# *Enhancing the Valuing of and Commitment to Effortful Achievement: An Achievement Goal Approach*

Roxane L. Lehmann
University of Minnesota
Paper prepared for AERA Annual Meeting 2002

In classrooms across the country students of very nearly the same age but with very different levels of skill and ability work on the same set of assigned tasks. The "one-size-fits-all" undifferentiated curricula used in these classrooms yield results that are easily comparable (Gustafsson & Undheim, 1996). This provides students with an abundance of logically compelling evidence that effort and ability vary inversely (Nicholls, Patashnick, Mettetal, 1986), and by the end of elementary school many students conclude that, at least in the classroom setting, effort is not all that valuable. For example, students as young as ten tend to react with pleasure when told that their success at a task is due to high ability but are indifferent when their success is associated with high effort (Nicholls, 1975). Similarly, a group of college students asked what sort of person they would prefer to be, effortful or able, were clearly biased towards high ability (Nicholls, 1976). Furthermore, American children value effort far less than their Asian counterparts whose willingness to work hard has been well documented (Stevenson, 1992). These findings are cause for concern given that significant adult accomplishment is associated with hard work and striving for success (e.g., Reis, 1995; VanTassel-Baska, 1989).

In the past three decades considerable research has focused on how classroom environments influence students' willingness to work hard and strive for success. Out of this research has come a new appreciation for the complexity of motivation as a construct. It has become clear that motivation, the willingness to work hard and strive for success, is more than just the desire to do well (Henderson & Dweck, 1990). Recent research within achievement goal theory has focused on how the structures of the classroom environment affect students' views about the overarching purpose for academic achievement. Specific classroom structures have been shown to influence whether students' purpose or goal for achieving is to perform by demonstrating superior ability relative to others or to learn by developing competence and mastery (Ames, 1992; Mueller & Dweck, 1998; Urdan, 1997). Because focusing on a learning goal has been shown to be conducive to more effective learning, it is important to define classroom structures that foster a learning goal focus.

Two contrasting views exist about the determinants of the achievement goals students pursue in a given situation. One view is that the achievement goals students pursue "arise in, are fostered by, and vary with the situation experienced" (Midgley & Edelin, 1998, p. 199). This view has prompted researchers and educators to focus on contextual factors or situational cues that affect the achievement goals students tend to pursue in a specific context. A second view is that, although the achievement goals students pursue for the duration of a specific achievement task can be influenced by contextual factors or situational cues, achievement goals are relatively stable orientations that students bring with them to achievement situations. Because students' beliefs about the nature of ability and intelligence and their attributions for success and failure have been shown to be related to the achievement goal orientations they develop (Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1989 as cited in Urdan, 1998), this view has prompted researchers and educators to consider how aspects of the learning environment influence these beliefs and attributions.

These contrasting views about the determinants of the achievement goals students pursue in a given achievement situation suggest that educators focus on different types of educational approaches to enhance students' motivation. Many of these educational practices tend to focus on contextual factors or cues. These practices include grouping students by topic or interest instead of grouping by ability, providing frequent occasions for success and praise, and grading for progress and allowing students to redo work (Anderman & Maehr, 1994). Such strategies may enhance students' motivation by strengthening their concepts about their ability within a performance framework or by increasing the likelihood that students will adopt a learning goal over the short term in a specific learning situation. They do little, however, to foster the integrated patterns of beliefs about ability and intelligence and attributions for achievement that have been associated in the research with a more stable, long-term adoption of a learning goal orientation.

Although many have argued for the importance of students developing a long-term learning goal orientation and a belief that effort will lead to success (see Ames, 1992), recommendations for specific educational practices to do so are not as well defined. Determining which specific environmental classroom structures affect long-term achievement goal orientation requires an understanding of how students' beliefs about the nature of ability and intelligence orient them towards specific goals. This study explores the environmental determinants of the relatively stable achievement goal orientations mediated by beliefs about the nature of ability and intelligence.

Reviews of the research on developmental change in the way children construe ability and intelligence (e.g., Stipek & MacIver, 1989) indicate that this phenomenon is best understood in terms of a student-by-learning-environment interaction. Young children are not able to coordinate proportional relations (Graham & Weiner, 1996; Nicholls, 1978), and until about age nine or ten children expect ability and effort to co-vary positively (Graham & Weiner) and conceive of ability as learning through effort (Nicholls, 1984a). By the age of 11 or 12, however, children are capable of manipulating these constructs independently of one another (Kun, 1977; Nicholls, 1978; Stipek, 1981: Stipek & Tannatt, 1984) and believe that both effort and ability play a role in academic outcomes. Therefore, by the middle school years many students expect that effort and ability will vary inversely (Nicholls, 1990) and for them higher effort implies lower ability if their peers require less effort for the same achievement or achieve more with equivalent effort (Nicholls, 1984b). Students' beliefs about the relation between ability and effort and their acquisition of specific skills help form the basis of theories of intelligence (Nicholls et al., 1986).

