

Students' perceptions of a mastery climate  
operating within a university course:  
Motivational implications

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Abstract

Students enrolled in a first year university course in 1992 responded twice to a questionnaire: at the end of the first semester (n=377), and at the end of the second semester (n=397). The questionnaire was designed in part to measure students' perception of the motivational "climate" of the course, that is, did the lecturers involved in the course encourage students to adopt a mastery achievement goal and/or a performance achievement goal? Between the first and second administration of the questionnaire, a change was introduced to the evaluative structure of the course in an attempt to increase students' perceptions of a mastery climate. The results demonstrated that students' perceptions of the course could be delineated in terms of a mastery goal (but less so in terms of a performance goal), and that perception of a mastery climate was related to a more enthusiastic approach to learning and greater reported use of metacognitive strategies. The change to the structure of the course did not result in an increase in students' perception of a mastery climate.

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Motivation is of interest to educators because learning is an active process which requires conscious and deliberate activity (Stipek, 1993). Even the most able student will not learn if he lacks the motivation to do so. Of recent years, cognitive psychology has offered many insights into the way information is processed and the sorts of metacognitive practices that enhance learning (eg, Flavell, 1985; Resnick, 1989). The cognitive basis of a number of current theories of motivation means that many of these insights have been incorporated into the motivational theories and, as a result, they provide a deeper and broader understanding of students' motivation to learn. The present study is an investigation of the motivation to learn of university students and an attempt to increase motivation by effecting changes to the structure of a university course.

The theoretical framework for this study is the construct of achievement goals. This means a focus on the achievement goal or goals that

a person holds as he approaches an academic task (Ames, 1992; Blumenfeld, 1992; Weiner; 1990). Because the construct emerged from several quarters, the goals have been variously labeled but share similar theoretical distinctions. As Ames (1992, p. 261) describes it, a goal "defines an integrated pattern of beliefs, attributions, and affect that produces the intentions of behavior ... and that is represented by different ways of approaching, engaging in, and responding to achievement-type activities." That is, the adoption of a goal sets in motion a particular way of interpreting and responding to the world.

Two types of goal in particular have been proposed. One has been referred to as a performance goal (Ames & Archer, 1988; Elliott & Dweck, 1988), an ego incentive (Maehr & Braskamp, 1986), or ego involved (Nicholls, 1984). Those who hold this goal are concerned primarily with demonstrating their ability which is shown to best advantage by outperforming others (or concealing a perceived lack of ability from others),

particularly if success is achieved with little effort. The second achievement goal has been labeled a mastery goal (Ames & Archer, 1988), a task incentive (Maehr & Braskamp, 1986), task involved (Nicholls, 1984), or a learning goal (Elliott & Dweck, 1988). Those who hold this goal want to develop their competence on a task or increase their understanding of a subject and anticipate that this end will be achieved by working hard. These two goals subsequently will be referred to as performance and mastery goals.

Orientation toward a goal has been demonstrated to be a function of individual differences or to be induced by situational constraints (for a discussion see Dweck, 1986). In situations where one goal does not appear more salient than the other, individual difference would be expected to emerge. There is considerable evidence that achievement goals are an important motivational construct.

In particular, orientation toward a mastery goal has been associated with the desire to gain an understanding of a topic (Ames & Archer, 1988), the choice of more difficult rather than less difficult tasks, in effect, taking more risks (Ames & Archer, 1988; Elliott & Dweck, 1988), focusing on attributions to effort and the quality of the teaching rather than attributions to ability (Ames & Archer, 1988; Archer, 1992; Nicholls et al., 1985), and using more effective metacognitive learning strategies (Ames & Archer, 1988; Archer, 1992; Archer et al., 1991; Meece et al., 1988). In all, the adoption of a mastery goal "encourages children to explore, initiate and pursue tasks that promote intellectual growth" (Dweck, 1986, p.1043).

