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Incremental and Entity Theories of Intelligence Affecting Self-Efficacy and the Goal-Setting-Performance Process

by

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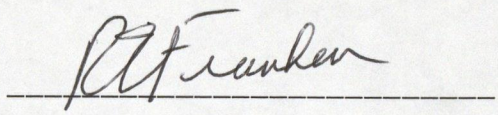

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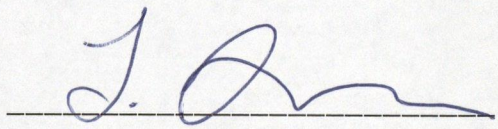

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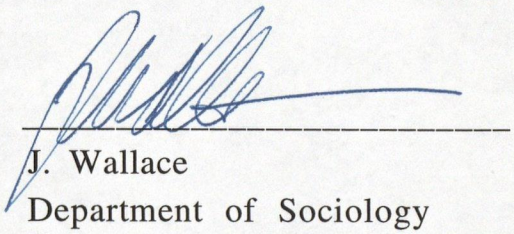

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Abstract

A number of studies provide support for the idea that people conceptualize ability or intelligence as either a stable skill (entity theory) or as an acquirable skill (incremental theory). Further, it has been shown that these conceptualizations, called implicit theories, have a significant impact on the self-regulatory influences that govern ongoing motivation and personal accomplishments in complex decision-making environments (e.g., Wood & Bandura, 1989a). One limitation of this literature is the fact that conceptions of ability have always been induced in these studies, which raises the question of whether or not these findings are simply laboratory phenomena. The purpose of the current study was to assess from the onset of the study, people's actual implicit theories about their intelligence, in an attempt to demonstrate that the results, in fact, mirror real world phenomena. Additionally, instead of conceptualizing implicit theories of intelligence as two separate belief systems, where individual adhere to one theory or the other, the current study conceptualized the theories as two separate belief systems, where individuals can simultaneously adhere to both systems. Results provide partial support for this hypothesized conceptualization of implicit theories of intelligence. Theoretical and practical implications of these findings, as well as future research are discussed.

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Overview

Work motivation typically has been described within the organizational behavior literature as the set of psychological processes that cause the arousal, direction and persistence of behavior (Locke et al., 1981; Mitchell, 1982; Naylor, Pritchard & Ilgen, 1980; cited in Lord & Hanges, 1987). It is generally conceptualized as a process which underlies behavior and is inferred from these behavioral dimensions.

Motivation theory continues to evolve and has experienced substantial change in the past few decades (Landy, 1989). During the late 1950s and early 1960s, expectancy theory was the 'preferred' theory of work motivation; only to be toppled by goal-setting theory (e.g., Ryan & Smith, 1954; Locke, 1968; in Locke & Latham, 1990).

In the last several years, there has been an attempt to incorporate the concept of personal self-efficacy (i.e., the belief that one can overcome task-related obstacles) into goal-setting theory (Bandura & Cervone, 1983, 1986; Bandura, 1986, 1990).

More recently, various theorists, most notably Dweck and Elliott (1983), Nicholls (1984), M. Bandura and Dweck (1985), Bandura (1991a), and Dweck (1991), have proposed that people tend to adopt one of two basic implicit theories about ability or intelligence.[1] They argue that people construe ability as a stable skill (entity theory) or as an acquirable skill (incremental theory) and these theories have a significant impact on the self-regulatory influences that govern ongoing motivation and personal accomplishments in complex decision-making environments. It has been demonstrated for example, that induced conceptions of ability, affected perceived self-efficacy, which in turn mediated[2] goal setting, analytic strategies, response to feedback and ultimately performance (Wood & Bandura,

1989a; Bandura & Wood, 1989; Wood and Bandura, 1989b; Wood, Bandura & Bailey, 1990; Jourden, Bandura & Banfield, 1991).

Although implicit theories of intelligence may be seen as representing qualitatively different self-systems that predispose the individual to operate within one system or the other (Dweck, 1991), researchers have continually induced conceptions of abilities experimentally. Instructing a subject who inherently holds an entity theory to adhere to an incremental theory of intelligence, should create an antagonism between existing conceptions regarding the nature of skills and suggests new ways of conceptualizing skills. Thus, inducing the entity and acquirable skill conceptions of ability, raises many concerns about the generalizability of the these findings. The primary intent of the current investigation was to further explore the effects of implicit theories of intelligence on self-regulatory mechanisms and ultimately performance. In an effort to demonstrate that the effects obtained are not merely laboratory phenomenon, but mirror real-world processes, the participants' implicit theories will be assessed to determine if such theories interact with induced conceptions.

Before proceeding to the development of the logic of the current investigation, several areas of theoretical and empirical research germane to the current study will be reviewed. Firstly, the core premises of goal-setting, analytical strategy, feedback and self-efficacy, as they relate to performance, will be examined. Secondly, research that has explored how self-efficacy mediates goal-setting, analytical strategy, and response to feedback, will be reviewed. Finally, research delineating the impact of implicit theories of intelligence on self-regulatory mechanisms and ultimately performance, will be examined and reviewed.

Goal-Setting Theory

There exists a large organizational literature concerned with goals, goal setting, and the positive effects of goals on consequent behavior (Locke & Latham, 1990). Goal setting can be traced

through the pioneering empirical work of Mace (1935), through the work on level of aspiration (Lewin et al., 1944; Starbuck, 1963), through Seigel's (1957) translation of level of aspiration into subjective expected utility terms, to Locke's (1968) synthesis, which has served as a focal paradigm for much of the recent research in organizational goal setting (cited in Austin & Bobko, 1985).

Goal setting theory assumes that human action is directed by conscious goals and intentions and is concerned specifically with the relationship between goals and task performance.

According to Locke and Latham (1990), the term goal can be defined as "the aim or end of an action" and goals affect performance through their effect on four mechanisms (a) effort; (b) persistence; (c) direction; and (d) task strategies. Firstly, goals energize performance by motivating people to exert effort according to the difficulty or demands of the task (e.g., Bandura & Cervone, 1983, 1986; Early, Wojnaroski, & Prest, 1987). Secondly, goals motivate individuals to persist in their activities through time (e.g., Kirsch, 1978; Hall, Weinberg, & Jackson, 1987). Thirdly, goals orient individuals toward goal-relevant activities and activate stored knowledge and skills that the individual possesses (e.g., Kaplan & Rothkopf, 1974; Rothkopf & Billington, 1979; Reynolds & Anderson, 1982). Fourthly, goals encourage individuals to develop task relevant strategies (e.g., Latham & Saari, 1982; Buller & Bell, 1986; Campbell & Gingrich, 1986; Chesney & Locke, 1988).

According to Locke and Latham (1990) and Bandura (1991b), goal intentions do not automatically activate the self-regulatory mechanisms that govern level of motivation. Certain properties of goal structures determine how strongly the self-system will become enlisted in any given endeavor. The relevant goal properties are addressed in the next section.

Goal Difficulty. Goal setting theory asserts that there is a direct linear relationship between goal difficulty and performance, such that more difficult goals yield higher performance (but only if the individual accepts these goals) [Locke, Chan, Harrison, & Lustgarten, 1989; Locke & Latham, 1990]. According to Locke and Latham

1990, the explanation for this 'goal difficulty effect' is that hard goals lead to greater effort and persistence than easy goals.

In a series of carefully controlled and sequenced laboratory and field experiments, Locke, Latham and others, have demonstrated the effect of goal difficulty on performance (Locke, 1968, 70; Steers & Porter, 1974; Latham & Yukl, 1975; Latham & Locke, 1979; Locke, Shaw, Saari, & Latham, 1981; Locke & Latham, 1990). Locke, et al. (1981), for example, reviewed 15 years of goal-setting research and found that 99 out of 110 studies supported the notion that difficult goals resulted in higher levels of performance than medium, easy, or no goal situations. In the most recent review of this literature, Locke and Latham (1990) concluded that there are 175 studies showing positive (140 studies) or contingently positive (35 studies, i.e., positive for one subgroup or condition) associations between goal difficulty and performance, and 17 that show no effect or effects in the opposite direction.

In addition to enumerative reviews providing support for the strong positive effect of difficult goals on performance, a number of meta-analyses have also supported this contention. Tubbs (1986), for example, in a meta-analysis of goal setting research, found moderately strong effects for goal difficulty, although he found stronger effects in laboratory settings than in field settings. He suggested that this might be the case only because subjects in short-duration laboratory studies would be willing to set or accept harder goals and to work harder to achieve them, since they know that the activity would be of a short duration. A year later, Mento, Steel and Karren (1987) and Wood, Mento, and Locke (1987), conducted meta-analytic studies focusing on the relationship between goal-setting variables and task performance. As expected, strong support was obtained for the goal difficulty of Locke's (1968) theory.

In general, meta-analyses has supported the claim that difficult goals have a strong positive effect on performance, with effect sizes ranging between d=.52 to d=.58 (Locke & Latham, 1990).

Goal Specificity. The extent to which goals create guides to action is partly determined by their specificity (Bandura, 1991b). Explicit standards regulate performance by designating the type and

amount of effort required to attain them. General intentions, which are indefinite about the level of attainment to be reached, provide little basis for regulating one's efforts or evaluating how one is doing.

Locke and Latham (1990) have supported this postulate by arguing that specific, difficult goals lead to higher levels of performance than "do your best" goals. As well, in studies of the regulative function of goals differing in specificity, clear, difficult, attainable goals produce higher levels of performance than general intentions to do one's best (Locke, 1968; Steers & Porter, 1974; Latham & Yukl, 1975; Locke, Shaw, Saari, & Latham, 1981; Bandura & Cervone, 1983; Locke & Latham, 1990). Locke & Latham (1990) for example, concluded that 183 out of 201 studies, or 91%, showed significant (152 studies) or contingently (31 studies) effects in favor of specific, hard goals.

The results of five meta-analyses of studies have also provided further support to the notion that clear, difficult goals result in higher levels of performance than vague "do your best" goals; with effect sizes ranging from d=.42 to d=.80 (Hunter & Schmidt, 1983; Chidester & Grigsby, 1984; Tubbs, 1986; Mento, Steel, & Karren, 1987; Wood, Mento, & Locke, 1987).

Goal Commitment. As suggested in the preceding discussion, goal difficulty and specificity are important determinants of successful task performance. However, having difficult, clear goals, does not automatically force an individual to act. The individual must choose to act. In short, the individual must therefore accept and be committed to the goal (Locke & Latham, 1990; Latham & Locke, 1991).

Although some goal setting theorists have shown that there is no relationship between goal commitment and performance (e.g., Bassett, 1979; Early & Shalley, 1991; Locke & Latham, 1990; Latham & Locke, 1991); the importance of goal commitment has been demonstrated empirically in a number of studies. Erez and Zidon (1984), for example, demonstrated in their study that when goal commitment dropped markedly in response to increasingly difficult goals, as a result of instructions implying the desirability of rejecting such goals, performance dropped accordingly. A number of

other studies have also yielded significant relationships between commitment and performance (Early & Kanfer, 1985; Erez, 1986; Hollenbeck & Klein, 1987; Hollenbeck, Williams, & Klein, 1989).

Theoretically, commitment should be related to performance in two ways. Firstly, if goal levels were held constant statistically or if all individuals within a given sample were given the same challenging goal, commitment could have a direct positive effect on performance (Erez & Zidon, 1984; Locke & Shaw, 1984; Wright, 1989; Locke & Latham, 1990). Erez and Zidon (1984), and Wright (1989), for example, found that within each of their difficult goal levels, there was a positive effect of commitment on performance. Secondly, commitment could moderate the effect of goals on performance when goal level varied among individuals. That is, goal level should be more highly and positively related to performance among individuals with high commitment than among those with low commitment to the goals (Wofford, 1982; Erez & Zidon, 1984; Locke & Latham, 1990; Locke & Latham, 1991).

Motivation through the pursuit of challenging standards has been the subject of extensive research on goal setting (Bandura, 1991b). Evidence from numerous studies shows that the enhancement of motivation by explicit, challenging goals is a remarkably robust effect, replicated across heterogeneous activity domains, settings, populations, social levels, and time spans (Mento, Steel, & Karren, 1987; Bandura, 1991a; Locke & Latham, 1990; Latham & Locke, 1991).

Much of this research has shown that three direct motivational mechanisms (direction of attention, effort, and persistence) mediate goal setting effects. A fourth, indirect cognitive mechanism, strategy development, has also been shown empirically to mediate goal setting effects (e.g., Latham & Saari, 1982; Earley & Perry, 1987). Given a goal, individuals usually develop a task strategy on their own (Locke & Latham, 1990), thus, goals could be considered stimulants to strategy development. A number of studies have been designed to delineate how the impact of goals on performance is mediated through analytic strategy. These studies will be reviewed next.

Analytic Strategy

Typically, analytic strategy has been operationalized as the allocation or direction of energy-related resources to specific acts (Humphreys & Revelle, 1984). Locke and Latham (1990) have indicated that the impact of goals on performance is mediated through task strategies and offer two major propositions.

"1. On simple tasks, goals affect performance relatively directly by activating one or more of three automatized, universal task strategies or plans (direction of attention, effort, and persistence) and one or more automatized task specific plans.

2. As tasks become more complex, universal plans and simple task-specific plans become progressively less adequate by themselves to ensure goal achievement, while problem solving and the development of task-specific plans become progressively more important. Automatized plans of all types play a less direct role as task complexity increases" (p. 293).

Both these propositions have been supported empirically.

Goals, Strategies and Performance on Simple Tasks. Numerous studies have found that when given a simple goal, individuals develop task strategies on their own. This is readily done, because the task is fairly simple or because the individual has a repertoire of knowledge and experience from which to develop a suitable plan (Locke & Latham, 1990). Latham and Saari (1982) for example, found that drivers given goals for a number of trips to the mill per day used their radios to coordinate with each other so that there was always a truck available when timber was ready to be loaded. As well, McCuddy and Griggs (1984) observed that engineers constructed and publicly displayed project schedule boards in order to keep track of the projects they were working on as a means of eliminating missed deadlines.

Even though other research also examining the effects of simple goals on strategy development, have consistently shown that individuals automatically develop task strategies (e.g., Kim, 1984; Campbell & Gingrich, 1986; Chesney & Locke, 1988), many of these studies involved fairly straightforward tasks, such as listing uses or

loading trucks. Furthermore, the strategies developed to reach the goals have been relatively straightforward (e.g., using radios to coordinate truck loading). "As tasks become more complex, however, requisite strategies not only become more complex but also become important in regulating task performance" (Locke & Latham, 1990, p. 102).

Goals, Strategies and Performance on Complex Tasks. Several studies (e.g., Shaw, 1984; Campbell & Gingrich, 1986; Early & Perry, 1987), have delineated the fact that as tasks become more complex, problem solving and development of task-specific plans become more focused. Shaw (1984) for example, found that subjects given both specific, hard goals and an effective task strategy out-performed all the other groups (hard goal-no strategy given, and do best with and without strategy), indicating an ordinal interaction effect.

In contrast to the subjects in Shaw's study, subjects involved in a dynamic environment would be in a constant search for several new strategies. Successful performance on complex tasks in dynamic environments require the testing and appraisal of several different task-specific plans. These complex tasks may require the application of nonlinear and compound behavioral rules, which are especially difficult to learn (Wood & Bailey, 1985). To discover them, individuals have to construct task-specific plans about the form of the rules, test their judgments against the consequences of their actions, and remember which task-specific plans they have tested and how effective different acts were (Locke & Latham, 1990, p. 301).

Three studies by Wood and Bandura (Bandura & Wood, 1989; Wood & Bandura, 1989a; Wood, Bandura, & Bailey, 1990) illustrate this further. All three studies used a complex, computerized, management simulation. It involved attaining production in a furniture factory and required the manager (subject) to allocate workers to tasks and to make decisions about what goals, feedback, and rewards to give each worker. The simulation can be run for up to eighteen trials. The manager must make four decisions (job allocation, goal, feedback, and reward) per employee per trial. The

game can be played using between three and eight employees; the former would require 3 x 4, or 12, decisions per trial, while the latter would require 8 x 4, or 32, decisions per trial. The number of employees, therefore, determines the complexity of the task. The effects of each decision are determined by complex formulas (some of which are time-lagged) governing each type of decision. That is, some formulas contain memory functions, such that current decisions become a function of previous decisions and performance. These decisions determine the productivity index of each trial, for each worker, and for the factory as a whole (see, Wood & Bailey, 1985, for the exact mathematical calculations).

All the Wood and Bandura studies included measures of personal goals, self-efficacy, analytic strategies, and performance. The best analytic strategy for discovering the cause-effect relationships between decisions and outcomes is to change only one variable (e.g., job allocation, goal, etc.) for a given employee on a given trial. Only in this way can the manager (subject) isolate the effects of that variable (Locke & Latham, 1990, p. 102; Bandura, 1991). These studies have shown that this type of task strategy, exploratory rule-learning, is an iterative problem solving process and different people can use or implement the same strategy with markedly differing degrees of effectiveness, due to differences in skill and self-regulatory mechanisms.

As numerous studies have indicated above, task strategies are a crucial link between goals and performance on simple as well as complex tasks. If, as argued by some of these studies, the performance effects of specific, challenging goals on complex tasks are mediated though their effects on information search, problem solving, and strategy development, then goal effects on complex tasks should be enhanced by other interventions that contribute to these processes. One such intervention of relevance to this issue, which has renewed interest to goal researchers, is feedback.

Goal Setting and Feedback

As indicated earlier, goal setting has been claimed to be one of the most well established and robust findings in psychology. It has also been claimed that the positive effect of knowledge of results of one's performance is also one of the best established findings in psychological literature (e.g., Ammons, 1956; Bilodeau & Bilodeau, 1961; Kopelman, 1982, 1986; Locke & Latham, 1990). Specifically, research has suggested that goals will not have a persistent effect unless they are coupled with outcome feedback (Bandura, 1986, 1991b).

Although it has been accepted for some time that feedback has a positive effect in motivating task performance (Ilgen, Fisher, & Taylor, 1979; Landy & Farr, 1983; Harackiewicz & Larson, 1986; Bobko & Colella, 1994), it has only been relatively recently that investigators have recognized and explored the importance of feedback in any long term goal setting intervention (cited in Brown, 1995). Research has suggested that the relationship between goals and feedback is a complex one in that, with respect to feedback, goals mediate the effect of feedback on task performance. With respect to goals, it has been suggested that feedback moderates the effect of goals on task performance (Locke et al., 1981; Kanfer, 1990; Locke & Latham, 1990).

Goal Setting as a Mediator of Feedback. Locke and Latham, (1990), have suggested that to determine if goal setting acts as a mediator of feedback, two things must be shown. Firstly, if goal setting in response to feedback is prevented, then feedback should have no effect on performance or a much smaller effect than when it is not prevented. Secondly, when feedback does lead to improved performance, it must be shown that this effect is reduced when differential goal setting among subjects is statistically or experimentally controlled. To date, only two studies have unequivocally prevented subjects from setting goals following feedback. In both studies, when subjects were prevented from setting goals subsequent to feedback, feedback had no significant effect on performance (Locke, 1967; Locke & Bryan, 1969). On the

other hand, several studies have shown that when subjects were provided with feedback on multiple dimensions of performance, improvement occurred only on those dimensions for which subjects already had a goal (e.g., Weinberg & Schulman, 1974; Nemeroff & Cosentino, 1979).

Feedback as a Moderator of Goal Setting. All the studies presented above did not delineate whether feedback moderated goal setting effects because all the subjects with goals, had other feedback signaling them about their progress. Individuals have been known to use external cues (e.g., how many problem sheets they have completed), as well as internal cues (e.g., how fast they feel they are working), to get an idea of how well they are doing on a task. To determine whether goal setting works in the absence of feedback, subjects with goals would need to be deprived of any knowledge of how they are doing (Locke & Latham, 1990).

