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Achievement Goals as Predictors of Achievement-Relevant Processes Prior to Task Engagement

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This research comprised 3 studies (2 prospective and 1 short-term longitudinal) designed to investigate mastery, performance-approach, and performance-avoidance goals as predictors of achievement-relevant processes prior to the undergraduate examination experience. Results from across the 3 studies were supportive of the authors' hypotheses and revealed a differential predictive pattern for each of the achievement goals. Mastery goals were linked to numerous positive processes (e.g., challenge appraisals, absorption during preparation), performance-approach goals were linked to a more limited set of positive processes (e.g., challenge appraisals, grade aspirations), and performance-avoidance goals were linked to numerous negative processes (e.g., threat appraisals, anticipatory test anxiety). Implications for the trichotomous achievement goal model and educators are discussed.

Achievement motivation theorists have long been interested in the mechanisms that lead to differential processes and outcomes in evaluative settings. One of the most generative approaches to studying achievement motivation has been the achievement goal approach offered by Dweck (1986), Nicholls (1984), and others (Ames, 1984; Maehr & Nicholls, 1980). Within this approach, achievement goals are construed as the purpose (Maehr, 1989) or cognitive-dynamic focus (Elliot, 1997) of task engagement, and the type of goal adopted is thought to establish the self-regulatory framework for behavior in achievement situations. Accordingly, achievement goals are regarded as important predictors of a variety of achievement-relevant variables (for reviews, see Ames, 1992; Dweck, 1991; Harackiewicz, Barron, & Elliot, 1998; Pintrich & Schunk, 1996; Urdan, 1997).

A large amount of research in the achievement goal tradition has centered on two distinct goal types: performance goals, which are focused on demonstrations of competence relative to others, and mastery goals, which are focused on the development of competence through task mastery (Ames & Archer, 1988; Dweck, 1986). From the standpoint of the dichotomous framework, performance goals are presumed to activate the self and self-related issues (e.g., self-presentation), while mastery goals are thought to better facilitate a task-based focus (or task involvement). In addition, overviews of this framework characterize performance goals as largely negative and mastery goals as primarily positive in terms of their influence on achievement-related behavior (see Ames, 1992).

Elliot and his colleagues (Elliot, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) have proposed a trichotomous model of achievement goals that serves as an extension of the mastery–performance dichotomy. In this model, the performance goal construct is bifurcated into separate approach and avoidance components, while the mastery goal is left unchanged, which results in three independent achievement goals: (1) *performance-approach goals*, which focus on the attainment of competence relative to others; (2) *performance-avoidance goals*, which focus on the avoidance of incompetence relative to others; and (3) *mastery goals*, which focus on the development of competence through task mastery.[1] Recent empirical findings have provided support for the trichotomous achievement goal model, with each goal leading to a distinct set of achievement-relevant variables (see Elliot, 1999).

Most achievement tasks (e.g., classroom examinations, athletic contests, business presentations) are not simply isolated evaluative experiences, but are best conceptualized as an unfolding sequence of events. Three components of this achievement sequence may be identified: (a) the period prior to task engagement, which includes the individual's appraisal of and orienting to the task and its requirements, preparation for task engagement, and his or her psychological state immediately prior to the evaluative encounter; (b) the actual experience of task engagement, which includes the individual's affective and cognitive state during task performance as well as performance per se; and (c) the period following task engagement, which includes the individual's immediate reaction to the evaluative encounter, response to competence feedback, and the ramifications for subsequent motivation and action. Each of these components provides important information regarding the processes that take place in the achievement context and must receive empirical attention if a comprehensive account of motivated achievement behavior is to be developed. A conceptual analogue to our proposal may be found in Folkman and Lazarus' (1985) analysis of coping with college examinations. Folkman and Lazarus argue that stressful events such as examinations should be viewed as having a dynamic quality, and that coping responses

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[1] In recent work, we (Elliot & McGregor, 2001; see also Pintrich, 2000b) have added a fourth achievement goal construct, mastery-avoidance goals, which are focused on the avoidance of task-based incompetence. Mastery-avoidance goals were not investigated in the present research.

should be assessed at different time points around the actual evaluative event.

To date, research on the trichotomous model has focused primarily on processes and outcomes relevant to the actual experience of task engagement and/or the responses or ramifications thereafter. For example, Elliot and McGregor (1999) demonstrated that performance-approach goals are positive predictors and performance-avoidance goals are negative predictors of exam performance, and that performance-avoidance goals are linked to test anxiety (specifically worry) while taking the exam. Likewise, Elliot and Church (1997) found that mastery and performance-avoidance goals are important predictors of intrinsic motivation that follow examination experiences, with mastery goals exhibiting a positive impact and performance-avoidance goals exhibiting a negative impact (see also Church, Elliot, & Gable, 2001; Elliot & Harackiewicz, 1996; Lopez, 1999; Middleton & Midgley, 1997; Rawsthorne & Elliot, 1999; Skaalvik, 1997; Tanaka & Yamauchi, 2000).

Given that achievement goals within the trichotomous model are thought to provide a perceptual framework for the construal and interpretation of achievement tasks, these goals should affect achievement-relevant processes throughout the achievement sequence, not just during and after the evaluative experience. A few studies have reported concurrent correlations between the three achievement goals and achievement-relevant processes early in the achievement sequence, such as the amount of anxiety experienced during math lessons and the tendency to avoid seeking help in math class (Middleton & Midgley, 1997; Skaalvik, 1997). However, the concurrent nature of these relationships makes it difficult to know whether the achievement-relevant processes that were assessed represent antecedents or consequences of achievement goal adoption. The only research that has used a prospective design to focus on processes early in the achievement sequence is that conducted by Elliot, McGregor, and Gable (1999) on study strategies. Elliot et al. found that mastery goals were positive predictors of deep processing, persistence, and effort while studying; performance-approach goals were positive predictors of surface processing, persistence, and effort while studying; and performance-avoidance goals were positive predictors of surface processing and disorganized studying and were negative predictors of deep processing while studying.

The primary purpose of the present research was to investigate the achievement-relevant processes that are operative early in the achievement sequence. The processes early in the achievement sequence may be viewed as particularly important because they set the stage for the rest of the evaluative experience. In essence, these early processes exert their influence throughout the entire achievement sequence by establishing the path in which all subsequent processes will unfold.

In our research, we sought to investigate the impact of each of the goal types in the trichotomous model on a number of affective, cognitive, and behavioral processes that are operative during the period leading to an undergraduate examination. Examinations are optimal events for the investigation of achievement-relevant processes, as these achievement tasks are encountered by a large portion of the population, are viewed by most as important evaluative experiences, and typically involve a rather protracted preparatory sequence. In Study 1, we focused on anticipatory cognitive appraisals of and grade aspirations for an upcoming examination. In Study 2, we focused on cognitive appraisals and self-regulatory processes (e.g., absorption in study material, procrastination) during preparation for an impending exam. In Study 3, we focused on how various achievement-relevant variables (e.g., anticipatory test anxiety, ability-related self-esteem) change over time as the examination date approaches.

Study 1: Anticipatory Cognitive Appraisals and Grade Aspirations

Our first study represented a prospective analysis of the influence of individuals' achievement goals on their challenge and threat appraisals formed in anticipation of the stress of an examination, and their grade aspirations for the exam. Stress has been defined in the coping literature as a person–environment relationship that is appraised by the individual as being important to well-being and that places demands on the person's resources (Lazarus, 1991; Lazarus & Folkman, 1984). This and other theories of stress and coping (Fischer, Shaver, & Carnochan, 1990; Frijda, 1988) have suggested that cognitive appraisals mediate the relationship between the objective environment and the emotional response experienced by the person. If, as we presume, achievement goals serve as a perceptual framework for the interpretation of objective environmental circumstances, these goals should influence the specific type of primary appraisals (i.e., challenge or threat) made by participants in response to the stress of an examination. Cognitive appraisals have been assessed in the literature in terms of both cognitive construal (Tomaka, Blascovich, Kelsey, & Leitten, 1993) and affect (Folkman & Lazarus, 1985). In the present work, we used both types of assessments to measure challenge and threat appraisals made in anticipation of an examination.