On the other hand, orientation toward a performance goal has been associated with a tendency to avoid challenging tasks (Elliott & Dweck, 1988), negative feelings such as shame and embarrassment following poor performance (Elliott & Dweck, 1988; Jagacinski & Nicholls, 1987), and the

use of "surface" learning strategies such as rote learning (Meece et al., 1988). Susceptibility to these maladaptive behaviours and attitudes is most pronounced in students who feel they lack ability. Because the focus of a performance orientation is to demonstrate competence to others, the fear of appearing incompetent impels students to use behaviours that might hide their perceived incompetence in the short term but does little to enhance learning in the long term.

Of particular interest is the relationship between orientation toward an achievement goal and use of metacognitive strategies that enhance learning (such as consciously attending to important information, planning work, checking one's understanding and monitoring one's progress). It has been shown that students choose not to use metacognitive strategies even though they are aware of them (eg, Pintrich, 1989; Schiefele, 1991). That is, motivational state affects students' use of effective strategies. As Ames (1992) argues, students are more likely to make use of metacognitive strategies (if they are aware of them) when they hold a mastery goal of wanting to understand the material they are working on. Mastery-oriented students would be likely to ask themselves questions such as "is this making sense?", "what's the best way to do this assignment?", and "should I make a change to my approach to this topic?". On the other hand, if demonstrating competence to others is the desired end (a performance goal orientation), then students are more likely to use the sorts of strategies (eg, "tipping" a likely examination question, narrow reading, rote learning) that lead to superficial rather than deep coverage of material.

As noted earlier, adoption of one goal rather than the other may be the result of individual differences or induced by situational cues. In experimental situations, signals or cues to subjects encouraging the adoption of a goal can be presented clearly and unambiguously. In classrooms, however, students may receive contradictory or confusing cues. For example, a teacher may exhort all students to work hard but at the same time draws attention to the more able students by treating them in a more informal and friendly manner than the other students. In addition,

research has shown that students within the same classroom may not attend to the same cues or may react differently to the same cues (Weinstein, 1989; Ryan & Grolnick, 1986). It is likely that many of these differing reactions reflect students' prior experiences, though it is likely also that teachers do not treat all their students similarly. Whatever the source, it can be argued that students' interpretations of experiences provide a meaningful understanding of life in classrooms because their subsequent attitudes and behaviour stem from these interpretations.

Research has shown that teachers are perceived by their students to encourage the adoption of mastery and/or performance goals. This research also has linked students' perceptions of teachers' behaviours to important variables such as enjoyment (Ames & Archer, 1988; Archer, 1992), willingness to tackle difficult tasks (Ames & Archer, 1988), attributions

(Ames & Archer, 1988; Archer, 1992), and reported use of effective metacognitive strategies (Ames & Archer, 1988; Archer, 1992; Nolen, 1987; Nolen & Haladyna, 1990; Meece et al., 1988). The present study extends this research to students undertaking a course at university.

In the Ames and Archer (1988) study, scales were developed to measure students' perceptions of classroom "climate" in terms of mastery and performance goals. Mastery and performance goal orientations were established for various dimensions of classroom life: definition of success (mastery: improvement, progress; performance: outperforming others), valued activities (mastery: effort, learning; performance: normatively high ability), reasons for satisfaction (mastery: working hard, accepting challenge; performance: doing better than others), orientation of the teacher (mastery: how students are learning; performance: how students are performing), attitude towards mistakes (mastery: part of learning; performance: cause for anxiety), focus of students' attention (mastery: process of learning; performance: own performance relative to others), reason for effort (mastery: learn new things; performance: do better than others), and criteria for evaluation (mastery: progress, absolute standards; performance: normative). A modification of these scales has been used with an Australian sample (Archer, 1992).

The present study focused on the question: can university students' perceptions of a first year course be delineated in terms of mastery and performance goals? If this is possible, do students' perceptions of a lecturer emphasizing a mastery goal or a performance goal relate to significant motivational variables in the manner predicted by achievement goal theory? A second question was posed: is it possible to increase students' perceptions of a mastery climate within a course by effecting a change to the evaluative structure of the course? Finally, what role is played by students' perception of their level of ability? Is perceived ability a stronger predictor of students' motivation and reported use of metacognitive learning strategies than students' perception of a mastery climate operating within the course?