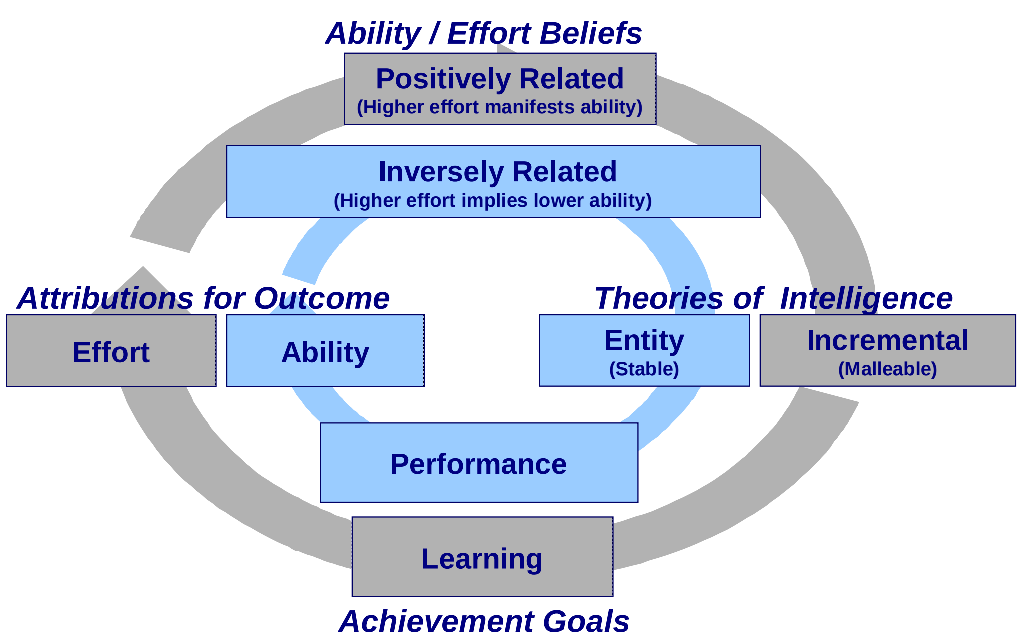
A series of studies that focus on one aspect of implicit theories of intelligence demonstrate that children differ in their beliefs about the stability of intelligence. Two types of implicit theories that individuals hold about intelligence have been identified: an entity theory and an incremental theory (Dweck and Leggett, 1988). For entity theorists, a belief in a stable or fixed intelligence means that an individual can learn new things, but one's intelligence cannot change. Entity theorists tend to believe that effort and ability vary inversely, and tend to be preoccupied with ability and a belief that high ability is essential for success (Meece, 1994). In contrast, incremental theorists tend to believe that effort and ability co-vary and that effortful learning is involved in the development of intelligence. For these theorists, a belief in a developmental intelligence means that an individual cannot only learn new things but that one's intelligence can grow through effort (Levy & Dweck, 1998).

Students' implicit beliefs about ability and intelligence influence students to pursue different achievement goals in learning situations. Students who focus on the adequacy of their ability and believe that intelligence is stable are oriented towards *performance goals*, thereby seeking to demonstrate high ability or avoid the demonstration of a lack of ability. In contrast, students who focus on effort and believe that intelligence is malleable are oriented towards *learning goals*, thereby seeking to develop ability or competence (Dweck & Leggett, 1988). In addition, when pursuing learning goals, students are more likely to employ an undifferentiated conception of ability in which ability and effort are perceived to positively co-vary, but when pursuing performance goals, students are more likely to believe that ability and effort vary inversely (Dweck & Leggett; Nicholls, 1984a). Furthermore, individuals with different implicit beliefs and related achievement goals seem to use markedly different inference rules to process information about effort and the causes of success and failure (Dweck, Chiu, & Hong, 1995). Attributions that emphasize effort have been correlated with learning goals, whereas attributions that emphasize ability have been correlated with performance goals (Mueller & Dweck, 1998).

The model of achievement goal orientation depicted in Figure 1 below is one way to think about the relations among the four major variables of achievement goal theory. The two different orientations depicted in the model are represented by an inner and outer loop.

The reasoning and behavior patterns represented by the outer loop of the model elicit the motivational orientation that will foster long-term and high quality, effortful

Figure 1. Model of Achievement Goal Orientation



involvement in learning (Ames, 1992). This orientation, termed an “adaptive” orientation (Dweck, 1986; Henderson & Dweck, 1990), is distinguished by: (a) implicit beliefs that ability and effort positively co-vary and that intelligence is malleable, (b) a learning goal orientation, and (c) a tendency to focus on effort attributions for achievement outcomes. When this orientation is emphasized the focus of attention is on the intrinsic value of learning and an individual is oriented toward developing new skills, trying to understand work, and improving competence (Dweck & Leggett, 1988; Elliott & Dweck, 1988; Nicholls, 1984a; Nicholls et al., 1986).

The reasoning and behavior patterns represented by the inner loop of the model are less conducive to effective learning. This orientation, sometimes referred to as a "maladaptive" orientation (Ames, 1992; Dweck, 1986; Henderson & Dweck, 1990)**,** is characterized by (a) implicit beliefs that ability and effort vary inversely and that intelligence is stable, (b) a performance goal orientation, and (c) a perception that achievement outcomes are indicative of ability. A focus that emphasizes this orientation tends to lead to ignoring, avoiding, or withdrawing from potentially valuable learning opportunities independent of a student’s actual skill level or measured intelligence (Bempechat et al., 1991). This orientation also has been shown to elicit negative, global ability self-judgements and disrupted task performance in the face of failure (Diener & Dweck, 1978, 1980; Dweck et al., 1995).

Although pursuing learning goals has been shown to have favorable effects on students’ motivation and achievement, it is not yet clear how various factors contribute to facilitating the development of a learning goal orientation (Urdan, 1997). Research has documented that the move from elementary to middle-level school for many students is associated with a general deterioration in self-perceptions, motivation, and school performance (Eccles & Midgley; Eccles, Midgley, & Adler as cited in Midgley & Edelin, 1998). At the time students are entering middle school, many are becoming capable of thinking in formal operational terms and, therefore, capable of viewing ability as inversely related to effort. In fact, it is during adolescence that students begin to use this concept of ability and effort systematically (Nicholls, 1978).

These developmental changes in children’s understanding of the relation between ability and effort have been associated with changes in their valuing of effort and their preferences to be hard-working or not working hard (Juvonen & Murdock, 1995). Young children perceive that effort and ability positively co-vary: a person who works hard is considered smart (Kun, 1977). Beginning in pre-adolescence, however, these perceptions typically change. Students come to believe that the association between effort and ability is compensatory: the harder a person must work, the less smart the individual is considered (Juvonen & Murdock, 1995).

Circumstances in classroom environments, beginning in elementary school, that seem to demand the belief that ability and effort are inversely related are ubiquitous (Nicholls et al., 1986). The lack of meaningful curriculum differentiation in most classroom learning environments makes ability differences salient and promotes the belief that the relationship between effort and ability is compensatory. Furthermore, because tasks assigned by teachers are often poorly matched to student skill level and abilities (Blumenfeld, 1992; see also Archambault, et al., 1993; Tomlinson, Moon, & Callahan, 1998), school performance and grades are generally determined far more by ability than by effort (Schuman, et al., 1985). Instructional practices that use an undifferentiated, "one-size-fits-all" curriculum, therefore, are encouraging many students to attribute their performance outcomes, both successes and failures, to ability rather than effort. Students for whom the curriculum is too easy attribute success with little effort to ability, and students who find the curriculum too difficult blame a lack of ability for their failure.

