The Reciprocal Effects of Science on Practice: Insights from the Practice and Science of Goal Setting

Presidential Address — Allocution présidentielle

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Abstract
The hypothesis of this paper is that the science and practice of psychology are interdependent. Science drives practice which drives science. The science and practice of 25 years of programmatic research on goal setting theory in industrial-organizational (I/O) psychology is used in support of this hypothesis. Scientists, practitioners, and scientist-practitioners alike are encouraged to work in unison in order to advance psychology for all.

The Smothers brothers, two comedians, have made millions of dollars from one sentence: "Mom always liked you best." People laugh in empathy recalling how as the older child, only the baby sat on mom’s knee, or as the younger child recalling that only the older child was granted special privileges. The Smothers brothers’ description of their relationship is not unlike the description one can make of the Canadian Psychological Association (CPA) in that many practitioners feel strongly that CPA exists primarily for scientists; many scientists know that CPA exists primarily for practitioners.

The hypothesis of this paper is that the science and practice of psychology are interdependent rather than a dichotomy. Scientific theories in psychology provide frameworks for practice. They facilitate the development of effective methodologies as well as provide a basis for understanding the success or failure of a predictor or an intervention (Latham & Crandall, 1991). They thus provide a basis for predicting, understanding, and influencing what people say and do. Practice provides evidence for the external validity of a scientific theory. Practice facilitates the abandonment, modification or improvement of theory through subsequent hypothesis testing in both the field and in laboratory settings. In short, practice suggests refinements to theory, and the refined theory provides an improvement in guidelines for effective practice. An illustration of this bidirectional refinement is the science and practice of goal setting theory in industrial-organizational (I/O) psychology. I/O psychology explicitly embraces the scientist-practitioner model.

GOAL SETTING THEORY
The core findings of Locke and Latham’s (1990) goal setting theory are that: (1) Specific high goals lead to higher performance than setting no goals or setting an abstract goal such as “do your best”; (2) There is a linear relationship between goal difficulty and performance. Thus the higher the goal the higher the performance; (3) Variables such as feedback, participation in decision making, and competition only affect performance to the extent that they lead to the setting of and commitment to specific high goals; (4) Three of the four mediators of the goal setting performance relationship are motivational, namely direction, effort, and persistence; the fourth is cognitive, namely, task strategies. Moderators of the effect of goals on performance are ability, commitment, feedback, task complexity, and situational constraints.

The immediate empirical origin of this theory can be found in Locke’s (1964) doctoral dissertation as well as a series of laboratory experiments that he conducted shortly thereafter (Locke, 1968). The dependent variables in his experiments included mathematical problems, making words from anagrams, as well as creating toys.

On the scientist-practitioner continuum, Locke places himself on the scientific end, although he has had a practice in clinical psychology and continues to have a consulting relationship with organizations in the public and private sector. I, on the other hand, view myself on the practitioner side of the continuum although I conduct research in both field and laboratory settings, and I hold a full-time position in an academic institution. My consulting practice is incorporated in Canada and in the United States. Locke and I have collaborated productively for 25 years. We view one another as scientists-practitioners.

PRACTICE AND SCIENCE OF GOAL SETTING
In a critical review of the literature, Heneman and Schwab (1972, p. 8) concluded that: “A noteworthy aspect of research on expectancy theory is the emphasis on investigating employees in their natural work environments, thus providing a high degree of external validity.
In the case of motivation, this is in direct contrast to research on ... goal setting theory (Locke, 1968), which has usually entailed student subjects working on laboratory tasks in experimental settings. The cost of external validity has been of course, a general inability to make causal inferences."

In the same time period as Heneman and Schwab’s favourable review of expectancy theory, the American Pulpwood Association (APA) wanted to identify the variables that differentiate the effective from the ineffective logger in the rural southern United States. I was APA’s first staff psychologist. With my mentor, Bill Ronan from Georgia Tech, and with the assistance of an individual with a PhD in forestry employed by the Georgia Kraft Company, Syd Kinne, we conducted a survey that included items on goal setting. A factor analysis revealed serendipitous findings as the survey items were based on dust-bowl empiricism rather than theory. The survey showed that items measuring goal setting and items regarding the presence of a supportive supervisor loaded on the same factor as items that measured cords per employee hour and a low injury rate. Goal setting alone, that is, in the absence of a supportive supervisor, loaded on a second factor that included measures of voluntary turnover. The third factor was defined by measures of supervisory supportiveness and mechanization, but no goal setting. None of these behaviours correlated with any performance criterion. The recommendations for practice formulated on the basis of that survey (Ronan, Latham, & Kinne, 1973) were greeted with skepticism because the industry sponsors (e.g., Georgia Kraft, International Paper Company, Owens Illinois) of APA were aware that correlation does not imply causation. Moreover, the sponsors, many of whom were mechanical engineers, read with disbelief that mechanization, in which they were investing thousands of dollars, had no correlation with loggers’ productivity. The loggers, many of whom had less than a middle school education, often ran the equipment with tires flat, and sometimes without even checking to see if the equipment needed oil.