## Method

The subjects of the study were students enrolled in the Bachelor of Education course at the University of Newcastle in a variety of specializations (including early childhood, primary, and secondary teaching). In their first year at university all the students (approximately 450 in total) take a year long course in child and adolescent development, commonly referred to as Education 1. The course is run by a group of eight lecturers who take turns to present a weekly massed lecture attended by all students. In addition to the massed lecture, there are two hour tutorial sessions each week for smaller groups of students (approximately 25 students in each) which are conducted by one of the lecturers, usually for the entire year. At the end of the first semester in 1992, however, there was a reorganization of some of the tutorial groups because one of the lecturers took study leave.

Towards the end of the first semester 1992, students were asked to

complete a questionnaire about their Education 1 course. There were 377 students in the first sample, including 131 males and 246 females. The contents of the questionnaire are detailed below. After the students completed the questionnaire, they were issued with the major assignment of the course (they had completed the minor assignment during the first semester). The major assignment differed from the minor assignment not only in length and content but also in the way it was to be marked: (1) students were to complete their major assignment and submit it to their tutorial lecturer; (2) the lecturer would give it a mark out of 10 and provide written feedback on ways in which the assignment could be improved; (3) students would be given their assignments back and allowed time to respond to the lecturer's feedback; (4) the revised assignments would be re-submitted to the tutorial lecturer who would give each one a mark out of 20; (5) the final mark would be the sum of the mark out of 10 for the first submission and the mark out of 20 for the resubmission.

Towards the end of the second semester students were asked to respond to the same questionnaire they completed at the end of the first semester. There were an additional two questions concerning their reactions to re-submitting their major assignment. There were 397 students in the second sample, including 159 males and 258 females. The great bulk of the students at both times of testing were aged between 18 and 20 years of age, with a tail of older students.

### Instruments

**Achievement goal orientation** This set of items was designed to assess students' perceptions of the mastery and performance dimensions of the tutorial sessions of Education 1. A modified version of the scales developed by Ames & Archer (1988) was used. In response to criticism of the scales by Nolen and Haladyna (1990), a number of items were reworded to emphasise the role of the teacher/lecturer rather than attitudes or behaviour brought to the classroom by the student. In addition, because the Ames and Archer scales were used with a high school sample, items were changed somewhat to fit a university sample. Items were prefaced with the heading "In this Education 1 course" and students rated each item on a five-point Likert scale ranging from "do not agree at all" (1), "agree" (3), to "strongly agree" (5). (In the Ames and Archer study, the five-point Likert scale was anchored by "strongly disagree" and "strongly agree").

Because data on students' perceptions of the climate of the tutorial sessions were gathered at two points, both data sets were used to develop the mastery and performance goal scales. Orthogonal factor analyses with varimax rotation on the 30 items were conducted in an attempt to confirm an

a priori classification of the items into mastery and performance goal categories. The classification was not as clear-cut as in the Ames and Archer (1988) study, particularly for the performance scale. For the mastery scale, eight items were selected on the basis of a relatively high loading on the mastery factor for both samples (.45 or higher) and a relatively low loading on the performance factor for both samples (.26 or lower). The coefficient alpha for the mastery scale was .77 for the first data set and .77 for the second data set.

For the performance scale, seven items were selected on the basis of a relatively high loading on the performance factor for both samples (.40 or higher, except for one item with a loading of .28 in one of the samples) and a relatively low loading on the mastery factor for both samples (.26 or lower). The coefficient alpha for the performance scale was .65 for the first data set and .67 for the second data set. The low coefficient alphas for the performance scale points to an inadequate scale and any statistics derived from this must be accepted with caution. The mastery and performance scales were not significantly correlated in the first sample ( $r = -.06$ ) nor in the second sample ( $r = .08$ ). The items comprising the mastery and performance goal scales are shown in Appendix 1.