Students' attributions for their academic successes and failures affect their motivation to achieve (Weiner, 1985). It is attributions that emphasize effort, not ability, that seem to orient students' attention more toward improving their understanding and skills than toward demonstrating competencies (Stipek & Gralinski, 1996). Therefore, if the goal is to foster the long-term adoption of a learning goal orientation, students need to be convinced of the value of effort.

When the structure of the academic task is differentiated to align with students' skill, social comparisons are more difficult and the notion that success is achievable but requires effort is promoted. A differentiated task structure, thus, fosters the beliefs that effort and ability co-vary and that intelligence is malleable and encourages effort attributions for achievement outcome (Ames, 1992; Stipek, 1993).

The instructional practice of using differentiated learning tasks, however, should not be viewed as an independent contributor to students' ability and intelligence beliefs and goal orientations. If the task structure focuses students' attention on effort attributions for outcome but the process of assigning the tasks emphasizes social comparison information about ability, the positive consequences of task differentiation may be undermined. Instructional practices are interdependent which implies an integrative approach should be used in studying classroom practices (Ames, 1992) and when making suggestions for change.

This study examined the potential of an instructional practice that provides multi-tiered learning tasks to accommodate a variety of readiness levels and task choice to foster the integrated pattern of beliefs and behaviors associated with more effective learning. The study is a preliminary step in exploring the determinants of students' long-term adoption of a learning goal orientation. Within this instructional framework, learning activities would be designed to provide individually appropriate task choices and would be structured so that the choices were perceived as equal.

The study conducted in a field context at the middle-school level investigated the effects of task differentiation and the task assignment process on the co-variance of effort and achievement outcome and the differential emphasis students place on ability and effort in explaining the causes of their achievement. Specifically, the study sought to test whether task differentiation within a multi-tiered task framework and task choice would affect the co-variance of students' perceptions of the task's challenge and time on task, the co-variance of time on task and score earned, and students' attributions of effort. It was anticipated that the time spent on the task and the score earned on the task would be more likely to positively co-vary for participants in the experimental conditions who were assigned or chose a task aligned with their skill level than for participants assigned a "one-size-fits-all" task of moderate difficulty in the control. Also it was anticipated that in the experimental conditions students' self-perceptions of the task's challenge would be more likely to positively co-vary with time spent working on the task than in the control and that these perceptions would moderate the relation between time on task and scores earned. In addition, students in the experimental condition in which the task was aligned with their skill were expected to attribute their achievement outcome more to effort compared to similar students in the control. Further, effort attributions for achievement outcome were expected to be higher for participants who chose an appropriate task as opposed to having an appropriate task assigned.

The study also investigated the relation between students' intelligence beliefs and achievement goals and the relations among students' achievement goals, their attributions of effort for their achievement outcome, and their judgements about the quality of their performance. Students' intelligence beliefs were expected to predict their achievement goals; that is, entity theorists were expected to prefer a performance goal, and incremental theorists were expected to prefer a learning goal. Further, students' achievement goals were expected to predict their tendency to emphasize effort attributions for achievement outcome. It was anticipated that students who were learning goal oriented would be more likely to emphasize effort attributions for their achievement outcomes than those who were performance goal oriented. In addition, it was anticipated that students' tendency to cite effort as a causal factor would be negatively associated with self-judgements about the quality of performance. Finally, although this has not been studied previously, it was predicted that achievement goal orientation might interact with students' self-judgements about the quality of their performance to predict attributions for achievement outcome. Specifically, it was predicted that instead of emphasizing ability for both success and failure outcomes as other researchers have suggested, performers attributions for their achievement outcome may depend on their judgements about the quality of their performance. It was predicted that performers would be more likely to emphasize ability attributions for outcomes judged a success and emphasize effort attributions for outcomes they judged a failure.

**Method**

*Participants*. A sample of 204 sixth-grade students (with an approximately equal number of girls and boys) was drawn from one public middle school in an upper-middle class, Midwestern suburb of the United States. All sixth graders within the school were invited to participate in the study. This sample from a homogeneous population was purposefully selected for this exploratory study to avoid the possibility of confounding the findings with differences due to age, culture, ethnicity, and economic status. Sixth graders, who typically range in age from 11 to 13 years, were chosen for this study because developmental research indicates that until about age 11 most children do not have the capacity to think about the nature of the relationship between effort and ability (Graham & Weiner, 1996).

*Instruments.* Selected problems from Raven's Progressive Matrices (Raven, Court, & Raven, 1977, 1983) were used both to assess students' skills on the experimental task, so that blocks of students with similar ability could be established, and for the five forms of the experimental achievement tasks. Problems were selected based on item difficulty information derived from a pilot study done with approximately 100 fifth graders enrolled in an elementary school that feeds into the middle school where the research was conducted. The five forms of the experimental task vary in difficulty and length with more items included on the forms consisting of easier problems. The 20 items on the blocking task are representative of the range of difficulty of the items included on the five experimental task forms.

Three instruments were used prior to the experiment to obtain additional information about the students' scholastic profile and their achievement goal orientation. These included the Scholastic Competence subscale of the Self-Perception Profile for Children (Harter, 1985), an implicit theory of intelligence measure (see Dweck et. al, 1995) and a measure of children's achievement goal orientation (see Dweck & Leggett, 1988; Mueller & Dweck, 1998).

Three additional instruments were used as post-experimental measures. A single-item instrument developed for this study was used to measure the students' perceptions of the difficulty of the experimental task immediately after completing the task. The scale used for challenge judgements ranges from 10 to 100 in ten-unit intervals from low challenge (10) to high challenge (100). A second single-item instrument developed for this study was used to assess students' judgements about the quality of their performance; that is, whether students view their performance on this task a success or a failure. The item was scored from 1 to 4 with a score of 1 indicating very low perceptions of success and a score of 4 reflecting very high perceptions of success.