Challenge appraisals have been posited to represent a perceived opportunity for mastery, growth, or gain, and threat appraisals have been hypothesized to signal the perceived potential for harm or loss (Lazarus, 1991; Lazarus & Folkman, 1984). We predicted that mastery goals, with their positive focus on the expression of competence through task mastery, would be positively related to appraising the examination as a challenge. Likewise, we predicted that performance-approach goals, with their positive focus on attaining competence relative to others, would be positively related to challenge appraisals for the exam. Performance-approach goals may also be related to threat appraisals, as research has shown that these goals can be grounded in aversive motivation (e.g., fear of failure) as well as appetitive motivation (e.g., need for achievement; Elliot & Church, 1997; Elliot & McGregor, 1999). Performance-avoidance goals, on the other hand, should be positively related to threat appraisals due to their negative focus on avoiding incompetence relative to others.

We were additionally interested in the influence of achievement goals on participants' grade aspirations for the (normatively evaluated) exam. A grade aspiration may be construed as the minimum grade that the individual would be satisfied with on the exam (Katkovsky, Preston, & Crandall, 1964). Mastery goals were expected to be unrelated to grade aspirations, as these goals are presumed to focus on a task-based, rather than normatively generated, standard of evaluation. Performance-approach goals, due to their positive focus on attaining competence relative to others, were hypothesized to be positively related to grade aspirations.

Because of their negative focus on avoiding incompetence relative to others, performance-avoidance goals were expected to be negatively related to grade aspirations. In this and the following studies, we had no specific hypotheses regarding gender, but we examined gender because it is of central interest to many in the achievement motivation literature (see Eccles, Wigfield, & Schiefele, 1998).

Method

Participants and Procedure

One hundred and fifty (68 men and 82 women) undergraduates in a lecture-based introductory psychology class at a northeastern university participated in the study in return for extra course credit. The mean age of participants was 19.71 years old with a range of 17 to 27 years. The ethnicity of participants was as follows: 7 African American, 22 Asian, 109 Caucasian, 7 Hispanic, 0 Native American, 4 other, and 1 who declined to answer. Participants were informed at the beginning of the course that evaluation would be based on a normative grading structure, and that the course examinations consisted of multiple-choice and short-answer and essay questions. More than 95% of the students enrolled in the course participated in the study.

At the end of the first class session, participants provided information regarding their SAT scores. Participants' achievement goals for the course were assessed during the second week of the semester. One week prior to their first examination (and approximately 3 weeks after the goal assessment), participants completed an exam-specific challenge and threat construal and affect questionnaire and indicated their grade aspiration for the exam.[2]

Measures

Achievement goals. Elliot and Church's (1997) achievement goal questionnaire was used to assess participants' achievement goals for the course.[3] This questionnaire is composed of three six-item scales that represent each of the achievement goals in the trichotomous model: mastery (e.g., "I desire to completely master the material presented in this class"), performance-approach (e.g., "It is important for me to do well compared to others in this class"), and performance-avoidance (e.g., "I just want to avoid doing poorly in this class"). Participants indicated their response to each item on a 1 (*not at all true of me*) to 7 (*very true of me*) scale, and their responses for each goal were averaged to form the mastery, performance-approach, and performance-avoidance goal indices (αs = .85, .91, and .84, respectively).

SAT scores. Participants' verbal and math SAT scores were summed to form a total SAT score index.

Challenge and threat construal. The challenge and threat construal measure consisted of revised items from existing measures (Ptacek, Smith, & Dodge, 1994; Tomaka et al., 1993) as well as new items generated for the present research. The indices were composed of five items each for challenge construal (e.g., "I view the exam as a positive challenge") and threat construal (e.g., "I view the exam as threat"). Participants responded to each item on a 1 (*not at all true of me*) to 7 (*very true of me*) scale, and their responses were averaged to form challenge construal and threat construal indices (αs = .80 and .85, respectively). In an independent sample, the challenge and threat construal items were submitted to a factor analysis that yielded two factors with eigenvalues exceeding unity (3.35 for challenge construal items, 3.89 for threat construal items) and good reliability (αs = .88 and .91, for challenge and threat construals, respectively).

Challenge and threat affect. Folkman and Lazarus' (1985) threat affect scale was used to measure threat affect (worried, fearful, and anxious), and a revised version of their challenge affect scale was used to measure challenge affect (eager, hopeful, and excited).[4] Participants were instructed to indicate on a 0 (*not at all*) to 4 (*very much*) scale the extent to which they felt each emotion when they thought about the upcoming exam. Responses were averaged to yield challenge affect and threat affect indices (αs = .67 and .82, respectively).

Grade aspiration. A single item was used to assess participants' grade aspiration for the exam: Participants were instructed to indicate the minimum grade that they would be satisfied with on the exam by circling the letter associated with that grade (Katkovsky et al., 1964). Twelve letter grades were presented, and responses were numerically coded (A = 12, A− = 11, . . . , D− = 2, F = 1) to form the grade aspiration index.

Results

Simultaneous multiple regression analyses were used to examine the hypothesized relationships. A basic model was used to test the three achievement goals as predictors of challenge and threat construal, challenge and threat affect, and grade aspiration, controlling for the influence of SAT scores. The main effect of gender and all possible interaction terms were tested in preliminary analyses; interactions were created using mean-deviated main effects (Aiken & West, 1991). Interactions that attained significance in the preliminary analyses were retained in the final analyses (Judd & Kenny, 1981). Preliminary analyses entailed testing numerous variables, including four-way interaction terms, which were of little conceptual interest for the present study. Therefore, results that involved interaction terms will not be presented here.[5] Descriptive statistics and zero-order correlations for the primary variables are presented in Tables 1 and 2.

Achievement Goals as Predictors of Challenge and Threat Construal

The regression of challenge construal on the basic model revealed that mastery and performance-approach goals were positive predictors, $F(1, 143) = 47.14$, $p < .01$ ($\beta = .50$), and $F(1,$

[2] Each of the studies in this research was conducted as part of a larger project that included a number of other variables: For Studies 1 and 2, see Elliot and McGregor (1999); for Study 3, see Elliot and Church (1997). An important point is that none of the predictive relationships investigated in the studies has been reported previously in published research.

[3] More precisely, Elliot's (1999) minor revision of the Elliot and Church (1997) questionnaire was used in this study and in Study 2; the original Elliot and Church measure was used in Study 3.

[4] The original items in Folkman and Lazarus's (1985) challenge affect scale were "eager," "hopeful," and "confident." On the basis of theoretical considerations (e.g., the importance of separating construal and perceived competence processes) as well as on Lazarus and Folkman's (1984) definition of challenge affect (see p. 33), we replaced "confident" with "excited" in the measure. For the sake of comparison, we also included the "confident" item in the assessment; our revised measure and the original measure yielded identical results.

[5] The following higher order interactions attained significance and thus were retained in the analyses. Study 1, Grade aspiration: Mastery Goals × Performance-Avoidance Goals × SAT Scores; Study 2, Calmness due to preparation: Mastery Goals × Performance-Avoidance Goals × SAT Scores; Study 3, Time 2 anticipatory test anxiety: Mastery Goals × Performance-Approach Goals × Gender, Time 1 and Time 2 ability-related self-esteem and Time 1 desire to escape: Mastery Goals × Performance-Approach Goals × Performance-Avoidance Goals × Competence Expectancy, Time 1 preparedness: Mastery Goals × Performance-Avoidance Goals × Competence Expectancy. Readers who are interested in these interactions may contact Holly A. McGregor for specific information.

Table 1
Study 1: Descriptive Statistics for the Primary Variables

Variable	*M*	*SD*	Observed range	Possible range
Mastery goals	5.66	0.87	3.00–7.00	1.00–7.00
Performance-approach goals	4.36	1.44	1.00–7.00	1.00–7.00
Performance-avoidance goals	3.94	1.34	1.00–6.67	1.00–7.00
Challenge construal	5.02	0.99	1.80–7.00	1.00–7.00
Threat construal	3.35	1.20	1.00–6.40	1.00–7.00
Challenge affect	2.19	0.81	0.00–4.00	0.00–4.00
Threat affect	2.02	0.92	0.00–4.00	0.00–4.00
Grade aspiration	2.65	1.22	1.00–6.00	1.00–12.00
SAT score	1164.50	136.72	755–1430	1–1600

Note. SAT = Scholastic Assessment Test.