**Learning strategies** Students' reported use of effective metacognitive strategies for studying for the Education 1 course (including monitoring, planning, and elaborating) was assessed using 16 items. The learning strategies scale used by Ames and Archer (1988) formed the basis of this scale, with three additional monitoring items added. Elaboration strategies focus on integrating new information into what has been learned previously, while monitoring strategies refer to ways of checking that the new material is being comprehended. The items were selected as strategies that are generic to the process of learning, rather than specific to a particular discipline. The coefficient alpha for the scale was .75 for the first data set and .87 for the second data set.

The items in the scale were prefaced with "In this course" and students rated each item on a five-point Likert scale from "not at all typical of me" (1) to "very typical of me" (5). Examples of items include "I make charts, diagrams, or tables to summarize material for this course", "When I study for this course, I set myself questions to make sure I understand", and "I try to make all the topics in this course fit together logically."

**Attributions** Students were asked two sets of attribution questions related to doing well and not doing well in the Education 1 course ("When you do well in this course, why do you think you are successful? Is it because...", "When you do not do very well in this course, why do you think you are not successful? Is it because..."). For success and failure attributions, students rated the importance of ability/lack of ability, effort/not sufficient effort, use of good study strategies/little use of

good study strategies, easy work/difficult work, and good lecturing/poor lecturing. A five-point Likert scale ranging from "not an important reason" (1) to "an important reason" (5) was used for each attribution. Preference for difficult and easy assignments A single question was used to assess students' willingness to tackle a difficult but ultimately rewarding assignment ("an assignment where you can learn a lot of new things, but you also will have some difficulty and make mistakes, but eventually learn something useful") on a five-point Likert scale ranging from "not likely at all (1) to "very likely" (5). A single question also was used to assess students' willingness to choose an easy assignment ("an assignment that will involve little struggle or confusion and you probably would do very well") on the same five-point scale.

Relevance A single question was used ("How relevant do you think this course will be for you in your teaching career?) followed by a five-point Likert scale ranging from "not relevant at all" (1) to "very relevant" (5).

Interest A single question was used ("How interesting do you find the subject matter of this course?") followed by a five-point Likert scale ranging from "not interesting at all" (1) to "very interesting" (5).

Choose to continue A single question was used ("If you had the choice, how willing would you be to take more courses like this?") followed by a five-point Likert scale ranging from "not willing at all" (1) to "very willing" (5).

Enjoyment A single question was used ("How enjoyable do you find this course in general?") followed by a five-point Likert scale ranging from "not enjoyable at all" (1) to "very enjoyable" (5).

Perceived ability A single question was used to assess students' perception of their relative ability ("How would you rate your ability in this course compared with the other students in your tutorial group?") followed by a five-point Likert scale ranging from "one of the lowest" (1), "about in the middle" (3), to "one of the highest" (5).

Re-submission of major assignment The second time the students completed the questionnaire, they were asked to respond to two additional questions about their reaction to the re-submission of the major assignment. The first question ("If you had the choice, how willing would you be to improve your assignments and re-submit them, as you did with the last Education 1 assignment?) was followed by a five-point Likert scale ranging from "not willing at all" (1) to "very willing" (5). The second question ("Do you think resubmitting your last Education1 assignment helped you understand

the content of that assignment?") was followed by a five-point Likert scale ranging from "no help at all" (1) to "very helpful" (5).

## Results

This study was concerned with individual students' perceptions of their lecturer's attitudes and behaviour, and the relationship between these perceptions and students' reported attitudes and behaviour. Because

of this, all analyses were conducted on the sample as a whole, not by tutorial group.

**Descriptive statistics** Table 1 shows the means and standard deviations for variables involved in the study at the first and second time of testing. Table 2 shows the means and standard deviations for students' attributions for success and failure at the first and second time of testing.