A serendipitous purview of the Psychological Abstracts led me to the discovery of Locke’s laboratory experiments. After reviewing the results of our survey in light of Locke’s findings in the laboratory, a follow-up study was done to remove the skepticism of the value of goal setting on the part of APA’s sponsor companies. Logging crews were matched on size, productivity, terrain, and level of mechanization. Each crew had a supervisor who was on the work site. The crews were randomly assigned to one of two conditions, namely a condition where the crews were assigned a specific high goal as to number of trees to cut down (cords) or a condition where they were urged to do their best to cut as many trees as possible. All the crews were paid on a piece-rate basis.

Within a week, the productivity of the crews in the goal setting condition as well as their job attendance was significantly higher than that of the crews in the “do best” condition (Latham & Kinne, 1974). Science had informed practice; goal setting did indeed increase employee productivity. On a variation of Parkinson’s Law, a subsequent analysis of APA data revealed that when the wood supply is high and quotas are thus put in place to restrict the number of days that a company purchases wood from these independent loggers, the crews harvest as much wood or more in those restricted days as they do in a normal work week (Latham & Locke, 1975). However, the logging supervisor must be present to ensure that the high productivity goals do not lead to employee turnover or foster unsafe work practices (Ronan, Latham, & Kinne, 1973). Practice informed science. I returned to graduate school to pursue a PhD.

PARTICIPATIVE DECISION MAKING
The Weyerhaeuser Company hired me as their first staff psychologist and manager of human resource research. To increase the attractiveness of the job offer, senior management offered to support my doctoral dissertation if I would join them as soon as I passed my doctoral area examinations. The question of interest to the company was whether the application of something so seemingly simple and straightforward as goal setting could be modified in ways to further improve productivity and lower costs. The majority of Weyerhaeuser loggers on the West Coast were unionized company operations rather than independent crews. These employees were paid by the hour rather than on a piece-rate basis. Would goal setting be effective with hourly workers? Using a time series design (Campbell & Stanley, 1972), we found that within nine months of goal setting, logging costs decreased by a quarter of a million dollars (Latham & Baldes, 1975).

The finding from practice (Ronan, Latham, & Kinne, 1973) of the necessity for a supportive supervisor was corroborated by my reading in my doctoral studies of Likert’s (1967) systems 4 theory of leadership, namely, the principle of supportive relationships, goal setting, and participation in decision making (pdm). In response to the question from Weyerhaeuser’s senior management, I therefore decided to include pdm to see the effect on the company’s logging crews. Science informed practice. Productivity was highest in the crews who were randomly assigned to the participative goal condition (Latham & Yukl, 1975). We noted only parenthetically that goal difficulty was significantly higher in the participative than in the assigned goal condition. However, a subsequent study with word processors revealed that lines typed per hour were the same regardless of whether the goal was assigned or set participatively.
Again, it was noted parenthetically that there was no significant difference in goal difficulty between goal conditions (Latham & Yukl, 1976). Practice was about to inform science.

An advantage of practice, especially when the practitioner is a colleague of the people who are the beneficiaries of an intervention, is the ability to make first-hand observations of behaviour in a natural environment. The word processing supervisors in the assigned goal condition lowered the goal when an employee had difficulty attaining it, and raised the goal when no such difficulty was experienced. Through enactive mastery, the supervisors in all likelihood were increasing the employee’s self-efficacy regarding productivity (two concepts of which we were ignorant at the time). The difficulty level of the goal in the participative condition remained constant throughout the 10-week study period.