143) = 6.76, $p < .01$ ($\beta = .20$), respectively. Gender was a negative predictor ($\beta = -.18$, $p < .05$), indicating that men had stronger challenge construals than women had. Performance-avoidance goals were unrelated to challenge construal. The regression of threat construal on the basic model revealed that performance-avoidance goals were positive predictors, $F(1, 142) = 104.80$, $p < .01$ ($\beta = .68$). Mastery and performance-approach goals were unrelated to threat construal.

Achievement Goals as Predictors of Challenge and Threat Affect

Regressing challenge affect on the basic model revealed that mastery and performance-approach goals were positive predictors, $F(1, 144) = 17.78$, $p < .01$ ($\beta = .32$), and $F(1, 144) = 5.58$, $p < .05$ ($\beta = .19$), respectively. Performance-avoidance goals were unrelated to challenge affect. Regressing threat affect on the basic model revealed that performance-avoidance goals were positive predictors, $F(1, 144) = 57.01$, $p < .01$ ($\beta = .55$). Mastery and performance-approach goals were unrelated to threat affect.

Achievement Goals as Predictors of Grade Aspiration

The regression of grade aspiration on the basic model revealed that performance-approach goals were positive predictors, $F(1, 138) = 7.12$, $p < .01$ ($\beta = .24$), whereas performance-avoidance goals were negative predictors, $F(1, 138) = 5.91$, $p < .05$ ($\beta = -.21$). Mastery goals were unrelated to grade aspirations.

Discussion

Our hypotheses regarding mastery goals and performance-avoidance goals were clearly supported by the data. Mastery goals were positive predictors of anticipatory challenge construals and affect; and performance-avoidance goals were positive predictors of anticipatory threat construals and affect and were negative predictors of grade aspirations for the exam. Our hypotheses regarding performance-approach goals were partially supported by the data. Performance-approach goals were positive predictors of anticipatory challenge construals and affect and grade aspirations; but, contrary to our hypotheses, these goals were unrelated to anticipatory threat construals and affect. We suspect that the reason for this null result is the anticipatory nature of the appraisal assessment. Although performance-approach goals are grounded in both appetitive and aversive motivation, it is possible that only the appetitive component becomes activated when the achievement task is construed from afar. That is, the aversive motivation underlying the performance-approach goal may only become manifest as the achievement event draws near and becomes a more concrete reality. We examined this possibility as well as several additional hypotheses in Study 2.

Study 2: Cognitive Appraisals and Self-Regulation During Exam Preparation

Our second study represented a prospective analysis of the influence of individuals' achievement goals on several achievement-

Table 2
Study 1: Intercorrelations Among the Primary Variables

Variable	1	2	3	4	5	6	7	8	9
1. Mastery goals	—								
2. Performance-approach goals	.15	—							
3. Performance-avoidance goals	−.04	.32**	—						
4. Challenge construal	.49**	.25**	−.04	—					
5. Threat construal	.02	.22*	.69**	−.10	—				
6. Challenge affect	.35**	.27**	.13	.59**	.07	—			
7. Threat affect	.10	.23*	.59**	−.04	.79**	.15	—		
8. Grade aspiration	.18*	.30**	−.15	.13	−.13	.07	−.10	—	
9. SAT score	.05	.08	−.23*	.10	−.25**	.04	−.24**	.10	—

Note. SAT = Scholastic Assessment Test.
* $p < .05$. ** $p < .01$.

relevant processes operative during exam preparation. As noted earlier, Elliot et al. (1999) recently demonstrated that each of the goals in the trichotomous model has an impact on the study strategies used during exam preparation. In this study, we investigated several additional processes that are likely to be operative during exam preparation.

We adapted the challenge and threat appraisal (specifically, affect) measure used in Study 1 to assess appraisals made while studying for the exam rather than those formed while simply thinking about the exam. Our hypotheses regarding the impact of achievement goals on these constructs were the same as those delineated in Study 1: Mastery goals would be positive predictors of challenge appraisals, performance-approach goals would be positive predictors of both challenge and threat appraisals, and performance-avoidance goals would be positive predictors of threat appraisals.

We further investigated participants' phenomenological experience during exam preparation by examining the impact of achievement goals on absorption in the study material and perceived controlledness while studying for the exam. Absorption is an important variable in the exam preparation context, as being fully absorbed in the course material while studying greatly facilitates the learning process. Our hypotheses for absorption were as follows. Mastery goals help focus the individual on the task at hand and have been linked to the deep-processing of study material; thus we predicted that they would be positive predictors of absorption while studying. The appetitive focus of performance-approach goals may also facilitate absorption, but the instrumental importance of the outcome and the threat appraisals these goals were hypothesized to generate may undermine total engagement in the study process. Thus, the relationship between performance-approach goals and absorption was expected to be null (or, perhaps, slightly positive). Performance-avoidance goals were predicted to be negative predictors of absorption: Several different literatures (e.g., test anxiety, flow) have indicated that focusing on a negative possibility disrupts ongoing cognitive activity (Csikszentmihalyi, 1990; Elliot & McGregor, 1999; Sarason, 1984).

Perceived controlledness is also an important variable in the exam preparation context. Self-determination theorists (Deci & Ryan, 1985) have documented that a lack of autonomy and choice in achievement settings is inimical to interest in, and sustained engagement with, activities. Our predictions for perceived controlledness were similar to those for absorption. Mastery goals are presumed to "pull the individual into" the study material by facilitating challenge appraisals and absorption resulting in a negative relationship with perceived controlledness. Performance-approach goals represent a composite of approach and avoidance processes (Elliot, 1997) that are likely to produce a null relationship with perceived controlledness. Performance-avoidance goals are a fundamentally aversive form of regulation and should be positively related to perceived controlledness.

The final set of focal variables in this study concerned participants' strategic organization of study time and the consequences therein. Specifically, we investigated how participants' achievement goals predicted their procrastination tendencies and how calm they felt at exam time as a result of their preparation. Procrastination has been linked to perfectionism (Flett, Blankstein, Hewitt, & Koledin, 1992) and test anxiety (Saddler & Buley, 1999) and has been construed as a self-handicapping strategy, whereby one seeks to protects one's self-worth by withdrawing effort and creating an a priori explanation for a poor performance (Garcia, Lissi, Matula, & Harris, 1996). Inasmuch as procrastination reflects concerns about incompetence, it should emerge naturally from performance-avoidance goal pursuit. Mastery and performance-approach goals both focus on positive possibilities and promote full effort expenditure (Elliot et al., 1999); consequently, these goals are unlikely to be related (or may even be negatively related) to procrastination.

Mastery and performance-approach goals have been shown to predict positive study processes, such as deep processing (mastery goals) and effort expenditure (mastery and performance-approach goals). Accordingly, mastery and performance-approach goals are likely to facilitate optimal exam preparation so that the student is able to feel ready and calm when exam time arrives. Conversely, performance-avoidance goals have been linked to negative study processes, such as surface processing and disorganization (Elliot et al., 1999), and this is likely to result in the student feeling unprepared and anxious, rather than calm, at exam time. Thus, we hypothesized that mastery and performance-approach goals would be positive predictors and performance-avoidance goals negative predictors of calmness due to preparation at exam time.

Method

Participants and Procedure

One hundred and seventy-four (66 men and 108 women) undergraduates in a lecture-based introductory psychology class at a northeastern university participated in the study in return for extra course credit. The mean age of participants was 19.77 years old with a range of 17 to 35 years. The ethnicity of the participants was as follows: 7 African American, 14 Asian American, 132 Caucasian, 15 Hispanic, 0 Native American, 5 other, and 1 who declined to answer. As in Study 1, participants were informed at the beginning of the course that evaluation would be based on a normative grading structure, and that the course examinations would consist of multiple-choice and short-answer and essay questions. More than 95% of the students enrolled in the course participated in the study.

