The Effects of Learning Goal Difficulty Level and Cognitive Ability on Performance

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The relationship between the difficulty level of a learning goal and a person’s (N = 146) performance on a task that required the acquisition of knowledge to perform effectively was examined. Multiple hierarchical regression analysis revealed that the higher the learning goal, the higher the person’s performance. Cognitive ability and goal commitment also positively affected performance. The results showed that the person’s cognitive ability moderated the learning goal–performance relationship.

Contrary to previous research findings on performance goals for tasks that are straightforward for people, the performance of individuals lower in cognitive ability was more positively affected by the setting of a difficult learning goal than was the case for people higher in cognitive ability.

Keywords: learning goal, cognitive ability, performance

A core premise of Locke and Latham’s (1990, 2002) goal-setting theory is that, given goal commitment, there is a linear relationship between the difficulty level of a goal and a person’s subsequent task performance. Commitment is the sine qua non for goal setting. As Locke and Latham (1990) stressed, a person who is not committed to a goal by definition does not have one.

More than 1,000 studies have shown that when people have the ability to perform a task, and the task only requires the choice to exert effort and to persist until it is accomplished, the setting of and commitment to a specific high goal leads to higher performance than a vague goal such as an exhortation to “do your best” (Mitchell & Daniels, 2003). On a task that is objectively complex in terms of number of components and the dynamic relationship amongst them (Wood, 1986; Wood, Mento, & Locke, 1987), a fourth moderator of the goal–performance relationship, in addition to choice, effort, and persistence, is strategy development (Locke, Shaw, Saari, & Latham, 1981). People draw on their “repertoire of knowledge and experience from which to develop a suitable plan” (Locke & Latham, 1990, p. 96). For example, drivers developed ways to assess the weight of their respective logging trucks so as to attain a specific high goal for their performance (Latham & Baldes, 1975). They also used their two-way radios to coordinate with one another so that there was always a truck available when the timber was ready to be loaded (Latham & Saari, 1982). People with a specific high goal for their test score started to write notes in their margins (Terborg & Miller, 1978). People who were trying to lose weight chose low calorie foods and refused second helpings in order to attain a specific difficult goal for losing weight (Bandura & Simon, 1977). In each of these studies, the participants already possessed the requisite knowledge for developing an effective strategy or plan for attaining their respective goals. Goal attainment only required choice, effort, persistence, and reliance on knowledge the person already possessed. This was not the case for participants in Kanfer and Ackerman’s (1989) and Mone and Shalley’s (1995) experiments.

When people are in the declarative stage of learning, Kanfer and Ackerman (1989) found that urging them to do their best resulted in higher performance than assigning them a specific high goal to attain regarding their performance. In their review of this study, Locke and Latham (1990) made three observations. First, the “subjects had to learn the best strategy to use” (p. 105). Second, because the Air Force trainees had no prior experience or training at the air traffic control task, they had no proven strategies or problem solving processes to fall back on. Third, those participants with a specific high goal for their performance likely felt pressure to perform effectively immediately. They were not informed that they should take the time to learn the task before focussing on performing well. Thus, people with a specific high goal, relative to those who were urged to do their best, “may have had tunnel vision, focussing more on the desire to get immediate results rather than learning the best way of performing the task” (Locke & Latham, 1990, p. 105).

Mone and Shalley (1995) replicated Kanfer and Ackerman’s findings. Using a human resources staffing task that required the acquisition of knowledge before it could be performed effectively, they too found that a specific high goal had a detrimental effect on performance relative to urging people to do their best. Contrary to their expectations, Mone and Shalley also found that multiple performance trials over a three-day period did not lead to the acquisition of the knowledge necessary to perform the task when people were committed to attaining a specific high goal for improving their performance. In fact, the deleterious effect on performance increased over the three-day period as a result of having a specific high goal. The very opposite was true of the three day performance of those who were simply urged to do their best. The mediating variable that explained these findings was strategy. Those with a...
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specific high goal to attain regarding their performance appeared
to mindlessly switch strategies relative to their counterparts who
had been urged to do their best. Those in the latter condition
appeared to search systematically for one or more effective strat-
egies. Mone and Shalley concluded that the setting of a specific
high goal for performance interfered with learning the strategies
necessary for the person to perform the task effectively. A limita-
tion of goal-setting theory appeared to have been found.

Kanfer and Ackerman’s (1989) results, Locke and Latham’s
(1990) critique of them, as well as Mone and Shalley’s (1995)
findings regarding strategy search support the concept of a learn-
ing goal. Whereas a performance goal refers to the desired aim or
end of an action in terms of level of performance to be attained on
a task (Locke & Latham, 1990), a learning goal refers to learning
the requisite strategies, processes, or procedures for performing
effectively as opposed to relying on the knowledge and skill one
already possesses. A specific high-performance goal, Locke and
Latham (1990) argued, only has a beneficial effect when a person
already possesses the knowledge for developing suitable plans or
strategies for attaining it; hence, the importance of studying the
concept of learning goals when this is not the case. Latham and his
colleagues speculated that a specific high-learning goal only has a
beneficial effect when the requisite knowledge for performing
effectively is not known to the individual.