In a symposium at the other APA, namely the American Psychological Association, Porter (1976) suggested that the positive effect of goal setting on performance might be limited to relatively low level jobs. The following year allowed a test of this assumption. Weyerhaeuser’s senior management decided to lay-off a significant number of engineers/scientists in R&D. To prevent this occurrence, the R&D senior vice president persuaded the president of the company that within a year scientists/engineers would be motivated to attain a level of excellence that would eliminate the desire of senior management to seek cut-backs in R&D. Step 1 required a job analysis to define excellence. The result was the development of behavioural observation scales or BOS (Latham & Mitchell, 1976; Latham & Wexley, 1977, 1994). Step 2 involved a 3 (assigned goal, participative goal, do best) x 3 (praise, public recognition, and monetary bonus) factorial design plus an additional 10th cell. The 10th condition was a control group consisting of people in R&D who were unaware that they were involved in this project. All the people in the other nine conditions were not only aware that they were participating in this project, they were aware of who was in each cell.

The results of the six-month study showed that the scientists and engineers in the do best condition performed no better than those in the 10th cell despite the fact that they received KOR and either praise, public recognition or a monetary bonus, and despite the fact that they knew that the participants in 6 of the 9 cells were setting specific goals to attain for their performance appraisal as assessed through the use of BOS (Latham, Mitchell, & Dossett, 1978). This finding is consistent with goal setting theory which states that those variables have no effect on performance unless they lead to the setting of and commitment to a specific high goal. Participative goals led to the highest performance, yet goal commitment was the same across all six goal setting conditions. Goal difficulty, however, was higher in the participative than in the assigned condition. That is, the pdm goals were significantly higher than those that were assigned by a supervisor unilaterally. Practice informed science. It appeared that it was not the method by which the goal was set that influences performance, but rather the difficulty level of the goal. The benefit of pdm was not an increase in goal commitment but rather an increase in goal difficulty. Goal setting theory states that the higher the goal, the higher the performance. Science informed practice.

Weyerhaeuser’s word processing supervisors requested assistance in the selection of employees and the appraisal of their operators. The results of one study showed that there were no significant differences between the assigned and participative goal conditions on performance or goal acceptance. The second study showed that performance and goal acceptance was higher in the assigned than in the participative goal condition (Dossett, Latham, & Mitchell, 1979). As a result of these contradictory findings, it was time to go into the laboratory.

Numerous theories in organization psychology (e.g., Argyris, 1964; Likert, 1967) emphasize the importance of pdm for ensuring employee commitment. Goal setting theory does not specify which method for setting a goal is preferable. It simply states that given goal commitment, the higher the goal the higher the performance. Consequently, we randomly assigned students to one of three groups. All participants were informed that Weyerhaeuser was in need of ideas to increase log exports to Asia. The goal for number of ideas agreed to by a participant in the pdm condition was given to a participant in the assigned goal condition. The participants who were in the third condition were urged to do their best to generate as many ideas as possible because the economy in the American Northwest at that time depended in large part on the profitability of companies such as Weyerhaeuser. The results of that study informed both science and practice. With goal difficulty held constant, goal commitment and performance were the same regardless of whether the goal was assigned or set participatively. Both goal setting conditions led to significantly higher performance than urging people to do their best (Latham & Saari, 1979a). These results were replicated in a second study (Latham & Marshall, 1982) involving brainstorming as part of a job analysis in a government agency regarding effective supervisory behaviours. With goal difficulty held constant, there was no significant difference among the two goal setting conditions regarding goal commitment or actual performance. Both methods of goal setting led to a greater number of ideas than urging employees to do their best.
This was true regardless of the employee’s age, education, position level, years as a supervisor, or length of time employed in the government.

As is the case in most North American universities, performance appraisals are conducted once a year within approximately the same time period at Weyerhaeuser. In this third study, we informed students that the company needed people to check the arithmetic on each appraisal instrument (BOS) as the accuracy of the total score was obviously of extreme importance to an employee. The experimental design that had been used in the two preceding studies was used in the present study with the exception that a fourth condition was included. In this fourth condition, there was an assigned goal that was significantly higher than the pdm goal.

As was the case in the preceding studies, performance in the pdm and yoked assigned goals resulted in the same high level of performance. Both goal setting conditions led to significantly higher performance than the do best condition. But, the highest performance was in that fourth condition where the assigned goal was higher than in the two yoked goal conditions (Latham, Steele, & Saari, 1982). Practice was indeed informing science. Pdm is not a variable of importance for increasing employee productivity; the variable of importance is the difficulty level of the goal.

By this time proponents of pdm were beginning to take notice of these contradictory findings to mainstream theories in organizational psychology. Tolchinsky and King (1980) criticized our studies for confounding goal setting and pdm. Consequently, we used a 3 x 2 factorial design to compare participatorily set goals, yoked assigned goals, and “do your best” vs pdm and individual decision making in the assembling of toys. This task is one that is used in assessment centres (Bray & Grant, 1966) for selecting and developing managers. A main effect was obtained for goal setting only. Performance was the same regardless of the method by which the goal was set (Latham & Steele, 1983).