Two weeks prior to the first examination, participants completed an exam-specific achievement goal questionnaire. One week prior to the first exam, participants were provided with a questionnaire regarding their challenge and threat affect, absorption, and perceived controlledness while studying. Participants were instructed to complete the questionnaire after they had finished the majority of their studying for the exam and to return it on the day of the exam. Immediately after the exam, participants completed a questionnaire concerning procrastination while preparing for the exam as well as how calm they had felt as a result of their preparation. At the end of the semester, participants signed a consent form that allowed access to their SAT information from the university registrar.

Measures

Achievement goals. Elliot and Church's (1997) achievement goal questionnaire was used to assess mastery, performance-approach, and performance-avoidance goals (αs = .90, .91, and .83, respectively).

SAT scores. Participants' verbal and math SAT scores were summed to form a total SAT index.

Challenge and threat affect. The measures that were used to assess challenge and threat affect in Study 1 were used in this study (αs = .67 and .87, respectively) to measure how participants felt during the process of studying for the exam.

Absorption. A seven-item task involvement measure, based on Elliot and Harackiewicz (1996), was used to assess participants' absorption while

studying (e.g., "While studying for this class I get totally absorbed in what I am doing"). Participants responded to each item on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, and their responses were averaged to form the absorption index ($\alpha = .75$).

Perceived controlledness. Perceived controlledness was measured with four items that reflected the internal pressure that is indicative of controlled regulation. Participants responded to each item on a 1 (*not at all true of me*) to 7 (*very true of me*) scale, and their responses were averaged to form the perceived controlledness index ($\alpha = .72$). In an independent sample, these items were submitted to a factor analysis that yielded a one-factor solution with an eigenvalue exceeding unity (2.12) and adequate reliability ($\alpha = .70$).

Procrastination. Procrastination was measured with three face-valid items (e.g., "I procrastinated in my studying for the exam"). Participants responded to each item on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, and their responses were averaged to form the procrastination index ($\alpha = .83$). In an independent sample, these items were submitted to a factor analysis that yielded a one-factor solution with an eigenvalue exceeding unity (2.60) and good reliability ($\alpha = .92$).

Calmness due to preparation. Calmness due to preparation was assessed using two items: "I felt prepared enough to relax while taking the exam" and "During the exam I was able to remain calm because I knew I had prepared as well as I could" ($r = .72$, $\alpha = .84$). Participants responded on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, and their responses were averaged to form a calmness due to preparation index. In an independent sample, these items exhibited good internal consistency ($r = .71$, $\alpha = .87$).

Results

The same basic regression model used in Study 1 (the three achievement goals and SAT scores as predictors) was also used in these analyses. Similarly, preliminary analyses involving gender and all possible interactions were conducted, and interaction terms that attained significance were retained in the final analyses. Descriptive statistics and zero-order correlations for the primary variables are presented in Tables 3 and 4.

Achievement Goals as Predictors of Challenge and Threat Affect

The regression of challenge affect on the basic model revealed that mastery and performance-approach goals were positive predictors, $F(1, 166) = 10.99$, $p < .01$ ($\beta = .25$), and $F(1, 166) = 3.95$, $p < .05$ ($\beta = .16$), respectively. Performance-avoidance goals were unrelated to challenge affect. Regressing threat affect on the basic model revealed that performance-avoidance goals were positive predictors, $F(1, 166) = 63.60$, $p < .01$ ($\beta = .53$), as were performance-approach goals, $F(1, 166) = 10.40$, $p < .01$ ($\beta = .21$). Mastery goals were unrelated to threat affect.

Achievement Goals as Predictors of Absorption

The regression of absorption on the basic model indicated that mastery goals were positive predictors, $F(1, 165) = 10.18$, $p < .01$ ($\beta = .23$), and performance-avoidance goals were negative predictors, $F(1, 165) = 20.28$, $p < .01$ ($\beta = -.35$). Gender was a positive predictor ($\beta = .14$, $p < .05$), such that men were more likely to experience absorption than women were. Performance-approach goals were unrelated to absorption.

Achievement Goals as Predictors of Perceived Controlledness

Regressing perceived controlledness on the basic model revealed that mastery goals were negative predictors, $F(1, 166) = 10.08$, $p < .01$ ($\beta = -.22$), whereas performance-avoidance goals were positive predictors, $F(1, 166) = 25.39$, $p < .01$ ($\beta = .38$). SAT scores were positively related ($\beta = .19$, $p < .01$), and performance-approach goals were unrelated to perceived controlledness.

Achievement Goals as Predictors of Procrastination

The regression of procrastination on the basic model revealed that performance-avoidance goals were positive predictors, $F(1, 168) = 16.26$, $p < .01$ ($\beta = .32$), as were SAT scores ($\beta = .22$, $p < .01$). Mastery and performance-approach goals were unrelated to procrastination.

Achievement Goals as Predictors of Calmness Due to Preparation

The regression of calmness due to preparation on the basic model revealed that mastery and performance-approach goals were positive predictors, $F(1, 163) = 4.28$, $p < .05$ ($\beta = .16$), and $F(1, 163) = 7.40$, $p < .01$ ($\beta = .21$), respectively, whereas performance-avoidance goals were negative predictors, $F(1, 163) = 13.76$, $p < .01$ ($\beta = -.29$). Gender was also significant ($\beta =$

Table 3
Study 2: Descriptive Statistics for the Primary Variables

Variable	*M*	*SD*	Observed range	Possible range
Mastery goals	5.54	0.94	2.17–7.00	1.00–7.00
Performance-approach goals	4.32	1.52	1.00–7.00	1.00–7.00
Performance-avoidance goals	3.66	1.36	1.00–7.00	1.00–7.00
Challenge affect	2.41	0.77	0.00–4.00	0.00–4.00
Threat affect	2.04	1.16	0.00–4.00	0.00–4.00
Absorption	3.74	0.75	1.86–5.86	1.00–7.00
Perceived controlledness	4.06	1.14	1.25–7.00	1.00–7.00
Procrastination	4.22	1.55	1.00–7.00	1.00–7.00
Calmness due to preparation	3.67	1.47	1.00–7.00	1.00–7.00
SAT score	1193.74	150.78	500–1530	1–1600

Note. SAT = Scholastic Assessment Test.

Table 4
Study 2: Intercorrelations Among the Primary Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Mastery goals	—									
2. Performance-approach goals	.09	—								
3. Performance-avoidance goals	.00	.32**	—							
4. Challenge affect	.26**	.13	−.04	—						
5. Threat affect	−.04	.39**	.58**	−.01	—					
6. Absorption	.26**	−.10	−.31**	.29**	−.34**	—				
7. Perceived controlledness	−.22**	.22**	.37**	−.24**	.43**	−.53**	—			
8. Procrastination	−.08	.01	.24**	−.21**	.18*	−.28**	.37**	—		
9. Calmness due to preparation	.09	.12	−.26**	.28**	−.21**	.22**	−.21*	−.31**	—	
10. SAT score	−.03	.08	−.23**	−.11	−.02	−.03	.11	.14	.06	—

Note. SAT = Scholastic Assessment Test.
* $p < .05$. ** $p < .01$.

−.24, $p < .05$), indicating that men were more likely than were women to feel calm as a result of their preparation.

Discussion

Our hypotheses for each of the achievement goals were clearly supported by the data. Mastery goals were positive predictors of challenge affect and absorption during preparation and calmness due to preparation at the time of the exam; these goals were negative predictors of perceived controlledness during exam preparation. Performance-approach goals were positive predictors of both challenge and threat affect during preparation and calmness due to preparation. Performance-avoidance goals predicted negative exam preparation processes. They were positively related to threat affect, perceived controlledness, and procrastination and were negatively related to absorption and feeling calm at exam time due to preparation.