**Correlational analyses** For both times of testing, students' scores on the mastery and performance goal scales were correlated with their reported use of learning strategies, their preference for difficult and easy assignments, perceived relevance of the course, interest generated by the course, willingness to take similar courses in the future, and enjoyment of the course. The results are shown in Table 3. As the correlations show, when the students perceived the lecturer to be emphasising a mastery goal, they reported greater use of effective learning strategies, greater willingness to undertake difficult assignments, greater perceived relevance, greater interest, greater willingness to take similar courses in the future, and greater enjoyment of the course. There were only two significant correlations between these variables and a performance goal. The stronger one was between a performance goal and use of learning strategies, but it occurred at the second time of testing only, and was less significant than any of the significant correlations involving a mastery goal.

Table 4 shows correlations between students' perceptions of mastery and performance goals and their attributions for success and failure in the Education 1 course. The results are not as clear-cut as the previous ones, and there is more variation in correlations between the first and second time of testing. Consistent and significant results emerge for a mastery goal and attributing success to good teaching, for a mastery goal and not attributing failure to poor teaching, and for a mastery goal and not attributing failure to difficult tasks. Also, for both times of testing, there are significant correlations between a performance goal and attributing failure to difficult tasks.

**Regression analyses** It might be expected that students who perceive themselves among the best students in the tutorial group would be the ones to use more effective learning strategies and to demonstrate a more enthusiastic approach to their work than students who see themselves among the weaker students. To demonstrate that students' perception of a mastery climate in the tutorial room predicted use of learning strategies and an adaptive approach to learning (including perceived relevance of the course, interesting nature of the course, willingness to take similar courses in the future, enjoyment of the course, and willingness to choose difficult assignments) over and above that of perceived ability, a series of hierarchical regressions were conducted. In these analyses, self-perception of ability was entered first into the regression equation, followed by students' perceptions of a mastery climate.

The results for the first and second times of testing are shown in Table 5. For each of the dependent variables, students' perception of a mastery climate remained a highly significant predictor after the contribution of perceived ability was taken into account. It should be noted, however, that the variance of the ability ratings at both times of testing was not large (Time 1: mean = 3.13, SD = 0.84, Time 2: mean = 3.08,

SD = 0.75). This limited variance may have reduced the strength of the regression coefficients for perceived ability.

Changes from Time 1 to Time 2 It had been anticipated that making a change to the evaluative structure of the Education 1 course would have increased students' perception of a mastery climate within the course, and, as a result, increased their adaptive approach to learning (eg, perceiving the course as relevant, willingness to tackle difficult assignments). Allowing students to re-submit their major assignment after receiving feedback from their lecturer should act as a mastery cue, shifting the emphasis from ability (or lack of it) to effort (or lack of it) or use of effective strategies (or lack of them). As Ames (1992) explains, when marks or grades are accompanied by the opportunity to improve, the amount of effort expended becomes a more salient factor for students.

For these analyses, the sample was restricted to students who had completed the questionnaire both at Time 1 and Time 2 (n=318). For the two achievement goal scales, the strategies scale, relevance of the course, interesting nature of the course, willingness to take similar courses in the future, enjoyment of the course, and willingness to tackle difficult assignments, students' score at Time 1 was subtracted from their score at Time 2. The means and standard deviations of these difference scores are shown in Table 6. As can be seen, there were only insignificant changes in all the variables from Time 1 to Time 2.

However, students did indicate strong support for the practice of re-submission. There were two items about re-submission on the second questionnaire. For the first item ("If you had the choice, how willing would you be to improve your assignments and resubmit them, as you did with the last Education 1 assignment?"), the mean on a five-point scale was 4.20 with a standard deviation of 0.92. For the second item ("Do you think re-submitting your last Education 1 assignment helped you to understand the content of that assignment?"), the mean on a five-point scale was 4.11 with a standard deviation of 0.98.