Finally, an instrument similar to the ones described in previous research on children's attributions for achievement (Diener & Dweck, 1980; Mueller & Dweck, 1998; Nicholls, 1975) was used to measure students' causal attributions. Two attribution wheels were used: one for success outcomes and one for failure outcomes. The instruments included only two possible causal factors (ability and effort) and were designed to tap the differential emphasis students place on ability and effort in identifying the causes for achievement outcome rather than "true" causes. Following the procedure used in previous research (Mueller & Dweck), two ability attributions were included to increase the perceived acceptability of this explanation. The devices were made of three circular discs of cardboard, each a different muted color, cut along a radius and slipped together to form a wheel. Each disc contained an attributional statement and was divided into 36 equal segments. The wheel was easily adjusted to reveal 360 degrees of any disc or various amounts of any combination of the discs. By exposing different amounts of each color, participants were able to choose how much weight, if any, to assign to each attributional statement. The number of segments left exposed for each attribution was taken as the index of the importance of that cause. Attribution scores were determined by counting the number of exposed segments for the effort attribution (0 to 36).

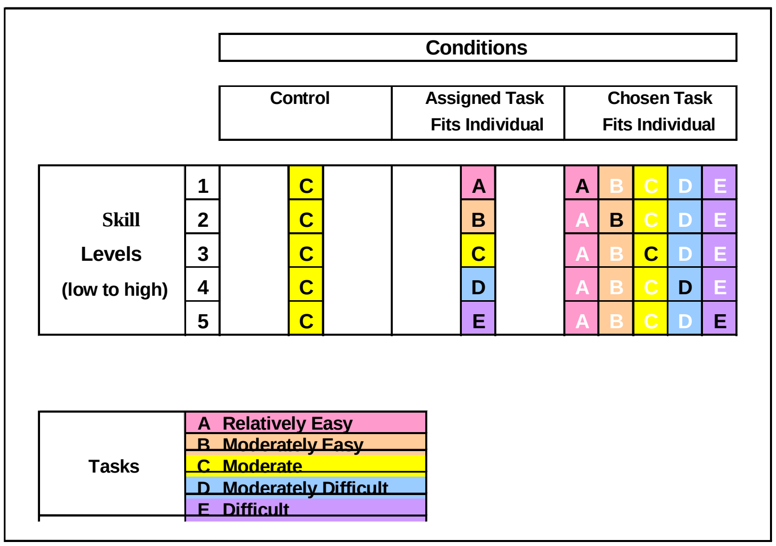
*Procedures.* This study included three sessions. The sessions were completed within a period of two weeks during the last term of the school year. All assessments were conducted following standardized procedures.

The blocking task used to assess the subject's skill level on the criterial task and the self-competence, intelligence belief, and achievement goal orientation measures were administered to the students in one forty-five minute session in classroom groups. The skill assessment measure was administered first following a brief tutorial on solving Raven's puzzles. Students were encouraged to take as much time as they needed to complete the 20 puzzles.

Students were then classified according to skill in solving Raven's puzzles, the criterial task, and assigned to one of five skill blocks: low (8 or fewer correct), low-moderate (9 to 10 correct), moderate (11 to 13 correct), high-moderate (14 to 15 correct), and high (16 or more correct). One of three conditions was then randomly assigned to participants within each block. The conditions included a control in which students were assigned an undifferentiated, “one-size-fits-all” task of moderate difficulty (the type typically assigned to all students in a classroom) and two experimental conditions. In the first experimental condition, teacher-assigned “task fits individual,” students were assigned a task differentiated to match their skill level using a multi-tiered task framework. In the second experimental condition, student-chosen “task fits individual,” students were allowed to work at any one of the tiered tasks with analysis restricted to instances in which the chosen task matched the student’s skill (i.e., the same task assigned to students within the corresponding block in teacher assigned "task fits individual" condition). (See Figure 2, below, for a visual of the experimental design.)

To increase the potential of including sufficient numbers for analysis within the task choice condition, without drastically increasing the overall sample size, conditions were randomly assigned to participants in each block on a proportional basis. The "one-size-fits-all" control, the teacher-assigned “task-fits-individual,” and the student-chosen “task fits individual” conditions were assigned to 25%, 25%, and 50% of the participants in each block, respectively.

Figure 2. Experimental Design




The three conditions of the experiment were completed in a second thirty-minute group session within two days of the first session. In all conditions, participants were given their scores from the skill assessment measure. This feedback was provided in writing with the score reported as the number of problems solved correctly out of the total number (20).

In the control condition, all participants were assigned the same task of “moderate” difficulty regardless of the participants’ skill level on the task. Students were given feedback about the skill assessment completed in session one and were told they would be given another puzzle task similar to the type worked in the first session. They were told that they would earn bonus points for doing this activity that could be exchanged for extra credit points on an upcoming assignment or test of their choice and that each problem answered correctly would be worth points. A strategy for solving the puzzles was briefly reviewed.

Immediately after finishing the task, students were asked to record the time at which they ended the task in a space provided on the answer sheet. Time spent on the task was taken as an index of effort. In addition, students were asked to complete the single item designed to measure their perceptions of the difficulty of the puzzle task.

The procedures for the two experimental conditions were identical to the control procedures except for the manipulation of the independent "task" variable and the task description provided the subjects. In the teacher-assigned "task fits individual" condition the difficulty of the task varied by the participants' block assignment and was controlled by the researcher with the difficulty of the task assigned differentiated to match the participant's presumed skill based on the skill assessment measure. Table 1 below shows the scheme used to match the blocking task score with a task form.

Table 1. Assignments by Skill Block for Teacher-Assigned "Task Fits Individual" Condition

| Number Correct on Blocking Task | Skill Block | Description of Assigned Form |
|---|---|---|
| 8 or fewer | Low | 35 relatively easy puzzles |
| 9 to 10 | Low-Moderate | 30 moderately easy puzzles |
| 11 to 13 | Moderate | 25 moderate puzzles |
| 14 to 15 | High-Moderate | 20 moderately difficult puzzles |
| 16 to 20 | High | 15 relatively difficult puzzles |

In this condition, after being told that the puzzles they would be given to work were similar to the type worked in the last session, students were told that not all of them would be working on the same puzzles and that not all of them would have the same number of puzzles. Instead, students were told that each of them would be working on a set of puzzles chosen specifically for them so that the task would be somewhat challenging but not too difficult for them to get many of them right. In addition, students were assured that all would have an equal chance to earn the same number of total bonus points. They were told that some tasks had more difficult puzzles than others, that more difficult puzzles were worth more points, and that tasks with more difficult puzzles had fewer puzzles than the easier tasks. The remainder of the session followed the procedures described above for the control condition.