Study 3: A Short-Term Longitudinal Analysis

Our third study represented a short-term longitudinal analysis of the influence of individuals' achievement goals on their achievement-relevant affect, cognition, and behavior prior to an examination. Nearly all investigations of the trichotomous achievement goal model have involved only single measurements of dependent variables and have not investigated how such variables may change over time. Thus, Study 3 was designed so that each variable of interest was measured at least twice at various points during the 2 weeks prior to the exam. In the following, we present our hypotheses in terms of the prospective relationships between the achievement goals and the dependent measures, with the anticipation that the longitudinal analyses may document a strengthening of these relationships as the examination date draws near.

As noted earlier, Elliot and McGregor (1999) recently demonstrated that achievement goals are an important predictor of test anxiety in examination settings. Specifically, they found that, during the examination, performance-avoidance goals were positive predictors of test anxiety, but that mastery and performance-approach goals were unrelated to test anxiety. The present research sought to extend these findings by assessing participants' anticipatory test anxiety 2 weeks before and immediately prior to the exam. In accordance with the findings of Elliot and McGregor, we predicted that mastery and performance-approach goals would be unrelated to the experience of anticipatory test anxiety, and that performance-avoidance goals would be positively related to anticipatory test anxiety.

Several studies have linked test anxiety and the desire to escape evaluative situations (Galassi, Frierson, & Sharer, 1981; Geen, 1987). As such, we anticipated that achievement goals would influence participants' desire to escape the exam in much the same manner that they influence their anticipatory test anxiety. However, given that mastery and performance-approach goals both have an appetitive, challenge-based aspect, they may actually be negative predictors of the desire to escape the exam. Accordingly, we expected that mastery and performance-approach goals would be either unrelated or negatively related to the desire to escape the exam, whereas performance-avoidance goals would be positively related to the desire to escape the exam.

Current theories of the self-concept and self-evaluation posit that self-esteem fluctuates as a function of environmental events (see Greenier, Kernis, & Waschull, 1995), including academic performances (Heatherton & Polivy, 1990). To the extent that achievement goals serve as a framework for interpreting achievement situations, it is possible that they influence ability-related self-assessment as the evaluative event approaches. Mastery goals are construed as focusing the individual on the task, thereby keeping the self psychologically removed from performance evaluation (see Elliot, McGregor, & Thrash, in press), and thus were hypothesized to be unrelated to ability-related self-esteem. The normative evaluation of performance involved in performance-approach and performance-avoidance goals is likely to make ability and self-evaluation issues salient (Dweck, 1986; Elliot et al., in press). Performance-approach goals are focused on a positive possibility, but are often undergirded by both positively and negatively valenced motivational orientations (Elliot, 1999). As such, these goals will likely evidence a null relationship with ability-related self-esteem. Performance-avoidance goals are thoroughly aversive forms of regulation and are likely to be negatively related to ability-related self-esteem.

We also investigated the influence of achievement goals on two behaviorally based variables: participants' reports of being prepared for the exam and the number of hours they reported studying

during the 7 days prior to the exam. Mastery goals are linked to challenge appraisals, deep processing, and intrinsic motivation (Elliot & Church, 1997; Elliot et al., 1999; Study 1 of the present research); as such, these goals should facilitate ongoing preparedness and lead to substantial amounts of studying well prior to the exam date. Performance-approach goals are linked to challenge appraisals, effort expenditure, and high grade aspirations (Elliot et al., 1999; Study 1 of the present research); as such, these goals should also facilitate ongoing preparedness and a great deal of studying well prior to the exam. Performance-avoidance goals are linked to threat appraisals, procrastination (Studies 1 and 2 of the present research), and (we hypothesize) the desire to escape the exam situation; as such, these goals should be negatively related to ongoing preparedness and should predict the tendency to put off studying until immediately prior to the exam.

In Studies 1 and 2, we controlled for a relatively objective indicator of competence (SAT scores) in examining the influence of achievement goals. In this study, we shifted our control variable to a subjective competence construct: competence expectancy. Some theorists contend that subjective perceptions of ability are more powerful predictor variables than actual ability per se (Kukla, 1972); thus, this shift to controlling competence expectancy should further test the predictive validity of the achievement goal constructs.

Method

Participants and Procedure

One hundred and seventy-seven (73 men and 104 women) undergraduates enrolled in a lecture-based introductory psychology class at a northeastern university participated in the study in return for extra course credit. The mean age of participants was 20.01 years old with a range of 17 to 48 years. The ethnicity of participants was as follows: 12 African American, 26 Asian American, 123 Caucasian, 5 Hispanic, 1 Native American, 9 other, and 1 who declined to answer. Participants were informed at the beginning of the course that evaluation would be based on a normative grading structure, and that course examinations consisted of multiple-choice questions. More than 95% of the students enrolled in the course participated in the study.

Competence expectancies were assessed immediately before the second class session, and achievement goals for the course were assessed just prior to the third class session. Test anxiety, desire to escape the exam, ability-focused self-esteem, and preparedness were assessed at two time periods. The Time 1 assessment took place 2 weeks before the first exam (and approximately 2 weeks after the goal assessment), and the Time 2 assessment took place immediately prior to administration of the exam. Information regarding the number of hours spent preparing for the exam was collected at two times: 3 days prior to the exam and on the day of the exam.

Measures

Achievement goals. Elliot and Church's (1997) achievement goal questionnaire was used to assess mastery, performance-approach, and performance-avoidance goals (αs = .88, .92, and .75, respectively).

Competence expectancy. Elliot and Church's (1997) measure was used to assess participants' competence expectancies for the class: "I expect to do well in this class" and "I believe I will receive an excellent grade in this class" (r = .70, α = .88). Participants responded to the items on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, and their responses were averaged to form a competence expectancy index.

Anticipatory test anxiety. The state measure of Spielberger, Gorsuch, and Lushene's (1970) 20-item revised State-Trait Anxiety Inventory was used to assess anticipatory test anxiety. Participants were asked to indicate, on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), how they currently felt when thinking about the exam. Participants' responses were averaged at Time 1 and Time 2 to form the T1-anticipatory test anxiety (α = .95) and T2-anticipatory test anxiety indices (α = .94), respectively.

Desire to escape. Two items were used to assess participants' desire to escape the exam: "I wish I could get out of taking exam 1" and "I can't wait until exam 1 is over" (r = .44, α = .61 at T1 and r = .41, α = .58 at T2). Participants were instructed to respond on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, and their responses were averaged at Time 1 and Time 2 to form T1-desire to escape and T2-desire to escape indices, respectively. In an independent sample, these items exhibited good internal consistency (r = .60, α = .72).

Ability-related self-esteem. The performance subscale of Heatherton and Polivy's (1991) State Self-Esteem Scale was used to measure ability-related self-esteem. This subscale assesses self-esteem that is specific to ability and performance (e.g., "I feel confident about my abilities" and "I feel as smart as others"). Participants indicated, on a 1 (*not at all*) to 5 (*extremely*) scale, the extent to which each of the statements was true for them "right now," and their responses were averaged at Time 1 and Time 2 to form T1-ability-related self-esteem (α = .82) and T2-ability-related self-esteem indices (α = .90), respectively.

Preparedness. Participants' perceptions of preparedness were assessed using two sets of items. The Time 1 items focused on the extent to which participants felt they were preparing for the exam on an ongoing basis (e.g., "I have been reading over my class notes [or the overheads in the library] outside of class"), and the Time 2 items focused on the extent to which participants felt they were fully prepared for the exam (e.g., "I have studied to the point that I feel very ready to take [the exam]"). For both the Time 1 and Time 2 assessments, participants were asked to indicate the extent to which each statement was true of them on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. Their responses to the three items at Time 1 were averaged to form a T1-preparedness index (α = .49), and their responses to the two items at Time 2 were averaged to form a T2-preparedness index (r = .83, α = .91). In an independent sample, Time 1 items were submitted to a factor analysis that yielded one factor with an eigenvalue exceeding unity (2.04) and good reliability (α = .76); the Time 2 items also exhibited adequate internal consistency (r = .75, α = .85) in the independent sample.