Following Locke and Latham’s (1990) explanation of Kanfer
and Ackerman’s (1989) results, Winters and Latham (1996) asked
two questions. The first was based on goal-setting theory: Does a
learning goal, as does a performance goal, have a positive effect on
subsequent task performance? The second question was based on
a moderator variable explicated in the theory, namely, ability.
Does the type of task, where the person has/has not the requisite
ability to perform it, moderate the effect of a learning versus a
performance goal? They found that when people were informed of
the correct ways to schedule classes for a university, a specific
high-performance goal led to higher performance than either urg-
ing people to do their best, or assigning them a specific high-
learning goal. When people were not informed how to perform this
task, Winters and Latham replicated the results obtained by both
Kanfer and Ackerman (1989) and Mone and Shalley (1995).
Urging people to do their best led to higher performance than the
setting of a specific high-performance goal. However, Winters and
Latham also found that the assignment of a specific high-learning
gold for the acquisition of knowledge led to higher performance
than a specific high goal for performance, or the exhortation to do
one’s best. In short, a learning goal, as does a performance goal,
have a positive effect on performance. But, the former is true only
when people have yet to acquire the knowledge to perform the task
effectively; the latter is true only when people already have the
ability to do what is required of them. These findings are consistent
with goal-setting theory regarding ability as a moderator of the
goal–performance relationship. Thus, Kanfer and Ackerman’s
(1989) finding as well as Mone and Shalley’s (1995) do not point
to a limitation of goal-setting theory. Rather, they point to the
necessity of taking into account the differential effect of two
different types of goals on performance, namely, learning versus
perfonnance. Subsequent research has been conducted to deter-
mine similarities and differences between these two types of goals.

Drach-Zahavy and Erez (2002) replicated the above findings
on a different task, namely, a simulation requiring predicting stock
values. People who were given a learning goal regarding strategies
to be discovered/learned had significantly higher performance than
those who either had a specific high-performance goal or who
were urged to do their best. Similarly, Kozlowski and Bell (2006)
found that on a radar-tracking task where participants had yet to
learn how to perform it, a learning goal led to higher performance
than a performance goal.

In a field experiment, Latham and Brown (2006) found that first
year MBA students who set a specific high-learning goal regarding
learning ways to make their education more meaningful to them
had a significantly higher grade point average at the end of the
academic year than those who set a specific high distal perform-
ance goal or were urged by the dean to do their best to obtain a
meaningful education. Furthermore, their satisfaction with the
MBA programme was significantly higher than it was in those
other two conditions.

In summary, both labouratory and field experiments have shown
that setting a learning goal has a differential effect on performance
relative to setting a performance goal. Both types of goals are
mediated by task strategies but in different ways. Performance
goals are mediated by knowledge/skill the individual already pos-
sesses when initially performing a task. Learning goals are medi-
ated by knowledge/skill the person has yet to acquire when ini-
tially performing a task. Hence both are moderated by ability, but
in different ways. A specific high-performance goal should be set
only when a person already has the ability to attain it. A specific
high-learning goal should be set only when the person lacks the
requisite ability to perform the task.

Only seven experiments, to the authors’ knowledge, have been
carried out in the effect of a specific high-learning goal on task
performance (Kaplan, Erez, & Van Dijk, 2004; Kozlowski & Bell,
2006; Latham & Brown, 2006; Noel & Latham, 2006; Seijts &
Latham, 2001; Seijts, Latham, Tasa, & Latham, 2004; Winters &
Latham, 1996). In each of those seven experiments, the assumption
of a relationship between goal difficulty level and subsequent
performance was assumed. This assumption, however, has yet to
be empirically tested. The purpose of the present study was to
address two questions central to goal-setting theory. First, is level
of difficulty a property of a learning goal that affects a person’s
performance? Second, if the answer is yes, does cognitive ability
moderate this relationship? For example, it would seem logical that
individuals higher in cognitive ability might be better able to direct
their attention to task knowledge acquisition than people with
lower cognitive ability. However, as is discussed below, an oppo-
site argument can also be made; hence, the need for empirical
research to find the answer.

Goal Difficulty

Goal setting theory asserts that there is a linear relationship
between the degree of goal difficulty and performance. The linear
relationship levels off only when individuals reach the limits of
their ability. This assertion has been supported in literally hundreds
of empirical laboratory and field studies of specific high-perform-
ance goals (Latham, 2007; Latham & Locke, 2007; Locke &
Latham, 2002).

Learning goals are typically set in terms of a specific number of
task-relevant strategies to be learned for successful completion of
a task. Thus, the first hypothesis of this experiment was as follows:
Hypothesis 1: There is a positive relationship between the difficulty level of a learning goal and the person’s performance on a task that requires the acquisition of knowledge.