In the student-chosen "task fits individual" condition, the difficulty of the task varied by participant and was controlled by the participant. In this experimental condition, after the students were told that the puzzles they would be given to work were similar to the type they worked in the last session, they were told that this time there were five different tasks made up of different puzzles and that they could choose which task to work. The same explanation given in the teacher-assigned "task fits individual" condition was used to assure students that regardless of the task they chose to work, they would all have an equal chance to earn the same number of bonus points. An overhead transparency was used to illustrate the differences among the five task forms described as: "35 relatively easy puzzles," "30 moderately easy puzzles," "25 moderate puzzles," "20 moderately difficult puzzles," and "15 relatively difficult puzzles." In addition, students were provided a copy of the five tasks and given time to peruse these individually at their desks.

Students were encouraged to consider their scores earned on the skill assessment activity completed in session one when making their task selection. To help students judge the difficulty of the various tasks with their own skills, they were shown an overhead transparency depicting the strategy utilized in assigning experimental tasks to blocks of participants in the teacher-assigned "task fits individual" condition. The researcher said, "Try to choose a task that will be right for you. Think about choosing a task that will have puzzles that are somewhat challenging for you but not too difficult for you to get many of them right. In making your selection you may want to consider the score you earned on the set of puzzles you have done. This [overhead] shows one strategy you might use to choose which set of puzzles to work. This is one way that you might match your skill at solving these puzzles with the task that is right for you. This is a strategy someone might use if the only information they had about you was the score on the puzzles you did earlier. This score, however, is just one of many pieces of information you have about yourself as a learner." Then, to ensure that participants felt no demand from the researcher to select a particular task, participants were told, "Some kids like to choose different tasks. You should pick the task that you think is right for you. I am interested in what task you will choose." Students were given several minutes to select a task. Once task selections had been made, the remainder of the session followed the procedures described above for the control condition.

In a subsequent ten-minute session, within two days of the second session, one of four female experimenters, blind to both the experimental hypotheses and the condition of each participant, met individually with students. Participants were shown their scores on the experimental task. and then questioned about their judgements regarding the quality of their performance; that is, whether they viewed their performance on this task as a success or a failure

Next, the students' causal attributions for their performance were measured using one of the causal attribution wheels designed for this study. Students indicating that their performance was a success were shown the wheel with three possible explanations for success: "I tried hard on these puzzles," "I'm smart at this," and "I'm good at these puzzles." Those who indicated their performance was not a success were shown the wheel with three possible explanations for failure: "I didn't work hard enough on these puzzles," "I'm not smart at this," and "I'm not good enough at these puzzles."

Instructions pointed out each possible cause of the obtained score. Students were shown how to use the wheel to indicate the relative importance of the three causes: giving important causes a large part, less important reasons a small part, and reasons deemed unimportant no part at all. Following this explanation, students were given the appropriate wheel with the three explanations equally exposed and asked to show why they got the score they did.

**Results**

*Description of the sample.* Of the 204 students recruited for this study, a total of 186 (99 girls and 87 boys) completed all three of the study's sessions. Two of these participants (in the teacher-assigned "task fits individual" condition) were excluded from analysis because their scores on the criterial task were extremely low (less than 40% correct). The 184 participants included in the analysis ranged in age from 11 to 13 years; their mean age was 12.25 years. Eighty-eight percent of the participants were Caucasian, 6% were Asian, 5% were African American, .5% were Hispanic, and .5% were Native American. Following procedures used in other studies (Dweck, et al., 1995) to insure that only participants with clear intelligence theories were classified, 74% of the 184 participants were classified as incremental theorists, 13% were classified as entity theorists, and 13% were not classified. Students' achievement goals were assessed using a measure that contains a choice of four tasks that embody either a performance or a learning goal. Of the 184 participants, 52.5% selected a performance goal focusing on the display of ability, and 47.5% chose a learning goal emphasizing the development of ability over the display of high ability. Students' average score on the self-perceptions of general academic competence scale was 3.12 (SD = .51) on a scale of 1 to 4 with a score of 4 indicating high perceived competence. Finally, students' average score on the blocking task consisting of 20 Raven's Progressive Matrices used to assess students' skill at the experimental task was 14.44 (SD = 2.76).

*Preliminary analysis.* A series of one-way and two-way ANOVAs was conducted to examine the effects of different experimenters, teaching teams, and student gender, years of age, and ethnicity, and self-perceptions of scholastic competence on responses to the dependent measures: time and score on task, self-perceptions of challenge, and students' effort attributions. Only a few inconsistent effects were found. None affected the interpretation of the study's findings; therefore these variables were not examined further.

In addition, analyses were conducted to insure that the blocking task of 20 problems was a valid measure of the participants' skill at solving the puzzles used to form the experimental tasks. The correlation between the blocking task scores and experimental scores for the control group, in which all students worked on the same task of "moderate" difficulty, was found to be positive and significant, r = .562, p Ω .001. In addition, a one-way ANOVA revealed that scores on the experimental task in the control condition differed according to the skill block assignment, F (2, 38) = 12.96, p Ω .001.

*Associations among intelligence beliefs, achievement goals, and attributions*. The predicted relation between intelligence beliefs and achievement goals depended on age. A two-way ANOVA conducted to examine differences between students less than twelve years of age and those 12 years or older revealed an interaction of age and achievement goal (F = 6.11, p. ≤ .01). Follow-up measures of association indicated that there was no meaningful relation between intelligence beliefs and achievement goal selection for children less than 12 years of age. For children twelve years or older, however, beliefs about intelligence predicted achievement goal preference (Ø = .233, p ≤ .01). Specifically, although incremental theorists did not show a clear achievement goal preference, 15 of the 17 students identified as entity theorists selected a performance goal.