Percentage of hours spent studying. Participants were asked to report the number of hours per day they spent studying for each of the 7 days prior to the exam. Each day was listed by both name and date (e.g., Friday, 2/17), and participants were asked to report the number of hours they spent studying for the exam on that day. The exam took place on a Thursday, and the hours spent studying were divided into four psychologically meaningful units: the weekend prior to the exam (Friday and Saturday), several days prior to the exam (Sunday and Monday, Sunday being more comparable to a weekday than to a weekend day with regard to undergraduate study habits), the days immediately prior to the exam (Tuesday and Wednesday), and the day of the exam (Thursday). A percentage variable was created for each of the four time periods by dividing the number of hours for each period by the total number of hours reported.

Results

The data were analyzed in two stages for all variables except the percentage of hours spent studying (see below). The first stage consisted of examining the direct relationships between the three achievement goals and the Time 1 and Time 2 variables. The same basic regression model used in Studies 1 and 2 was used in these analyses, except that in this study, competence expectancies were controlled rather than SAT scores. The second-stage analyses

involved examining relationships between the three achievement goals and longitudinal change in the dependent variables using a residual-change regression model. In this model, Time 2 variables were regressed on the three achievement goals, controlling for competence expectancies and the appropriate Time 1 variable (see Cohen & Cohen, 1983). As in Studies 1 and 2, the main effect of gender as well as all possible interactions were tested in preliminary analyses, and interaction terms that attained significance were retained in the final analyses. The same basic regression model used in Studies 1 and 2 was used to test achievement goals as predictors of the percentage of hours spent studying during each of the four periods, controlling for competence expectancies. Descriptive statistics and zero-order correlations for the primary variables are presented in Tables 5 and 6.

Achievement Goals as Predictors of Anticipatory Test Anxiety

The regression of T1-anticipatory test anxiety on the basic model revealed that performance-avoidance goals were positive predictors, $F(1, 151) = 24.22$, $p < .01$ ($\beta = .45$). Mastery and performance-approach goals were unrelated to T1-anticipatory test anxiety. The regression of T2-anticipatory test anxiety on the basic model yielded a positive relationship for performance-avoidance goals, $F(1, 157) = 21.73$, $p < .01$ ($\beta = .37$). Gender was also a positive predictor ($\beta = .17$, $p < .05$), indicating that women experienced more anticipatory test anxiety at Time 2 than did men. Mastery and performance-approach goals were unrelated to T2-anticipatory test anxiety.

The regression of T2-anticipatory test anxiety on the residual-change model revealed that performance-avoidance goals were positive predictors, $F(1, 156) = 5.88$, $p < .05$ ($\beta = .20$), beyond the variance accounted for by T1-anticipatory test anxiety ($\beta = .41$, $p < .01$). This indicates that performance-avoidance goals predicted an increase in anticipatory test anxiety from 2 weeks before the exam to immediately before the exam. Mastery and performance-approach goals were not related to change in anticipatory test anxiety.

Achievement Goals as Predictors of Desire to Escape

The regression of T1-desire to escape on the basic model revealed that performance-approach goals were negative predictors, $F(1, 150) = 7.23$, $p < .01$ ($\beta = -.27$), whereas performance-avoidance goals were positive predictors, $F(1, 150) = 19.28$, $p < .01$ ($\beta = .41$). Mastery goals were unrelated to T1-desire to escape. Regressing T2-desire to escape on the basic model revealed that mastery goals were negative predictors, $F(1, 161) = 7.24$, $p < .01$ ($\beta = -.22$), and that performance-avoidance goals were positive predictors, $F(1, 161) = 17.53$, $p < .01$ ($\beta = .35$). Gender was also a positive predictor ($\beta = .19$, $p < .05$), indicating that women felt a greater desire to escape at Time 2 than did men. Performance-approach goals were unrelated to T2-desire to escape.

The regression of T2-desire to escape on the residual-change model revealed that mastery goals were negative predictors, $F(1, 160) = 7.68$, $p < .01$ ($\beta = -.19$), beyond the variance accounted for by T1-desire to escape ($\beta = .55$, $p < .01$). This indicates that mastery goals predicted a decrease from Time 1 to Time 2 in desire to escape the exam. Gender was a positive predictor ($\beta = .14$, $p < .05$), indicating that women evidenced an increase in their desire to escape the exam from Time 1 to Time 2. Performance-approach and performance-avoidance goals were unrelated to change in desire to escape the exam.

Achievement Goals as Predictors of Ability-Related Self-Esteem

The regression of T1-ability-related self-esteem on the basic model revealed that performance-avoidance goals were negative predictors, $F(1, 150) = 10.64$, $p < .01$ ($\beta = -.30$). Mastery and performance-approach goals were unrelated to T1-ability-related self-esteem. Regressing T2-ability-related self-esteem on the basic

Table 5
Study 3: Descriptive Statistics for the Primary Variables

Variable	*M*	*SD*	Observed range	Possible range
Mastery goals	5.66	0.91	3.17–7.00	1.00–7.00
Performance-approach goals	4.26	1.41	1.00–7.00	1.00–7.00
Performance-avoidance goals	3.57	1.15	1.00–6.17	1.00–7.00
T1: Anticipatory TA	3.19	1.15	1.05–6.85	1.00–7.00
T1: Desire to escape	4.00	1.55	1.00–7.00	1.00–7.00
T1: Ability-related SE	3.74	0.68	1.57–5.00	1.00–5.00
T1: Preparedness	4.57	1.20	1.00–7.00	1.00–7.00
T2: Anticipatory TA	3.95	1.17	1.20–7.00	1.00–7.00
T2: Desire to escape	4.56	1.51	1.00–7.00	1.00–7.00
T2: Ability-related SE	3.77	0.76	1.14–5.00	1.00–5.00
T2: Preparedness	4.29	1.57	1.00–7.00	1.00–7.00
% hours spent studying				
Weekend prior	0.12	0.13	0.00–0.94	
Several days prior	0.20	0.18	0.00–0.94	
Immediately prior	0.48	0.20	0.00–1.00	
Day of the exam	0.21	0.19	0.00–1.00	
Competence expectancy	5.65	0.89	3.00–7.00	1.00–7.00

Note. T1 = Time 1; T2 = Time 2; TA = test anxiety; SE = self-esteem.

Table 6
Study 3: Intercorrelations Among the Primary Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mastery goals	—															
2. Performance-approach goals	.29**	—														
3. Performance-avoidance goals	.07	.34**	—													
4. T1: TA	−.05	.10	.43**	—												
5. T1: Escape	.00	.06	.38**	.48**	—											
6. T1: Ability SE	.00	−.19*	−.42**	−.61**	−.34**	—										
7. T1: Prep	.35**	.15	−.05	−.21**	−.09	.21**	—									
8. T2: TA	−.05	.19*	.39**	.53**	.34**	−.43**	−.15	—								
9. T2: Escape	−.14	.06	.31**	.32**	.61**	−.20**	−.07	.47**	—							
10. T2: Ability SE	.03	−.14	−.42**	−.46**	−.33**	.63**	−.18*	−.73**	−.42**	—						
11. T2: Prep	.11	−.04	−.29**	−.21**	−.20*	.24**	.30**	−.44**	−.32**	.59**	—					
12. % hours weekend prior	.19*	.13	−.06	.00	.02	−.02	.18*	−.10	−.08	.05	.11	—				
13. % hours several days prior	.14	.16*	.15	.12	.02	−.08	.14	−.07	.01	−.05	.07	−.02	—			
14. % hours immediately prior	.05	.00	−.05	−.04	−.02	−.06	.02	.11	.03	−.12	−.06	−.34**	−.49**	—		
15. % hours day of exam	−.31**	−.24**	−.05	−.07	.00	.16*	−.27**	−.11*	.02	.15	−.08	−.32**	−.41**	−.36**	—	
16. Competence expectancy	.35**	.17*	−.21**	−.27**	−.08	.26**	.14	−.13	−.13	.30**	.21**	−.07	.00	.09	−.05	—

Note. T1 = Time 1; T2 = Time 2; TA = test anxiety; SE = self-esteem; Prep = preparedness; % hours = percentage of hours spent studying during specified period.
* $p < .05$. ** $p < .01$.

model revealed that performance-avoidance goals were negative predictors, $F(1, 157) = 13.91$, $p < .01$ ($\beta = -.30$). Gender was a negative predictor ($\beta = -.15$, $p < .05$), indicating that men reported greater T2-ability-related self-esteem than did women. Competence expectancies were positively related to T2-ability-related self-esteem ($\beta = .23$, $p < .01$), whereas mastery and performance-approach goals exhibited a null relationship.