The rationale for this hypothesis is that, consistent with goal-setting theory, a more difficult learning goal leads to greater cognitive effort to acquire task-relevant strategies than an easier goal, given that the individual is committed to goal attainment. Learning appropriate strategies, processes, or procedures increases a person’s performance as opposed to sheer effort and persistence alone when a person lacks the requisite knowledge to perform effectively. This finding, although not tested in the seven previous experiments on learning goals, can be inferred from them. Nevertheless, the counterargument can be made that a focus on learning processes or procedures for performing effectively in those experiments is not qualitatively the same as a focus on attaining a specific performance level as is required in the vast majority of goal-setting studies. Thus, it is possible that a learning goal operates differently from a performance goal, and hence it may not have the same moderating variables.

Cognitive Ability

In his review of the literature, Vroom (1964) concluded that when a person’s motivation is high, the role that ability plays on performance is also high. That is, people with high ability likely show a proportionately greater improvement in their performance from an increase in motivation than do those individuals with low ability. Subsequent research on goal setting supported this conclusion. Specifically, Locke (1965) found that goal setting has a greater effect on the performance of people with high as opposed to low ability. This is because the more challenging the goal, the more free rein people have to perform in accordance with their skills, and thus the higher the association between one’s ability and performance (Locke, 1982). Locke’s findings, however, were based on tasks where people already possessed the knowledge to perform well. Ability was defined in terms of a median split on level of performance on the initial practise trial. Cognitive ability was not assessed.

On a task where a person lacks the requisite knowledge, performance is primarily a function of learning task-relevant strategies (Latham, 2007; Locke, 2000). As discussed earlier, the assignment of a challenging learning goal has been shown to have a positive effect on the acquisition of task-relevant knowledge and hence subsequent performance. A moderating variable is likely to be an individual’s cognitive ability.

As Sejts and Latham (2005) explained, the purpose of a learning goal is to stimulate one’s intellect, to engage in discovery, to acquire knowledge and integrate it with prior information, and to “think outside the box.” Commitment to a challenging performance goal, on the other hand, results in the choice to exert effort and to persist until a desired level of performance is attained. The performance goal cues people to use the knowledge, skill and ability one already possesses (Locke & Latham, 1990). Commitment to a challenging learning goal leads to the choice to systematically learn new ideas. The resulting behaviour is to execute a specific number of newly acquired ideas in order to test newly formed hypotheses (Sejts & Latham, 2005). The resulting behaviour of a person who commits to a difficult performance goal is to focus on ways to quickly implement knowledge and skills that have already been acquired in order to perform effectively (Locke & Latham, 1990).

Cognitive ability or intelligence has been shown consistently to predict learning and performance on tasks where people lack the knowledge to perform effectively (Ackerman, Kanfer, & Goff, 1995; Hunter, 1986; Ree & Earles, 1991). As noted earlier, on a task where cognitive mastery had yet to take place, Kanfer and Ackerman (1989) found that following the declarative stage of learning, the beneficial effects of setting a specific, high-performance goal “are most likely to accrue to low-ability rather than to high-ability persons” (p. 687). This is because such tasks are more demanding for people with low rather than high cognitive ability. Once initial learning has occurred, attentional demands go down, and the positive effects of goal setting should prove to be especially beneficial for low ability individuals. Higher cognitive ability people in the same learning situation, they said, may not get the same “boost” from goal setting because goal setting from the outset has already heightened effort allocation. People with relatively low cognitive ability, who now exert a great deal of effort, have more room to improve their performance than their high ability counterparts who are already exerting a great deal of effort. Thus, there can be a “ceiling effect” for individuals with higher cognitive ability when a specific high-performance goal is set. Kanfer and Ackerman’s finding has yet to be tested with regard to setting a learning goal.

The present study is a constructive replication of Kanfer and Ackerman’s finding regarding cognitive ability as a moderator of the goal–performance relationship. As Barrick, Bradley, Kristof-Brown, and Colbert (2007) stated, a constructive replication is a study that assesses the same relationships amongst the same constructs investigated in an earlier study, but varies the operationalization of those constructs. In the present study, a learning rather than a performance goal was assessed with regard to the moderating effect of cognitive ability as opposed to physical skill. In addition, the goal difficulty–performance relationship, which is a core premise of goal-setting theory, was investigated with regard to a learning rather than a performance goal. As Eden (2002) has noted, replications that are different from previous studies are required for advancing theory.

Individuals who commit to a high-learning goal must engage in effortful cognitive processes during the declarative stage of learning where the acquisition of knowledge/strategy is needed, but has yet to take place. Individuals with lower cognitive ability may benefit more from the assignment of a more difficult than less difficult learning goal than do those with higher cognitive ability. This is because, as noted earlier, people with high cognitive ability may not derive the same benefit from an emphasis on discovering ways to master the task when a learning goal is given to them. They likely do so automatically and hence do not need to be instructed to do so. Thus, there should be an interaction effect between a learning goal and cognitive ability, such that a higher learning goal is more effective than a lower learning goal for individuals with lower rather than higher cognitive ability. Therefore, the second hypothesis tested in this experiment, contrary to Vroom’s (1964) conclusion from his review of the literature and Locke’s (1965) finding regarding setting a performance goal, was as follows:
Hypothesis 2: The difficulty level of an assigned learning goal has a greater effect on the performance of individuals with lower cognitive ability than it does on the performance of individuals with higher cognitive ability.