For me, the issue of assigned versus participatorily set goals was settled. Later that same year, however, the first of a series of four studies by Miriam Erez and her colleagues appeared in the literature (Earley & Kanfer, 1985; Erez, 1986; Erez, Earley, & Hulin, 1985; Erez & Kanfer, 1983). The results of these studies can be summarized in one sentence: Latham is wrong. This type of conclusion can be rather disconcerting regardless of where one fits on the scientist-practitioner continuum.

Fortunately for me, there were at least 10 studies that had replicated my findings (Chacko, Stone, & Brief, 1979; Chang & Lorenzi, 1983; Dossett, Cella, Greenberg, & Austin, 1983; Ivancevich, 1976, 1977; Leifer & McGannon, 1986; Shalley, Oldham, & Porac, 1987; Vanderslice, Rice, & Julian, 1987; Wexley & Baldwin, 1986). The 10th study eliminated the rival hypothesis that the results reflected experimenter bias: “Results from the study concerning assigned vs participative goal setting were contrary to our initial expectations as well as preference for more participative approaches...” (Kerman & Lord, 1988, p.84).

When highly competent researchers obtain contradictory findings, chances are that both research camps may be correct (Campbell & Stanley, 1972). The explanation may be in a boundary condition or moderator variable. The discovery of such a variable is as important to practice as it is to science.

Locke is as close a friend of Erez as he is to me, although I have tended to believe that at times he favours me; similarly, at times Erez believes that he favours her. This is in stark contrast to the feelings of the Smothers brothers regarding their mom. Consequently, Locke was an ideal mediator. The result was a study that won an award from the Academy of Management (Latham, Erez, & Locke, 1988) as it was the first published paper in psychology based on the collaboration of two antagonists who worked with a neutral party to resolve their differences (see also Campbell, 1992; Erez, 1992; Latham, 1992; Locke, 1992).

The first step, the results of which are shown below, was a joint interview of the two of us by Locke of hypothesized reasons for our contradictory findings:

1. Task importance: In my laboratory experiments/simulations, the task was always stressed to the participants as important to Weyerhaeuser. The importance of the task was not stressed by Erez to the participants in her studies.
2. Group discussion: Erez’s participative condition almost always involved groups discussing and then setting the goal. With the exception of the logging crews, my pdm conditions involved dyads.
3. Self-set goals: Erez had people set their own goal. She then “forced” them to abandon the goal in favour of one that was assigned or set participatively. I suspected that this process might especially irritate the participants in the assigned goal condition.
4. Self-efficacy: In my research, I always stated the positive effects that one can expect as a result of goal setting (e.g., “previous work has shown that goal setting increases...”). This was not done by Erez.
5. Value differences: Erez suggested that Israelis may be more collectivistic than North Americans. However, this would not explain the results she obtained in her research conducted while on sabbatical at the University of Illinois.

Two of our four studies (Latham, Erez, & Locke, 1988) failed to find support for any of the five hypotheses.
Locke “interrogated” Erez’s former research assistant, C. Earley. As a result of Earley’s comments, the third and fourth experiment yielded the answer to the puzzle (see Cummings & Earley, 1992). The explanation was not a result of differences in the way in which the goals were set participatively in the Erez and Latham studies. The explanation was the difference in the way the goals were assigned. Our jointly conducted research revealed that when the assigned goal is given with a logic or rationale, it is as effective as one that is set participatively. When the goal is assigned tersely (e.g., “Do this...”) or when participants are told that they don’t have to try to attain it as was done in the Erez studies, an assigned goal is indeed inferior to one that is set participatively.

COGNITIVE BENEFITS OF GOAL SETTING

The thrill, the excitement of programmatic research is akin to being a detective or an investigative reporter. The frustration is having highly competent colleagues, in a systematic fashion, show that your results are wrong. An additional thrill, however, is criticizing your own work so as to stay one step ahead of your critics. This insight was given to me by Henry Tosi shortly after I had received my PhD.

I always believed that Erez was correct in her assertion that pdm in goal setting is preferable to a goal that is assigned. But, as was the case with Kernan and Lord (1988), my data never fit my hypothesis. There was, however, an exception to this statement.