Erez (1977) was the first investigator to fully separate goal setting and feedback and show the moderator effect statistically. She had subjects perform a number comparison task under one of two conditions: (a) feedback before goal setting and (b) goal setting alone. Results of this study demonstrated a significant goal-performance relationship only for subjects with feedback. Subsequent studies have also demonstrated that goals enhance performance only when combined with feedback (e.g., Ivancevich & McMahon, 1982; Bandura & Cervone, 1983; Balcazar, Hopkins, & Suarez, 1986; Locke & Latham, 1990; Latham & Locke, 1991).

Research has shown that when goal setting is prevented following feedback, feedback has no significant effect on performance. As well, it has also been shown that goals have no or only marginal effects on performance without feedback. It appears then that goals and feedback are integrally tied together and the combination of goal setting plus feedback should be more effective than either one alone. Research consistent with this notion, is presented below.

Goals And Feedback Together vs. Either One Alone. According to Bandura (1986, 1991b) and Klein (1989), feedback and goals are inseparable elements in a single motivational process. Two reviews

of the motivational literature have supported this contention (Balcazar, Hopkins, & Suarez, 1989; Locke & Latham, 1990). Locke and Latham, 1990, for example, concluded that seventeen out of eighteen studies found the combination of goals and feedback to be better than goals alone, and twenty one out of twenty two studies found it to be better than feedback alone. Among these thirty-eight studies, were pivotal studies demonstrating that either goals alone or feedback alone had no lasting motivational impact. For example, Chhokar and Wallin, 1984, involved subjects in a six-stage time series design for machine shop workers under one of six conditions: (a) baseline; (b) training plus goal setting; (c) weekly feedback added; (d) monthly feedback added; (e) training and goal setting only; and (f) bimonthly feedback added. Results of this study showed that training and goal setting led to improved performance. Introducing feedback led to a further improvement, removing it led to lower performance and introducing it once again led to higher performance.

The accumulated evidence has demonstrated that goals and feedback work most effectively together to improve performance. Research by Matsui, Bandura and others (e.g., Matsui, Okada, & Inoshita, 1983; Bandura & Cervone, 1983, 1986; Bandura, 1986, 1991b; Podsakoff & Farh, 1989) have offered valuable insights into this process. These authors have suggested that goals and feedback when combined, are more effective in motivating subsequent performance because "the degree and direction of discrepancy from the initial goal (mediated by subsequent personal goals or intentions), affect the response to feedback given in relation to initial goals" (Locke & Latham, 1990, p. 199).

Research has also supported the notion that other variables, most notably self-efficacy, affect an individual's response to goal-relevant feedback. Bandura and Cervone, 1983, were the first researchers to introduce self-efficacy into the feedback literature, delineating the fact that like goal setting, self-efficacy mediates the effect of feedback on subsequent performance. Later, other researchers supported the notion that self-efficacy also mediated the effects of goal setting (Bandura, 1986, 1991b), as well as analytic strategy (Bandura & Wood, 1989; Wood & Bandura, 1989a; Wood,

Bandura, & Bailey, 1990) on subsequent performance. Before reviewing the literature supporting the mediating effect of self-efficacy on these self-regulatory mechanisms, there is a multitude of studies suggesting that self-efficacy affects performance directly, and this contention will be explored first.

Self-Efficacy and Performance

Social cognitive theory (Bandura, 1977, 1986, 1991b) posits that goals enhance motivation through self-reactive influences. When individuals commit themselves to explicit goals, perceived negative discrepancies between what they do and what they seek to achieve create self-dissatisfactions that serve as incentives for enhanced effort. The motivational effects do not derive from the goals themselves but rather from the fact that people respond evaluatively to their own behavior. Goals specify the conditional requirements for positive self-evaluation. The more self-dissatisfied people are with substandard performance, the more they heighten their efforts. Goals not only provide direction and create incentives for action, they also figure prominently in the development of self-efficacy. Without standards against which to measure their performance, people have little basis for judging how they are doing, nor do they have much basis for gauging their capabilities (Bandura & Cervone, 1983, 1986; Bandura, 1991b).

Specifically, Bandura has maintained that the relationship between goals and performance is mediated by two types of self-influences: affective self-evaluation and perceived self-efficacy (Bandura, 1986, 1991b). Bandura (1991a) has suggested that goals motivate by enlisting self-evaluative involvement in an activity. Once feedback has been provided, then performance depends on the appraisal and decision sequence that follows. If there is a high goal-performance discrepancy which induces self-dissatisfaction with current or anticipated future performances, this will lead to increased effort and ultimately improved performance (Locke & Latham, 1990). Bandura and his colleagues (e.g., Bandura & Cervone, 1983, 1986; Matsui, Okada, & Inoshita, 1983; Podsakoff &

Farh, 1989) have explored this relationship between goals, satisfaction/dissatisfaction and performance and have consistently shown that dissatisfaction with any previous level of performance affected subsequent performance. For example, Bandura and Cervone (1986) had subjects perform an ergometric task under four artificial levels of goal performance discrepancy conditions: (a) large negative; (b) moderately negative; (c) small negative; and (d) small positive. Self-set goals, satisfaction, and self-efficacy were all measured. Results indicated that performance was correlated with dissatisfaction within two of the groups and moreover, the combination of dissatisfaction with the other two dependent measures had a marked effect on performance. That is, the group with low satisfaction, high self-efficacy and high goal, showed a mean improvement of one hundred and twenty nine percent.

Bandura has also suggested that the second type of self-influence, perceived self-efficacy, also plays an influential role in mediating the effect of goals on performance. According to Bandura (Ozer & Bandura, 1990), "perceived self-efficacy is concerned with people's belief in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over given events" (p. 472). It is partly based on their self-belief of efficacy that people choose what challenges to undertake, how much effort to expend in the endeavor and how long to persevere in the face of difficulties Whether substandard performance is motivating or discouraging is partly determined by people's belief that they can attain the goals they set for themselves. Those individuals who harbor self-doubt or low self-efficacy about their capabilities, are easily dissuaded by substandard performance. Those individuals who are assured of their capabilities or have high self-efficacy, intensify their efforts when faced with substandard performance (Bandura, 1991a).

Bandura has asserted that perceived self-efficacy is significantly and positively related to future performance, even more so in some cases than past performance (Bandura, 1982, 1986). Extensive evidence across diverse domains of functioning for both children and adults have corroborated this claim (e.g., Brown &

Inouye, 1978; Weinberg, Gould, & Jackson, 1979; Jacobs, Prentice-Dunn, & Rogers, 1984; Schunk, 1984; Bandura & Cervone, 1986; Cervone & Peake, 1986; Peake & Cervone, 1989; Cervone, 1989). In an attempt to verify that self-efficacy beliefs are directly linked to performance, many of these studies introduced a trivial factor devoid of information that would affect competency, but would alter perceived self-efficacy. The impact of the altered self-efficacy beliefs on performance were then measured (Bandura, 1991a). For example, Cervone and Peake (1986) and Peake and Cervone (1989) used arbitrary anchor values to influence subjects' self-efficacy judgments. Judgments made from an arbitrary high self-efficacy, increased the subjects' perceived self-efficacy as problem solvers, whereas an arbitrary low starting point reduced judgments of efficacy. Moreover, the higher the instated perceived self-efficacy, the longer the subjects persevered on difficult problems. In a related study, Cervone (1989) had subjects focus on different aspects of the task in an attempt to bias self-efficacy judgments. Subjects who dwelled on the hardest aspects of the task lowered their beliefs in their efficacy, whereas the subjects who focused on the doable aspects of the task, increased their self-efficacy. Just like the two previous studies, the higher the instated perceived self-efficacy, the longer the subjects persevered.

The converging evidence has suggested that perceived self-efficacy directly impacts performance at all goal discrepancy levels. The stronger an individual's self-efficacy beliefs that they can meet challenging standards, the more they intensify their efforts (Bandura, 1991a). Social Cognitive theory (Bandura, 1986; Wood & Bandura, 1989a) has also posited that perceived self-efficacy also affects the challenges or goals that people undertake, whether people's thinking patterns take self-aiding or self-impeding forms, as well as how individuals response to goal-relevant feedback. The relationship between these self-regulatory mechanisms will be reviewed next.

Perceived Self-Efficacy and its mediating effect on Goal Setting, Analytical Strategy and Response to Feedback

Bandura (e.g., Bandura, 1986; Wood, Bandura, & Bailey, 1990), has argued that self-regulation of motivation and performance attainments are governed by several self-regulatory mechanisms operating in concert. These mechanisms often impact each other and the relationships are often bi-directional. Moreover, these self-regulatory mechanisms have considerable impact on how well cognitive-processing systems work (Wood & Bandura, 1989a).

Recent theoretical and empirical work by Bandura and others (e.g., Wood & Bandura, 1989a) have demonstrated that self-efficacy mediates the effects of goal-setting, analytical strategy and feedback on task performance.

As reported earlier, evidence has shown (Erez & Zidon, 1984; Locke & Latham, 1990) that controlling for commitment, explicit and challenging goals enhance performance (Latham & Locke, 1991). Moreover, a number of studies have been designed to relate self-efficacy to the core findings of goal-setting theory. Bandura (1986, 1991a) has argued that people must have a robust sense of personal efficacy to sustain the perseverant effort needed to succeed. In effect, self-efficacy has been shown to mediate the relationship between assigned goals and performance. For example, Earley and Erez (1991) found that subjects with difficult goals, reported higher levels of self-efficacy and had higher levels of performance. Bandura (Bandura & Cervone, 1983, 86) has explained this phenomenon by suggesting that individuals "who hold a strong sense of self-efficacy motivate themselves by setting higher goal challenges that create new discrepancies to be mastered" (Bandura, 1991a, p. 90-91). White (1982) substantiated this contention by documenting the fact that the most common characteristic of people who achieve eminence in their respective fields, is a resilient sense of self-efficacy that enabled them to override innumerable rejections in their early work.

Research has also shown that the relationship between self-efficacy and goals is bi-directional and self-efficacy is impacted by goals (e.g., Bandura & Cervone, 1983, 1986; Locke, Frederick, Lee, &

Bobko, 1984; Garland, 1985; Cervone & Peake, 1986; Meyer & Gallatly, 1988; Earley & Erez, 1991). Meyer and Gallatly (1988) and Earley and Erez (1991) for example, found that individuals assigned high, specific goals reported higher levels of self-efficacy than individuals assigned low or "do best" goals.

Perceived self-efficacy determines not only level of effort expenditure, but also how productively that effort is deployed. According to Wood and Bandura (1989a), self-efficacy mediates analytic strategy leading people who have a strong sense of self-efficacy to engage in more efficient analytic thinking than self-doubters. Bandura and Wood (1989), Wood and Bandura (1989a) and Wood, Bandura and Bailey (1990) found that individuals with high self-efficacy chose better analytic task strategies than those with low self-efficacy on a complex managerial task. These authors argued that the stronger a person's perceived self-efficacy, the more effective the individual tests and appraises activities leading to rule learning and the development of task relevant plans (Locke & Latham, 1990). A number of other findings regarding the determinants of self-efficacy have indicated that the relationship between self-efficacy and analytic strategy is reciprocal. That is, analytic strategy can affect self-efficacy. Locke and Latham, 1990, have gone so far as to suggest that the strategy/efficacy link is stronger than the efficacy/strategy link. Locke, Frederick, Lee and Bobko (1984) and Earley (1986), have supported this bi-directional relationship between self-efficacy and analytic strategy in their research. In each of these studies, it was found that giving task-strategy information or strategy training, produced higher self-efficacy than not giving such information or training. The effects of strategy information or training on self-efficacy resulted in better performance.

As indicated earlier, the degree and direction of discrepancy from an initial goal, mediated by subsequent goals, affect the response to feedback given in relation to initial goals (Matsui, Okada, & Inoshita, 1983; Bandura & Cervone, 1983, 1986; Bandura, 1986, 1991b; Podsakoff & Farh, 1989; Locke & Latham, 1990). In addition, other research has shown that goal setting is not the only

mediator of feedback effects. Evidence has indicated that perceived self-efficacy also plays an important role in mediating[2] the effect of feedback on performance. For example, Matsui, Okada, and Kakuyama (1983) and Podsakoff and Farh (1989) found that self-efficacy affected the individual's response to goal-relevant feedback. Subjects with higher self-efficacy showed greater improvement than subjects with lower self-efficacy. This effect was replicated in Bandura and Cervone's (1983) study and also later in their (1986) study. Both studies employed an ergometric task. In the earlier study, within the goal plus feedback condition, performance improvement was positively associated with degree of self-efficacy and with degree of dissatisfaction with past performance, and even more strongly with anticipated dissatisfaction with future low performance (Locke & Latham, 1990). As indicated earlier (in the later more complex design), the group with high self-efficacy and high goals, plus low satisfaction showed a mean improvement of one hundred and twenty nine percent.

In addition to self-efficacy mediating the effect of feedback, research has also demonstrated that the effect of self-efficacy on subsequent performance is also impacted by feedback (Weinberg, Gould, & Jackson, 1979; Jacobs, Prentice-Dunn, & Rogers, 1984; Earley, 1988; Litt, 1988; Meyer & Gellatly, 1988). Meyer and Gallatly, 1988, for example, found that providing individuals with normative information showing what other similar people could do, affected self-efficacy. Higher norms lead to higher self-efficacy and higher performance.

Social Cognitive Theory (e.g., Bandura, 1986) has posited that self-regulation of motivation and performance attainments are governed by several self-regulatory mechanisms operating in concert. The converging lines of evidence reviewed thus far, has delineated the relationships between goals, analytic strategies, feedback, perceived self-efficacy and performance. That is, these self-regulatory mechanisms are a multiplicity of interacting variables impacting our cognitive-processing systems (Wood & Bandura, 1989a). However, within the context of motivation theory, recent theoretical and empirical work by Dweck and others (e.g., Dweck &

Elliott, 1983; M. Bandura & Dweck, 1985; Dweck, 1991) has been suggested as critical for fully understanding ongoing motivation.

Implicit Theory of Intelligence on Self-Regulatory Mechanisms

Dweck's major contribution to our understanding of ongoing motivation centers around how an individual's implicit theories about certain self attributes (e.g., ability or intelligence) orient them differently toward specific goals (e.g., self-judgment vs. self-development), and affect the way in which these goals set up characteristic patterns of maladaptive or adaptive behavior (Dweck & Elliott, 1983; Dweck, 1991).

Mastery-Oriented versus Helpless Behavior. Dweck's early work (see Dweck & Reppucci, 1973; Dweck, 1975; Diener & Dweck, 1978, 1980) was aimed at discovering the cognitive, affective and behavioral facets of the adaptive, persistent (mastery-oriented) pattern and the maladaptive, nonpersistent (helpless) pattern. Diener and Dweck (1978, 1980), for example, studied grade-school-age children, designated as either helpless or mastery-oriented, work on a concept-formation task. To capture the children's analytic strategies for hypothesis testing and responses to failure, the task was designed to allow the children to succeed on the first eight problems, but fail on the next four. Since the task was designed so that the children's precise hypothesis strategies could be identified together with feelings about the task, the different cognitive, affective and behavioral components of the two patterns could be identified. Results indicated that although both groups exhibited similar performances on the success problems, soon after failure the helpless children defined themselves as "failures" and saw the failure as a measure of their ability. In fact, 35% of these children felt that they could not solve one of the original success problems if it were administered. The helpless children also expressed negative affect and 60% of them showed a decline in the level of sophistication of their strategies as they encountered failure. In contrast, soon after failure, the mastery-oriented children began planning and instructing themselves in strategies designed to overcome the

failures. As well, their affect remained positive and many of them saw the failures as challenges to overcome. Eighty percent of these children maintained or improved their problem solving strategies and twenty five percent showed more sophisticated strategies during failure.

Learning versus Performance Goals. Dweck's next line of research was aimed at discovering why helpless children react as though their ability was being measured and discredited at the onset of failure, whereas mastery-oriented children see failure as an opportunity to learn. Dweck and others (e.g., Dweck & Elliott, 1983; Elliott & Dweck, 1988; Dweck & Leggett, 1988; Dweck, 1989) hypothesized that the two groups of children were focusing on different goals in the same situation and these different goals led them to react to similar events in discrepant ways. Specifically, these authors proposed that performance goals (where the aim is to gain favorable judgments of competence and to avoid unfavorable ones), sets up the helpless orientation, whereas, learning goals (where the aim is to increase competence, learning or mastery), sets up the mastery-oriented pattern.

Consistent with this notion, two types of research were specifically designed to delineate these relationships. In the first type (Dweck & Elliott, 1983; Elliott & Dweck, 1988), Dweck and Elliott experimentally induced an emphasis on performance or learning goals in order to test for a causal relation between these goals and the helpless versus master-oriented patterns. After the experimental induction, the children were given the Diener and Dweck concept-formation task (Diener & Dweck, 1978, 1980). As predicted, children who were focused on performance goals showed all the cognitive, affective and behavioral characteristics of the naturally occurring helpless pattern. In the second types of studies (Dweck & Leggett, 1988; Dweck, 1989), children's naturally existing goal preferences were documented from the onset of the studies. Results indicated that similar to the findings of the preceding studies, the two classes of goals differentially foster the different motivational patterns (Dweck, 1991).

Dweck (Dweck & Leggett, 1988; Dweck, 1991) has suggested that the different goals create a framework within which information is processed and interpreted. Within a performance goal, information is processed in terms of its relevance for measuring, judging, or proving ability. Even effort is interpreted differently in this framework; effort is seen as implying low ability. Within a learning goal, information is processed in terms of its relevance for improving ability or mastering the task. In this framework effort is seen as a strategy for mastery.

Conceptions of Ability or Intelligence. It is apparent then, that in achievement settings, some children focus on proving their ability, while others focus on improving it. Dweck and Mary Bandura (M. Bandura & Dweck, 1985) have offered insights into this phenomenon. They have hypothesized that children with different goals, adhere to different conceptions of ability (or different implicit theories about the nature of their intelligence). Two conceptions of ability or intelligence have been identified. That is, people construe ability as an acquirable skill (incremental theory) or as a stable skill (entity theory)[M. Bandura & Dweck, 1985; Dweck & Leggett, 1988; Nicholls, 1984].

In one perspective, intelligence is construed as an incremental skill that can be continually enhanced by acquiring knowledge and perfecting one's competencies. People with this conception seek challenging tasks that will provide opportunities to expand their knowledge and develop their competencies. Errors are regarded as a natural, instructive part of learning. Capabilities are judged more in terms of personal progress than by comparison against the achievements of others. Individuals with this conception adopt a learning goal (Bandura, 1991a). In the contrasting perspective, intelligence is construed as a stable entity. People with this conception regard quality of performance as diagnostic of intellectual capability thus, errors carry personal threat and arouse concern over social evaluation of incompetence. Prolonged expenditure of effort also poses threats because high effort is believed to be indicative of low ability. These individuals aim to look smart through proficient performance and measure their capabilities

by comparison with the achievements of others. Consequently, people adopting the entity perspective tend to favor performance goals, where they can showcase their established skills and minimize the risk of errors (Bandura, 1991a; Dweck, 1991).

The contention that children's theories of intelligence would also predict achievement goals were shown in three experiments (M. Bandura, 1985; Dweck & Leggett, 1988; Dweck, Tenney, & Dinces, cited in Dweck & Leggett, 1988). In the first two studies, the children's theories were assessed by means of a questionnaire. The children agreed or disagreed to statements such as "Your intelligence is something basic about you that you can't really change" (Dweck, 1991). In the third study, children's theories of intelligence were manipulated by means of reading passages that espoused an entity or incremental theory. In all three cases, children's theories of intelligence were a significant predictor of their choice of goals on an upcoming achievement task. In the study by Dweck and Leggett (1988) for example, 81.8% of the children who endorsed an entity theory also elected to pursue a performance goal on the experimental task. In contrast, 60.9% of the children who endorsed an incremental theory selected the learning goal. As well, 29.3% of them selected the challenging performance task and only 9.8% of them chose the easy performance task (Dweck & Leggett, 1988; Dweck, 1991).

These results support the view that implicit theories of intelligence orient individuals toward different goals. These goals, in turn, set up and organize different patterns of behavior. In addition, the implicit theories of intelligence, with their allied goals, may be seen as representing qualitatively different self-systems, each with its own values, rules, logic and coherence (Dweck, 1991). Moreover, since the theories and goals can be induced experimentally (e.g., Dweck, Tenney, & Dinces, cited in Dweck & Leggett, 1988) these results suggest that people can operate within both paradigms.