Method

Sample and Design

Eighty-three female and 63 male students, whose mean age was 18.66 years ($SD = 2.21$), participated in the study. The participants were first or second year university students who were enrolled in the prebusiness programme at a large Canadian university. All participants received course credit for their participation. The 146 participants were randomly assigned to one of two goal conditions: a low-learning goal or a high-learning goal. Each condition contained 73 participants.

Experimental Task

The participants were required to produce unique class schedules comprised of five nonredundant university classes. The task was divided into three 8-min trials. Previous research indicated that three 8-min trials is a sufficient time-span for acquiring the knowledge to complete class schedules correctly (Seijts & Latham, 2001; Winters & Latham, 1996).

The instructions provided six rules for producing class schedules. The rules are as follows: (1) each schedule indicates the course name, its code, meeting times, and section; (2) each schedule must have five different classes scheduled on the same day; (3) each schedule must be unique, that is, it cannot duplicate another class schedule; (4) any course with a quiz section must have the quiz section scheduled on the same day as the class; (5) no two marketing courses can be scheduled within one hour of each other; and (6) any speech communication lecture class must have a laboratory class scheduled as well.

This task was used for three reasons. First, it meets the criterion for complexity set forth by Wood (1986). That is, performance on the task is not increased solely through effort or persistence. Effective task performance requires learning effective task strategies. Second, previous studies indicate that individuals perceive this task as complex for them (Earley, 1985; Seijts & Latham, 2001; Winters & Latham, 1996). Third, scheduling is an organizationally relevant task (e.g., railways, trucks, inventory scheduling of supplies, etc.). Using organizationally relevant tasks in laboratory studies enhances the generalizability of findings from laboratory simulations to field settings (Latham, 2007; Latham & Lee, 1986).

Procedure

Each participant received a package that included an explanation of the task requirements, a class schedule list, blank schedules, and a series of questionnaires (see Measures). Participants were informed that the computer broke down, and that “the Office of the Registrar has requested you to complete class schedules.”

Consistent with recommendations by Locke and Latham (1990), participants were given a 4-min pretest prior to the manipulation of the independent variables so that the person’s current ability could be used as a control variable in the analyses of performance. Participants were encouraged to “schedule as many classes as possible within the 4-min period.”

In developing the task, Earley (1985) created four unique, task-effective strategies for producing correct class schedules. These strategies are: (1) recording class names and times chronologically; (2) repeatedly scheduling the same subject; (3) scheduling night classes; and (4) repeatedly scheduling the same section. To the authors’ knowledge, no additional task-effective strategies exist. The learning goal was framed as the number of unique, task-relevant strategies to be identified and implemented. Some participants were thus assigned an easier learning goal (to discover and implement 1 or 2 strategies) than others, whereas others were by definition assigned a more challenging learning goal (to learn 3 or 4 strategies). Defining a learning goal in terms of number of task-relevant strategies to be discovered or learned for successful completion of the task is consistent with Locke and Latham’s (1990) goal-setting theory.

The experimental instructions were as follows: “There will be three trials of 8 minutes each. Research has shown that thinking about specific strategies to help you more quickly produce class schedules results in the production of a larger number of schedules. A pilot study of individuals with abilities similar to your own indicated that a goal of discovering and implementing 1 or 2 (vs. 3 or 4) strategies is attaineable. Research has shown that setting a specific, yet attainable goal maximises productivity. Hence, your goal for the next 24 minutes is to learn and implement 1 or 2 (vs. 3 or 4) strategies to produce class schedules.”

Measures

Perceived complexity of the task. A task can be “objectively” complex in terms of meeting the criteria put forth by Wood (1986) yet relatively straightforward for people who already have the ability to perform it effectively (e.g., playing chess, obtaining funding for a grant proposal, or making money in the stock market). A learning goal, as explained in the introduction, only has a beneficial effect on performance when a task is “subjectively” complex for an individual. Thus, perceived complexity of the task was measured. Failure to perceive the task as complex would explain why the specific high-learning goal in this study did not have a positive effect on performance. Perceived or subjective complexity of the task was measured by five 5-point Likert-type items (e.g., “Many times, I had to cheque one thing before I scheduled something else”) after the participants completed the third 8-min trial. These items were used by Winters and Latham (1996). Scale scores could range from 1 (not at all) to 5 (very much so). This measure was included in the analyses because research has shown that the extent to which individuals judge a task to be complex for them affects motivation and subsequent performance (Cervone, Jiwani, & Wood, 1991; DeShon, Brown, & Greenis, 1996).