## Discussion

The results demonstrate that students' perceptions of the climate of a course, as demonstrated by its lecturing staff, could be delineated in terms of a mastery goal orientation (using an internally reliable scale). However, it was more difficult to delineate a course climate in terms of a performance goal orientation. This latter occurrence will be addressed in

more detail later in the discussion.

Students' perception of a mastery climate was linked with a willingness to tackle difficult tasks and to take a similar course in the future, perception of the course as relevant, interesting, and enjoyable, and reported use of effective metacognitive strategies. As such, the results provide support for the construct of a mastery achievement goal. Its criterion validity has been strengthened by significant relationships with variables that indicate an adaptive approach to learning.

The link between perception of a mastery climate and reported use of effective learning strategies is of particular interest because, as noted earlier, students may choose not to make use of strategies with which they are familiar (Pintrich, 1989; Schiefele, 1991). That is, students must be motivated to use strategies (though of course some students may be unaware of them). Pintrich argues that many students choose not to use effective metacognitive strategies as a means of protecting their sense of self-worth. For example, writing an assignment at the last moment so that there is no time for the strategies of review and revision means that a good mark can be attributed to high ability, while a poor mark can be attributed to a lack of effort.

However, if the student's goal is to develop a deep understanding of the topic, then it makes sense to use strategies such as review and

revision of work. The focus shifts from looking competent in front of others to developing competence for one's own satisfaction. There is no sense of shame attached to working hard. As Dweck (1986) argues, adoption of an achievement goal sets in motion a particular way of interpreting and responding to academic tasks.

The regression analyses demonstrated that a mastery goal orientation lessens the impact on students of their perceived level of ability. That is, seeing oneself as among the top students in the tutorial group was not the most important reason for such responses as enjoying the course, being willing to take similar courses in the future, and making use of effective learning strategies. There is increasing interest in the area of self-concept of ability (eg, Nicholls, 1989; Sternberg & Kolligian, 1990). This study and others using achievement goals as a theoretical base suggest that a mastery goal orientation lessens the impact of perceived ability on subsequent attitudes and behaviour. Fear of low ability can be debilitating for students and manifested in high anxiety, fear of failure, and an unwillingness to tackle personally challenging tasks. Proponents of achievement goal theory argue that it is possible to structure the learning situation to lessen the impact of perceived ability (especially low perceived ability) on students' attitudes and behaviour.

The correlational analyses involving goal scales and attributions for success and failure were less easy to interpret than the analyses discussed

already. However, several significant and consistent findings emerged. Students who perceived a mastery climate to be operating in the Education 1 course were more likely to attribute success to good teaching and were less likely to attribute failure to poor teaching or to excessively difficult tasks. This pronounced tendency to attribute success to good teaching but not to attribute failure to poor teaching also emerged in Ames and Archer (1988) and Archer (1992).

The inability to form a robust performance goal scale may reflect the lack of a strong competitive focus within the Education 1 course. Even though grades are awarded at the end of the year (including high distinction, distinction, credit, pass, and fail), most lecturers make little reference to grading procedures during the year. Also, unlike some university courses where many more students are admitted into the first year of a course than can be accommodated in the second year, it is poor performance alone that leads to failure. Little information about performance relative to others is available to students. Interviews this year with some current students in the course indicate that most students are unaware of the marks others receive on tests and assignments (except the marks of close friends). In fact, a number of students commented that they would like more social comparative information, not to create a competitive environment but to give them an indication of whether or not they were putting sufficient effort into the course.

It can be argued therefore that a robust performance scale did not emerge because lecturers involved in the course provide few cues encouraging the adoption of a performance goal. Indeed, inspection of the items comprising the performance scale shows that none of the items refers directly to the lecturer's attitudes or behaviour even though there were five "performance" items in the questionnaire with a reference to the lecturer (eg, "the lecturer gives more attention to students who do better on tests and assignments than other students"). The performance goal scale perhaps should be seen as indicating a personal orientation toward that goal, rather than a student's perception of the lecturer's orientation toward that goal. Also it should be noted that the present author had difficulty forming a performance goal scale for Australian high school students' perception of their classroom teachers (Archer, 1992) and in fact in the Ames and Archer (1988) study, the mastery goal scale was the more robust of the two.

