 (cont.)

Means, Standard Deviations, and Intercorrelations

Variable	7	8	9	10	11	12	13	14
1. Goal frame								
2. Goal content								
3. Goal proximity								
4. Cognitive ability								
5. Learning orientation								
6. Performance-prove orient.								
7. Performance-avoid orient.	--							
8. Self-efficacy	-.16**	--						
9. Negative affect	.21**	-.54**	--					
10. Off-task thoughts	.11*	-.43**	.42**	--				
11. Cognitive focus	-.03	.00	-.02	-.09*	--			
12. Self-evaluation activity	.01	.07	-.07	-.19**	.26**	--		
13. Practice focus	-.05	.16**	-.17**	-.19**	.03	.14**	--	
14. Basic knowledge	-.03	.37**	-.34**	-.35**	.20**	.22**	.19**	--
15. Strategic knowledge	.06	.22**	-.23**	-.27**	.21**	.25**	.19**	.39**
16. Basic performance	.01	.41**	-.39**	-.34**	.13**	.22**	.12**	.63**
17. Strategic performance	.01	.21**	-.20**	-.19**	.12**	.17**	.16**	.23**

Table 1 (cont.)

Means, Standard Deviations, and Intercorrelations

Variable	15	16	17
1. Goal frame			
2. Goal content			
3. Goal proximity			
4. Cognitive ability			
5. Learning orientation			
6. Performance-prove orient.			
7. Performance-avoid orient.			
8. Self-efficacy			
9. Negative affect			
10. Off-task thoughts			
11. Cognitive focus			
12. Self-evaluation activity			
13. Practice focus			
14. Basic knowledge			
15. Strategic knowledge	--		
16. Basic performance	.39**	--	
17. Strategic performance	.47**	.28**	--

Table 2

Cell Means for the Effects of Goal Frame, Goal Content, and Goal Proximity on the Self-Regulatory Processes

| | Learning Frame | | | | Performance Frame | | | |
| | Learning Goals | | Performance Goals | | Learning Goals | | Performance Goals | |
Variable	Proximal	Distal	Proximal	Distal	Proximal	Distal	Proximal	Distal
Self-efficacy	3.47	3.81	3.61	3.51	3.66	3.51	3.33	3.46
Negative Affect	2.50	2.18	2.68	2.47	2.58	2.51	2.87	2.62
Off-task thoughts	2.08	1.75	1.92	1.97	1.92	1.94	1.96	1.94
Cognitive focus	296.94	272.85	291.24	291.66	278.13	264.89	291.64	271.75
Self-evaluation activity	251.38	243.81	239.38	251.76	238.81	219.73	228.26	219.27
Practice Focus	2.59	2.55	2.26	2.37	2.47	2.62	2.20	2.31

Table 3

Between-Subjects Effects for RM-MANCOVA for Self-Regulatory Processes

Source	F	η^2	p
Cognitive Ability	7.34**	.08	.00
Trait Learning Orientation	17.99**	.17	.00
Trait Performance-Prove Orient.	2.55*	.03	.02
Trait Performance-Avoid Orient.	3.28**	.04	.00
Goal Frame	3.51**	.04	.00
Goal Content	9.38**	.10	.00
Goal Proximity	3.61**	.04	.00
Frame x Content	0.21	.00	.97
Frame x Proximity	1.05	.01	.39
Content x Proximity	1.06	.01	.39
Frame x Content x Proximity	2.12*	.02	.05

Note: Df (6, 525). Dependent variables include affective and cognitive self-regulatory processes: self-efficacy, negative affect, off-task thoughts, cognitive focus, self-evaluation activity, and practice focus. ** p < .01. * p < .05.