Goal commitment. As noted in the introduction, goal commitment was measured because a person who is not committed to a goal by definition does not have one. Failure to commit to the goal would therefore provide another explanation as to why an increase in performance was not found in this study. Hence, it too was measured. Commitment to the learning goal was measured prior to each 8-min trial using five 5-point Likert-type items (e.g., “I am strongly committed to pursuing this goal”) taken from Klein, Wesson, Hollenbeck, Wright, and DeShon (2001). Scale scores could range from 1 (completely disagree) to 5 (completely agree).
The goal referred to the specific number of strategies that was assigned to the participant. Commitment to the learning goal was measured in order to determine whether the participants were in fact attempting to attain it (Locke & Latham, 1990). The three commitment scores were added to obtain an overall commitment score.

**Learning.** Learning was operationalized as the number of unique strategies learned. In developing this task, Earley (1985), as reported earlier, created four task-effective strategies for producing correct class schedules. The extent to which each of these strategies was identified and used was assessed by examining each class schedule. For example, to measure the strategy of recording class names and times chronologically, each schedule was examined to determine whether classes and times written on the schedule started with early morning classes on the first line of the schedule, and ended with late classes on the last line of the schedule. One point was given each time a particular strategy was used. The strategies of repeatedly scheduling the same subject across the completed schedules (e.g., business writing, accounting, or consumer behaviour), repeatedly scheduling the same section (e.g., using the same 10:00–10:50 a.m. Friday finance class across the completed schedules), and recording class names and times chronologically could be used only once for each schedule. In contrast, the strategy of scheduling night classes could be used only twice; from 4:00 to 5:20 p.m. and from 6:00 to 8:30 p.m. One point was given each time a night class was scheduled.

**Performance.** Performance was operationalized as the number of correct class schedules produced at the end of the 24-min period.

**Cognitive ability.** The Wonderlic Aptitude Test was used to measure cognitive ability. The Wonderlic User’s Manual reports test–retest reliability coefficients ranging from .82 to .94. The internal consistency as assessed by Kuder–Richardson KR-20 is .88. The predictive validity of the Wonderlic Aptitude Test with performance is high. For example, using meta-analytic techniques, Hunter and Hunter (1984) reported a predictive validity coefficient of .63. Participants in the present experiment completed the test at the beginning of the session, prior to reading the instructions of the class-scheduling task. Participants were given 12 minutes to respond to the 50 questions on the test.

**Results**

Table 1 shows the means and SDs, as well as the intercorrelations, of variables measured, collapsed across trials. The results of the regression analyses are shown in Table 2.

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>SE B</th>
<th>ΔR²</th>
<th>ΔF</th>
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<tr>
<td>1/2/3</td>
<td>Practice trial</td>
<td>.14/ .92/ .96</td>
<td>.18/ .18/ .25</td>
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<td>1/2/3</td>
<td>Cognitive ability</td>
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<td>.19/ .17/ .25</td>
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<td>.18/ .17/ .17</td>
<td>&lt;</td>
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<tr>
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<td>Commitment</td>
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<tr>
<td>1/2/3</td>
<td>Goal Level × Cognitive Ability</td>
<td>.17/ .17/ .17</td>
<td>.18/ .18/ .18</td>
<td>&lt;</td>
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*p < .05.

**Measures**

**Perceived complexity of the task.** The coefficient alpha for the five-item scale was .81. The mean overall score was 3.62 (SD = 0.80), indicating that the task was viewed by the participants as moderately complex. The Pearson correlation coefficient between perceived complexity of the task and overall performance was −.32 (p < .05). That is, the higher the person perceived the complexity of the task, the lower the person's performance.

**Goal commitment.** The coefficient alphas for the five-item goal commitment scale were .77, .86, and .88 for Trials 1, 2, and 3, respectively. The Pearson correlation coefficient between goal commitment and overall performance was .29 (p < .05). Thus, the higher the commitment to the learning goal, the higher the person’s performance. The reliability of commitment across the three trials was .91.

**Learning.** The first strategy, recording the classes and time in chronological order, was used by 99% of the participants. The second strategy, repeatedly scheduling the same subject, was implemented by 98% of the participants. The third strategy, scheduling night classes, was implemented by 73% of the participants.

Table 1

*Descriptive Statistics and Correlations Among Variables Measured*

<table>
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<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>1. Cognitive ability</td>
<td>24.14</td>
<td>4.63</td>
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<td>2. Goal commitment</td>
<td>03.40</td>
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<td>−.01</td>
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<td>3. Goal level</td>
<td>00.50</td>
<td>0.50</td>
<td>−.02</td>
<td>−.01</td>
<td>1.00</td>
<td></td>
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<tr>
<td>4. Task complexity</td>
<td>03.62</td>
<td>0.80</td>
<td>−.10</td>
<td>−.12</td>
<td>.11</td>
<td>1.00</td>
<td></td>
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<td>5. Practice trial</td>
<td>00.86</td>
<td>0.33</td>
<td>.23**</td>
<td>.17**</td>
<td>.25**</td>
<td>−.03</td>
<td>1.00</td>
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<td>6. Strategies learned</td>
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<td>0.66</td>
<td>.15†</td>
<td>.10</td>
<td>.20†</td>
<td>−.08</td>
<td>.25***</td>
<td>1.00</td>
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<tr>
<td>7. Performance</td>
<td>08.87</td>
<td>2.65</td>
<td>.40***</td>
<td>.29***</td>
<td>.20†</td>
<td>−.32***</td>
<td>.50***</td>
<td>.36***</td>
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*Note.* N ranges from 141 to 146. Goal level ranges from 0 = “low-learning goal” to 1 = “high-learning goal.”