The attempt to increase students' perception of a mastery climate (and thereby encourage a more adaptive approach to the course) by introducing the practice of resubmitting an assignment following feedback from the lecturer was not successful. This may have been because the change was an isolated one. Ames (1992) argues that for the perception of a mastery climate to increase, change must be effected simultaneously to three aspects of the learning environment: the nature of the tasks students receive; the

way tasks are evaluated and students recognised for good work; and the amount of autonomy in making decisions accorded to students. With change in some of these aspects but not in others, the motivational outcomes will be confused.

To conclude, the present study has demonstrated that the way lecturers approach their teaching - the attitudes and behaviours they display - is related to students' motivation to learn. Students who perceive their lecturer to be encouraging students to work towards understanding the subject matter, treating mistakes as a natural part of learning, concentrating on improving the quality of students' work, and presenting material in an interesting fashion show greater motivation towards the course and indicate greater use of effective metacognitive strategies that would be expected to enhance learning.

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TABLE 1 Means and standard deviations for variables at first and second time of testing

	Time 1	Time 2
(n=319)		
(n=344)		
Measure *		
Mastery goal (8)	M = 23.36 SD = 4.38	M = 23.99 SD = 4.38
Performance goal (7)	M = 23.09 SD = 4.16	M = 22.36 SD = 3.97

Strategies (16)	M = 47.08 SD = 9.76	M = 46.37 SD = 9.46
Choose hard task	M = 3.10 SD = 1.02	M = 3.10 SD = 1.05
Choose easy task	M = 3.75 SD = 1.18	M = 3.68 SD = 1.24
Relevance	M = 3.73 SD = 0.92	M = 3.58 SD = 1.06
Interest	M = 3.41 SD = 0.99	M = 3.36 SD = 1.08
Choose to continue	M = 2.91 SD = 1.03	M = 2.92 SD = 1.12
Enjoyment	M = 3.11 SD = 0.94	M = 3.12 SD = 1.00

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\* Number in parenthesis shows the number of items (when greater than one) involved in computing the mean

TABLE 2 Means and standard deviations for attributions for success and failure at first and second time of testing

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	Time 1 (n=319)	Time 2 (n=344)
<hr/> Attributions for success		
Ability	M = 3.00 SD = 1.02	M = 2.91 SD = 1.01
Effort	M = 3.91 SD = 1.02	M = 3.78 SD = 1.04
Good strategies	M = 3.22 SD = 1.03	M = 3.29 SD = 1.04
Easy task	M = 2.80 SD = 1.21	M = 2.95 SD = 1.15

Good teaching	M = 3.33 SD = 0.98	M = 3.34 SD = 1.00
Attributions for failure		
Lack of ability	M = 2.62 SD = 1.24	M = 2.66 SD = 1.13
Lack of effort	M = 4.25 SD = 0.95	M = 4.24 SD = 0.89
Poor strategies	M = 3.84 SD = 1.03	M = 4.01 SD = 1.98
Difficult task	M = 3.34 SD = 1.11	M = 3.33 SD = 1.14
Poor teaching	M = 2.50 SD = 1.11	M = 2.41 SD = 1.08

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TABLE 3 Zero-order correlations between goals and self-related measures at first and second time of testing

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2 (n=336) Measures	Time 1 (n=322)		Time
	Mastery Goal	Performance Goal	
Mastery Goal			
	Performance Goal		
Learning strategies ***	.32 *** .16 **	.08	.30
Choose hard task ***	.18 ** .05	-.05	.21
Choose easy task .08	-.09	-.06	-.07
Relevance .06	.21 ***	.06	.34 ***

Interest .09	.30 ***	.01	.40 ***
Choose to continue *** .02	.27 ***	.05	.36
Enjoyment .12 *	.30 ***	.05	.44 ***