Although the theories were originally hypothesized to further explain the underpinnings of achievement-related processes, they have been generalized to the social goals children pursue (Erdley & Dweck, 1989), and implicit theories about their personalities (Olshefsky, Erdley, and Dweck, 1987) [cited in Dweck, 1991].

Moreover, research germane to implicit theory of intelligence has moved from the laboratory (e.g., Dweck & Leggett, 1988) to the classroom (e.g., Henderson & Dweck, 1990). More recently, Wood and Bandura (1989a, 1989b), Bandura and Wood (1989), Wood, Bandura, and Bailey (1990), Jourden, Bandura, and Banfield (1991) have studied implicit theories of intelligence in complex decision-making environments.

Implicit Theories of Intelligence and Dynamic Environments.

Much of the research examining implicit theories of intelligence and decision making have been studied in static environments under nontaxing conditions (e.g., Dweck & Leggett, 1988). By contrast, in dynamic environments, decisions must be made from a wide array of information within a continuous flow of activity, under time constraints and with significant social and evaluative consequences (Bandura, 1991a). Bandura (1991a) has stated that "many of the decisional rules for exercising control over dynamic environments must be learned though exploratory experiences in the course of managing ongoing organizational activity. Because organizational outcomes must be achieved through the coordinated efforts of others, some of the most important management decisions concern how best to use human talent and how to guide and motivate human effort" (p. 109). According to Wood and Bandura, 1989a, in the management of such dynamic environments, self-regulatory mechanisms govern organizational attainments much as they do individual accomplishments. More specifically, these authors have espoused that in studies of the management of group efforts, implicit theories of intelligence have a significant impact on the self-regulatory influences that govern ongoing motivation and group accomplishments in complex decision-making environments.

Consistent with this notion, a number of studies have been designed to illustrate this contention (e.g., Wood & Bandura, 1989a, 1989b; Bandura & Wood, 1989; Wood, Bandura, & Bailey, 1990; Bandura & Jourden, 1991). As discussed earlier, these studies used a complex, computerized, management simulation that depicted the types of decisional activities required in complex dynamic environments (Wood & Bailey, 1985). It involved attaining

production in a furniture factory and required the manager (subject) to learn a complex set of decision rules on how to best allocate workers to tasks and to make decisions about what goals, feedback, and rewards to give each worker. To discover these rules they had to test options, cognitively process the outcome feedback information of their decisions, and continue to apply analytic strategies in ways that would reveal the governing rules. To complicate matters further, the motivational factors involved both nonlinear and compound rules (see Wood & Bailey, 1985), which were difficult to learn. Moreover, knowing rules did not ensure optimal implementation of them. Subjects also had to gain proficiency in tailoring the applications of the rules to individual employees and apply them in concert to achieve desired results (Wood & Bailey, 1989a). Managers performed the challenging managerial task under an experimentally induced entity or incremental conception of ability. As well, the studies included measures of personal goals, self-efficacy, analytic strategies, and performance. Wood and Bandura (1989a), for example, found that managers who performed the task under the experimentally induced entity conception of ability, construed performance as diagnostic of underlying cognitive aptitude. As a result, substandard performance on the challenging managerial task created increasing doubts about their managerial efficacy. They became more erratic in their analytic thinking, lowered their organizational goals, and their organizational performance continually decreased. In marked contrast, managers who performed the task under an induced incremental conception, construed performance as skill acquisition, where one learns from mistakes. These managers fostered a highly resilient sense of personal efficacy. They maintained their perceived managerial self-efficacy, continued to set challenging organizational goals, and used analytic strategies in ways that aided discovery of optimal managerial decision rules. Such an orientation resulted in high organizational attainment (Bandura, 1991a). Path analyses revealed that self-efficacy had both a direct effect on organizational performance and an indirect effect through its influence on analytic strategies. Personal goals also affected organizational performance

through the mediation of analytic strategies (Wood & Bandura, 1989a).

Study 1

Overview

Since all prior research using Wood and Bailey's (1985) simulated organization have artificially induced implicit theories of intelligence (e.g., Wood & Bandura, 1989a), the purpose of Study 1 was to determine if implicit theories of intelligence are naturally occurring belief systems. To that end, implicit theories of intelligence scales were constructed, validated and tested for reliability.

Hypotheses

(1) Consistent with Dweck's belief (1991), it was anticipated that individual's naturally occurring implicit theories of intelligence would be two separate and uncorrelated belief systems.
(2) Since individuals can conceive themselves sometimes as a fixed object that is being judged and at other times as a dynamic system (Dweck, 1991), it was also expected that individuals can adhere to both belief systems simultaneously, and lay along different points of each system.

Method

Participants

Subjects were 151 undergraduate psychology students from the University of Calgary subject pool and from undergraduate psychology classes at the University of Calgary. The sample consisted of 46 males and 104 females.

Apparatus

A ten item scale (M. Bandura & Elliott, 1990) was revised to make it conceptually more meaningful. Five of the ten items were

used to tap entitism: 1) I hope my performance is up to par; 2) I wonder who will see my results; 3) Will I look competent; 4) I wonder how my performance will compare with others and 5) I hope I don't make any mistakes. The five items used to tap incrementalism were: 1) Am I going to learn something; 2) I hope I get a chance to discuss my ideas with others; 3) I hope this is something new; 4) I am eager to get started trying to figure this out and 5) I hope there are some tough parts that will challenge me.

Procedure

The experiment was run in several ten minute sessions with between 15 to 30 subjects participating in each session. They were informed that the questionnaire was a task questionnaire. Following that, the subjects were instructed to indicate the likelihood, that each of the ten items (thoughts) would cross their mind, if they were working on a marked assignment. The anchors for the scale were (1) never, (2) rarely, (3) sometimes, (4) very often and (5) always. Subjects were also asked to indicate their gender and whether they thought intelligence was more or less fixed, or an acquirable skill.

Results

A principle components factor extraction technique was used to analyze the data. As indicated in Table 1, a varimax rotation resulted in two separate and distinct factors. Table 2 shows that a oblimin rotation resulted in two uncorrelated factors. Cronbach's alphas were also calculated, which revealed a value of .78 and .77 for the incremental scale and the entity scale respectively.

Table 1

ROTATED FACTOR MATRIX: (VARIMAX)

		FACTOR 1 ENTITY	FACTOR 2 INCREMENTAL
	Question #		
LEARN	1 (Increm)	-.02259	.72112
PAR	2 (Entity)	.72168	-.00043
RESULTS	3 (Entity)	.53953	.15252
IDEAS	4 (Increm)	-.03399	.66385
NEW	5 (Increm)	-.06105	.78652
FIGURE	6 (Increm)	.08892	.65463
COMPETEN	7 (Entity)	.79970	.08712
CHALLENG	8 (Increm)	.02835	.78353
COMPARE	9 (Entity)	.77513	-.17456
MISTAKES	10(Entity)	.78433	-.10640

Table 2

FACTOR CORRELATION MATRIX: (OBLIMIN ROTATION)

	FACTOR 1 ENTITY	FACTOR 2 INCREMENTAL
FACTOR 1	1.000	
FACTOR 2	0.005	1.000

Discussion

The factor analysis provides convincing evidence for two naturally occurring, distinct, and uncorrelated belief systems. Moreover, Study 1 indicates that individuals can in fact adhere to both belief systems simultaneously, and lay along different points of each system.

More importantly, such a conceptualization of people's belief systems, delineates four levels of implicit theories of intelligence. That is, individuals high in the incremental belief system and low in the entity belief system (True Incrementalists), individuals low in the incremental belief system and high in the entity belief system (True Entitists), individuals high in the incremental belief system and high in the entity belief system (Incremental Performers) and individuals low in the incremental belief system and low in the entity belief system (Unclassified).

In a complex, dynamic, simulated organization (e.g., Wood & Bandura, 1989a), adherence to the different levels of implicit theories of intelligence, would differentially affect individuals' self-regulatory mechanisms governing performance. This contention was tested in Study 2 and Study 3.

Study 2

Overview

People construe ability as a stable skill (entity theory) or as an acquirable skill (incremental theory) and these theories have a significant impact on the self-regulatory influences that govern ongoing motivation and personal accomplishments in complex decision-making environments (e.g., Wood & Bandura, 1989a, 1989b; Bandura & Wood, 1989; Wood, Bandura, & Bailey, 1990; Bandura & Jourden, 1991). In all these studies, managers performed the challenging managerial task under an experimentally induced entity or incremental conception of ability. The issue that remains unclear, however, is whether or not the effects obtained are merely

laboratory phenomenon, due to the artificial induction of implicit theories of intelligence. Dweck (Dweck, 1991) has argued that implicit theories of intelligence, with their allied goals, may be seen as representing qualitatively different self-systems, each with its own values, rules, logic and coherence. Therefore, an individual would have a bias towards one conception of intelligence over the other. Such that, instructing a subject who inherently holds an entity theory to adhere to an incremental theory of intelligence, would create an antagonism between existing conceptions regarding the nature of skills and would suggest new ways of conceptualizing skills. Further, if the individual were given a complex, dynamic task with multiple trials (e.g., Wood & Bailey, 1985), eventually the individual would revert back to known values, rules, logic and coherence, consistent with the entity conception of ability. Moreover, it makes intuitive sense that if individuals can adhere to both belief systems simultaneously, and lay along different points of each system (e.g., a true incrementalist), individuals would have a bias towards a specific belief system and experimental induction of an inappropriate belief system, within a complex dynamic environment with multiple trials, would create antagonism and eventually the individual would return to known ways of conceptualizing skills.

This suggests that the results of studies like Wood and Bandura (1989a, 1989b), Bandura and Wood (1989), Wood, Bandura, and Bailey (1990), Bandura and Jourden (1991), may be confounded. Therefore, the object of Study 2 was to begin to address these issues, while demonstrating that implicit theories of intelligence have a significant impact on self-regulatory mechanisms in a complex decision-making environment (e.g., Bandura & Wood, 1989a). Unlike previous research, the current study conceptualized implicit theories of intelligence as two separate and distinct belief systems, where individuals could adhere to both systems simultaneously and lay along different points of each system. More specifically, the intention of the current study was to assess the individual's true conception of ability, from the onset of the study, in an attempt to demonstrate that the effects obtained are not merely laboratory phenomenon, but mirror real-world processes.

In addition to being of theoretical importance, this study has practical significance. Prior research has indicated that people's implicit theory of intelligence can affect self-regulatory mechanisms, which can ultimately affect performance in many environments (e.g., Wood & Bandura, 1989a, 1989b). This is of particular importance within complex, dynamic organizational settings, in regards to ongoing motivation, yet these researchers offer no practical means of measuring people's implicit theories of intelligence. The current study begins to address this discrepancy.

Hypotheses

Given that the managerial simulation occurred over eighteen trials and subjects were assessed on three occasions, the hypotheses for the current study have been organized according to assessment phases. Firstly, those hypotheses pertinent to all three phases will be outlined. Secondly, expectations regarding changes in the effect of variables between assessment phases will be discussed.

Dependent Variable Measures at Phase 1, Phase 2, and Phase 3

(1) Given that no research to date has conceptualized implicit theories of intelligence as two distinct and separate belief systems, where individuals could adhere to both systems simultaneously, and lay along different points of each system; the primary objective of the current study was to delineate the fact that true incrementalists (people high in incrementalism and low in entitism) would in effect, respond like individuals experimentally induced under the conception of ability as an acquirable skill. As well, true entitists (people high in entitism and low in incrementalism) would in effect, respond like individuals experimentally induced under the conception of ability as a fixed entity (see Wood & Bandura, 1989a). Since true incrementalists are conceptually similar to individuals experimentally induced under the conception of ability as an acquirable skill, they would judge capabilities more in terms of personal improvements. If these individuals were given a long, complex decision making task, it was expected that they would sustain a higher level of perceived self-efficacy. Entitists on the

other hand, would sustain a lower sense of perceived self-efficacy (Wood & Bandura, 1989a).

(2) Bandura (1986, 1991a) has argued that people must have a robust sense of personal efficacy to sustain the perseverant effort to succeed. Moreover, as outlined earlier, Earley and Erez (1991) have shown that self-efficacy mediates the relationship between goals and performance. Given this, and the findings of Wood and Bandura (1989a, 1989b), and Wood, Bandura, and Bailey (990), it was expected that self-efficacy would significantly impact goal setting. More specifically, it was expected that for true incrementalists, maintaining a resilient self-efficacy would result in higher self-set goals. This would in turn, enhance the level of organizational performance (Wood & Bandura, 1989a). True entitists on the other hand, would set lower goals.

(3) Researchers have suggested that self-efficacy mediates analytic strategy and people who have a strong sense of self-efficacy engage in more efficient analytic thinking than self-doubters. In effect, Bandura and Wood (1989), Wood and Bandura (1989a) and Wood, Bandura and Bailey (1990) found that individuals with high self-efficacy chose better analytic task strategies than those with low self-efficacy on a complex managerial task. Consistent with this research, it was expected that true incrementalists as opposed to true entitists, would use analytic strategies more effectively. This would in turn, enhance the level of organizational performance (Wood & Bandura, 1989a).

(4) As previous research has demonstrated (e.g., Bandura, 1982, 1986; Peake & Cervone, 1989) perceived self-efficacy is significantly and positively related to future performance. Specifically, the higher the instated perceived self-efficacy, the longer individuals will persevere on difficult tasks. Given this, coupled with research delineating that the effects of personal goal setting (Earley and Erez, 1991) and analytic strategy (Wood & Bandura, 1989a) on subsequent performance, are mediated through perceived self-efficacy, it is hypothesized that true incrementalists would have enhanced organizational performance. That is, for true incrementalists, perceived self-efficacy would enhance organizational performance

both directly and indirectly by its effects on personal goal setting and on use of analytic strategies. True entitists on the other hand, would sustain a lower level of performance.

Figures 1 and 2 further illustrate the expected impact of implicit theories of intelligence on self-regulatory mechanisms and performance, discussed in hypotheses 1 through 4.

Figure 1. The Relationship Between Incremental Theory of Intelligence, Self-Regulatory Mechanisms and Performance.

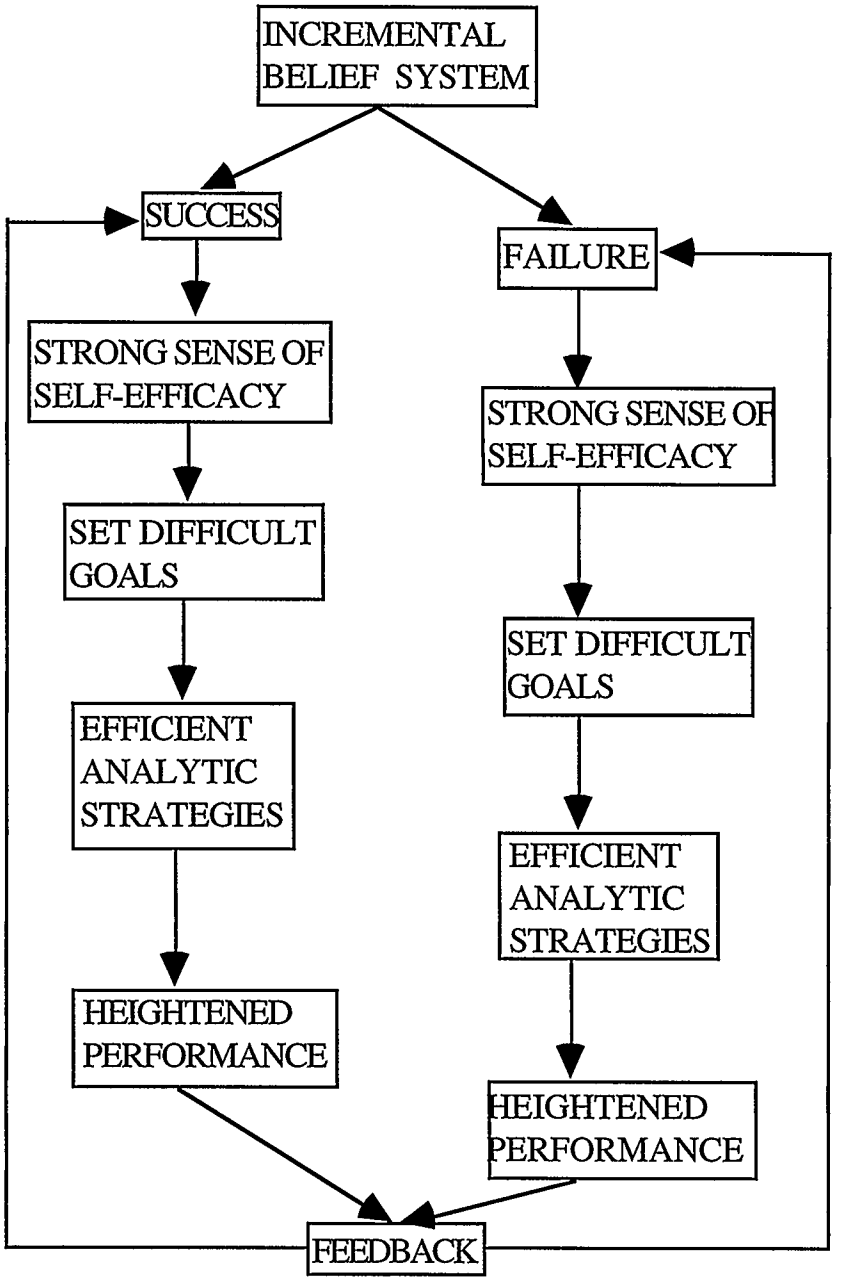
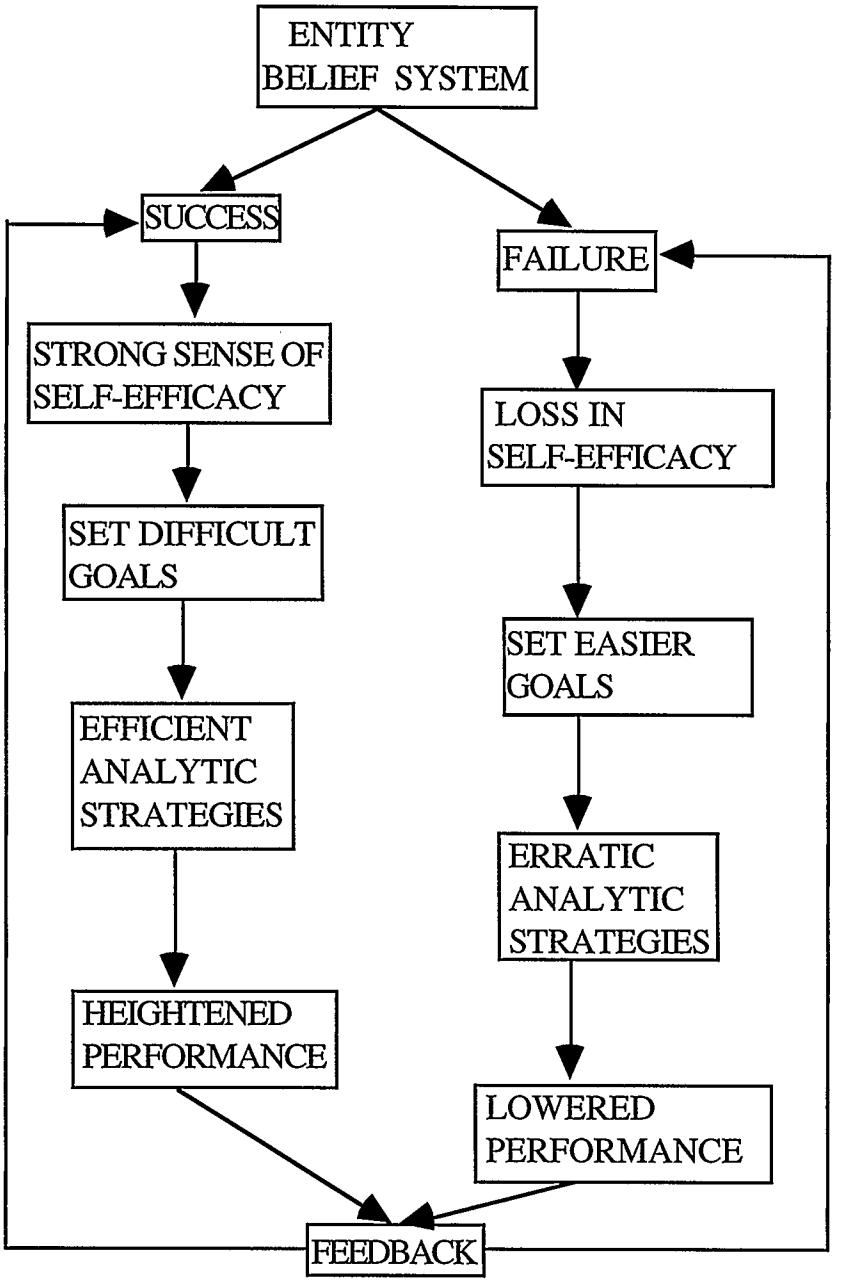


Figure 2. The Relationship Between Entity Theory of Intelligence, Self-Regulatory Mechanisms and Performance.