†p = .06. **p ≤ .05. ***p ≤ .01. ****p ≤ .001.
And finally, the fourth strategy, repeatedly scheduling the same class section was used by only 70% of the participants. Thus, not everyone learned the latter two strategies. This is further evidence that the task was relatively complex in that 27% and 30% of the participants failed to discover the third and fourth strategies, respectively. A two-tailed \( t \) test revealed that participants in the high-learning goal condition learned more unique strategies (\( M = 3.52, SD = 0.60 \)) than those in the low-learning goal condition, \( M = 3.26, SD = 0.69; t(144) = 2.43, p < .05 \). A series of paired-sample \( t \) tests also showed that the number of unique strategies identified increased over time: from 2.45 (\( SD = 0.88 \)) on Trial 1 to 2.73 (\( SD = 0.72 \)) on Trial 3; all \( p \)'s < .01. The number of unique task strategies learned by the participants during the 24-min task correlated positively with performance (\( r = .36, p < .01 \)). Once the unique strategies were identified, they could be used repeatedly in completing the schedules. The number of times the various task strategies were actually used by the participants correlated highly with performance (\( r = .88, p < .001 \)). Therefore, a strong argument can be made that number of task strategies used was another measure of performance.

**Performance.** The reliability of performance across the three trials was .85. A repeated measures analysis of covariance (ANCOVA) with goal level as a between-groups factor and trials as a within-group factor was conducted. The results showed a significant effect for trials, \( F(2, 286) = 15.15, p < .05, \eta^2 = .10 \). A post hoc analysis using the Bonferroni test showed that performance on Trial 2 (\( M = 2.96, SD = 0.98 \)) was higher than performance on Trial 1 (\( M = 2.45, SD = 0.81 \)); and performance on Trial 3 (\( M = 3.47, SD = 1.20 \)) was higher than performance on Trial 2 (all \( p \)'s < .05). These findings suggest that learning increased across trials, thus providing further evidence of the complexity of the task for the participants. The results also showed a main effect for goal level, \( F(1, 144) = 5.88, p < .05, \eta^2 = .04 \). The mean performance scores in the low and high-learning goal conditions were 8.35 (\( SD = 2.83 \)) and 9.40 (\( SD = 2.36 \)), respectively.

**Cognitive ability.** The Pearson correlation coefficient between cognitive ability, as measured by the Wonderlic Aptitude Test, and overall performance was .40 (\( p < .05 \)). Cognitive ability also correlated positively with the number of strategies identified (\( r = .15 p = .06 \)) and the actual number of strategies used (\( r = .33, p < .001 \)).

**Tests of Hypotheses**

Hypothesis 1 stated that the difficulty level of the learning goal is positively related to performance. The results, shown in Tables 1 and 2, support this hypothesis. The biserial correlation between people who were assigned a low versus a high-learning goal and performance was significant (\( r_{bis} = .20, p < .05 \)). The results for the hierarchical regression analyses show that the difficulty level of the learning goal is positively related to performance; \( B = .78, p < .05 \). Cognitive ability (\( B = 1.14, p < .05 \)) and goal commitment (\( B = .57, p < .05 \)) were also positively related to task performance.

Hypothesis 2 stated that there is a goal difficulty level \( \times \) cognitive ability interaction on performance. The results, reported in Table 2, show that the interaction is significant; \( B = -.66, p < .05 \). Consistent with the hypothesis, the multiple hierarchical regression analysis revealed that the goal difficulty level–performance relationship was stronger for participants with lower cognitive ability. That is, the individuals with lower cognitive ability benefited more from the setting of a learning goal that increased in difficulty than did individuals with higher cognitive ability.

Figure 1 shows the nature of the goal difficulty level \( \times \) cognitive ability interaction graphically. As would be expected, people with higher cognitive ability performed at higher levels than those with lower cognitive ability. Figure 1 also illustrates that the performance of participants with lower cognitive ability was more positively affected by the setting of increasingly difficult learning goals than it was for participants with higher cognitive ability; the latter group did not appear to benefit from the assignment of learning goals. Figure 1 also suggests that participants in the low cognitive ability \( \times \) low goal difficulty condition performed worse than those in the other conditions. We conducted a median split on the scores for cognitive ability and then performed a series of two-tailed \( t \) tests to explore differences in performance across the four conditions. The means and standard deviations are shown in Table 3. The performance of the participants in the low goal \( \times \) low cognitive ability condition was significantly lower than the performance of the participants in the other three conditions; there were no other significant differences.