Findings also offered some support for the predicted association between achievement goals and attributions for achievement outcome. Although a t-test revealed that overall participants with learning goals were no more likely than participants oriented towards performance goals to attribute their achievement outcome to effort (M = 14.7, SD = 10.05 and M = 15.76, SD = 10.24, respectively), when the interaction effects of self-judgements about quality of performance and achievement goals were examined, differences between performers and learners were noted. As predicted, overall students' self-judgements about the quality of their performance (very successful to very unsuccessful) were negatively associated with their attributions of effort ($r = -3.9$ $p \leq .0001$). A two-way ANOVA indicated that achievement goals interacted with self-judgements about quality of performance to explain attributions ($F = 3.2$, $p \leq .05$). A follow-up t-test indicated that students were more likely to attribute outcomes they rated very successful to effort if they were oriented towards a learning goal ($M=13.5$) compared to those oriented towards performance goals ($M = 9.6$), ($t = 1.99$, $p \leq .05$). Further, a follow-up one-way ANOVA revealed that performers' attributions for their achievement were dependent on their self-judgements about the quality of their performance ($F = 13.5$, $p \leq .0001$). Specifically, performers emphasized attributions of effort for outcomes they judged as failures ($M = 24.4$ effort) and emphasized ability attributions for outcomes they judged a success ($M = 13.3$ effort). In contrast, the attributions of students who chose learning goals were unrelated to their judgements about their performance ($F = 2.02$, ns).

*Effects of task differentiation and the task assignment process.* A sub-sample of students was included in the analyses that examined the effects of task differentiation and the task assignment process on students' attributions of effort for their achievement outcome, co-variance of time and score on task, and the co-variance of time and self-perceptions of challenge. Of the 91 participants assigned to the condition in which they were allowed to work at the task of their choice, only the 38 students who chose the task differentiated to match their identified skill level were included in the sub-sample. This portion of the study's analyses thus included the 47 participants assigned to the control condition, the 46 participants in the teacher-assigned "task fits individual" condition, and the 38 participants in the student-chosen "task fits individual" condition. A series of one-way ANOVAs was conducted for each skill block to verify that the 38 students in the student-chosen "task fits individual" condition who selected the task matched to their identified skill level were similar to students assigned to the other two conditions of the experiment. This analysis examined the demographic characteristics, scholastic profile variables (i.e., self-perceptions of scholastic competence, score earned, and time spent on the blocking task), achievement goals, and intelligence beliefs of students across the three conditions. Only two inconsistent effects were found, and neither affected the interpretation of the study's findings.

Means and standard deviations for effort attributions, working minutes on task, students' self-perceptions of challenge, and score on the task for the three experimental conditions are shown in Table 2. On the measure designed to gauge students' perceptions of the importance of ability and effort for their achievement, the table shows that while students' scores on this measure varied considerably within conditions, across conditions students' effort attributions were quite similar. Across conditions students attributed less than 45 percent of their achievement outcome to effort. The minutes spent working on the tasks across conditions are in line with expectations with each form of the task designed to take 10 to 15 minutes to complete. In addition, although there was significant variation in students' perceptions of the difficulty of the tasks, on average students across the conditions perceived the task to be within the "somewhat challenging" range. Finally, the average scores across the three conditions indicate that overall students did well on the puzzle tasks.

Table 2. Means and Standard Deviations for Effort Attributions, Working Minutes on Task, Self-Perceptions of Challenge, and Score (% correct)

| Dependent Variable | | Experimental Condition | | |
|---|---|---|---|---|
| | | Control | Assigned Fit | Choice Fit |
| Effort Attributions | | | | |
| | Mean | 16.98 | 16.13 | 13.76 |
| | SD | 10.14 | 9.93 | 9.31 |
| | N | 47 | 46 | 38 |
| Working Minutes | | | | |
| | Mean | 8.40 | 9.48 | 9.66 |
| | SD | 2.13 | 3.16 | 3.34 |
| | N | 43 | 46 | 35 |
| Self-Perceptions of Challenge | | | | |
| | Mean | 42.87 | 45.32 | 39.61 |
| | SD | 26.58 | 23.58 | 25.79 |
| | N | 47 | 47 | 38 |
| Score | | | | |
| | Mean | 84.94 | 79.11 | 82.11 |
| | SD | 13.22 | 13.98 | 13.01 |
| | N | 47 | 47 | 38 |

In contrast to predictions, the results of a one-way ANOVA indicated that students' attributions of effort for their achievement outcome did not vary by condition. Correlations conducted to test the relations among self-perceptions of challenge, time on task, and score on task, however, revealed differences across the conditions.

Partial correlations controlling for student's perception of challenge, a moderator variable, revealed students earned scores that positively co-varied with time spent working on the task only in the student-chosen "task fits individual" condition in which students chose the task matched to their skill level ($r = .35$, $p \leq .05$). No significant relation between working minutes was found for either the "one-size-fits-all" control group in which an undifferentiated task was assigned ($r = .14$, ns) or the teacher-assigned "task fits individual" experimental group in which a task matched to the student's skill level was assigned ($r = -.09$, ns).

In addition, bivariate correlations revealed a positive association between students' self perceptions of the challenge level of the task and the time they spent working on the task only for participants in the student-chosen "task fits individual" condition ($r = .40$, $p \leq .01$). Interestingly, this relation also was found to be significant when the data for all 91 students assigned to this condition, regardless of the appropriateness of the task chosen, were analyzed ($r = .35$, $p \leq .001$). No significant relation between perceptions of challenge and time spent on task was found for either the control group ($r = .14$, ns) or the teacher-assigned "task fits individual" group ($r = .19$, ns).

## Discussion

This study examined the role of the learning task in influencing students' reasoning and learning behavior patterns. The study took an integrative approach, examining the effects of the design of the learning task and the task delivery process. The findings from this study provide evidence of the differential effects of a "one-size-fits-all" approach to instruction and an instructional practice that provides multi-tiered learning tasks to accommodate a variety of readiness levels and allows for student choice. Although students' attributions of effort did not vary across the study's three conditions, the findings indicate that task differentiation and choice did affect the relations between students' self-perceptions of challenge and time spent working on the task and between time on task and the score earned on task. Students' perceptions of the task's challenge level predicted the time they spent working on the task only when students were given an opportunity to first peruse the multi-tiered tasks and then choose which task to work. The more difficult these students perceived the task, the longer they worked. Further, time spent working on the task and the score earned on the task co-varied only for students who selected an appropriate task so that the task fit the individual. These relations between perceptions of challenge and working time and between working time and score earned were not found for students who worked a "one-size-fits-all" task or for those who worked on a teacher-assigned task that fit the individual.

