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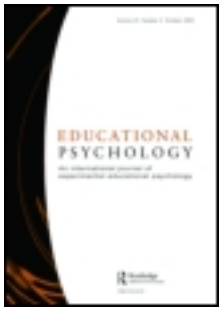
Summary: This scholarly publication on goal-setting is an example of my individually-driven line of original research on student motivation and self-regulation. This manuscript was published in a respectable international journal with an impact factor of 1.021.



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Relationships among properties of college students' self-set academic goals and academic achievement

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The major purpose of this study was to investigate the relationships among properties of college students' self-set academic goals and academic achievement, using multiple theoretical perspectives. Using a personal goal-based research methodology, college students enrolled in a learning-to-learn course ($N = 130$) were asked to list 20 of their goals (academic and/or non-academic). For each of their goals, goal specificity, value, expectation of success and autonomous and controlled motivation were measured and then ratings on each goal property were averaged across students' academic goals (24.75% of all goals) to predict students' grade point average (GPA) for the semester. Regression results suggested a positive effect on students' semester GPA for goal specificity and a negative effect for controlled motivation; the model explained 19% of the variation in GPA. This research may help to inform motivation researchers and educational practitioners who assist college students with goal setting.

Keywords: goal-setting theory; self-determination theory; self-set goals; goal properties; college student achievement

Social cognitive theories of motivation generally hypothesise that thoughts, beliefs and emotions influence motivation, and more recently, they have emphasised the value of goals when explaining students' motivation and patterns of achievement behaviour (Schunk, Pintrich, & Meece, 2008). A goal can be described as a cognitive representation of an outcome that one wants to attain or avoid in the future (Elliot & Fryer, 2007). Students' goals direct their choices, effort and persistence in academic learning contexts and are, thus, crucial for academic success (Alderman, 1999). Furthermore, setting goals and making progress towards achieving them have been found to contribute to students' general well-being (Sheldon & Houser-Marko, 2001; Weise & Freund, 2005), positive affect (Diener, Suh, Lucas, & Smith, 1999), self-efficacy, self-regulated learning (Cleary & Zimmerman, 2001) and performance on academic tasks (Bandura & Schunk, 1981; Dresel & Haugwitz, 2008).

Researchers have also found that the impacts of goals on learning and achievement are dependent on a variety of goal properties (Austin & Vancouver, 1996), including the specificity and difficulty of students' goals (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006; Kane, Baltes, & Moss, 2001; Locke & Latham, 1990, 2002), how much students value and expect that they can achieve their goals (Eccles, 2005; Heckhausen

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& Kuhl, 1985; Simpkins, Davis-Kean, & Eccles, 2006; Wigfield & Eccles, 1992, 2000) and the degree to which they have autonomous vs. controlled motivation for their goals (Deci & Ryan, 2008; Sheldon, Ryan, Deci, & Kasser, 2004). Thus, it would be important to consider these properties of goals when examining the relationships between students' goals and their academic achievement.

While a considerable amount of research has investigated relationships among properties of students' academic goals and academic achievement, much of this research has been confined to variables within a single theoretical perspective. For example, there has not been much research that has incorporated variables from multiple theoretical perspectives such as goal-setting theory (e.g. goal specificity and difficulty), expectancy-value theory (e.g. expectation beliefs and value perceptions) and self-determination theory (e.g. autonomous vs. controlled motivation) in one study. Since the motivational benefits that goals provide likely depend on complex interactions among multiple goal properties (Austin & Vancouver, 1996), it warrants further research to assess various goal properties simultaneously through multiple theoretical perspectives and examine their unique and relative contributions to student achievement. Utilising the combination of theoretical frameworks would offer a more complete picture of how academic goals exert motivational influence on academic achievement.

In addition, much of the research on the properties of students' goals has focused on relationships with course achievement or achievement on specific academic tasks. More studies are needed that focus on the role of academic goal properties in the prediction of more global measures of academic achievement (e.g. semester or cumulative grade point average, GPA, and retention to graduation) to broaden our understanding of the impact of academic goals on academic success.

Furthermore, research examining relationships between students' academic goals and educational outcomes has rarely dealt with students' self-set goals. It has been more typical to assign students to experimental goal conditions or to have students rate their level of agreement to survey items that are in the form of goal statements. Asking participants to list their goals and then examining the relationships among properties of those goals and outcomes have been a methodological approach primarily used in personal goal-based research (e.g. Emmons, 1986; Sheldon & Elliot, 2000). Identifying relationships among properties of students' self-set academic goals and their academic achievement could help inform instructors, academic coaches, advisors, counsellors, programme developers and other practitioners about where to focus their efforts when helping students set academic goals.

In the current study, we wanted to: (1) examine the degree to which various properties of college students' self-set academic goals (goal specificity, expectation of success, value, autonomous and controlled motivation) can uniquely predict a global measure of academic achievement (semester GPA) and (2) extend the use of personal goal-based research methodologies to the academic setting.

Theoretical background

Motivation researchers have identified a number of variables related to students' goals that have been shown to be predictive of students' motivation and achievement. Theoretically, the specificity, value, expectation of success and the autonomous and controlled motivation of students' self-set academic goals should be predictive of their semester GPA. However, these variables have not been

simultaneously measured using students' self-set goals and they have not been used as a group to predict semester GPA. The literature review that follows is divided into four areas: (a) goal specificity, (b) expectancy beliefs and value perceptions for attaining goals, (c) autonomous vs. controlled motivation for attaining goals and (d) personal goal-based research.