On a Sunday morning I received a telephone call from Rensis Likert. He informed me that it was his belief that the reason why I found no differences between goal setting conditions is that the supervisor/experimenter behaved in a supportive manner regardless of whether the goal was assigned or set participatively. Consequently, Latham and Saari (1979b) conducted a laboratory experiment that supported the findings from the factor analysis of the survey of pulpwood producers (Ronan, Latham, & Kinne, 1973). We found that supportive behaviour resulted in higher goals being set than non-supportive behaviour. In further support of Likert’s systems 4 theory, the basis for which had been correlational studies, we found that participatively set goals led to better performance than assigned goals even when goal difficulty was held constant, and even though there was no significant difference between conditions in goal commitment. But, because this laboratory experiment was the only one of four studies (Latham & Marshall, 1982; Latham & Saari, 1979a; Latham & Steele, 1983; Latham, Steele, & Saari, 1982) that obtained this finding, I had foolishly forgotten it. Worse, I had foolishly forgotten the final conclusion of that experiment, namely, that participation can increase understanding of what is required to perform the task. The participants in the pdm condition asked far more questions than did those in the assigned condition.

While reading a book on a beach, it occurred to me that I had never paid attention to my own words regarding goal setting as a cognitive theory of motivation. I used the term cognitive only to differentiate the theory from the philosophy of behaviourism and to make clear that goal setting is not a stimulus to which the employee responds (Locke & Latham, 1991).

I periodically re-read the books that influenced my behaviour as a graduate student. Not only do they keep my values rooted in the fundamental tenets of my field, they never fail to provide me additional insights as a scientist and as a practitioner. On that day on the beach, I re-read Campbell, Dunnette, Lawler, and Weick (1970). Coupled with the criticism that research on goal setting had been limited to the laboratory was speculation by the authors that goal setting undoubtedly has cognitive, in addition to motivational, benefits. Thus it occurred to me that Erez might be right for the wrong reason. The benefit of pdm might be primarily cognitive rather than motivational. In the literally hundreds of goal setting studies conducted in the past 40 years, the vast majority of tasks required primarily choice, effort, or persistence to perform them. This is because goal setting is primarily a motivational technique (Locke & Latham, 1984); hence the task researchers selected was almost always one that minimized the need for learning.

I was aware that quality circles at Weyerhaeuser had been formed to generate ways for employees “to work smarter rather than harder.” Inherent in quality circles is goal setting regarding the generation of concrete ways for continuous improvement. Both the literature (science) and practice (quality circles) had generated a hypothesis, namely, that the benefit of pdm is primarily cognitive.

Consequently, we (Latham, Winters, & Locke, 1994) randomly assigned individuals to an assigned or a participative goal condition in which people worked in a group (pdm) or alone. No main effect was obtained for goal setting as the two conditions were yoked. But, there was a main effect for decision making with performance significantly higher in the pdm than in the individual decision making condition on a task that was highly complex, a task requiring the scheduling of course offerings for a university. This main effect of pdm on performance, however, was completely mediated by self-efficacy and task strategy.

The practical significance of the discovery of these mediators for practice should not be lost on anyone who has attended a faculty meeting. The participation of the faculty is generally not an issue. Virtually everyone talks in these meetings while few people listen. Since little is heard, even less subsequently gets done. It is only to the
extent that pdm increases self-efficacy and the discovery of the appropriate task strategy(s), that much is accomplished. The effect of self-efficacy on task strategy in our study could not be tested. We concluded that the effect is probably reciprocal as an increase in self-efficacy increases one’s conviction that the appropriate strategy will be found while the discovery of the appropriate strategy increases self-efficacy that the task can indeed be mastered.

BOUNDARY VARIABLES
Upon receipt of my PhD, I did not announce that I intended to do programmatic research on goal setting. I have been doing programmatic research in psychology because one finding leads to questions that are fascinatingly puzzling for me as a scientist-practitioner. As a scientist-practitioner, I am sympathetic with McGuire’s (1983) and Campbell’s (1992) view that a primary purpose of psychologists is to determine the conditions under which a particular assertion is true as well as the conditions under which it is not true, to determine where the most critical substantive relationships suggested by a theory hold or do not hold. For example, fundamental to the theory of goal setting is that urging people “to do your best” results in inferior quality and quantity of performance than the setting of specific high goals. Kanfer and Ackerman (1989) showed the opposite to be true.