(5) In addition to true incrementalists sustaining a higher level of perceived self-efficacy, self-set goals, analytic strategies and performance, it was also anticipated that this effect would hold, even

after controlling for whether or not the individual was assigned to an experimentally induced incremental or entity group.

Indices of Self-Regulatory Mechanisms and Performance between Phase 1 and Phase 2 and between Phase 2 and Phase 3

(6) In addition to those hypotheses outlined within Phases 1, 2 and 3 above, it was also predicted that there would be temporal shifts in the effect of implicit theories of intelligence on perceived self-efficacy, self-set goals, analytic strategies and task performance, such that, the effect of implicit theory of intelligence would increase over time. This hypothesis was based on evidence from Wood & Bandura (1989a), who indicated that individuals who performed the task under an acquirable skill conception of ability increased their perceived self-efficacy, set more challenging goals, used analytic strategies more effectively and improved organizational performance over time. Alternatively, individuals who performed the challenging managerial task under an entity conception of ability suffered a greater loss in perceived self-efficacy, lowered their organizational goals, became less efficient in their analytic strategies and had lower organizational performance over time.

(7) In essence, this research was an attempt to replicate the findings of Bandura and others (e.g., Wood & Bandura, 1989a) using a new conceptualization of implicit theories of intelligence. Therefore, no predictions were made for individuals who were high in the incremental belief system and high in the entity belief system (Incremental Performers) or low in the incremental belief system and low in the entity belief system (Unclassified).

Method

Participants

Subjects were 50 undergraduate psychology students recruited from the University of Calgary subject pool and from undergraduate psychology classes at the University of Calgary. The sample consisted of 6 males and 44 females, with the mean age of the sample being 23 years (s.d. = 5, range = 19 to 40).

Design

The experiment consisted of a 2 (instruction group) x 2 (incremental score) x 2 (entity score) x 3 (assessment phase) design. Subjects were randomly assigned to one of the two instruction groups: (1) incremental instruction group where conception of ability was induced as an acquirable skill; and (2) entity instruction group where conception of ability was induced as a fixed entity. In addition to the instruction groups outlined above, subjects were also assigned incremental and entity scores (i.e., high or low, using a median split), depending on their assessed incremental and entity scores. Instruction group, incremental score and entity score were between-subjects variables and assessment phase was a repeated measure variable.

Simulated Organization

The study was presented to the subjects as a project in managerial decision making in which they would manage a simulated organization. The introductory information described the simulation as one in which managers receive weekly orders for the production of furniture items, along with a roster of available employees. The manufacture of the items, in each of the weekly orders required five different production subfunctions, such as milling the timber, assembling the parts, staining and glazing the assembled frame, upholstering the furniture, and preparing the products for shipment. Subjects managed the organizational unit for a total of 18 trials, with each order representing a performance trial in the simulation.

The subject's managerial task was to allocate workers from a five member roster to the different production subfunctions so as to complete the work assignment within an optimal period. By correctly matching employees to job requirements, subjects could attain a higher level of organizational performance than if employees were poorly matched to jobs. To assist them in this decision task, subjects received descriptions of the effort and skill required for each of the production subfunctions and the characteristics of each employee. This information described the particular skills of the employees, experience, motivational level, preference for routine or challenging work assignments, and standards of work quality. The

employee profile descriptions were provided at the beginning of the simulation, but subjects could refer to them at any time during their organizational decision making.

After employees had been allocated to jobs for a given trial, subjects would then assign each employee a production goal from a set of options that included urging the employees to do their best or assigning them one of three specific goals set at, above, or below the established standard. A fifth option allowed subjects to set no production goal for an employee, if they judged that it would have a negative motivational effect. To enhance the performance of their organizational unit, subjects had to learn the decision rule for setting the optimal level of challenge for each employee.

Instructive feedback and social rewards were given after the production order for each trial had been completed. The feedback and reward decisions influenced performance on the subsequent trial. For the feedback decisions, subjects could give employees no feedback or select one of three options that varied in the amount of direction given regarding methods of workmanship and analysis of difficulties. Effective use of the feedback options to improve organizational performance required subjects to learn decision rules for optimal adjustment of level of instructive feedback to performance attainments.

For decisions regarding social rewards, the effects of the three options varied with the type of reward given (e.g., compliment, social recognition, note of commendation) and with the degree to which rewards were contingent on employees' performance attainments. Subjects also had the option of not making any comments regarding their employees' work. The magnitude of the incentive effect for a given employee depended on the ratio of rewards to attainment for that employee compared with the equivalent ratio for other employees. Subjects, therefore, had to learn a compound decision rule combining incentive and equity factors on how best to use social rewards to increase organizational performance (Wood & Bandura, 1989a).

Although each weekly production order was different, prior to trial thirteen, the subjects assigned the same five member roster of

employees to the same five production subfunctions so as to complete the work assignment within an optimal period. Trial thirteen introduced new tasks demands for the subjects (e.g., a new five member roster of employees and five new production subfunctions) which reduced the generalizability of decision rules learned previously.

The group performance for each trial was reported to subjects as a percentage of a preset standard number of hours to complete each manufacturing order. The performance standard, which was based on information from a pretest of performance attainments on this task (see Wood & Bailey, 1985, for a more detailed description or the mathematics and logic of the model), was set at a level that was difficult to fulfill.

Induction of Conceptions of Ability

In the acquirable skill condition, subjects were told that "decision making skills are developed through practice. In acquiring a new skill, people do not begin with faultless performance. Therefore, the more you practice making decisions the more capable you will become. Think of this simulation as a vehicle for cultivating your cognitive decision making capabilities". In the entity condition, subjects were told that "decision making reflects basic cognitive capabilities that people possess. The higher your underlying cognitive-processing capacities are, the better your decision making. Think of this simulation as a vehicle for gauging your underlying cognitive capacities" (Wood & Bandura, 1989a, p. 410).

Measures

Demographic Information. Two pieces of demographic information were collected at the outset of the experiment. First, subjects were asked to indicate their gender, second, they were asked to indicate their age.

Implicit Theories of Intelligence. Implicit theories of intelligence were assessed using a revised 10 item scale (M. Bandura & Elliott, 1990). Subjects rated the likelihood that each of the ten items (thoughts) would cross their mind, if they were working on a marked assignment. The ratings were made in terms of a 5-point scale ranging form (1) never to (5) always.

Perceived Self-Efficacy. Perceived self-efficacy was recorded on a multi-item efficacy scale that described nine levels of production attainments, ranging from 30% better to 40% worse than standard production time. Subjects rated the strength of their perceived self-efficacy that they could get the group they were managing to perform at each of the levels of productivity described. The ratings were made in terms of a 10-point scale ranging from no confidence at all (1) to total confidence (10). The strength of perceived self-efficacy was the sum of the confidence scores for the nine levels of organizational performance.

Self-Set Goals. In assessing self-set goals, subjects recorded the level of organizational performance they were personally aiming for in the succeeding trials. They selected their personal goal from nine levels of possible organizational attainments ranging from 40% below to 30% above the established standard and from a tenth option of no particular goal.

Analytic Strategy. The number of systematic tests that subjects carried out to determine how job allocations, production goals, instructive feedback and social rewards, affected the performance of individual employees provided the measure of analytic strategy. The strategy score was the sum of the decisions across an assessment phase (6 trials) in which subjects changed only a single factor (e.g., job allocation, goal level, instructive feedback, or social reward) for individual employees. Systematic analytic strategies require changing only one factor at a time. Five systematic tests, one for each employee, could be made in each trial. Therefore, a subject's analytic strategy score across an assessment phase could range from 0 to 30. Another aspect of decision making is the subject's sheer level of decision activity, represented by the total number of factors changed for all employees in each trial without consideration of confounding variations.

Organizational Performance. Organizational performance was measured in terms of the total number of hours taken by the group of employees to complete each weekly order. The simulation model automatically calculated the number of production hours for each trial on the basis of the subject's job allocations and selections of

motivational factors. The fewer the production hours, the better the subject's managerial decision making. Organizational performance scores were averaged across three assessment phases of six trials each (Wood & Bandura, 1989a).

Procedure

The experiment was run in several one and a half hour sessions with between 5 and 22 subjects participating in each session. Subjects were initially assessed, to determine their implicit theory of intelligence scores, using the revised version of the M. Bandura and Elliott (1990) ten item scale. Subjects were then randomly assigned to one of two experimental conditions. One group was designated the entity instruction group, where the subject's conception of ability was verbally induced as a fixed entity. Subjects were told that the simulation was a vehicle for gauging their underlying cognitive capabilities, and they should avoid making any mistakes. In the incremental instruction group, conception of ability was induced as an acquirable skill. Subjects were told that making mistakes was a part of learning and the simulation was as vehicle for mastering complex decision making. The subjects were told to use the clock on the wall to pace their progress. They were then instructed on how to use the computer keyboard. After they read the introductory information and the descriptive profiles of the employees and subfunctions on the computer terminal, they were then asked if there were any questions. After all questions were answered, the subjects performed the simulation at the computer terminal. Subjects received information about the weekly production orders, the roster of available employees, and feedback on the organizational's level of productivity on the computer screen.

All data were collected in the context of the simulation, which included a total of 18 trials. The scales of the different self-regulatory measures were presented on the monitor following trials 6, 12, and 18. Subjects recorded their responses on the keyboard. The first assessment was conducted after the sixth trial so that the subjects would have some experience with the simulation before

being asked to judge their perceived self-efficacy and to set goals for themselves.

After the final trial, the experimenter gave the subjects a full explanation of the nature and purpose of the study. They learned that they had performed the organizational simulation against a difficult performance standard (Wood & Bandura, 1989a).

Results

Since this study is the first exploratory attempt to conceptualize implicit theories of intelligence as two distinct dimensions, where individuals can operate simultaneously on both; Bonferroni adjustments were not made. That way, all the possible interacting effects of implicit theories of intelligence with the other factors, can be explored.

Prior to beginning any data analysis, the subjects' assessed incremental and entity scores were added to the data file.

Phase 1, Phase 2 and Phase 3

(1) To test the effect of incremental scores and entity scores on perceived self-efficacy, 2 (incremental scores) x 2 (entity scores) Factorial Analysis of Variances were performed on the efficacy data for each phase. The two way interactions between incremental scores and entity scores were not significant for phase 1, phase 2 or phase 3, ($F(1,46)=.17$, $p>.05$), ($F(1,46)=.065$, $p>.05$) and ($F(1,46)=.07$, $p>.05$) respectively. Although none of the means were significantly different at phase 1, phase 2, or phase 3, Table 3 indicated that contrary to what was expected, entitists achieved the highest perceived self-efficacy scores at all three phases.

Table 3

Perceived Self-Efficacy as a Function of Incremental and Entity Scores

	Phase1 Mean/S.D.	Phase2 Mean/S.D.	Phase 3 Mean/S.D.	N
Inc2Ent1* (Incrementalists)	66.18/20.00	63.36/21.68	43.27/17.24	11
Inc1Ent2 (Entitists)	67.70/09.58	71.50/14.60	50.20/16.65	10
Inc2Ent2	63.93/14.54	59.07/18.78	41.50/24.95	14
Inc1Ent1	64.87/17.54	67.07/21.34	51.13/25.49	15

*(Inc2)=High Incremental Score and (Ent1)=Low Entity Score.

(2) To test the effect of implicit theory of intelligence scores on self-set goals, 2 (incremental scores) x 2 (entity scores) Factorial Analysis of Variances were performed on the data for each phase. The result of these analyses indicated that there were no two way interactions, ($F(1,46)=.99$, $p>.05$), ($F(1,46)=.08$, $p>.05$), and ($F(1,46)=.01$, $p>.05$) respectively. As can be seen in Table 4, entitists set the higher goals in phase 1, followed by incrementalists, while subjects who had a low incremental score and a low entity score set the highest goals in phase 2 and phase 3.

Table 4

Self-Set Goals as a Function of Incremental and Entity Scores

	Phase1 Mean/S.D.	Phase2 Mean/S.D.	Phase 3 Mean/S.D.	N
Inc2Ent1 (Incrementalists)	7.55/2.58	7.36/2.62	5.09/2.02	11
Inc1Ent2 (Entitists)	7.60/1.78	7.20/2.86	5.20/2.49	10
Inc2Ent2	7.00/2.08	7.07/2.17	4.57/2.53	14
Inc1Ent1	6.93/2.02	7.87/1.96	5.60/2.47	15

(3) To test whether true incrementalist would use better analytic strategies than entitists, 2 (incremental scores) x 2 (entity scores) Factorial Analysis of Variances were first performed on the strategy scores for each phase, then on the decision activity score for each phase. The results of these analyses showed that there were no two way interactions between incremental scores and entity scores for strategy score, ($F(1,46)=.09$, $p>.05$), ($F(1,46)=.72$, $p>.05$) and ($F(1,46)=.31$, $p>.05$) or for decision activity, ($F(1,46)=.41$, $p>.05$), ($F(1,46)=.55$, $p>.05$), and ($F(1,46)=.42$, $p>.05$), respectively. The combined results of Table 5 and Table 6 indicated that although there were no significant differences between the means, at phase 1, subjects with a low incremental score and a low entity score used better analytic strategies. At phase 2, subjects with a high incremental score and a high entity score achieved the highest strategy score, while entitists had the best decision activity score. At phase 3, entitists used the better analytic strategy.

Table 5

Strategy score as a Function of Incremental and Entity Scores

	Phase1 Mean/S.D.	Phase2 Mean/S.D.	Phase 3 Mean/S.D.	N
Inc2Ent1 (Incrementalists)	2.64/0.54	1.50/0.72	2.23/0.40	11
Inc1Ent2 (Entitists)	2.47/0.59	1.68/1.00	2.55/0.53	10
Inc2Ent2	2.55/0.56	1.94/0.67	2.52/0.70	14
Inc1Ent1	2.66*/0.59	1.61/0.68	2.43/0.53	15

*Higher scores indicates better analytic strategy

Table 6

Decision Activity as a Function of Incremental and Entity Scores

	Phase1	Phase2	Phase 3	N
	Mean/S.D.	Mean/S.D.	Mean/S.D.	
Inc2Ent1 (Incrementalists)	5.77/3.28	6.26/3.43	7.91/3.03	11
Inc1Ent2 (Entitists)	6.10/2.67	5.87/3.34	5.90/1.30	10
Inc2Ent2	7.41*/1.85	7.42/2.06	7.05/2.84	14
Inc1Ent1	5.44/2.77	6.04/3.59	7.66/2.00	15

*Higher scores indicate poorer analytic strategy

(4) To test the overall effect of implicit theory of intelligence scores on organizational performance, a 2 x 2 Factorial Analysis of Variance was performed on the performance data for each phase. The two way interactions between incremental scores and entity scores were not significant for phase 1 or phase 2, ($F(1,46)=.17$, $p>.05$) and ($F(1,46)=.07$, $p>.05$) respectively. In phase 3 however, there was a significant interaction ($F(1,46)=4.23$, $p<.05$) between incremental scores and entity scores. Simple main effects tests indicated that at phase 3, entitists were significantly different from subjects who had a high incremental score and a high entity score. Here, Entitists had the highest organizational performance ($F(1,22)=8.00$ $p<.05$). The means and standard deviations for each phase are presented in Table 7. The data indicated that at phase 1, subjects with a low incremental score and a low entity score gained the higher performance. Incrementalists achieved the second highest

performance score at phase 1. At phase 2, entitists gained the highest performance attainments.

Table 7

Performance as a Function of Incremental and Entity Scores

	Phase1 Mean/S.D.	Phase2 Mean/S.D.	Phase 3 Mean/S.D.	N
Inc2Ent1 (Incrementalists)	115.5/19.3	92.2/19.0	163.2/4.6	11
Inc1Ent2 (Entitists)	116.3/13.7	088.1/19.5	158.3/8.7	10
Inc2Ent2	121.2/15.4	096.0/17.7	165.5/3.3	14
Inc1Ent1	114.4*/15.8	087.1/18.7	162.2/4.1	15

* The fewer the production hours, the higher the organizational performance.

(5) To test whether instating ability as an attainable skill or as a stable entity had an effect on theory of intelligence scores at each phase, 2 (instruction group) x 2 (incremental scores) x 2 (entity scores) Factorial Analysis of Variances were performed on the data.
a. Table 8 showed that there was a significant three way interaction between the three factors, for perceived self-efficacy. However, simple main effects tests did not reveal significant two way interactions between incremental and entity scores.
b. Table 8 also showed that there was a significant three way interaction between instruction group; incremental scores and entity scores for self-set goals at phase 1, phase 2 and phase 3. As can be

seen in Table 9, analysis of the three way interaction at phase 1, produced a significant two way interaction between incremental scores and entity scores, when instruction group was incremental. Follow up tests to the simple main effects tests, revealed that when instruction group was incremental and incremental score was low, there was a significant difference between entitists and subjects who had a low incremental score and a low entity score. Entitists set the highest goals in this condition ($F(1,9)=9.26$, $p<.05$). Within the incremental condition, follow up tests also showed that compared to subjects with a high incremental score and a high entity score, entitists set significantly higher goals ($F(1,10)=6.21$ $p<.05$).

As can be seen in Table 9, analysis of the three way interaction for self-set goals, at phase 2, produced a significant two way interaction between incremental scores and entity scores. That is, when instruction group was incremental and entity score was high, there was a significant difference between entitists and subjects with a high incremental score and a high entity score. In this condition, entitists set the higher goals ($F(1,10)=4.82$, $p<.05$). Follow up tests of the simple main effects tests also showed that when instruction group was entity and incremental score was low, subjects with a low incremental score and a low entity score, set significantly higher goals than entitists ($F(1,12)=5.49$, $p<.05$).

Even though Table 8 delineates a significant three way interaction for self-set goals, at phase 3, there were no significant two way interactions, at each level of instruction.

c. Tests for two way interactions between incremental scores and entity scores for performance, at phase 1, were non significant.

Table 8

Three way Factorial Analysis for Perceived Self-Efficacy, Self-Set goals, Analytic Strategies and Organizational Performance.