The regression of T2-ability-related self-esteem on the residual-change model revealed that performance-avoidance goals were negative predictors, $F(1, 152) = 4.89$, $p < .05$ ($\beta = -.16$), beyond the variance accounted for by T1-ability-related self-esteem ($\beta = .50$, $p < .01$). This indicates that the adoption of performance-avoidance goals predicted a decrease in self-esteem from 2 weeks prior to the exam to immediately before the exam. Mastery and performance-approach goals were unrelated to change in ability-related self-esteem.

Achievement Goals as Predictors of Preparedness

Regressing T1-preparedness on the basic model revealed that mastery goals were positive predictors, $F(1, 157) = 9.81$, $p < .01$ ($\beta = .26$). Gender was also positively related ($\beta = .19$, $p < .05$), indicating that women were more prepared at Time 1 than were men. Performance-approach and performance-avoidance goals were unrelated to T1-preparedness. Regressing T2-preparedness on the basic model revealed a negative relationship for performance-avoidance goals, $F(1, 161) = 17.45$, $p < .01$ ($\beta = -.35$). Mastery and performance-approach goals were unrelated to T2-preparedness.

Regressing T2-preparedness on the residual-change model revealed that performance-avoidance goals were negative predictors, $F(1, 158) = 15.57$, $p < .01$ ($\beta = -.31$), beyond the variance accounted for by T1-preparedness ($\beta = .29$, $p < .01$). This indicates that performance-avoidance goals predicted a decrease in preparedness from 2 weeks prior to the exam to immediately before the exam. Mastery and performance-approach goals were unrelated to change in preparedness.

Achievement Goals as Predictors of Percentage of Hours Spent Studying

The regression of the "weekend prior" index on the basic model revealed a positive relationship for mastery goals, $F(1, 156) = 6.94$, $p < .01$ ($\beta = .22$), as well as performance-approach goals, $F(1, 156) = 3.70$, $p = .06$ ($\beta = .17$); performance-avoidance goals were negative predictors, $F(1, 156) = 4.75$, $p < .05$ ($\beta = -.19$). Regressing the "several days prior" and the "days immediately prior" indices on the basic model revealed no significant relationships for any of the three achievement goals. The regression of the "exam day" index on the basic model revealed that both mastery and performance-approach goals were negatively related to the percentage of hours spent studying on the day of exam, $F(1, 156) = 12.01$, $p < .01$ ($\beta = -.29$) and $F(1, 156) = 4.85$, $p < .05$ ($\beta = -.19$), respectively. Performance-avoidance goals were unrelated to the percentage of hours spent studying on the day of the exam.

Discussion

Our hypotheses regarding the impact of achievement goals on the Time 1 and Time 2 variables were clearly supported by the

data. Mastery goals were positive predictors of early preparation and time spent studying well in advance of the exam, and they were negative predictors of the percentage of time spent studying the day of the exam and the desire to escape the exam. Performance-approach goals were positively related to the percentage of hours spent studying the weekend before the exam, and they were negative predictors of the percentage of time spent studying the day of the exam and the desire to escape the exam immediately prior to taking it. Performance-avoidance goals were positive predictors of anticipatory test anxiety and a desire to escape the exam, and they were negative predictors of ability-related self-esteem at both Time 1 and Time 2. In addition, these goals were negatively related to spending time preparing for the exam well in advance and to feeling prepared for the exam immediately prior to taking it.

We anticipated that the longitudinal analyses would reveal a strengthening of the impact of achievement goals as the exam approached, and this was observed for several of the variables. Mastery goals predicted a decrease in the desire to escape the exam, and performance-avoidance goals were linked to a change in anticipatory test anxiety, ability-related self-esteem, and feelings of preparedness. Specifically, performance-avoidance goals predicted an increase in anticipatory test anxiety and a decrease in ability-related self-esteem and feelings of preparedness.

General Discussion

The present research comprised three studies designed to investigate mastery, performance-approach, and performance-avoidance goals as predictors of achievement-relevant processes prior to the undergraduate examination experience. Results across the three studies were supportive of our hypotheses, and they revealed a different predictive pattern for each of the achievement goals. In Studies 1 and 2, *mastery goals* were positive predictors of challenge appraisals a week in advance of the exam and challenge appraisals during exam preparation. Mastery goals were also linked to absorption during exam preparation, a lack of perceived controlledness during exam preparation, and a sense of calmness at exam time due to preparation. In Study 3, mastery goals were linked to an optimal approach to exam preparation, as they positively predicted preparedness 2 weeks before the exam and the proportion of time spent studying well in advance of the exam, and they were negatively related to the proportion of time spent studying the day of the exam. Mastery goals were also negative predictors of the desire to escape the exam, both 2 weeks before and immediately prior to the exam; the longitudinal analysis revealed that these goals predicted a decrease in the desire to escape the exam over this time period.

In Studies 1 and 2, *performance-approach goals* were positive predictors of challenge appraisals a week prior to the exam, but, unlike mastery goals, they were positive predictors of both challenge and threat appraisals during exam preparation. Performance-approach goals were also positively related to participants' grade aspirations for the exam and to their sense of calmness at exam time due to preparation. In Study 3, performance-approach goals were positive predictors of the proportion of time spent studying well in advance of the exam, and they were negatively related to the desire to escape the exam 2 weeks prior to the exam date.

Performance-avoidance goals evidenced a consistently negative pattern of results across the three studies. In Studies 1 and 2, performance-avoidance goals were positive predictors of threat appraisals, both in anticipation of the exam and during exam preparation, and were linked to perceived controlledness and to procrastination while preparing for the exam. Performance-avoidance goals were also negatively related to absorption during exam preparation, feeling calm at exam time due to preparation, and to participants' grade aspirations. In Study 3, performance-avoidance goals were linked to anticipatory test anxiety, to the desire to escape the exam, and to low ability-related self-esteem 2 weeks prior to the exam. Immediately prior to the exam, these goals were linked to each of these variables as well as to a lack of preparation. Furthermore, performance-avoidance goals predicted an increase in anticipatory test anxiety and a decrease in both ability-related self-esteem and preparedness from the period 2 weeks prior to the exam to immediately prior to the exam. Finally, these goals were also negative predictors of the proportion of time spent studying well in advance of the exam date. (See Table 7 for a summary of the prospective results from the three studies.)

Two features of our studies are important to note when considering the aforementioned empirical patterns. First, in each of the studies, we controlled for an indicator of actual or expected competence in all analyses (i.e., SAT scores in Studies 1 and 2, competence expectancies in Study 3). This statistical procedure is of great value, in that it enables us to conclude that the predictive relationships observed for the three goals are not simply a function of objective or subjective ability constructs (cf. Kukla, 1972). In addition, we would like to highlight that our conceptualization of cognitive appraisal in the present work focused exclusively on individuals' orienting toward the potential beneficial or harmful features of the examination event, that is, "primary" appraisal in Lazarus's (1991) terminology. Some conceptualizations of cognitive appraisal incorporate perceptions of competence or coping ability into the appraisal construct per se (Blascovich & Tomaka, 1996; Tomaka et al., 1993; cf. Tomaka et al., 1999), which we believe unnecessarily confounds the appraisal and perceived resource variables.

Second, in Study 3, we added a short-term longitudinal component to our research, which addressed the issue of whether the observed relationships are simply a byproduct of response tendencies (e.g., those more willing to report negative information about their goals may be more willing to report negative information about their achievement-relevant processes). The results, particularly for performance-avoidance goals, clearly argue against a response bias interpretation. Performance-avoidance goals were not only significant predictors of the Time 1 and Time 2 variables, but also predicted the Time 2 variables with the Time 1 variables (and their attendant response tendencies) held constant. Thus, the data-analytic procedures that we used to examine longitudinal change not only provided information regarding the time course during which the processes under consideration were operative, but also provided statistical controls that directly addressed an alternative explanation for our results.