We also explored the effects of learning goals over time. Individuals may need time to discover the strategies but once they are discovered, there should be an improvement in performance. We contrasted the results for Trial 1 versus those for Trials 2 and 3. The main effect for goal difficulty level, and the interaction effect between goal difficulty level and cognitive ability, was not significant on the initial trial. This is common in learning studies because participants have yet to acquire the knowledge necessary to perform the task effectively. The combined results for Trials 2 and 3 were similar to the data collapsed across trials. Had the task been more complex, there might have been improvement in performance in Trial 3 relative to Trial 2.

Finally, we tested for a significant interaction between goal difficulty level and goal commitment. The results showed that the interaction was not significant. This is because the variance was not sufficient to create a moderating effect. Goal commitment is typically high in laboratory experiments; in fact, considerable effort on the part of an experimenter is typically required to get variance in goal commitment (Locke & Latham, 1990).
Discussion

The findings of the present experiment have both theoretical significance for Locke and Latham’s (1990, 2002) goal-setting theory and practical significance for managers. A goal for learning is similar to a goal for performance in terms of the goal difficulty–performance level relationship. From a theoretical standpoint, this study shows that, as is the case with a goal for a specific performance outcome, a challenging high-learning goal leads to high performance when the task requires the acquisition of knowledge in order to perform it effectively.

The second major finding from this experiment is of practical as well as theoretical significance in that it is contrary to what has been found with tasks where people already have the ability to perform them. As noted in the introduction, previous research on performance goals show that goal setting typically has a beneficial effect on performance for people with higher as opposed to those with lower ability, as defined by skill (Locke, 1965). The findings from this study revealed the opposite result. A high-learning goal was more beneficial for people lower in ability, as defined by cognitive intelligence, than it was for those who scored higher on this variable. It appears that by assigning high-learning goals, people with lower cognitive ability can raise their performance levels relative to those of people with higher cognitive ability. Moreover, the findings from the present study suggest that high-learning goals have little impact on individuals who have high cognitive ability. As the results in Table 3 and Figure 1 indicate, a learning goal and cognitive ability appear to be able to compensate for one another to some degree. The performance of participants with lower cognitive ability who were assigned a high-learning goal approached the performance of participants with higher cognitive ability. Those participants with lower cognitive ability, however, who were assigned a lower learning goal performed poorly. This pattern of results suggests that for people to eventually perform well on a task where they lack the ability to do so, they must have either high cognitive ability or a high-learning goal. In the absence of further research, we can only speculate as to the reasons underlying the beneficial effect of a relatively high-learning goal for people who score relatively low on cognitive ability.

A learning goal may prompt people with lower cognitive ability to take the time to reflect on what went wrong regarding the execution of one or more strategies. It may keep them from becoming ensnared in decision-making blunders that smarter people avoid. That is, it may keep them from rushing to judgment, from acting too swiftly. A high-learning goal may prompt them to conduct an adequate search for alternative solutions to a problem. Hence, they do not settle on a single idea early in their decision making process. In short, a high-learning goal likely leads to increases in the option pool and thus increases a person’s prospects for success. People with high cognitive ability may do all of this intuitively or automatically. The search for alternatives that contain innovative solutions is important for both the intelligent and less intelligent; the benefit of a high-learning goal is that it appears to cue the less intelligent person to do so. Thus, this study provides additional evidence of ability as a moderator of goal setting.

Table 3

<table>
<thead>
<tr>
<th>Cognitive ability</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>7.83</td>
<td>9.36</td>
</tr>
<tr>
<td>SD</td>
<td>2.98</td>
<td>2.45</td>
</tr>
<tr>
<td>Learning goal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>8.79</td>
<td>9.46</td>
</tr>
<tr>
<td>SD</td>
<td>1.98</td>
<td>2.36</td>
</tr>
</tbody>
</table>

Figure 1. Graphic depiction of the Goal Difficulty Level × Cognitive Ability Interaction on performance.
effect of ability on performance, however, differs when a learning versus a performance goal is set.

Limitations and Future Research

It is unlikely that the relationship between setting a learning goal and subsequent performance will always be linear. As noted earlier, previous research has shown that the linear relationship levels off when people who have a high-performance goal reach the limits of their ability (Locke & Latham, 1990). Similarly, the relationship between the difficulty level of a learning goal and performance will likely be shown in future studies to level off when the appropriate number of effective strategies has been learned. Future research may even show that the relationship is curvilinear if people persist in their search for additional ones. Such behaviour is described colloquially as “paralysis by analysis.”

A related limitation of this study is that the range in cognitive ability scores of the university students who participated in this experiment ranged from average to high. The mean score of 24 was higher than the approximate average score of 21 for all workers in the United States (Wonderlic Personnel Test and Scholastic Level Exam User’s Manual, 2002). Thus, the present results may be indicating that learning goals benefit people who are moderately high in cognitive ability. Learning goals may have little or no benefit for people who are quite low on cognitive ability even if they are motivated to acquire the knowledge necessary to perform a give task. Conversely, the results of the present study suggest that those with high cognitive ability may not have much room to improve their performance on some tasks despite the fact a high-learning goal is set. It may be that individuals with moderate levels of cognitive ability have the greatest opportunity to improve when motivated by difficult goals. Research is needed on a sample of participants where cognitive ability ranges from low to high in order to test for linear and nonlinear effects of goal effects.