	Phase1	Phase2	Phase3
Variable and Test	F	F	F
Percieved Self-Efficacy			
Group	.02	1.03	1.58
Increm scores	.71	2.32	2.02
Entity scores	.00	.00	.03
G*I	.81	.47	.59
G*E	.06	.12	.21
I*E	.31	.47	.02
G*I*E	5.70*	2.64	.08
Self-Set Goals			
Group	.13	.00	.52
Increm scores	.00	.27	.87
Entity scores	.01	.57	.46
G*I	.15	.22	2.29
G*E	.20	.39	.19
I*E	.98	.05	.00
G*I*E	11.79***	10.31**	4.08*
Strategy Score			
Group	.43	.03	1.59
Increm scores	.07	.10	.37
Entity scores	.76	1.33	1.71
G*I	5.03*	.34	.27
G*E	.20	.01	3.16
I*E	.11	.65	.40
G*I*E	.00	1.22	1.70

Decision Activity			
Group	.00	.35	.58
Increm scores	1.04	.71	.76
Entity scores	2.19	.30	3.39
G*I	.05	.86	.06
G*E	1.51	.01	.04
I*E	.23	.62	.57
G*I*E	.74	.19	1.80
Performance			
Group	.01	.02	1.13
Increm scores	.44	1.44	5.78*
Entity scores	.71	.20	.20
G*I	.05	.03	.03
G*E	.11	.59	.01
I*E	.15	.11	4.51*
G*I*E	5.72*	2.24	.28

*p<.05 **p<.01 ***p<.001

Table 9

Analysis of the 3 way interactions

Phase 1	F
Self-Set Goals	
Group (at level 1= incremental instruction)	
I*E	10.17**[3]
Phase 2	**F**
Self-Set Goals	
Group (at level 1=incremental instruction)	
I*E	4.49*
Group (at level 2= entity instruction)	
I*E	5.80*

*p<.05 **p<.01

Indices of Self-Regulatory Mechanisms and Performance between Phase 1 and Phase 2 and between Phase 2 and Phase 3

(6) To assess change over time on indices of perceived self-efficacy, self-set goals, analytic strategy and organizational performance, a mixed model repeated measures ANOVA was performed with time (3 assessment phases) as the within-subjects factor and group (incremental or entity instruction), incremental scores (high or low), and entity scores (high or low), as the between subjects factors. As well, a mixed model repeated measures ANOVA was performed with time (3 assessment phases) as the within-subject factor and group (incremental or entity instruction) as the between subject factor. This was an attempt to replicate the

effects of implicit theories of intelligence, found in Bandura and Wood (1989), Wood and Bandura (1989a) and Wood, Bandura and Bailey (1990). Table 10 presents this analysis. Most noteworthy, is the fact that none of the two way interactions between conceptions of ability and time were significant.

Table 10

Repeated measures analysis for Perceived Self-Efficacy, Self-Set goals, Analytic Strategies and Organizational Performance.

Variable and Test	F	Sig. of F
Perceived Self-Efficacy		
Group	.81	.37
Phase	32.27	.00
G*P	.74	.48
Self-Set Goals		
Group	.13	.72
Phase	38.25	.00
G*P	.24	.80
Strategy Score		
Group	1.00	.32
Phase	30.93	.00
G*P	.28	.76
Decision Activity		
Group	.49	.49
Phase	3.32	.04
G*P	.30	.74
Performance		
Group	.04	.84
Phase	643.11	.00
G*P	.18	.84

Table 11

Repeated measures analysis for Perceived Self-Efficacy, Self-Set goals, Analytic Strategies and Organizational Performance.

Variable and Test	F	Sig. of F
Self-Efficacy		
Group	1.41	.24
Incremental scores	1.99	.17
Entity scores	.02	.90
Phase	28.66	.00
G*I*E*P	3.22	.05
Self-Set Goals		
Group	.98	.33
Incremental scores	.53	.47
Entity scores	.06	.80
Phase	33.40	.00
G*I*E*P	.78	.46
Strategy Score		
Group	.70	.41
Incremental scores	.01	.94
Entity scores	1.16	.29
Phase	30.87	.00
G*I*E*P	1.69	.19
Decision Activity		
Group	.38	.54
Incremental scores	1.34	.25
Entity scores	.01	.92
Phase	2.25	.11
G*I*E*P	2.44	.09
Performance		
Group	.03	.86
Incremental scores	1.74	.19

Entity scores	.11	.74
Phase	604.02	.00
G*I*E*P	4.47	.01

Table 11 above, has presented the results of all four factors entered into the ANOVA. As indicated, there was a four way interaction between instruction group, incremental scores, entity scores and phase, for perceived self-efficacy ($F(2,84)=3.22$ $p<.05$) and organizational performance ($F(2,84)=4.47$ $p<.01$). Figures 3 and 4 illustrates the relationship between the four levels of implicit theories of intelligence for perceived self-efficacy.

Figure 3. The Relationship between Assessment Phase and Perceived Self-Efficacy at each Level of Implicit Theories of Intelligence within the Incremental Instruction Group.

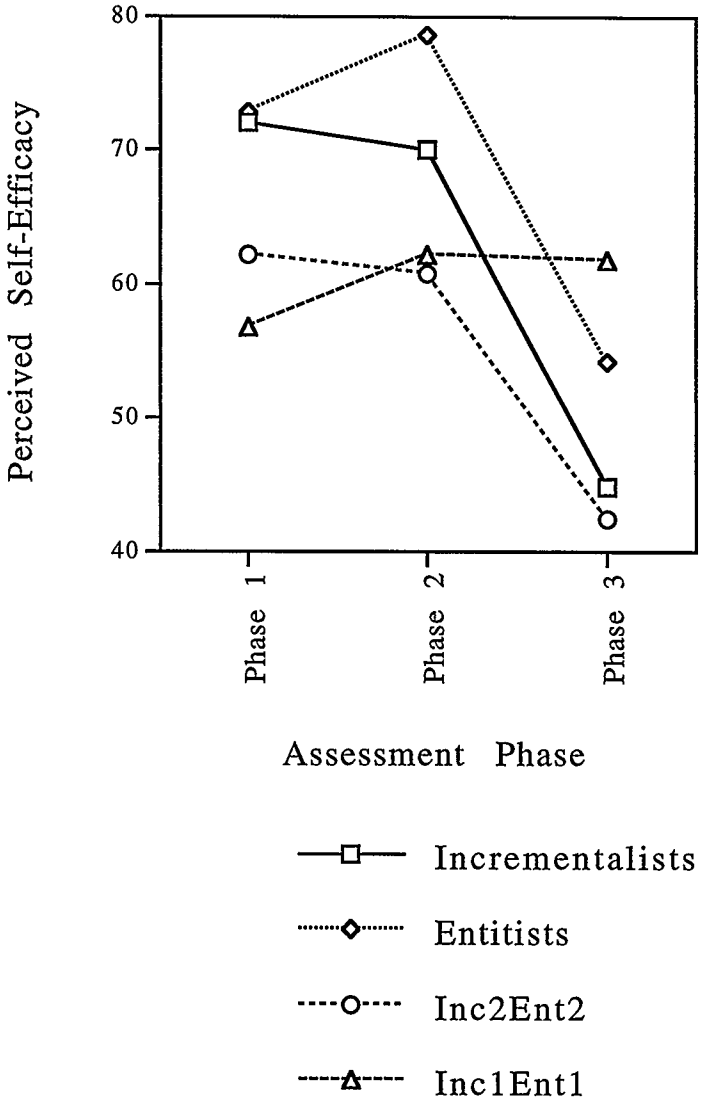
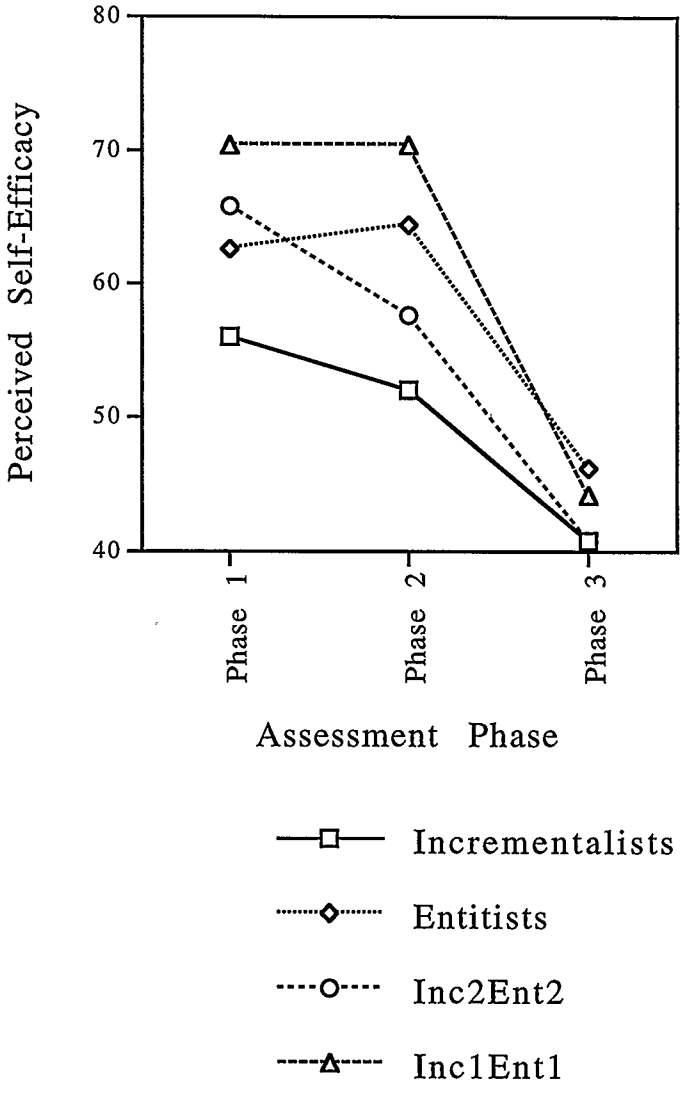


Figure 4. The Relationship between Assessment Phase and Perceived Self-Efficacy at each Level of Implicit Theories of Intelligence within the Entity Instruction Group.



1) Initially, within both the incremental and entity instruction conditions, subjects adhering to all four levels of implicit theories of intelligence, expressed a moderately strong sense of managerial efficacy. Figures 3 and 4 demonstrated that across all three phases, within both the incremental and entity instruction conditions, incrementalists and entitists maintained the same position relative to each other, although their positions changed, relative to the other levels of implicit theories of intelligence. Within the incremental instruction condition, entitists expressed the highest self-efficacy, across all three phases, while incrementalists expressed the second highest self-efficacy. However, within the entity instruction condition, entitists expressed the second highest perceived self-efficacy, while incrementalists displaced the worst self-efficacy, across all three phases. Moreover, as subjects continued to fulfill the difficult production standards, Entitists expressed higher efficacy at phase 2, but displayed a decline in perceived self-efficacy when faced with new tasks demands at trial thirteen. Incrementalists on the other hand, displayed a progressive decline in perceived self-efficacy from phase 1.

To get a better idea of the four way interaction for perceived self-efficacy, (see Table 11) follow up tests were conducted. Tables 12 and 13 present these results.

Table 12
Analysis of the 4 way interaction

Variable and Test	F
Self-Efficacy	
Entity score (at level 1=low)	
G*I*P	5.26**[3]
Phase (at level 1)	
G*I*E	5.70*

*p<.05 **p<.01

Table 13

Analysis of the 3 way interactions

Variable and Test	F
Self-Efficacy	
Entity score (at level 1=low)	
Group (at level 1=incremental instruction)	
I*P	5.58**[3]
Incremental score (at level 1=low)	
G*P	4.46*
Phase (at level 1)	
Incremental score (at level 1=low)	
G*E	4.20*
Entity score (at level 1=low)	
G*I	4.13*

*p<.05 **p<.01

Since assessing change over time was of interest, mean comparisons were performed for only the two way interactions that included phase.

Follow up tests indicated that when entity was low and instruction group was incremental, low and high incremental scores were not significantly different at phase 1 ($F(1,11)=1.98$ $p>.05$) , phase 2 ($F(1,11)=.47$ $p>.05$), or phase 3 ($F(2,84)=1.98$ $p>05$). As well, when entity score was low and incremental score was low, there was not a significant difference between incremental instruction and entity instruction at phase 1 ($F(1,13)=2.40$ $p>.05$), phase 2 ($F(1,13)=.51$ $p>.05$), or phase 3 ($F(1,13)=3.22$ $p>.05$). At phase 1, when incremental score was low, there were no significant mean differences between levels of instruction and levels of entity scores. Finally, at phase 1, when entity was low, there were no significant

mean differences between levels of instruction and levels of incremental scores.

2) Even though there was not an initial four way interaction between the four factors for self-set goals, according to Figures 5 and 6, self-set goals followed a similar pattern of change within both the incremental and entity instruction condition. That is, in the incremental instruction condition, entitists set for themselves the highest goals across all three phases, while incrementalists set the second highest goals. In the entity instruction condition, again, incrementalists dropped markedly, relative to their standing in the incremental instruction condition. As well, in the incremental instruction condition, while entitists increased their goal setting in the second phase and decreased it in the third phase following new task demands, incrementalists displayed a progressive decline in goal setting from phase 1. This relationship was reversed in the entity instruction condition.

Figure 5. The Relationship between Assessment Phase and Self-Set Goals at each Level of Implicit Theories of Intelligence within the Incremental Instruction Group.

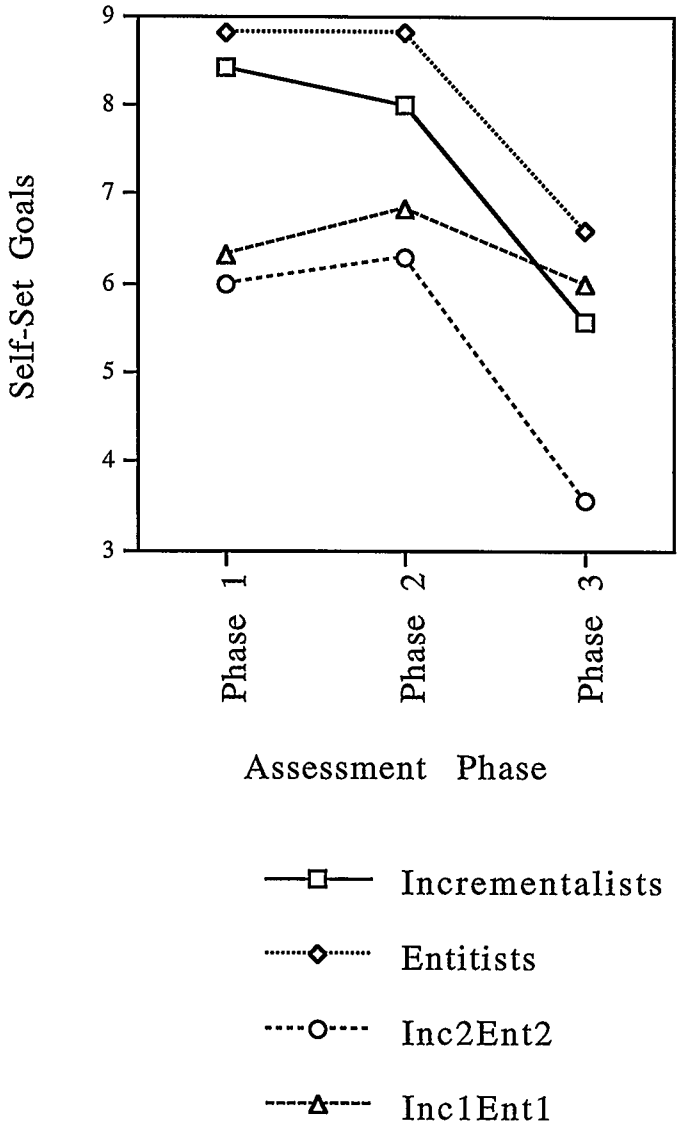
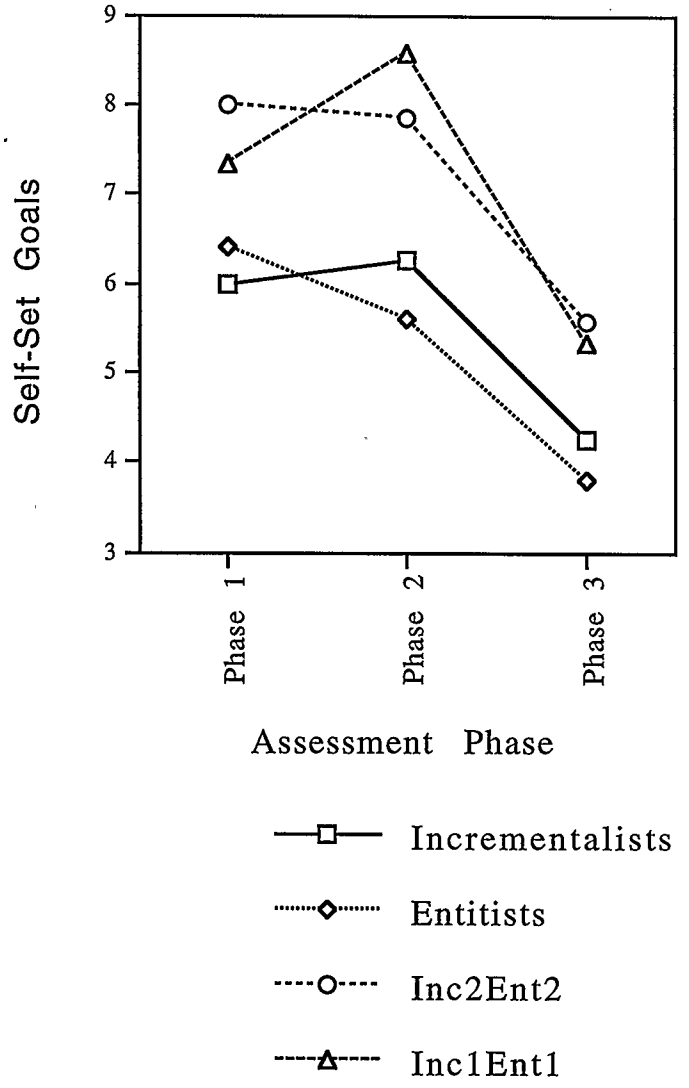


Figure 6. The Relationship Between Assessment Phase and Self-Set Goals at each Level of Implicit Theories of Intelligence within the Entity Instruction Group.



3)

a. Figures 7 and 8 illustrate the pattern of change for the four levels of implicit theories of intelligence for strategy score. Initially, within both the incremental and entity conditions, all subjects were systematic in their use of analytic strategies in testing the impact of job allocations and motivational factors on performance. As subjects continued to perform the simulation task, they became less efficient, but again became increasingly more systematic in their testing of managerial options, by phase 3. In the incremental instruction condition, relative to the other levels, incrementalists were systematic in their use of analytic strategies. However, in the entity instruction condition, their use of decision-making skills dropped markedly.

Figure 7. The Relationship Between Assessment Phase and Strategy Score at each Level of Implicit Theories of Intelligence within the Incremental Instruction Group.