Gender was not a central focus of the present research, but we did examine gender differences in each study. Significant gender differences emerged only sporadically; when they did emerge they tended to reveal a more positive profile for men than for women. This profile is consistent with prior research indicating that men are more likely than are women to engage in positive self-

Table 7
Prospective Results Summary for Studies 1, 2, and 3

Dependent variable	Mastery goals	Performance-approach goals	Performance-avoidance goals
Study 1			
Challenge construal	0.50**	0.20**	−0.07
Threat construal	0.07	−0.01	0.68**
Challenge affect	0.32**	0.19*	0.08
Threat affect	0.12	0.04	0.55**
Grade aspiration	−0.12	0.24**	−0.21*
Study 2			
Challenge affect	0.25**	0.16*	−0.13
Threat affect	−0.06	0.21**	0.53**
Absorption	0.23**	−0.01	−0.35**
Perceived controlledness	−0.22**	0.10	0.38**
Procrastination	−0.06	−0.11	0.32**
Calmness due to preparation	0.16*	0.21**	−0.29**
Study 3			
T1: Anticipatory TA	0.07	−0.13	0.45**
T1: Desire to escape	−0.06	−0.27**	0.41**
T1: Ability-related SE	−0.01	0.03	−0.30**
T1: Preparedness	0.26**	0.09	−0.03
T2: Anticipatory TA	−0.12	0.01	0.37**
T2: Desire to escape	−0.22**	−0.04	0.35**
T2: Ability-related SE	−0.03	−0.01	−0.30**
T2: Preparedness	0.11	0.07	−0.35**
% hours spent studying			
Weekend prior	0.22**	0.17*	−0.19*
Several days prior	0.11	0.09	0.10
Immediately prior	0.02	−0.01	−0.03
Day of the exam	−0.29**	−0.19*	0.06

Note. Tabled values are standardized regression coefficients. T1 = Time 1; T2 = Time 2; TA = test anxiety; SE = self-esteem.
* $p < .05$. ** $p < .01$.

evaluative processes in classroom achievement settings (see Pomerantz & Ruble, 1998).

Our findings demonstrating that mastery goals evoke positive processes in the examination context are conceptually consistent with the extant literature in both the dichotomous and trichotomous achievement goal traditions. Across these traditions, mastery goals are positively related (or at minimum unrelated) to a variety of favorable achievement-relevant variables (Ames, 1992; Dweck, 1991; Elliot, 1999; Urdan, 1997), and the pattern of results reported herein nicely extends this nomological network. Given their overall positive influence on achievement-relevant processes, it remains somewhat counterintuitive that mastery goals often fail to positively influence actual performance on exams in the undergraduate classroom (see Elliot, 1997; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997). Although a number of explanations for this null finding have been offered (see Elliot & McGregor, 1999), these explanations at present represent speculation. A high priority for future research is to investigate characteristics of the student, the classroom context, and/or the examination itself that may serve as moderators of the relationship between mastery goals and exam performance. For example, it is possible that mastery goals may facilitate performance for elementary school students, in classrooms with engaging teachers or professors, and/or when performance is not normatively evaluated (Church et al., 2001). Parenthetically, it is important to highlight that even when mastery goals fail to facilitate exam performance in the short term, they may still have a positive influence on the long-term retention of exam-related material (Elliot & McGregor, 1999).

The pattern of results that we obtained for performance-approach goals are conceptually consistent with previous research on the trichotomous model, in that these goals were related to some positive processes, but evidenced a null relationship with several others. In addition, performance-approach goals were linked to one aversive process—threat appraisals during exam preparation—which undoubtedly reflects the aversive component of these goals (Elliot & Church, 1997; Elliot & McGregor, 1999). It is interesting to note that performance-approach goals evoked purely appetitive (e.g., challenge) appraisals when the exam was anticipated from afar, but these goals evoked both appetitive and aversive appraisals during exam preparation. This suggests that performance-approach goal pursuit is primarily energized by appetitive motivation at the early, anticipatory stage of the achievement sequence, and that its aversive component only becomes activated and operative when the actual evaluative experience looms near and becomes a salient reality. A conceptual parallel may be found in the literature on defensive pessimism: Defensive pessimists are said to exhibit

aversive motivational reactions only when the evaluative event is imminent (Norem & Cantor, 1986). Indeed, recent empirical work has shown a positive relationship between defensive-pessimism and performance-approach goal adoption (Church & Elliot, 2001).

The simultaneous activation of appetitive and aversive motivation is likely responsible for many of the null findings evidenced for performance-approach goals in this and other research, as the positive and negative effects produced independently by each motivational system cancel each other out when merged together (see Cacioppo & Berntson, 1994). Additional research is clearly needed to examine the precise manner in which appetitive and aversive motivational processes converge and the specific mechanisms through which this confluence impacts phenomenological experience, cognitive processing, behavioral inclinations, and actual performance outcomes. Research on approach-avoidance conflict (and related issues) has a long history in psychology (Atkinson, 1957; Lewin, Dembo, Festinger, & Sears, 1944; Miller, 1944; Mowrer, 1960), but the empirical work conducted in this area remains at a molar level of analysis.

The pattern of results that we obtained for performance-avoidance goals is also conceptually consistent with previous research on the trichotomous model, in that these goals were related to an extensive set of negative processes. The present research additionally demonstrates that the pursuit of performance-avoidance goals is inimical for achievement regulation throughout the examination sequence, from anticipation of the exam, to preparation for the exam and to a readiness and willingness to take the exam. Indeed, the short-term longitudinal component of our research clearly shows that the deleterious impact of pursuing performance-avoidance goals increases as the exam approaches, suggesting that the negative processes evoked by these goals reach their zenith when the time for the examination actually arrives. In essence, it appears that the negative processes evoked at the beginning of the sequence cumulate or "snowball," such that by the time of the achievement event, the overall effect of these aversive processes is devastating. As such, it should come as little surprise that performance-avoidance goals have been consistently linked to the undermining of such critical outcomes as intrinsic motivation, exam performance, and the retention of exam-related information (see Elliot, 1999).

Although we have portrayed achievement goals as causal predictors of various achievement-relevant processes, it is important to highlight that the results reported here are correlational in nature. The prospective and longitudinal features of the studies, in conjunction with the statistical controls used, certainly enhance the likelihood that the observed relationships are in the presumed direction; but without experimental manipulation of the achievement goal variables, definitive causal statements are not warranted. Although we believe that the findings documented in this research apply directly to an assortment of achievement tasks and settings, this remains an assumption. Future work is needed to validate the observed relationships beyond the examination context. In addition, although the internal consistency estimate of the T1-preparedness index was good in our preliminary work, it was low in the Study 3 sample; thus, conclusions based on this index should be made with caution.

The present findings suggest that intervention efforts targeting achievement goals should focus on facilitating mastery goals and discouraging performance-avoidance goals. Clearly, as many theorists have stated (Ames, 1992; Anderman, 1997; Dweck, 1986; Maehr & Midgley, 1991; Nicholls, 1984), mastery goals are optimal self-regulatory devices, and educators should do everything possible to foster the adoption and maintenance of mastery goal pursuit. Equally clearly, performance-avoidance goals are inimical for a host of achievement-relevant processes and outcomes, and educators should do everything possible to guide students away from these aversive regulatory foci. Interestingly, the present research is consistent with an accumulating body of evidence indicating that performance-approach goals can be adaptive in some achievement settings (see Elliot, 1999), and it is time that educators begin to discuss and, perhaps, debate the issue of whether such goals should be encouraged in some instances (e.g., at some grade levels, for certain achievement tasks, for particular types of individuals) or at least not actively discouraged. Recent work on multiple goals indicates that mastery and performance-approach goals are not necessarily incompatible, and that the combination of mastery goals and performance-approach goals may indeed be optimal for some outcomes (Barron & Harackiewicz, 2001; Pintrich, 2000a). The question of how mastery and performance-approach goals can be supported simultaneously in educational contexts is quite complex, but we encourage basic and applied researchers alike to grapple with this important consideration. We believe that the answers that emerge from that grappling will serve to further the maturity of the achievement goal approach to achievement motivation.

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