Related to these issues, the generalizability of the present findings to tasks of high complexity needs to be investigated. The present task was perceived by the participants, on average, to be moderately complex. It was likely seen by participants high in cognitive ability as relatively low in complexity. Had the task been very complex and the strategies very difficult to discover, the effect of a difficult learning goal might have been stronger for high cognitive ability participants and have had little effect on low cognitive ability participants.

Assigning a challenging learning goal for discovering a specific number of task strategies may not be functional for all tasks that require the acquisition of knowledge for a person to perform well. This is because knowledge acquisition is likely to be only one type of learning that may be necessary for performing effectively. Studies are now needed on the effect of a learning goal on the acquisition of motor skills and abilities.

The present study did not include the setting of a specific high-performance goal. The rival hypothesis that such a performance goal would have had a similar, or better, effect on performance than a learning goal can be rejected on the basis of the findings obtained by Winters and Latham (1996). As noted in the introduction, they found that a “do your best” goal led to higher performance than a specific high-performance goal, and a specific high-learning goal led to higher performance than urging partici-

pants to do their best on the same task that was used in the present study.

Field experiments are now required to test the external validity of a learning goal (e.g., discover 5 ways to significantly increase revenue) with employees where the number of available strategies is not known. On what basis should the number of strategies, processes or systems be set in such situations? On very complex tasks, the number of strategies that are necessary (e.g., ways to increase trust, or ways to prevent a hostile merger and acquisition) are not known a priori. On other tasks that require learning (e.g., how to obtain legislation favourable to a company), it may very well be that learning/discovering “the” optimal task strategy is required. In such instances, there may be a diminishing return for continuing to seek and apply additional strategies. Research is needed to address such issues.

When it is known a priori what constitutes appropriate behaviour or strategies, behavioural goals are more effective than learning goals on a person’s performance (Brown & Latham, 2002). Once one or more optimal ways have been discovered to perform a task effectively, it would appear likely that employees can be trained to implement them, and a specific high performance, rather than a learning goal can be set. The search for additional strategies might detract from performance. In sum, the appropriate timing for switching from the setting of learning to performance goals should be investigated, particularly regarding individuals with relatively low cognitive ability.

Finally, learning goals should be investigated in combination with Frese’s (2005) error-management training. Keith and Frese (2005) found that this training induces both emotion control and metacognitive activity, and that these processes enhance performance on tasks that require finding new solutions. Error management training and learning goals appear to go hand in hand in that both interventions induce discovery type activities (Latham, 2007). Moreover, Keith and Frese found that error training masks the effects of a goal orientation disposition. As noted earlier, Seijts et al. (2004) found that a specific high-learning goal masks a goal orientation disposition. Implicit in the extant research on error training may be self-set learning goals.

Conclusion

The effect size of a specific high-performance goal has been shown to be smaller on complex tasks than on ones that are straightforward for people (Wood, 1987); some studies have even shown that setting a difficult performance goal can have an adverse effect on performance on tasks that people have yet to learn how to perform effectively (Earley, Connolly, & Ekegren, 1989). The positive effects of a specific high-performance goal on such tasks are often delayed or do not occur at all (Locke & Latham, 1990; Mone & Shalley, 1995). As Locke and Latham (2005) acknowledged, the passage of time does not guarantee that people will learn how to perform a task effectively.

Seven studies have shown that a specific high-learning goal can help people acquire the knowledge they lack to improve their performance relative to immediately setting a specific high-performance goal (Seijts et al., 2004; Winters & Latham, 1996). The unique contribution of the present study to the literature is that it is the first to show that, as is the case with a specific high-performance goal, there is a positive relationship between the difficulty
Résumé

L’étude réalisée portait sur le rapport entre le niveau de difficulté d’un but d’apprentissage et le rendement d’une personne (N = 146) dans l’accomplissement réussie d’une tâche qui requiert l’acquisition de connaissances. De multiples analyses de régression hiérarchique révèlent que plus le but d’apprentissage est élevé, meilleur est le rendement de l’individu. La capacité cognitive et l’engagement à l’égard du but influencent aussi positivement sur le rendement. Les résultats révèlent que la capacité cognitive d’une personne a des répercussions sur le rapport but d’apprentissage-rendement. Contrairement aux résultats de recherches antérieures sur les objectifs de rendement pour des tâches qui sont simples pour les sujets, le rendement d’individus présentant une capacité cognitive inférieure était influencé positivement dans une plus grande mesure lorsque le but d’apprentissage était difficile que dans le cas d’individus ayant une plus grande capacité cognitive.

Mots-clés : but d’apprentissage, capacité cognitive, rendement

References