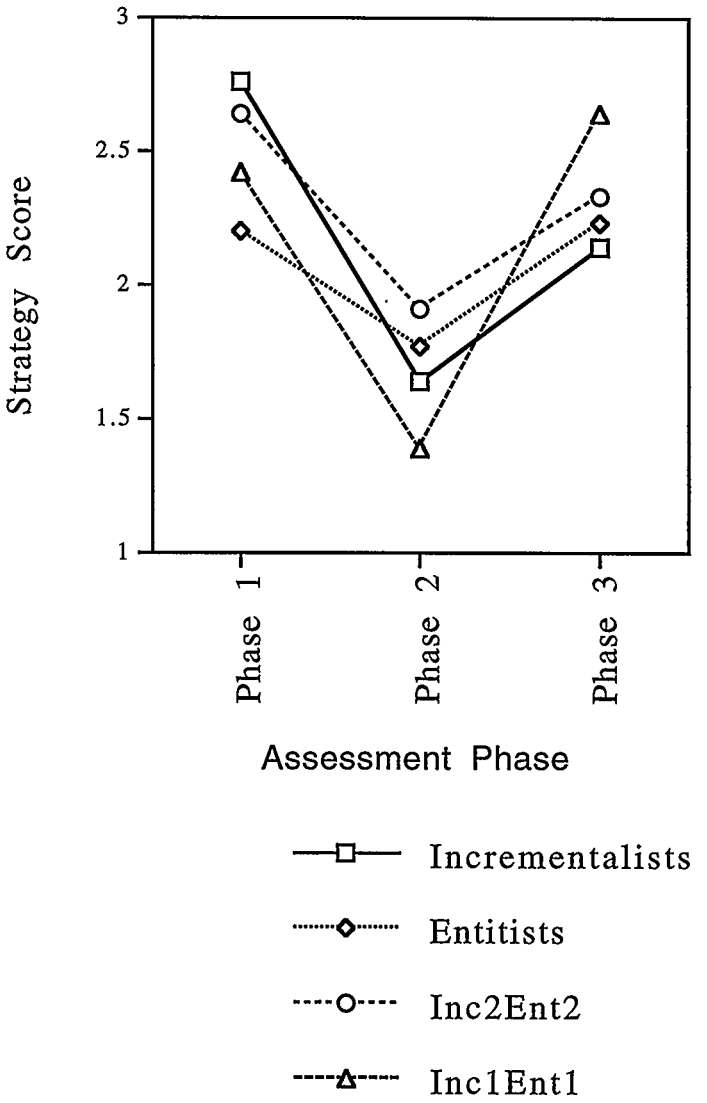
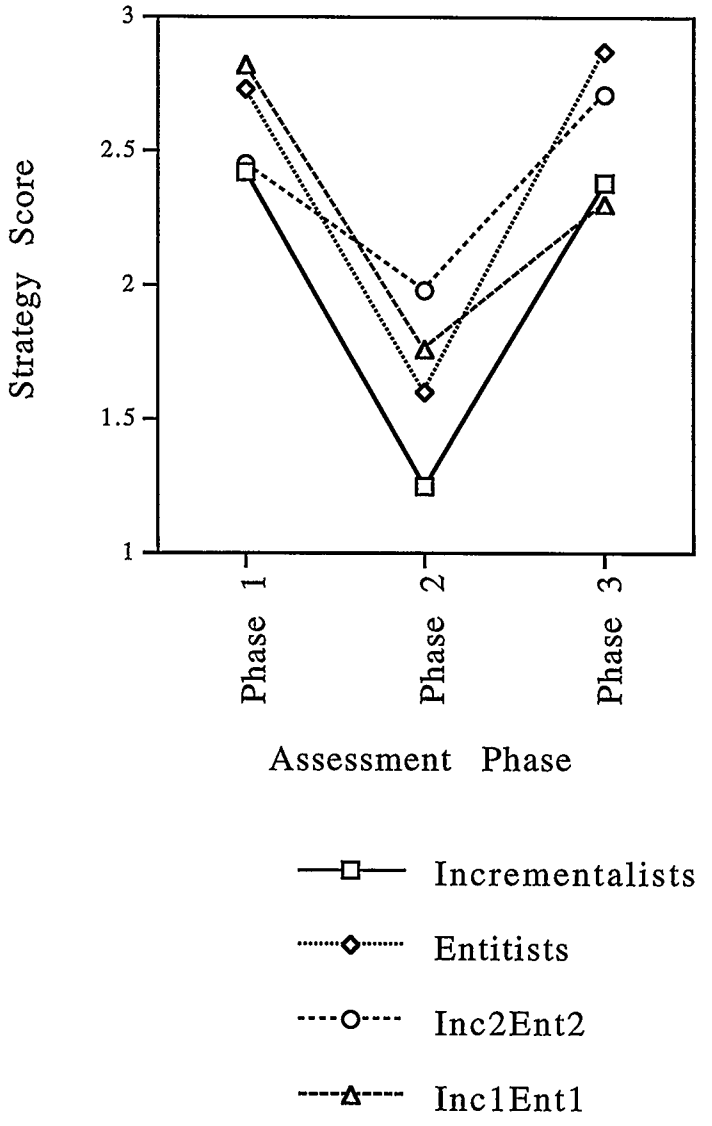


Figure 8. The Relationship Between Assessment Phase and Strategy Score at each Level of Implicit Theories of Intelligence within the Entity Instruction Group.



b. Although there was not a significant four way interaction between instruction group, incremental score, entity score, and phase for decision activity, Figures 8 and 10 show that as subjects managed the simulation, the four levels of implicit theories of intelligence became more divergent. At phase one, within the incremental instruction group, incrementalists changed fewer job allocations and motivational factors in their efforts to discover optimal decision rules. Entitists were third best in their systematic changes. As they continued to perform the task, both incrementalists and entitists became progressively worse in their strategic thinking, with incrementalists becoming erratic in their changes by phase 3. At phase 1, within the entity instruction condition, incrementalists changed more factors, while entitists made fewer systematic changes. As they continued to fulfill the difficult production standard, both incrementalists and entitists remained divergent, but made fewer changes.

Figure 9. The Relationship Between Assessment Phase and Decision Activity at each Level of Implicit Theories of Intelligence within the Incremental Instruction Group.

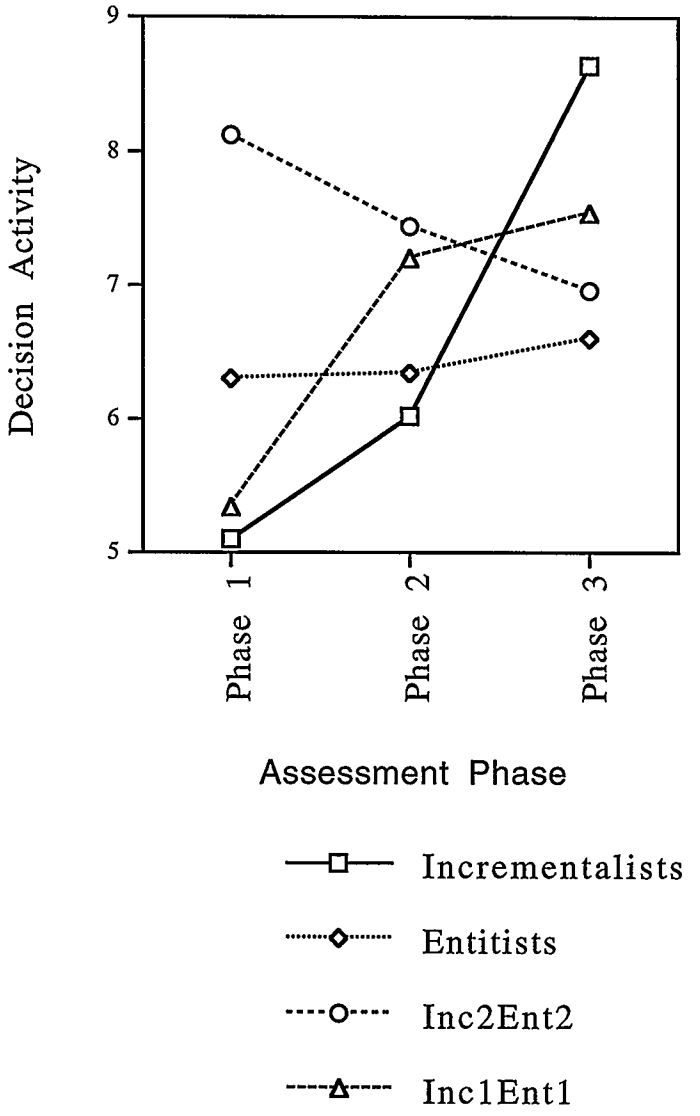
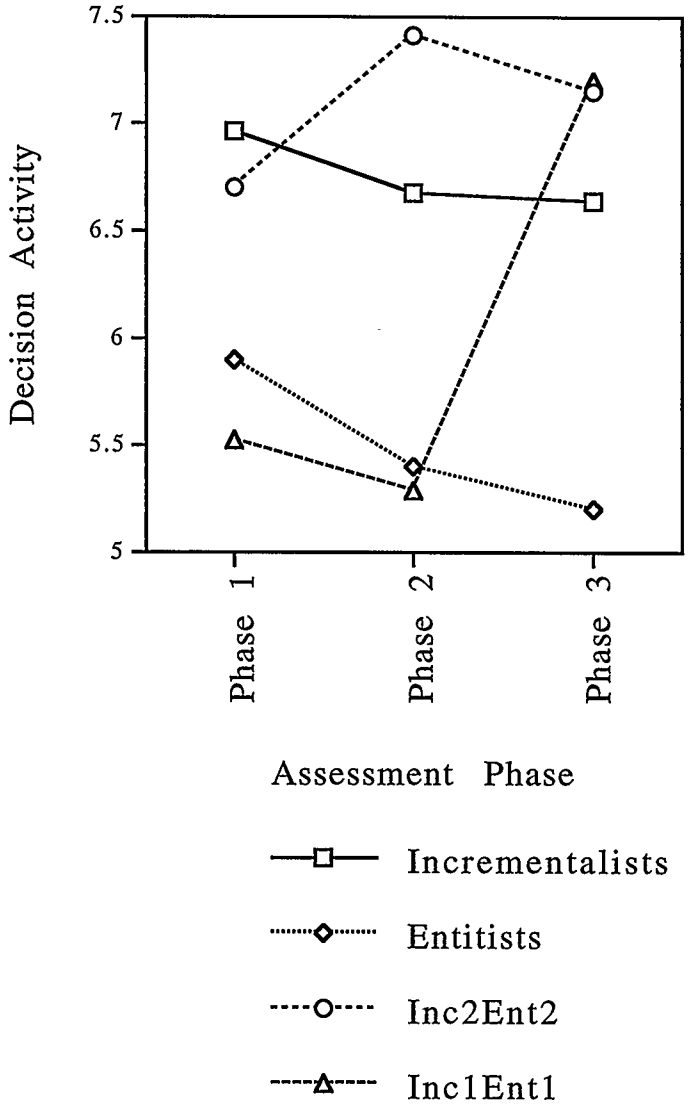


Figure 10. The Relationship Between Assessment Phase and Decision Activity at each Level of Implicit Theories of Intelligence within the Entity Instruction Group.



4) Figures 11 and 12 show the pattern of change for the four levels of implicit theories of intelligence within the two instruction groups, for organizational performance. Within both the incremental and entity instruction conditions, subjects performed below the preset standard of productivity. All subjects attained similar levels of performance in the early trials of organizational management. Relative to the preset standard, all subjects improved their performance at phase 2 and again improved performance at phase 3, relative to the more difficult standard. In the incremental instruction condition, entitists attained the greatest performance across all three phases, while incrementalists achieved the second best performance. Within the entity instruction condition, the organizational performance for both incrementalists and entitists dropped markedly.

Figure 11. The Relationship between Assessment Phase and Organizational Performance at each Level of Implicit Theories of Intelligence within the Incremental Instruction Group.

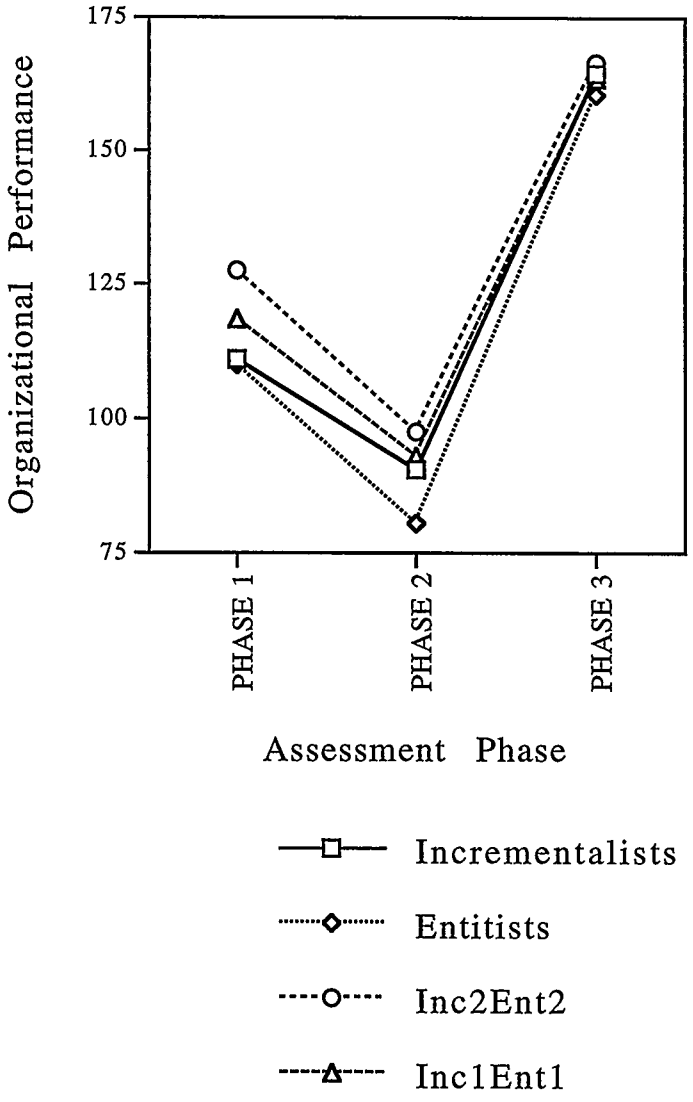
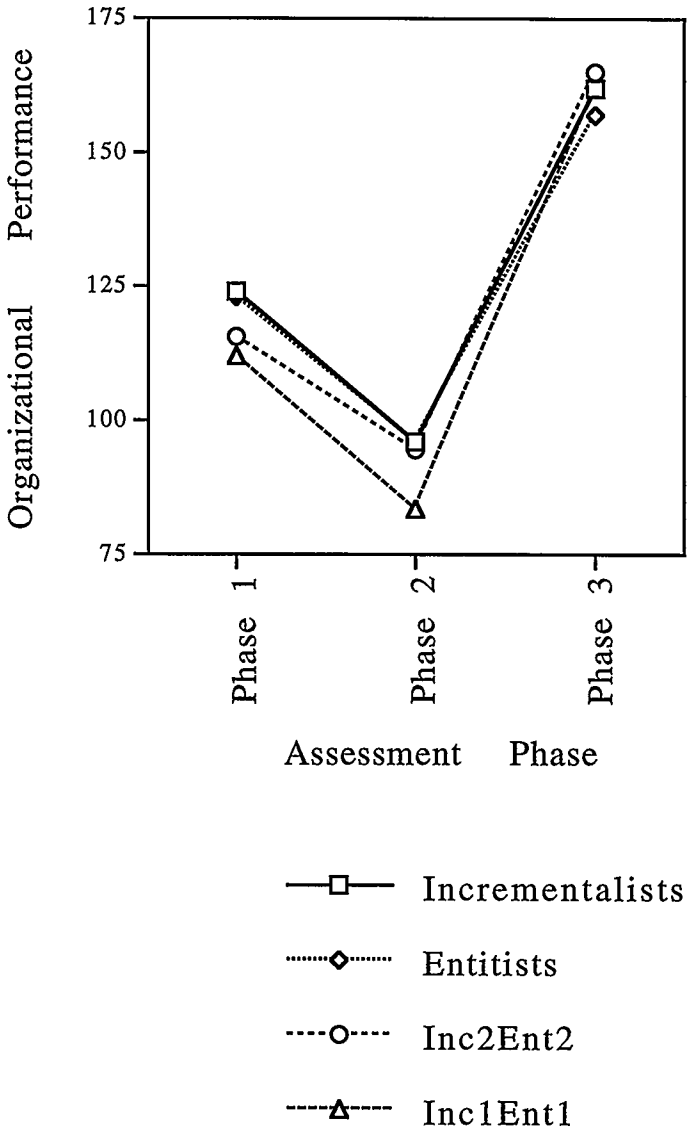


Figure 12. The Relationship between Assessment Phase and Organizational Performance at each Level of Implicit Theories of Intelligence within the Entity Instruction Group.



To get a better idea of the four way interaction for organizational performance, (see Table 11) follow up tests were conducted. Tables 14 and 15 present these results.

Table 14

Analysis of the 4 way interaction

Variable and Test	F
Performance	
Entity score (at level 2=high)	
G*I*P	3.05*[3]
Group (at level 2=entity instruction)	
I*E*P	3.09*
Phase (at level 1)	
G*I*E	5.72*
Phase (at level 3)	
Incremental score	5.80*
I*E	4.50*

*p<.05

Table 15

Analysis of the 3 way interactions

Variable and Test	F
Performance	
Entity score (at level 2=high)	
Phase (at level 1)	
G*I	4.42*[3]
Group (at level 2=entity instruction)	
Icremental score (at level 1=low)	
E*P	3.21*
Phase (at level 1)	
Entity score (at level 2=high)	
G*I	4.42*
Phase (at level 3)	
I*E	4.50*

*p<.05

Analysis of the two way interactions for organizational performance, revealed that at phase 1, when entity score was high, there were no significant differences between the levels of instruction group and incremental score. As well, when a low incremental score was coupled with the entity instruction group, there were no significant differences between the levels of entity score at phase 1 ($F(1,12)=2.10$ $p>.05$), phase 2 ($F(1,12)=1.40$ $p>.05$) or phase 3 ($F(1,12)=2.03$ $p>.05$). Other follow tests also revealed that at phase 1, when entity score was high, there were no significant differences between the levels of instruction group and incremental score. Finally, at phase 3, a low incremental score proved to be significantly different from a high incremental score, when entity was high. That is, entitists were significantly different from subjects who had a high incremental score and a high entity score. Here,

Entitists had the highest organizational performance ($F(1,22)=8.00$ $p<.05$).

Discussion

The results of Study 2 indicate that at each phase, where significant differences were found, contrary to expectations as well as previous research, entitists in fact, had the higher indices on self-regulatory mechanisms and performance. As well, unexpectedly, entitists proved to be differentially effective in both instruction conditions.

An attempt to replicate the effects of conceptions of ability on self-regulatory mechanisms over time (e.g., Wood & Bandura, 1989a), with these data, proved unsuccessful. However, when all the hypothesized factors were added into the model, two four way interactions for self-efficacy and organizational performance emerged. This finding provides partial supporting evidence that individuals do in fact, simultaneously adhere to both implicit theories of intelligence belief systems, and their associated rules, logic and algorithms, cause people to behave quite differently. Although follow up tests to the four way interactions indicated that over the long run, incrementalists did not differ significantly from entitists or any other level of implicit theories of intelligence, the data suggests that across all self-regulatory mechanisms as well as performance, entitists attained the highest indices in the incremental instruction condition as well as the entity instruction condition. Incrementalists on the other hand, appear to attain relatively high indices in the incremental condition, but not fare as well in the entity instruction condition.

Since all the hypothesized relationships were not fully teased out, it may be due to the small sample size. As well, since instruction group appears to differentially affect the levels of implicit theories of intelligence, a control instruction group could give a baseline measure for the self-regulatory mechanisms and performance. This way, the effects of instruction group could be more fully teased out. Finally, since people in complex, dynamic organizational settings are

often working under deadlines, giving subjects a time limit for completing the simulated task, could explore this relationship. These concerns were addressed in Study 3.

Study 3

Overview

In an attempt to more fully demonstrate the impact of implicit theories of intelligence on self-regulatory mechanisms and performance in Study 3, the sample size was increased to ninety subjects. Secondly, in an attempt to ascertain baseline measures of perceived self-efficacy, self-set goals, strategy score, decision activity and performance, a control instruction group was also added to the design. Subjects designated to this group, were not given conception of ability instructions. Thirdly, to further simulate real world working conditions, where people work under deadlines, subjects were given exactly one hour to complete the organizational simulation.

Hypotheses

Consistent with Study 2.

Method

Participants

Subjects were 90 undergraduate psychology students recruited from the University of Calgary subject pool and from undergraduate psychology classes at the University of Calgary. The sample consisted of 32 males and 58 females, with the mean age of the sample being 23 years (s.d. = 5, range = 19 to 40).

Design

The experiment consisted of a 3 (instruction group) x 2 (incremental score) x 2 (entity score) x 3 (assessment phase) design.

Subjects were randomly assigned to one of the three instruction groups: (1) incremental instruction group where conception of ability was induced as an acquirable skill; (2) entity instruction group where conception of ability was induced as a fixed entity; an (3) a control group where no instruction was given. In addition to the instruction groups outlined above, subjects were also assigned incremental and entity scores (i.e., high or low, using a median split), depending on their assessed incremental and entity scores. Instruction group, incremental score and entity score were between-subjects variables and assessment phase was a repeated measure variable.

Simulated Organization/Induction of Conceptions of Ability/Measures

Consistent with Study 2.