\*  $p < .05$                       \*\*  $p < .01$   
 \*\*\*  $p < .001$

TABLE 4 Zero-order correlations between goals and attributions for success and failure at first and second time of testing

2 (n=344) Measures	Time 1 (n=322)		Time
	Mastery Goal	Performance Goal	
Mastery Goal			
Attributions for success			
Ability -.01	.20 ***	.02	.11 *
Effort .17 **	-.03	.08	.06
Good strategies .19 **	-.04	.11 *	
	.11 *		
Easy task .01	-.09	.10	-.13 *
Good teaching .08	.30 ***	.01	.37 ***
Attributions for failure			

Lack of ability				
**	.11 *	-.04	.09	-.16
Lack of effort		-.09	.01	.05
.06				
Poor strategies		.02	.02	.03
.09				
Difficult task		-.22 ***	.13 *	
-.19 **	.20 ***			
Poor teaching		-.18 **	.06	-.19
**	.01			

TABLE 5 R2

and increments in R2

for hierarchical regressions for dependent variables at first and second time of testing (with perceived ability entered as first independent variable and mastery goal as second independent

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Time 1 Time 2  
 (n=354) (n=382)

Learning strategies  
 R2 (perceived ability only).08\*\*\*  
 Increment in R2 (mastery goal).07\*\*\*  
 Total R2 .15\*\*\*

Relevance  
 .03\*\*\* R2(perceived ability only)  
 .07\*\*\* Increment in R2 (mastery goal)  
 .09\*\*\* Total R2

.01\* .04\*\*\*  
 .04\*\*\* .10\*\*\*  
 .05\*\*\* .14\*\*\*

Interest

R2 (perceived ability only) .06\*\*\* .07\*\*\*  
 Increment in R2 (mastery goal).07\*\*\* .13\*\*\*  
 Total R2 .13\*\*\* .19\*\*\*

Choose to continue

R2 (perceived ability only).05\*\*\*  
 Increment in R2 (mastery goal).05\*\*\*  
 Total R2 .10\*\*\*

Enjoyment

.08\*\*\* R2 (perceived ability only)  
 .10\*\*\* Increment in R2 (mastery goal)  
 .17\*\*\* Total R2

.05\*\*\* .03\*\*\*  
 .07\*\*\* .16\*\*\*  
 .12\*\*\* .20\*\*\*

Choose difficult assignment

R2 (perceived ability only) .02\*\* .01  
 Increment in R2 (mastery goal).04\*\*\* .03\*\*\*  
 Total R2 .06\*\*\* .04\*\*\*

\*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .001$

TABLE 6 Means and standard deviations for differences in students' responses at first and second time of testing (n=318)

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Difference (Time 2-Time 1)	Mean	Standard Deviation
Mastery goal	1.02	4.36

Performance goal	-0.52	3.80
Strategies	-0.66	6.77
Relevance	-0.12	0.91
Interest	0.03	0.87
Choose to continue	-0.00	0.97
Enjoyment	.00	0.82

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#### APPENDIX I          Items that comprise the mastery and performance goal scales

Mastery goal scale      In this Education I course:

1. The lecturer wants us to enjoy learning about educational psychology.
2. The lecturer gives us interesting work to do.
3. The lecturer makes sure we understand the work.
4. The lecturer wants us to learn how to solve problems on our own.
5. The lecturer pays attention to whether I'm improving in my work.
6. The lecturer encourages trying even though we make mistakes.
7. We work hard because the lecturer wants us to know more about child psychology.
8. Students are given a change to correct their mistakes.

Performance goal scale In this Education I course:

1. Students compete against each other to get high marks.
2. Students don't care about the marks other students get (reversed).
3. Students feel bad when they do not do as well as others.
4. Students compete to see who can do the best work.
5. Doing better than others is important to me.
6. Students want to know how others score on assignments and tests.
7. I worry when the work is difficult.