Based on their findings from air force cadets performing an air traffic control task, Kanfer and Ackerman argued that in the declarative stage of learning, setting a specific difficult goal has a detrimental effect on performance. The trainees needed to devote their attention to understanding how to perform the task rather than their mastery of it. They needed to store and encode rules rather than focus on a performance outcome. This finding paralleled those of Dweck (1986) and her colleagues in their studies of learning with children.

That science had appeared to have informed practice as a result of the Kanfer and Ackerman study is an understatement. When people lack the requisite knowledge to master a task, when they are in the early stages of learning, urging them to do their best results in higher performance than setting a specific high outcome goal. The reasons are at least three-fold. First, where such tasks are complex for people, the direct goal mechanisms of effort, persistence, and choice are no longer sufficient to ensure high performance. This is because people have yet to learn the correct strategy for performing effectively. Second, such tasks require primarily learning rather than motivation to perform them because people have no appropriate problem solving processes to draw upon. Third, people with specific high performance goals feel pressure to perform well immediately. They focus more on their desire to get results than on learning the correct way of performing the task. In short, tasks that are straightforward as well as those that are complex for an individual require attentional resources, but the resource demands of the latter tasks are greater than those of the former (Kanfer, 1990). Where tasks fall within the problem solving abilities of people, as in cases where they have performed the task effectively, specific difficult outcome goals lead to the development and execution of task specific strategies. For example, truck drivers at Weyerhaeuser found ways to increase truck loads (Latham & Baldes, 1975) and to decrease truck turnaround time (Latham & Saari, 1982) after being assigned a specific difficult performance outcome goal.

Learning goals. Are tasks that are complex for people, tasks that require primarily the acquisition of knowledge rather than choice, effort or persistence a boundary or conditional variable for goal setting theory? Or did Kanfer and Ackerman select the wrong type of goal for a learning task? To answer these questions, we (Winters & Latham, 1996) used a complex class scheduling task developed by Earley (1985). The results revealed that the deleterious effect of a specific difficult goal on performance is not due to a fault in goal setting theory, but rather in the type of goal that is set. Consistent with the findings of Kanfer and Ackerman, there was a decrease in performance when a specific high outcome goal was set regardless of the number of schedules to be produced relative to simply urging people to do their best. But, when a high learning goal was set in terms of discovering a specific number of ways to solve the task, performance was significantly higher in this condition than it was when people were either urged to do their best or had set an outcome goal. This is because a learning goal requires people to focus on understanding the task that is required of them and developing a plan for performing it correctly. High performance is not always the result of high effort or persistence, but rather, high cognitive understanding of the task and strategy or plan necessary to complete it (Fres et al., 1984; Hacker, 1987; Latham & Saari, 1979b). Both science and practice benefitted from research.

Proximal goals. Among the biggest impediments to the usual positive benefits of goal setting is environmental uncertainty (Locke & Latham, 1990a). This is because the information required to set goals may be unavailable. And even when such information is available, it may become obsolete due to rapid changes in the environment. Thus as uncertainty increases, it becomes increasingly difficult to set and commit to a long-term outcome goal. Earley, Connolly, and Ekegren (1989) found that business students who were assigned a specific outcome goal on a stock market prediction task for which they had yet to acquire the necessary knowledge to perform effectively performed worse than those who were urged
to do their best. In the latter condition, people took the
time to systematically test and modify their task strategies
when feedback indicated that they were responding
incorrectly. In contrast, those with a specific difficult
outcome goal frantically switched from one strategy to
another in a futile attempt to attain the goal.

In a simulation of a similar situation, Latham and
Sejts (1999) replicated the findings of both Earley et al.
(1989) as well as Kanfer and Ackerman (1989) using a
business game where high school students were paid on
a piece-rate basis to make toys, and the dollar amounts
paid for the toys changed continuously without warning.
Setting a specific high outcome goal resulted in profits
that were significantly worse than urging the students to
do their best. But when proximal outcome goals were set
in addition to the distal outcome goal, self-efficacy as well
as profits were significantly higher than in the other two
conditions. This is because in highly dynamic situations,
it is important to actively search for feedback and react
quickly to it (Frese & Zapf, 1994). In addition, Dornier
(1991) has found that performance errors on a dynamic
task are often due to deficient decomposition of a goal
into proximal goals. Proximal goals can increase what
Frese and Zapf (1994) call error management. Errors
provide information to employees as to whether their
picture of reality is congruent with goal attainment.
There is an increase in informative feedback when
proximal or subgoals are set relative to setting a distal
goal only.