Procedure

The experiment was run in several one and a half hour sessions with between 5 and 22 subjects participating in each session. Subjects were initially assessed, to determine their implicit theory of intelligence scores, using the revised version of the M. Bandura and Elliott (1990) ten item scale. Subjects were then randomly assigned to one of three experimental conditions. Within the entity instruction group, the subject's conception of ability was verbally induced as a fixed entity. Subjects were told that the simulation was a vehicle for gauging their underlying cognitive capabilities, and they should avoid making any mistakes. In the incremental instruction group, conception of ability was induced as an acquirable skill. Subjects were told that making mistakes was a part of learning and the simulation was as vehicle for mastering complex decision making. The third group was designated the control group and subjects received no instructions.

The subjects were told that they had exactly one hour to complete the task and therefore should use the clock on the wall to pace their progress. They were then instructed on how to use the computer keyboard. After they read the introductory information and the descriptive profiles of the employees and subfunctions on the computer terminal, they were then asked if there were any questions. After all questions were answered, the subjects

performed the simulation at the computer terminal. Subjects received information about the weekly production orders, the roster of available employees, and feedback on the organizational's level of productivity on the computer screen.

All data were collected in the context of the simulation, which included a total of 18 trials. The scales of the different self-regulatory measures were presented on the monitor following trials 6, 12, and 18. Subjects recorded their responses on the keyboard. The first assessment was conducted after the sixth trial so that the subjects would have some experience with the simulation before being asked to judge their perceived self-efficacy and to set goals for themselves.

After the final trial, the experimenter gave the subjects a full explanation of the nature and purpose of the study. They learned that they had performed the organizational simulation against a difficult performance standard (Wood & Bandura, 1989a).

Results

Again, an attempt was made to replicate the effects of conceptions of ability on self-regulatory mechanisms over time (e.g., Wood & Bandura, 1989a), with these data. A mixed model repeated measures ANOVA was performed, with time (3 assessment phases) as the within-subject factor and group (incremental or entity instruction) as the between subject factor. Table 16 delineates this analysis. Most noteworthy, is the fact that none of the two way interactions between conceptions of ability and time were significant.

Table 16

Repeated measures analysis for Perceived Self-Efficacy, Self-Set goals, Analytic Strategies and Organizational Performance.

Variable and Test	F	Sig. of F
Perceived Self-Efficacy		
Group	.17	.68
Phase	56.33	.00
G*P	.14	.87
Self-Set Goals		
Group	.88	.35
Phase	50.99	.00
G*P	.24	.79
Strategy Score		
Group	.32	.57
Phase	66.89	.00
G*P	2.53	.08
Decision Activity		
Group	1.53	.22
Phase	9.67	.00
G*P	.65	.52
Performance		
Group	.02	.88
Phase	723.88	.00
G*P	.00	.99

To assess change over time on indices of perceived self-efficacy, self-set goals, analytic strategy and organizational performance, a mixed model repeated measures ANOVA was performed with time (3 assessment phases) as the within-subjects factor and group (incremental instruction, entity instruction and control instruction), incremental scores (high or low), and entity scores (high or low), as the between subjects factors. As indicated in Table 17, unexpectedly, there were no four way interactions.

Table 17

Repeated measures analysis for Perceived Self-Efficacy, Self-Set goals, Analytic Strategies and Organizational Performance.

Variable and Test	F	Sig. of F
Self-Efficacy		
Group	1.55	.22
Incremental scores	.34	.56
Entity scores	4.85	.03
Phase	72.25	.00
G*I*E*P	.42	.79
Self-Set Goals		
Group	.83	.44
Incremental scores	.00	.96
Entity scores	1.07	.30
Phase	61.58	.00
G*I*E*P	.36	.84
Strategy Score		
Group	.56	.57
Incremental scores	.08	.78
Entity scores	1.58	.21
Phase	91.83	.00
G*I*E*P	1.04	.39
Decision Activity		
Group	2.09	.13
Incremental scores	.95	.33
Entity scores	2.62	.11
Phase	18.07	.00
G*I*E*P	.75	.56
Performance		
Group	.24	.79
Incremental scores	.16	.70
Entity scores	1.47	.23

Phase	815.58	.00
G*I*E*P	1.25	.29

Discussion

Taken together, all the findings provide partial supporting evidence that individuals do in fact, simultaneously adhere to both implicit theory of intelligence belief systems, whose associated rules, logic and algorithms, orient people to different patterns of behavior.

All prior research using Wood and Bailey's (1985) simulated organization (e.g., Wood & Bandura, 1989a; Bandura & Wood, 1989; Wood, Bandura, & Bailey, 1990; Bandura and Jourden, 1991; Jourden, Bandura, & Banfield, 1991) have experimentally induced implicit theories of intelligence. The current research was unique in that implicit theories of intelligence was conceptualized as two distinct and separate belief systems, where individuals could adhere to both systems simultaneously, and lay along different points of each system. In Study 1, results unequivocally demonstrated that implicit theories of intelligence are in fact two distinct and uncorrelated belief systems.

Dependent Variable Measures at Phase 1, Phase 2, and Phase 3

Research by Bandura (e.g., 1986, 1991a) have supported the fact that people must have a robust sense of personal self-efficacy to sustain the perseverant effort to succeed. A resilient perceived self-efficacy in turn, enhances organizational performance both directly and indirectly by its effects on personal goals and on use of analytic strategies (Wood & Bandura, 1989a). The stronger an individual's perceived self-efficacy, the more challenging and more systematic they use strategies to discover managerial rules. High self-set goals and systematic strategies in turn, enhance the level of organizational performance. It was hypothesized that since true incrementalists are conceptually similar to individuals experimentally induced to adapt such an orientation, they would judge capabilities more in terms of

personal improvements, and entitists, who are conceptually similar to individuals experimentally induced to adapt such an orientation, they would judge capabilities more in terms of competencies. Thus, it was expected that perceived self-efficacy, self-set goals, analytic strategies and performance would be sustained at a higher level, for true incrementalists, at all three phases. Contrary to these expectations, and previous research, the results of Study 2, indicated that where significant differences were found, entitists in fact, had the higher indices on self-regulatory mechanisms as well as performance. As well, unexpectedly, entitists proved to be differentially effective in both instruction conditions.

Although these findings were unexpected, they are not surprising. Research indicates that individuals can possess two broad goal orientations (e.g., Dweck 1986; Dweck & Leggett, 1988; Nicholls, 1984). Individuals may have a learning orientation in which they are focused on task mastery and improving their performance. On the other hand, individuals may have a performance goal orientation, in which they attempt to demonstrate their competencies and establish superiority over others (Nicholls, 1989). Moreover, some theorists have shown that not only is it possible to differentiate people who have a learning orientation from those who have a performance orientation, but that these two goal orientations are orthogonal (Duda, 1989; Goudas, Biddle & Fox, 1994; cited in Franken & Brown, 1995). In this regard, Kanfer (1990) has argued that specific difficult goals (e.g., the simulated task) lead to a performance orientation, while vague goals lead to a learning orientation. That is, the simulated task, seems more suitable for an entitist's performance goal orientation. Locke and Latham (1990) have also corroborated Kanfer's contention. They claim that if tasks are complex, the direct goal mechanisms of effort, and persistence are not sufficient to ensure high performance. Subjects have to learn the best strategies to use. The subjects with specific, hard goals might feel pressure to perform well immediately. Hard goals subjects may therefore have tunnel vision, focusing more on the desire to get immediate results than on learning the best way of performing the task. Wood, Bandura, and Bailey (1990) give direct

evidence to support Lock and Latham. In their study, specific, hard goals led to better performance than "do best goals" on the low-complexity version of the game (three employees) but did not do so on the high-complexity version of the game (eight employees).

Indices of Self-Regulatory Mechanisms and Performance between Phase 1 and Phase 2 and between Phase 2 and Phase 3 for Study 2.

An attempt to replicate the effects of conceptions of ability on self-regulatory mechanisms and performance over time (e.g., Wood & Bandura, 1989a), with the data from Study 2, proved unsuccessful. Bandura and his colleagues have consistently shown the mediating effects of conceptions of ability over different domains. For example, Wood and Bandura, 1989a, showed that conceptions of ability differentially affected managerial decision makers in a simulated organization. In Bandura and Wood (1989), the influential impact of perceived controllability on the self-regulatory factors governing group attainments was shown. People who managed the simulated organization under a cognitive set that organizations are easily changeable quickly lost faith in their managerial capabilities, even when performance standards were within easy reach. Bandura and Jourden, 1991, demonstrated the influential role self-regulatory factors play in mediating the impact of social-comparative influences on motivation and collective attainments (Bandura, 1991b). Jourden, Bandura, and Banfield (1991) delineated the fact that conceptions of ability affected self-regulatory processes and the acquisition rate of a perceptual-motor skill. In all of these studies conceptions of ability were instated through instructions that subjects read before beginning the task. These differential conceptions of ability were also embedded in instructions for the simulation task that were identical in every respect.

In Study 2, after subjects were randomly assigned to a instruction condition, conceptions of ability were induced though verbal instructions. They were also introduced to the simulation task, via information on the computer terminal. This information did not contain embedded conceptions of ability information. The

differential methods of instating conceptions of ability, could account for the different results.

One promising finding of this study was the two significant four way interactions between incremental score, entity score, instruction group and assessment phase, for perceived self-efficacy and organizational performance. This lends some credence to the new conceptualization of implicit theory of intelligence. That is, individuals do in fact, simultaneously adhere to both implicit theories of intelligence belief systems, and their associated rules, logic and algorithms, cause people to behave quite differently. Moreover, even though follow up tests to the simple main effects test indicated that there were no significant mean differences between levels of any of the factors, significant four way interactions indicate that levels of implicit theories do differ across phases, even if the differences are not significantly different from phase to phase.

The results of this study also suggests that across all self-regulatory mechanisms as well as performance, entitists attained the highest indices in the incremental instruction condition as well as the entity instruction condition. Incrementalists on the other hand, appear to attain relatively high indices in the incremental condition, but do not fare as well in the entity instruction condition. One possible explanation for this finding, could be related to feedback effects attributable to the simulated task. All subjects performed below the difficult organizational standard and at the end of each trial, they received feedback on the organization's level of productivity. Goal theory (Locke & Latham, 1990) and control theory (Klein, 1989) both predict that individuals will exert more effort when a negative discrepancy exists between a current level of performance and some desired goal or standard. This, in conjunction with the fact that according to Kanfer (1990), specific, difficult goals lead to a performance orientation, would suggest that entitists managing the simulated task within the incremental or entity instruction condition would be motivated to reduce the negative goal discrepancy. Kanfer and Ackerman (1989) have also claimed that during the early stages of skill acquisition, specific, difficult goals and intrusive feedback do not facilitate the acquisition of needed

strategies. Malone (1981) has also suggested that the early learning of complex tasks or skills be undertaken with minimal outside pressures in order to ensure efficient learning. Incrementalists, pursuing learning goals would find the outcome feedback somewhat intrusive, particularly in the entity instruction condition. As well, for incrementalists, effective strategy development could be dependent on other task-related information. On dynamically complex tasks, outcome feedback can be ineffective for learning because of the difficulty of interpreting the effects of random error (Wood, 1986).

The results of Study 2 also indicate that over the long run, true incrementalists do not differ significantly from true entitists or any other level of implicit theories of intelligence, on any of the self-regulatory mechanisms or performance. Moreover, no significant four way interactions were found for self-set goals or analytic strategies. On these issues, it may be that on complex tasks the effect of goals, is lagged in time, probably because it takes time for the individual to develop suitable strategies and plans, for these to pay off in performance (Earley, Lee, & Hanson, 1989). According to Locke and Latham (1990), on simple tasks, goal setting effects are virtually immediate. However, on complex tasks there may be a time lag in the effects of goals and strategies on performance. The lag in the effect of goals and strategies may be caused by the fact that effort does not pay off right away on complex tasks. The task strategies that are developed in response to goals take time to formulate, to master, and to affect outcome measures. Evidence for lag effects on complex tasks has been found in several studies [e.g., Shaw, 1984, Earley, Lee, Hanson, 1989; Smith, Locke, & Barry (in press), cited in Locke & Latham, 1990]. In each of these studies, goals and strategic plans only had significant effects on performance in latter trials of tasks with multiple trials or after subjects had gained experience with their jobs. Smith, Locke, and Barry, for example, using a complex task (a management game) found that significant goal setting and planning effects were not manifested until about the third hour of the total six-hour work period. Therefore, it is reasonable to assume that the simulated managerial task used in this study, did not allow sufficient time for the predicted

relationship to be born out. Thus, future studies of performance on complex, dynamic tasks should look for time lag effects.

Indices of Self-Regulatory Mechanisms and Performance between Phase 1 and Phase 2 and between Phase 2 and Phase 3 for Study 3.

Again, an attempt to replicate the effects of conceptions of ability on self-regulatory mechanisms and performance over time (e.g., Wood & Bandura, 1989a) proved unsuccessful. As indicated in Study 2, the different methods of establishing conceptions of ability in the Bandura studies versus the two studies presented here, could be the determining factor. Secondly, results of the analysis of change over time on indices of perceived self-efficacy, self-set goals, analytic strategy and organizational performance, did not reveal any four way interactions between incremental score, entity score, instruction group and assessment phase.

Study 2 consisted of fifty subjects and in a 2 x 2 x 2 x 3 design, that designates only two subjects per cell. Even though Wood and Bandura, 1989a, found significant results with only twenty four subjects, it was thought that the small sample size in Study 2 was a contributing factor to lack of support for the hypotheses. Since steps were taken to increase the sample size in Study 3, no four way interactions were unexpected. However, one of the concerns that Study 3 was designed to address, was the fact that people in complex, dynamic organizational settings are often working under deadlines. Incorporating a time limit for the simulated task could be the salient reason behind this non significant result. Research has shown that subjects with a specific, hard goal, who are undertaking a timed task, feel pressure to perform well immediately (Locke & Latham, 1990). Not only does this lead to a performance goal orientation, but unduly pressure will lead to ineffective learning of task strategies. This is consistent with the extensive literature on anxiety and performance (e.g., Ozer & Bandura, 1990). It may be that on complex tasks in which individuals are not pressured due to time restrictions and have the capacity to discover suitable plans or task strategies, there will be time-lagged effect of goals. The goals

might not help performance until subjects are able to formulate and implement workable plans. The conditions under which this will occur are not yet fully understood. Clearly studies of time-lagged effects on goals are in order.

Taken together, the results of Study 2 and Study 3 provide some insights for methodological improvements, to future research studying the effects of conceptions of ability on self-regulatory mechanisms and performance. Specifically, if implicit theory of intelligence is to be conceptualized as two distinct belief systems, where individuals can simultaneously adhere to both, then larger sample sizes are needed. It might be also useful to make sure that the different levels of implicit theories of intelligence have equal number of subjects represented in the sample. That way, each level will be equally represented in each cell of the design. In Study 3, within the incremental instruction condition, there were two incrementalists, ten entitists, twelve subjects who had a high incremental score and a high entity score and six subjects who had a low incremental score and a low entity score. Within the entity instruction condition, there were six incrementalists, five entitists, ten subjects who had a high incremental score and a high entity score and nine subjects who had a low incremental score and a low entity score. Within the control group, there were nine incrementalists, six entitists, seven subjects who had a high incremental score and a high entity score and eight subjects who had a low incremental score and a low entity score. Methodologically, it doesn't make sense to be assessing change over time on indices of the dependent variables, with such few subjects, as well as such an imbalance between the levels of implicit theories of intelligence. The results of Study 3, has also introduced the idea that time pressure could have deleterious effects on analytic strategies and ultimately performance. Future studies might want to investigate this effect more thoroughly, by designating time pressure as an independent variable.

Taken together, Studies 1, 2, and 3, have theoretical as well as practical implications. Firstly, from a theoretical perspective, if

researchers continue to induce conceptions of ability, then a rating scale, like the one used in these experiments, or others developed and normed in the future, could be used at minimum, as a manipulation check. Secondly, conceptualizing implicit theories of intelligence as two separate and distinct belief systems, where individuals simultaneous lay at different point along each system, has major theoretical underpinnings. If this conceptualization holds true, then it suggests that existing conceptualization of implicit theories of intelligence is lacking. Thirdly, this research was also unique in the sense that not only were implicit theories of intelligence measured from the onset, but then subjects were randomly assigned to one of three instruction conditions. This is of theoretical relevance, since the control group gives a baseline measure, while within the incremental and entity instruction groups, change due to instating the differential conceptions of ability can be assessed.

Certainly, one important albeit controversial practical implication lies within the organizational context. The organizational zeitgeist of today is downsizing and employers want their fewer employers to be more motivated and productive. Industry has been turning to the motivation literature, to see what factors instigate and prolong ongoing motivation. Often the problem lies in finding the proper person-job fit, and if employers know what job requirements are needed, then if they could find the proper employee, the problem would be solved. In conjunction with other selection instruments, an implicit theories of intelligence rating scale would prove fruitful in trying to match a specific employee to a specific type of job. Even more practical, is administering such a rating scale to existing employees as a means of assessing employee needs.

Although it makes intuitive sense that since true incrementalists judge capabilities more in terms of personal improvements, compared to true entitists, they would be better suited for many occupations or might even be more socially adjusted. However, this might not always be the case. A true entitist might be perfectly suited for and happy working on a conveyor belt, while a

true incrementalist, who would tend to have a bias toward creativity, might not be best suited for such an occupation.

Secondly, even though the emphasis of this research was replicating the effects of implicit theories of intelligence, this new conceptualization of intelligence has revealed two new levels of implicit theories of intelligence. That is, incremental performers (those who are high in the incremental belief system and high in the entity belief system) and unclassified (those who are low in the incremental belief system and low in the entity belief system). Since there is such a prevalence of incremental performers (e.g., lawyers, doctors, professional athletes) in our society, this group warrants further investigation. It could be hypothesized that since this group of individuals are appraised daily, and merit is contingent on good performance, they adopt performance goals. However, since they are also high in incrementalism, whenever they face obstacles or discrepancy, they adopt learning goals (e.g., training, education). It would also be of importance to discover which jobs Unclassified individuals are drawn to and how they perform in these jobs.

Conclusion

As the current studies have partially demonstrated, implicit theories of intelligence can be conceptualized as two separate and distinct belief systems, where individuals can simultaneously lie along different points of both. In this regard, implicit theories of intelligence appear to orient individuals toward different goals. These goals, in turn, set up and organize different patterns of behavior.

There is a plethora of research indicating that people's implicit theories of intelligence can affect self-regulatory mechanisms which can ultimately affect performance in many environments. Researchers must devise reliable and valid instruments to measure implicit theories of intelligence, particularly, if want to experimentally induce these conditions. Such measures would be

seminal in stimulating new research with many different theoretical orientations.

References

Ammons, R. B. (1956). Effects of knowledge of performance: A survey and tentative theoretical formulation. Journal of General Psychology, 54, 279-299.

Austin, J.T., & Bobko, P. (1985). Goal-setting theory: Unexplored areas and future research needs. Journal of Occupational Psychology, 58, 189-308.

Balcazar, F., Hopkins, B. L., & Suarez, Y. (1986). A critical, objective review of performance feedback. Journal of Organizational Behavior Management, 7, 65-89.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147.

Bandura, A. (1986). Social foundation of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1991a). Self-regulation of motivation through anticipatory and self-reactive mechanisms. In R. A. Dienstbier (Ed). Perspectives on Motivation. Nebraska Symposium on Motivation Lincoln: University of Nebraska Press.

Bandura, A. (1991b). Social cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes, 50, 248-287.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivatinal effects of goal systems. Journal of Personality and Social Psychology, 45, 1017-1028.

Bandura, A., & Cervone, D. (1986). Differential engagement of self-reactive influences in cognitive motivation. Organizational Behavior and Human Decision Processes, 38, 92-113.

Bandura, M. M., & Dweck, C.S. (1985). The relationship of conceptions of intelligence and achievement goals to achievement-related cognition, affect and behavior. Unpublished manuscript, Harvard University.

Bandura, M. M., & Elliott, E. S. (1990). Unpublished manuscript.

Bandura, A., & Jourdan, F. J. (1991). Self-regulatory mechanisms governing social-comparison effecs on complex decision making. Journal of Personality and Social Psychology, 6, 941-951.