Thus, time spent on the task, arguably one of the best indices of effort, was positively influenced by students' perceptions of the task's challenge level and positively co-varied with achievement outcome, as measured by the score earned, only when students chose the task and the task fit or aligned with their skill. Although causal inferences cannot be drawn from these correlational results, considerable research and writings associate the belief that effort and achievement outcome co-vary with a belief that ability and effort co-vary, a belief that intelligence is malleable, and a purpose for achieving that is learning oriented (e.g., Ames, 1992; Dweck, 1986; Henderson & Dweck, 1990; Mueller & Dweck, 1998; Stipek, 1993). This suggests that building personal challenge into the design of the learning task and choice into the task delivery process should encourage students' commitment to effortful achievement and nurture the development of a learning goal focus that is long-term.

This study's findings also provide some possible explanations for students' attributions for their successes and failures. After controlling for age, a connection was found between implicit beliefs about intelligence and achievement goals. Specifically, students 12 years and older who believed that their intelligence was stable were much more likely to be performance goal oriented. These students overwhelmingly selected a task that focused on the display of ability rather than a task that focused on the development of ability. In addition, students with different goal orientations seemed to reason differently in determining what caused their success or failure on the puzzle tasks. Students with a learning goal orientation, who tend to focus on the development of ability, were more likely to attribute achievement outcomes they rated as very successful to effort compared to those with a performance goal orientation, who tend to focus on the display of ability. Furthermore, although the attributions of students with a learning goal orientation were unrelated to their judgements about their performance, the attributions of students with a performance goal orientation were highly influenced by their judgements about the quality of their performance. Performers emphasized attributions of effort, that is, "I didn't work hard enough on these puzzles," for outcomes they judged a failure but emphasized ability attributions, that is, "I'm smart at this" or "I'm good at these puzzles," for outcomes they judged a success.

The relation between performers' attributions and judgements about the success of their performance is troublesome. Considerable evidence associates long-term adoption of a learning goal orientation with an attributional belief that effort leads to success. One would hope, therefore, that, as happened in the student-chosen "task-fits individual" condition, increases in the time spent working on a task would result in students earning higher scores. That higher scores, which were highly correlated with students' judgements about their performance, might result in students subsequently attributing less of their achievement outcome to effort versus ability, suggests that for performers the situation is analogous to a catch-22. Increased effort, as measured by more time on task, might actually have a negative, indirect effect on performers' attributions of effort when success occurs. Attributing success mostly to ability rather than effort can affect students' achievement. When students believe that effort is not needed for success, they do not work as hard on tasks and, as a result, do not achieve to the level that their capable of achieving (Stipek, 1993).

**Conclusion**

The results of this study indicate that an instructional practice that pairs a differentiated curriculum within a multi-tiered learning task framework and a task choice can positively affect the association between students' effort and achievement outcome. When students chose the task and the task fit with their skill, time spent working on the task and the score earned on the task positively co-varied. The co-variance of effort and achievement outcome, however, was not accompanied by the predicted increase in students' attributions of effort for their achievement. Instead, students' achievement attributions depended on an interaction of their achievement goal orientation and their judgments about the quality of their performance.

The study's findings raise intriguing questions about the way in which various factors influence students' effort and their attributions for their achievement outcome and suggest a number of directions for future research. The potential benefits of an instructional practice that pairs a task aligned with the student's skill with a choice of task leads to questions about how teachers can offer opportunities for students to build the self-regulatory skills needed to choose an appropriate task and to fully benefit from choice and autonomy. In addition, the tendency of many students to attribute success to ability rather than effort raises questions about what teachers might do to encourage students, particularly performers who judge their achievement a success, to focus more on effort as a cause of their success. Specifically, would altering students' perceptions so that ability at the task is seen as unstable rather than stable or controllable rather than uncontrollable encourage a greater focus on effort for success?

In addition, because the findings from this research may reflect particular features of the study, future research should address questions about the degree to which the experimental findings can be replicated. All of the participants were from a middle school with a higher than average ability student population. Further, the tasks were novel rather than actual school tasks, and scores earned translated into bonus points rather than grades. Future studies should be conducted in schools with a more diverse student population, including a larger number of students with less than average skills, using actual school tasks, and using a more typical method of grading.

Although questions remain to be investigated, it is clear that educational practices need to be more focused on providing students with experiential evidence of the direct relation between hard work and achievement if students are to develop long-term achievement goal orientations. Currently, students believe that success in school depends mostly on ability rather than effort (Stevenson, 1992). They derive more satisfaction from attributing success to ability rather than effort (Nicholls, 1975), and as they become older, ability attributions become increasingly important in explaining their successes whereas the importance of effort as a causal factor decreases (Nicholls, 1979 as cited in Schunk, 1983). The findings from this study suggest that an educational practice that provides for task choice within a multi-tiered, differentiated task structure can provide students the type of experiential evidence needed to foster the development of a learning goal orientation.

When students are provided both guidance and autonomy in selecting among task options so that they and their classmates work on self-chosen tasks that fit the individual and are personally challenging, the idea that success is achievable but requires effort is promoted. This should foster the beliefs that effort and ability co-vary and that intelligence is malleable – beliefs that contribute to the development of a learning goal orientation. Students who, beginning in early elementary school, learn within classroom environments that provide this readily available evidence of the direct relation between effort and achievement are apt to grow up thinking more like the paragon of ingenuity, Thomas Alva Edison, who once said, "Genius is one percent inspiration and ninety-nine percent perspiration."

## References


Ames, C. (1992). Classroom: Goals, structures, and student motivation. Journal of Educational Psychology, 84 (3), 261-271.

Anderman, E. M., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. Review of Educational Research, 64 (2), 287-309.

Archambault, F. X. Jr., Westberg, K. L., Brown, S. W., Hallmark, B. W., Emmons, C. L., & Zhang, W. (1993). Regular classroom practices with gifted students: Results of a national survey of classroom teachers. University of Conneticut, Storrs, CT: The National Research Center on the Gifted and Talented (NRC/GT).