In addition to being informative, the setting of
proximal goals can also be motivational relative to a
distal goal that is far into the future. Moreover, the
attainment of proximal goals can increase commitment,
through enactive mastery, to attain the distal goal
(Bandura, 1986; Bandura & Schunk, 1981). Science
informed practice.

In a follow-up study, Sejts and Latham (in press)
examined the effect of setting proximal goals in conjunc-
tion with either a distal learning or a distal outcome goal
on a task that required learning in order to perform it
correctly, namely, the scheduling of university classes. As
was found in the previous studies, participants who were
instructed to do their best significantly out-performed
those who had been assigned a specific difficult outcome
goal. But, once again, the results revealed that perfor-
ance was significantly higher when people were
assigned a specific difficult learning goal than when
urged to do their best. This is because a distal learning
goal resulted in higher goal commitment than setting a
distal outcome goal. This appears to have been due to
the fact that self-efficacy increased across trials in the
distal learning goal condition and decreased across trials
in the distal outcome goal condition. There was a
significant correlation between self-efficacy and perfor-
mance on the second and third trials. Support was found
for Winters and Latham's (1996) assertion that individu-
als with high self-efficacy are more likely than those with
low self-efficacy to discover and implement task-relevant
strategies which in turn affected performance. Mediation
analyses showed that strategies had both a direct effect
on self-efficacy as well as an indirect effect on perfor-
mance.

Setting proximal goals resulted in the greatest num-
er of strategies generated. Task relevant strategies, in
turn, correlated positively with performance. That
proximal goals did not have a direct effect on perfor-
mance may have been due to the differences between
the scheduling task used in this study in contrast to that
used in the study preceding it (Latham & Sejts, 1999). A
direct effect of proximal goals on performance may be
limited to tasks where learning is required in a context of
environmental uncertainty. Science was again informing
practice.

Social dilemma and group goals. A meta-analysis involv-
ing 10 studies and 163 groups revealed that the mean
performance levels of groups with specific high goals is
almost one standard deviation higher than the perfor-
mance of groups for which no goals are set (O'Leary-
Kelly, Martocchino, & Frink, 1994). Laboratory experi-
ments by Weldon and her colleagues (e.g., Weldon,
Jehn, & Pradhen, 1991) identified variables that mediate
the effect of goals on a group's performance, namely,
effort, persistence, identification of strategies to attain
the goals, goal commitment, performance monitoring,
morale building, communication, and extra-role behav-
iours. In all of these studies, however, working to attain
the goal was beneficial for both the individual and the
group.

Organizational alliances, such as Stentor, require
companies to work together for the common good. In
the case of Stentor, the 10 telecommunication compa-
nies in Canada agreed to form a national organization to
provide seamless service to customers with a "local
touch." This is not unlike the divisions within companies
such as Weyerhaeuser that are to work together for the
overall good of the corporation.

Our observations as practitioners revealed that in such
organizational settings, the group's goal and the goal of
the manager often conflict. Working to attain the
group's goal is often detrimental to the monetary bonus
of the individual president of a telephone company or a
division vice-president. These people are often rewarded
monetarily more for the performance of the people they
lead than for the performance of the overall organiza-
tion. This phenomenon is referred to in the social
psychology literature as a social dilemma, where an
individual's personal interests are in conflict with those
of the group to which the person belongs.
Observations from practice formed the basis for a laboratory simulation where we hypothesized that a social dilemma is a boundary condition for the normally positive effect of a specific difficult goal on a group's performance. Specifically, we wanted to determine whether there are main effects for group goals on group performance, self-set personal goals for the individual's performance, and time on group performance when the group is small (3-person) or large (7-person). The reward structure of the task was such that high school students who allocated 25¢ to their personal account could take advantage of those people who contributed all or a significant amount of their monetary resources to the group's account. However, if others also behaved in a similarly self-enhancing fashion, each participant's earnings would be less than if the money had been allocated to the group's account. Multiple investments allowed participants to observe the behavior of fellow group members, and to experience the consequences of one another's actions.

The results revealed that a social dilemma is a boundary condition for goal setting (Seijts & Latham, 2000). However, high personal goals that are compatible with the group's goal of maximizing performance enhance group performance; self-enhancing personal goals have a detrimental effect on a group's performance. Individuals in 3-person groups were more cooperative than those in 7-person groups. Collective efficacy correlated positively and significantly with group performance thus providing support for Bandura's (1997) assertion that the concept of self-efficacy can be extended to groups. The findings regarding outcome expectancies suggest that people are likely to exert effort on a task if they expect that goal-directed behavior leads to a desired outcome. In a social dilemma, people may not commit to a specific difficult group goal if they do not believe that others will commit to doing what is in the best interest of the group. Science informed practice as a result of observations of practice.