Bandura, A., & Wood, R. E. (1989). Effects of perceived controllability and performance standards on self-regulation of complex decision-making. Journal of Personality and Social Psychology, 56, 805-814.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, 51, 1173-1182.

Bassett, G. A. (1979). A study of the effects of task goal and schedule choice on work performance. Organizational Behavior and Human Decision Processes, 24, 202-227.

Bilodeau, E. A., & Bilodeau, I. McD. (1961). Motor-skills learning. Annual Review of Psychology, 12, 243-280.

Bobko, P., & Colella, A. (1994). Employee reactions to performance standards: A review and research propositions. Personnel Psychology, 47, 1-29.

Brown, I., Jr., & Inouye, D. K. (1978). Learned helplessness through modeling: The role of perecived similarity in competence. Journal of Personality and Social Psychology, 36, 900-908.

Brown, J. B. (1995). The effect of specific versus vague goals and normative feedback on task performance. Unpublished manuscript.

Buller, P. F., & Bell, C. H. (1986). Effects of team building and goal setting on productivity: A field experiment. Academy of Mangement Journal, 29, 305-328.

Campbell, D. J., & Gingrich, K. F. (1986). The interactive effects of task complexity and participation on task performance: A field experiment. Organizational Behavior and Human Decision Processes, 38, 319-324.

Cervone, D. (1989). Effects of envisioning future activities on self-efficacy judgments and motivation: An availability heuristic interpretation. Cognitive Therapy and Research, 13, 247-261.

Cervone, D., & Peake, P. K. (1986). Anchoring, efficacy, and action: The influence of judgment heuristics on self-efficacy judgments and behavior. Journal of Personality and Social Psychology, 50, 492-501.

Chesney, A. A., & Locke, E . A. (1988). An examination of the relationship among goals, strategies and performance on a complex management simulation task. College of Management, Georgia Institute of Technology, unpublished manuscript.

Chhokar, J. S., & Wallin, J. A. (1984). A field study of the effect of feedback frequency on performance. Journal of Applied Psychology, 69, 524-530.

Chidester, T. R., & Grigsby, W. C. (1984). A meta-analysis of the goal setting performance literature. Academy of Management Proceedings. 202-206.

Diener, C. I., & Dweck, C. S. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy and achievement cognitions following failure. Journal of Personality and Social Psychology, 36, 451-462.

Diener, C. I., & Dweck, C. S. (1980). An analysis of learned helplessness: 2. The processing of success. Journal of Personality and Social Psychology, 39, 940-952.

Dweck, C.S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 31, 674-685.

Dweck, C.S. (1986). Motivational processes affecting learning. American Psychology, 41, 1040-1048.

Dweck, C.S. (1989). Motivation. In A. Lesgold & R. Glaser (Eds.), Foundations for a psychology of education. Hillsdale, NJ: Erlbaum.

Dweck, C.S. (1991). Self-theories and goals: Their roles in motivation, personality, and development. In R.A. Dienstbier (Ed.) Perspectives on Motivation: Nebraska Symposium on Motivation Lincoln: University of Nebraska Press.

Dweck, C.S., & Elliott, E. S. (1983). Achievement motivation. In P.H. Mussen & E.M. Heatherington (Eds.), Handbook of child

psychology: Socialization, personality and social development (4th ed., Vol. 4, pp. 644-691). New York: Wiley.

Dweck, C.S., & Leggett, E. L. (1988). A social-cognitive approach to personality and motivation. Psychological Review, 95, 256-273.

Dweck, C.S., & Reppucci, N. D. (1973). Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 25, 109-116.

Earley, P. C. (1986). Supervisors and shop stewards as sources of contextual information in goal setting: A comparison of the U.S. with England. Journal of Applied Psychology, 71, 111-117.

Earley, P. C. (1988). Computer-generated performance feedback in the magazine subscription industry. Organizational Behavior and Human Decision Processes, 41, 50-64.

Earley, P. C., & Erez, M. (1991). Time-dependency effects of goals and norms: The role of cognitive processing on motivational models. Journal of Applied Psychology, 76, 717-724.

Earley, P. C., & Kanfer, R. (1985). The influence of component participation and role models on goal acceptance, goal satisfaction, and performance. Organizational Behavior and Human Decision Processes, 36, 378-390.

Earley, P. C., Lee, C., & Hanson, L. A. (1989). Joint moderating effects of job experience and task component complexity: Relations among goal setting, task strategies, and performance. Journal of Organizational Behavior, 10.

Earley, P. C., & Perry, B. C. (1987). Work plan availability and performance: An assessment of task strategy priming on subsequent task completion. Organizational Behavior and Human Decision Processes, 39, 279-302.

Earley, P. C., & Shalley, C. E. (1991). New perspectives on goals and performance: Merging motivation and cognition. Research in Personnel and Human Resources Management, 9, 121-157.

Earley, P. C., Wojnaroski, P., & Prest, W. (1987). Task planning and energy expended: Exploration of how goals influence performance. Journal of Applied Psychology, 72, 107-114.

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. Journal of Personality and Social Psychology, 54, 5-12.

Erez, M. (1977). Feedback: A necessary condition for the goal setting-performance relationship. Journal of Applied Psychology, 62, 624-627.

Erez, M. (1986). The congruence of goal setting strategies with socio-cultural values, and its effect on performance. Journal of Management, 12, 585-592.

Erez, M., & Zidon, I. (1984). Effects of goal acceptance on the relationship of goal difficulty to performance. Journal of Applied Psychology, 69, 69-78.

Franken, R. E., & Brown, D. J. (1995). Why do people like competition? The motivation for winning, putting forth effort, improving one's performance, performing well, being instrumental, and expressing forceful/aggresive behavior. Personality and Individual Differences, 2, 175-184.

Garland, H. (1985). Influence of ability, assigned goals, and normative information on personal goals and performance: A challenge to the goal attainability assumption. Journal of Applied Psychology, 68, 20-30.

Hall, H. K., Weinberg, R. S., & Jackson, A. (1987). Effects of goal specificity, goal difficulty, and information feedback on endurance performance. Journal of Sports Psychology, 9, 43-54.

Harackiewicz, J. M., & Larson, J. R. (1986). Managing motivation: The impact of supervisor feedback on subordinate task interest. Journal of Personality and Social Psychology, 51, 547-556.

Henderson, V., & Dweck, C. S. (1990). Adolescence and achievement. In S. Feldman & G. Elliot (Eds.), At the threshold: Adolescent development. Cambridge: Harvard University Press.

Hollenbeck, J. R., & Klein, H. J. (1987). Goal commitment and the goal setting process: Problems, prospects and proposals for future research. Journal of Applied Psychology, 72, 212-220.

Hollenbeck, J. R., Williams, C. R., & Klein, H. J. (1989). An empirical examination of the antecedents of commitment to difficult goals. Journal of Applied Psychology, 74, 18-23.

Humphreys, M. S., & Revelle, W. (1984). Personality, motivation and performance: A theory of the relationship between individual differences and information processing. Psychological Review, 91, 153-194.

Hunter, J. E., & Schmidt, F. L. (1983). Quantifying the effects of psychological interventions on employee job performance and work force productivity. American Psychologist, 38, 473-478.

Ilgen, D. R., Fisher, C. D., & Taylor, M. S. (1979). Consequences of individual feedback on behavior in organizations. Journal of Applied Psychology, 64, 349-371.

Ivancevich, J. M., & McMahon, J. T. (1982). The effects of goal setting, external feedback, and self-generated feedback on outcome variables: A field experiment. Academy of Management Journal, 25, 359-372.

Jacobs, B., Prentice-Dunn, S., & Rogers, R. W. (1984). Understanding persistence: An interface of control theory and self-efficacy theory. Basic and Applied Social Psychology, 5, 333-347.

James, L. R., & Brett, J. M. (1984). Mediators, moderators and tests for mediation. Journal of Applied Psychology, 69, 307-321.

Jourden, F.J., & Bandura, A., & Banfield, J. T. (1991). The impact of conceptions of ability on self-regulatory factors and motor skill acquisition. Journal of Sport & Excercise Psychology, 8, 213-226.

Kanfer, R. (1990). Motivation and individual differences in learning: An integration of developmental, differential and cognitive perspectives. Learning and Individual Differences, 2, 221-239.

Kanfer, R., & Ackerman, P. L. (1989). Motivation and cognitive abilities: An integration/aptitude-treatment interaction approach to skill acquisition. Journal of Applied Psychology, 74, 657-690.

Kaplan, R., & Rothkopf, E. Z. (1974). Instructional objectives as directions to learners: Effect of passage length and amount of objective-relevant content. Journal of Educational Psychology, 66, 448-456.

Kim, J. S. (1984). Effects of behavior plus outcome goal setting and feedback on employee satisfaction and performance. Academy of Management Journal, 27, 139-149.

Kirsch, I. (1978). Tangible self-reinforcement in self-directed behavior modification projects. Psychological Reports, 43, 455-461.

Klein, H. (1989). An integrated control theory model of work motivation. Academy of Management, 14, 150-172.

Kopelman, R. E. (1982). Improving productivity through objective feedback: A review of the evidence. National Productivity Review, 2, 34-55.

Landy, F.J. (1989). Psychology of Work Behavior. Pacific Grove, California: Brooks/Cole Publishing Company.

Landy, F.J., & Farr, J. L. (1983). The Measurement of Work Performance: Methods, Theory, and Applications. New York: Academic Press.

Latham, G. P., & Locke, E. A. (1979). Goal setting: A motivational technique that works. Organizational Dynamics, 8, 68-80.

Latham, G. P., & Locke, E. A. (1991). Self-regulation through goal-setting. Organizational Behavior and Human Decision Processes, 50, 212-247.

Latham, G. P., & Saari, L. M. (1982). The importance of union acceptance for productivity improvement through goal setting. Personnel Psychology, 35, 781-787.

Latham, G. P., & Yukl, G. A. (1975). A review of research on the application of goal setting in organizations. Academy of Management Journal, 18, 824-845.

Litt, M. D. (1988). Self-efficacy and perceived control: Cognitive mediators of pain tolerance. Journal of Personality and Social Psychology, 54, 149-160.

Locke, E. A. (1967). Motivational effects of knowledge of results: Knowledge or goal setting? Journal of Applied Psychology, 51, 324-329.

Locke, E. A. (1968a). Effects of knowledge of results, feedback in relation to standards, and goals on reaction-time performance. American Journal of Psychology, 81, 566-574.

Locke, E. A. (1970b). Job satisfaction and job performance: A theoretical analysis. Organizational Behavior and Human Performance, 5, 484-500.

Locke, E. A., & Bryan, J. F. (1969). The directing function of goals in task performance. Organizational Behavior and Human Performance, 4, 35-42.

Locke, E. A., Chan, D. O., Harrison, S., & Lustgarten, N. (1989). Separting the effects of goal specificity from goal level. Organizational Behavior and Human Decision Processes, 43, 270-287.

Locke, E. A., & Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self-efficacy, goals, and task strategies on task performance. Journal of Applied Psychology, 69, 214-251.

Locke, E. A., & Latham, G. P. (1990). A theory of goal setting and task performance. NJ: Prentice-Hall.

Locke, E. A., & Shaw, K. M. (1984). Atkinson's inverse-U curve and the missing cognitive variables. Psychological Reports, 55, 403-412.

Locke, E. A., Shaw, K. M., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969-1980. Psychological Bulletin, 90, 125-152.

Lord, R. G., & Hanges, P. J. (1987). A central system model of organizational motivation: Theoretical development and applied implications. Behavioral Science, 32, 161-176.

Malone, T. W. (1981). Toward a theory of intrinisically motivating instruction. Cognitive Science, 4, 333-369.

Matsui, T., Okada, A., & Inoshita, O. (1983). Mehanisms of feedback affecting task performance. Organizational Behavior and Human Performance, 31, 114-122.

McCuddy, M. K., & Griggs, M. H. (1984). Goal setting and feedback in the management of a professional department: A case study. Journal of Organizational Behavior Management, 6, 53-64.

Mento, A. J., Steel, R. P., & Karren, R. J. (1987). A meta-analytic study of the effects of goal setting on task preformance: 1966-1984. Organizatinal Behavior and Human Performance, 39, 52-83.

Meyer, J. P., & Gellatly, I. R. (1988). Perceived performance norm as a mediator in the effect of assigned goal on personal goal and task performance. Journal of Applied Psychology, 73, 410- 420.

Nemeroff, W. F., & Cosentino, J. (1979). Utilizing feedback and goal setting to increase performance appraisal interviewer skills of managers. Academy of Management Journal, 22, 566-576.

Nicholls, J.G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. Psychological Review, 91, 328-346.

Nicholls, J.G. (1989). The competitive ethos and democratic education. Cambridge, MA: Harvard University Press.

Ozer, E. M., & Bandura, A. (1990). Mechanisms governing empowerment effets: A self-efficacy analysis. Journal of Personality and Social Psychology, 58, 472-486.

Podsakoff, P. M., & Farh, J. (1989). Effects of feedback sign and credibility on goal setting and task performance. Organizational Behavior and Human Decision Processes, 44, 45-67.

Reynolds, R. E., & Anderson, R. C. (1982). Influence of questions on the allocation of attention during reading. Journal of Eduational Psychology, 74, 623-632.

Rothkopf, E. Z., & Billington, M. J. (1979). Goal-guided learning form text: Inferring a descriptive processing model from inspection times and eye movements. Journal of Educational Psychology, 71, 310-327.

Schunk, D. H. (1984). Self-efficacy perspective on achievement behavior. Educational Psychologist, 19, 48-58.

Shaw, K. N. (1984). A laboratory investigation of the relationship among goals, strategies, and task performance. College of Business and Management, Univesity of Maryland, unpublished doctoral dissertation.

Steers, R. M., & Porter, L. W. (1974). The role of task-goal attributes in employee performance. Psychological Bulletin, 81, 434-452.

Sternberg, R. J., & Kolligian, J. (1990). Competence considered. New Haven, NY: Yale University Press.

Stone, E. F. (1988). Moderator variables in research: A review and analysis of conceptual and methodological issues. Research in Personnel and Human Resources Management, 6, 191.229.

Tubbs, M. E. (1986). Goal setting: A meta-analytic examination of the empirical evidence. Journal of Applied Psychology, 71, 474-483.

Weinberg, G. M., & Schulman, E. L. (1974). Goals and performance in computer programming. Human Factors, 16, 70-77.

Weinberg, R. S., Gould, D., & Jackson, A. (1979). Expectations and performance: An empirical test of Bandura's self-efficacy theory. Journal of Sports Psychology, 1, 320-331.

White, J. (1982). Rejection. Reading, MA: Addison-Wesley.

Wofford, J. C. (1982). Experimental tests of the goal-energy-effort requirement theory of work motivation. Psychological Reports, 50, 1259-1273.

Wood, R.E. (1986). Task complexity: Definition of the construct. Organizational Behavior and Human Decision Processes, 37, 60-82.

Wood, R.E., & Bailey, T. C. (1985). Some unanswered questions about goal effects: A recommended change in research methods. Asutralian Journal of Management, 10, 61-73.

Wood, R.E., & Bandura, A. (1989a). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. Journal of Personality and Social Psychology, 56, 407-415.

Wood, R.E., & Bandura, A. (1989b). Social cognitive theory of organizational management. Academy of Management Review, 14, 361-384.

Wood, R.E., & Bandura, A., Bailey, T. (1990). Mechanisms governing organizational performance in complex decision-making environments. Organizational Bebehavior and Human Decision Processes, 46, 181-201.

Wood, R.E., Mento, A. J., & Locke, E. A. (1987). Task complexity as a moderator of goal effects: A meta-analysis. Journal of Applied Psychology, 72, 416-425.

Wright, W.R. (1989). Goals as mediators of the relationship between incentives and performance: A test of the goal commitment hypothesis. College of Business Administration, University of Notre Dame, Unpublished manuscript.

Footnotes

[1]The terms ability and intelligence are often used interchangeably since ones intelligence is often inferred from ones ability. However, the two constructs are distinguishable. The concept of ability addresses the question of competence (e.g., socially, athletically, mathematically) or who is more able at a given activity. The concepts of ability are general in that they apply to diverse skills and a score or performance is normally interpreted as high or low with reference to the scores of others (Sternberg & Kolligian, 1990). The concept of intelligence refers to a specific class of abilities. For example, could one improve verbal reasoning more than other forms of reasoning. Said another way, questions about ability pertain to the process of assessing the relative standing of individuals, whereas questions of intelligence pertain to explaining the nature and development of the abilities that are assessed.

[2]Mediator and Moderator variables have played a prominent role in both theory and research in industrial and organizational psychology, although much controversy exists in regards to how these concepts should be defined. Even though these inconsistencies are evidenced in some of the research reviewed in this research project, some authors have tried to be consistence in their used of the terms. For example, James and Brett (1984), Baron and Kenny (1986), and Stone (1988), have defined a moderator variable as any variable which when systematically varied causes the relationship between two other variables to change. On the other hand, a mediator variable is the mechanism by which one variable affects another. In sum, moderator variables specify when certain effects will hold, while mediators speak to how or why such effects occur.

[3]For brevity, only significant interactions are shown.

APPENDIX A
Implicit Theories of Intelligence Rating Scale

The University of Calgary

TASK QUESTIONNAIRE

Below are 10 thoughts that might cross your mind when you are working on a marked assignment. Using the rating scale below, please indicate the likelihood that each thought might cross your mind, by circling the appropriate response. Thus, the number one (1) would mean that the thought would **never** cross your mind and the number five (5) would mean that the thought would **always** cross your mind.

1) "Am I going to learn something"?
How likely is it that this thought would cross your mind, WHEN WORKING ON A MARKED ASSIGNMENT?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

2) "I hope my performance is up to par".
How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

3) "I wonder who will see my results"?
How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

4) "I hope I get a chance to discuss my ideas with others."
How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

over please

5) "I hope this is something new".

How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

6) "I am eager to get started trying to figure this out".

How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

7) "Will I look competent"?

How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

8) "I hope there are some tough parts that will challenge me".

How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

9) "I wonder how my performance will compare with others".

How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

10) "I hope I don't make any mistakes".

How likely is it that this thought would cross your mind?

never	rarely	sometimes	very often	always
(1)	(2)	(3)	(4)	(5)

Thank you for your assistance!

Your sex: **MALE** **FEMALE**

Please **"CIRCLE'** one of the following:

Intelligence is more or less fixed

Intelligence is an acquirable skill

APPENDIX B
Roster of Employees

Bert:-is recently out of school. He studied woodwork and metal work, but he is not highly skilled. He sometimes seems more interested in his car than his job, and he tends to be rather slipshod in his approach.

Dave:-has been with the company for a few years now. He began as a general carpenter, but he is now highly skilled in most forms of woodwork, an is starting to learn some upholstery work. He is highly motivated, and works quickly and carefully.

Janice:-is a first-class upholsterer. She began in the trade as her father's assistant, in his small furniture repair shop, and supplemented this practical apprenticeship with evening classes in upholstery and woodwork. She is meticulous in her approach. She has acquired a range of general woodworking skills and she can sew if necessary, but upholstery is her forte.

Hilary:-has been with the company for only a few years. She is a seamstress and dressmaker by training, but was made redundant when her previous employer got into financial difficulties. She takes pride in her work, both in her furniture covers and the dressmaking and embroidery which occupy her evenings.

Evelyn:-is a new employee who enjoys fabric cutting and is able to perform simple sewing tasks. She has few skills in other areas and is not motivated to learn new tasks.

APPENDIX C
Job Descriptions

Rough Milling - Raw timber cut to approximate size & defects removed.

Finish Milling - Rough-cut timber is finished, ready for assembly.

Assembly - Finished timber is assembled.

Finishing Conveyor - Assembled furniture is stained, sealed & glazed.

Fabric Cutting - Upholstery material is cut to pattern.

Sewing Room - Cut material is sewn.

Upholstery - Sewn material, padding & springs fixed to furniture.

Finished Good Warehouse - Storage & movement of finished goods.