Bempechat, J., London, P., & Dweck, C. S. (1991). Children's conceptions of ability in major domains: An interview and experimental study. Child Study Journal, 2 (1), 11-36.

Blumenfeld, P. C. (1992). Classroom learning and motivation: Clarifying and expanding goal theory. Journal of Educational Psychology, 84 (3), 272-281.

Deiner, 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 (5), 451-462.

Dweck, C. S. (1986). Motivational processes affecting learning. American Psychologist, 41 (10), 1040-1048.

Dweck, C. S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgements and reactions: A world from two perspectives. Psychological Inquiry, 6 (4), 267-285.

Dweck, C. S., & Leggette, E. L. (1988). A social-cognitive approach to motivation and personality. Psychological Review, 95 (2), 256-273.

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. Journal of Personality and Social Psychology, 54 (1), 5-12.

Graham, S., & Weiner, B. (1996). Theories and principles of motivation. In D. C. Berliner & R. C. Calfee (Eds.), Handbook of educational psychology (pp. 63-84). New York: Simon & Schuster Macmillan.

Gustafsson, J., & Undheim, J. O. (1996). In D. C. Berliner & R. C. Calfee (Eds.), Handbook of educational psychology (pp. 186-242). New York: Simon & Schuster Macmillan.

Harter, S. (1985). Manual for the self-perception profile for children. University of Denver.

Henderson, V. L., & Dweck, C. S. (1990). Motivation and achievement. In S. S. Feldman & G. R. Elliott (Eds.), At the threshold: The developing adolescent (pp. 308-329). Cambridge, MA: Harvard University Press.

Juvonen, J., & Murdock, T. B. (1995). Grade-level differences in the social value of effort: Implications for self-presentation tactics of early adolescents. Child Development, 66, 1694-1705.

Kun, A. (1977). Development of the magnitude-covariation and compensation schemata in ability and effort attributions of performance. Child Development, 48, 862-873.

Levy, S. R., & Dweck, C. S. (1998). Trait – versus process-focused social judgment. Social Cognition, 16 (1), 151-172.

Meece, J. L. (1994). The role of motivation in self-regulate learning. In D. H. Schunk & B. J. Zimmerman (Eds.), Self-regulation of learning and performance (pp. 25-44). Hillsdale, NJ: Erlbaum.

Midgley, C., & Edelin, K. C. (1998). Middle school reform and early adolescent well-being: The good news and the bad. Educational Psychologist, 33 (4), 195-206.

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. Journal of Psychology and Social Psychology, 75 (1), 33-52.

Nicholls, J. G. (1975). Causal attributions and other achievement-related cognitions: Effects of task outcome, attainment value, and sex. Journal of Personality and Social Psychology, 31 (3), 379-389.

Nicholls, J. G. (1976). Effort is virtuous, but it's better to have ability: Evaluative responses to perceptions of effort and ability. Journal of Research in Personality, 10, 306-315.

Nicholls, J. G. (1978). The development of the concepts of effort and ability, perception of academic attainment, and the understanding that difficult tasks require more ability. Child Development, 49, 800-814.

Nicholls, J. G. (1984a). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. Psychological Review, 91 (3), 328-346.

Nicholls, J. G. (1984b). Conceptions of ability and achievement motivation. In C. Ames & R. Ames (Eds.), Research on motivation in education: Vol. 1 (pp. 39-73). Orlando, FL: Academic Press, Inc.

Nicholls, J. G. (1990). What is ability and why are we mindful of it? A developmental perspective. In R. J. Stermberg & J. Kolligian, Jr. (Eds.), Competence considered (pp. 11-40). New Haven, CT: Yale University Press.

Nicholls, J. G., Patashnick, M., & Mettetal, G. (1986). Conceptions of ability and intelligence. Child Development, 57, 636-645.

Raven, J. C., Court, J. H., & Raven, J. (1977). Advanced progressive matrices. London: H. K. Lewis & Co.

Raven, J. C., Court, J. H., & Raven, J. (1983). Standard progressive matrices. London: H. K. Lewis & Co.

Reis, S. M. (1995). Older Women's Reflections on Eminence: Obstacles and Opportunities. Roeper Review, 18 (1), 66-72.

Schuman, H., Walsh, E., Olson, C., & Etheridge, B. (1985). Effort and reward: The assumption that college grades are affected by quantity of study. Social Forces, 63 (4), 945-966.

Schunk, D. H. (1983). Ability versus effort attributional feedback: Differential effects on self-efficacy and achievement. Journal of Educational Psychology, 75 (6), 848-856.

Stevenson, H. W. (1992). Learning from Asian Schools. Scientific American, 70-76.

Stipek, D. (1981). Children's perceptions of their own and their classmates' ability. Journal of Educational Psychology, 73 (3), 404-410.

Stipek, D. J. (1993). Motivation to learn: From theory to practice (126-139). Boston, MA: Allyn & Bacon.

Stipek, D., & Gralinski, J. H. (1996). Children's beliefs about intelligence and school performance. Journal of Educational Psychology, 88 (3), 397-407.

Stipek, D., & MacIver, D. (1989). Developmental change in children's assessment of intellectual competence. Child Development, 60, 521-538.

Stipek, D. J., & Tannatt, L. M. (1984). Children's judgement of their own and their peers' academic competence. Journal of Educational Psychology, 76 (1), 75-84.

Tomlinson, C. A., Moon, T. R., & Callahan, C. M. (1998). How well are we addressing academic diversity in the middle school? Middle School Journal, 29 (3), 3-11.

Urdan, T. C. (1997). Achievement goal theory: Past results, future directions. Advances in Motivation and Achievement, Vol. 10, (pp. 99-141). Greenwich, CT: JAI Press.

VanTassel-Baska, J. L. (1989). Characteristics of the Developmental Path of Eminent and Gifted Adults. In J. VanTassel-Baska & P. Olszewski-Kublilus (Eds.), Patterns of influence on gifted learners: The home, the self, and the school. (pp. 146-162). New York: Teachers College Press.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. Psychological Review, 92 (4), 548-573.