DISCUSSION
The primary theme underlying this paper is the interdependent refinement of science and practice in psychology. This theme is aptly captured in Lewin's (1951) dictum that there is nothing so practical as a good theory. Without scientific theory, practice is uninformed. It is at best art. Replication by self, not to mention others, can become exceedingly difficult. What distinguishes the practice of psychology from arm-chair speculation, journalism, or novelist writing is that application is based on rigorous methodological discipline and empirical testing that allow generalizable solutions (Drenth, in press). Having a theoretical grounding in science allows a deep understanding of science that is invaluable to the practice of psychology on a daily basis (Saari, in press).

Conversely, careful observation in the practice of psychology leads to meaningful questions that may be addressed systematically through the careful design of experimental and quasi-experimental studies (Dunnette, in press). In turn, the results obtained from such experiments can facilitate significant improvements in practice. In short, science drives practice that drives science (Latham, in press). The effects are reciprocal.

A second parallel theme throughout this paper is the sheer excitement from conducting programmatic research. The value of additive research is that it enlightens what we know about fundamental questions in psychology, in this instance, questions that led to cumulative findings of individual and group productivity in organizational settings as a result of goal setting. These findings accumulated through blurring the distinction between science and practice. These findings accumulated through the use of experimental as well as quasi-experimental designs. Though the use of quasi-experimental designs, psychologists can make excellent use of "naturally occurring" manipulations of phenomena that allow strong inferences regarding causal relationships.

The third parallel theme inherent in the paper is that as scientists, practitioners, and as scientist-practitioners, we owe a debt to psychology regardless of where we are employed. It is the systematic accumulation and dissemination of knowledge in psychology that allowed us to become who we are today. Regardless of whether we work in an academic or a nonacademic setting, it is now incumbent upon us to repay that debt by advancing knowledge through the publication of the findings of our work. Journals are the repository of our knowledge (Hulin, in press). If we discover is not known by others, if it is not applied in some way by our colleagues, the value of the discovery is greatly diminished. Practitioners and scientists have equal responsibility for advancing knowledge in our field (Dunnette, in press).

As Kanfer (in press) has emphasized, making a distinction between science and practice offers little or no discriminatory information for making a decision as to a contribution to knowledge. Influential publications may be primarily theory-based or practice-based; they may be the result of work in the field or in the laboratory. The importance of a journal article is not a function of its origin, but rather of its findings in terms of influencing subsequent research and practice. Practice-based research, as noted in the introduction, facilitates the refining of methods and procedures by which theoretical processes are assessed and improved upon. As Kanfer noted, it is through practice that theoretical perspectives are often extended in innovative ways.

Inherent in the discipline of industrial-organizational psychology is training scientist-practitioners to be alert to
opportunities in field settings that allow for the investigation of basic research questions while solving an organizational problem(s). Working at the science-practice interface can be facilitated through collaboration between those who see themselves as primarily scientists and those who see themselves primarily as practitioners, people with complementary strengths in psychology, and shared interests in advancing knowledge in our field (Kanfer, in press; Latham & Latham, 2000).

In summary, no opposition need exist between the pursuits of truth or utility (Drentz, in press). Contributions to our field occur through the continuous interplay of basic and applied paradigms (Kanfer, in press). As Bandura (personal communication) noted, no theory is ever true unconditionally. No theorist can specify all the conditions at the outset. Hence a theory is subsequently tested, and auxiliary conditions are added that increase the specificity of the theory, i.e., explicate the conditions that govern the effects of a theory on practice. By working in unison as scientists, practitioners, and as scientist-practitioners, we will transfer knowledge from psychology to build a better world (Latham, in press; Latham & Latham, 2000).

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Résumé
Le présent article repose sur l’hypothèse que la science et la pratique de la psychologie sont interdépendantes. La science motive la pratique qui motive la science. La science et la pratique s’étalant sur vingt-cinq années de recherche dans le cadre de programmes portant sur la théorie de l’établissement d’objectifs en psychologie industrielle organisationnelle (i/o) viennent à l’appui de cette hypothèse. Les scientifiques, les praticiens et les scientifiques-praticiens, autant les uns que les autres, sont encouragés à travailler à l’unisson afin de faire progresser la psychologie pour tous.

References


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