Table 4

Summary of Planned Contrasts

Hypothesis	Conditions Contrasted	Summary of Results
Hypothesis 4a: Congruent learning goal frames and content will have more positive effects on self-regulatory processes relative to congruent performance goal frames and content.	Learning Frame x Learning Goals vs. Performance Frame x Performance Goals[1]	- Congruent learning conditions produced higher self-efficacy, less negative affect, greater self-evaluation activity, and more exploratory practice focus.
Hypothesis 4b: Congruent learning goal frame and content will have more positive effects on self-regulatory processes relative to inconsistent combinations of goal frame and content.	Learning Frame x Learning Goals vs. Learning Frame x Performance Goals/ Performance Frame x Learning Goals[1]	- Congruent learning conditions led to less negative affect and a more exploratory practice focus.
Hypothesis 4c: Congruent performance goal frame and content will have more negative effects on self-regulatory processes relative to inconsistent combinations of goal frame and content.	Performance Frame x Performance Goals vs. Learning Frame x Performance Goals/ Performance Frame x Learning Goals[1]	- Congruent performance conditions yielded lower self-efficacy, higher negative affect, and a less exploratory practice focus.
Hypothesis 4d: A learning goal frame coupled with performance goal content will have greater positive effects on self-regulatory processes relative to a performance goal frame coupled with learning goal content.	Learning Frame x Performance Goals vs. Performance Frame x Learning Goals[1]	- Learning frame x performance goal produced more focused cognitive effort. - Performance frame x learning goal yielded a more exploratory practice focus.[2]

Notes: [1] The contrast was examined across both proximal and distal goal conditions. [2] The finding was contrary to expectations.

Table 4 (cont.)

<u>Summary of Planned Contrasts</u>

Hypothesis	*Conditions Contrasted*	*Summary of Results*
Hypothesis 5: Distal, congruent learning goal frames and content will have greater positive effects on self-regulatory processes relative to proximal, congruent learning goal frames and content.	Learning Frame x Distal Learning Goals vs. Learning Frame x Proximal Learning Goals	- Distal, congruent learning conditions resulted in higher levels of self-efficacy, less negative affect, fewer off-task thoughts.
Hypothesis 6: Proximal, congruent performance goal frames and content will have greater positive effects on self-regulatory processes relative to distal, congruent performance goal frames and content.	Performance Frame x Proximal, Performance Goals vs. Performance Frame x Distal, Performance Goals	- There were no significant differences between proximal and distal performance goals on the affective or cognitive self-regulatory processes.
Hypothesis 7: Distal, congruent learning goal frame and content will have greater positive effects on self-regulatory processes relative to sequenced, congruent performance goal frames and content.	Learning Frame x Distal, Learning Goals vs. Performance Frame x Proximal, Performance Goals	- The learning configuration produced higher levels of self-efficacy, lower levels of negative affect, and more exploratory practice focus.

Table 5

Hierarchical Regression Results: Self-Regulatory Processes Predicting Knowledge and Performance

Predictor/Step	β	CI	R^2	ΔR^2
DV: Basic Knowledge				
1. Control variables			.15**	.15**
2. Self-efficacy	.18**	(.27, .84)		
Negative affect	-.14**	(-.65, -.13)		
Off-task thoughts	-.11**	(-.68, -.11)		
Cognitive focus	.15**	(.00, .01)		
Self-evaluation activity	.13**	(.00, .01)		
Practice focus	.10*	(.09, .78)	.34** [a]	.18**
DV: Strategic Knowledge				
1. Control variables			.24**	.24**
2. Self-efficacy	.06	(-.15, .61)		
Negative affect	-.07	(-.59, .10)		
Off-task thoughts	-.11*	(-.86, -.11)		
Cognitive focus	.15**	(.00, .01)		
Self-evaluation activity	.14**	(.00, .01)		
Practice focus	.08*	(.05, .95)	.34**	.10**
DV: Basic Performance				
1. Control variables			.21**	.21**
2. Self-efficacy	.26**	(.23, .47)		
Negative affect	-.19**	(-.35, -.13)		
Off-task thoughts	-.08*	(-.24, .00)		
Cognitive focus	.06	(.00, .00)		
Self-evaluation activity	.15**	(.00, .00)		
Practice focus	.04	(-.07, .23)	.41**[a]	.21**
DV: Strategic Performance				
1. Control variables			.10**	.10**
2. Self-efficacy	.07	(-.05, .24)		
Negative affect	-.10	(-.25, .01)		
Off-task thoughts	-.04	(-.21, .08)		
Cognitive focus	.07	(.00, .00)		
Self-evaluation activity	.10*	(.00, .00)		
Practice focus	.10*	(.03, .37)	.16**	.06**

Note: DV = dependent variable. Control variables include cognitive ability, the three dimensions of trait goal orientation, and the three training manipulations. The numbers in parentheses are the lower and upper bounds, respectively, for the 95% confidence intervals.
[a] R^2 values do not add to 100 due to rounding of values. * $p < .05$. ** $p < .01$.

Figure 1. Conceptual integration of achievement orientation and goal setting elements withinHeckhausen and Kuhl's (1985) goal hierarchy (hi = high, lo = low).