Goal specificity

Goal specificity is emphasised in goal-setting theory (see Locke & Latham, 2002) and social-cognitive theory (see Schunk et al., 2008), so we start by briefly discussing and comparing these theories before introducing pertinent findings related to goal specificity. Even though goal-setting theory has permeated many disciplines, since its major proponents have been industrial–organisational psychologists, its research foundation has focused on the role of goal-setting in predicting, explaining and influencing performance on organisational or work-related tasks (e.g. Locke & Latham, 2002). Core findings related to goal-setting theory highlighted goal difficulty and specificity as two key variables that influence goal performance positively (Locke & Latham, 2002). Social-cognitive theory, which emphasises reciprocal interactions among personal, behavioural and environmental factors (e.g. influences of modelling, self-efficacy and self-regulation on motivation, learning and performance), has been a prominent theory in the field of educational psychology and general psychology. Self-regulation is a key component of social-cognitive theory and goal-setting has been discussed as a critical self-regulatory process that fits within a broader model of self-regulation (Zimmerman, 2000). Research on social-cognitive theory supported the positive role of goal setting in its relationship with self-efficacy and task performance (Kitsantas, Reiser, & Doster, 2004; Schunk et al., 2008). Although both theories emphasise the importance of goals and goal-setting, social-cognitive theory has placed more emphasis on self-efficacy and self-regulation, whereas goal-setting theory has placed more emphasis on goal-setting itself. As Locke and Latham (2002) suggested 'goal-setting theory is fully consistent with social-cognitive theory in that both acknowledge the importance of conscious goals and self-efficacy. The two theories differ in scope and emphasis'. One area in which these two theories converge is on research related to goal specificity.

Unlike goals that state a general intention to do one's best, setting specific goals involves stating a clear and measurable standard of performance that can be used to determine if a goal has been reached (Locke, Chah, Harrison, & Lustgarten, 1989). Researchers have theorised that when a goal has an unclear standard, it can be difficult to decide the type and amount of effort to expend to achieve the goal and that evaluating goal progress can also be difficult (Bandura, 1997; Locke & Latham, 1990, 2002; Schunk et al., 2008). Experimental studies have found that providing participants with specific goals leads to higher levels of motivation and performance compared to unspecific 'do your best' goals, which seem to have little or no effect (Bandura & Cervone, 1983; Locke & Latham, 1990, 2002; Locke, Shaw, Saari, & Latham, 1981). Research on students' self-set goals has also supported these findings. For example, Kane et al. (2001) examined high school wrestlers' self-set goals and investigated the relationships between the specificity and difficulty of those goals and future wrestling performance. Students were asked to list three pre-season, three during season and three long-term personal goals. First, the researchers

selected goals specific to wrestling. Then the researchers rated the specificity and difficulty of those goals and averaged those ratings over students' goals. They found that during season goal specificity and difficulty uniquely added to the positive prediction of future wrestling performance (Kane et al., 2001).

Other research has suggested that elaborating goals with specific implementation intentions can lead to more effective goal pursuit (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006). Specifying when, where and under what circumstances to initiate goal pursuit has been suggested to lead to the automatic activation of goal-directed behaviour when encountered with situations that meet those specifications (Gollwitzer, 1999). In a meta-analysis of 94 studies, Gollwitzer and Sheeran (2006) found a medium-to-large positive effect ($d = .65$) of implementation intentions on goal attainment. For example, in an experimental study on students' self-set personal goals, Koestner, Lekes, Powers and Choicoine (2002) found that students who were asked to form specific implementation intentions reported making significantly greater progress towards their self-set goals compared to students in a control condition. Setting specific goals might involve creating clear and measurable standards of performance as well as specifying the temporal and situational conditions around which goal pursuit should be initiated and terminated.

Expectancy beliefs and value perceptions

Expectancy-value theories have suggested that students tend to choose and put effort towards goals that they expect they can successfully achieve and perceive as valuable (Atkinson, 1964; Eccles et al., 1983; Heckhausen & Kuhl, 1985; Wigfield & Eccles, 2000). Believing that success is possible, is necessary for motivation. If a person had no expectation of reaching a goal, it would be pointless to put effort towards that goal. People are also more likely to expend energy on goals that they perceive as being important compared to ones that have little value to them. Accordingly, research has shown that students' expectancy beliefs and value perceptions are positively related to academic motivation and achievement (Cole, Bergin, & Whittaker, 2008; Eccles, 2005; Pajares & Urdan, 2006; Wigfield & Eccles, 1992, 2000). For example, Simpkins et al. (2006) found that high school students' expectancies and values about math and science were positively related to their math and science grades and their decisions to take courses in those areas. Using personal goal-based methods, Emmons (1986) asked students to list 15 personal goals and rate various properties of those goals including goal value and expectation for success. Findings from regression analyses suggested that goal value and expectation of success uniquely predicted life satisfaction (Emmons, 1986). However, little research has examined students' values and expectations related to their self-set academic goals and academic achievement.

Autonomous and controlled motivation

Self-determination theory posits that individuals have natural inclinations to feel autonomous in the choices they make and the goals they pursue (Ryan & Deci, 2000). Instead of pursuing goals that reflect one's interests and personal beliefs (autonomous motivation), students often choose goals because of external pressures such as looming negative incentives (e.g. bad grades), social pressures and expectations of others (controlled motivation). Theoretically, controlled motivation refers to

both external and introjected regulations (Deci & Ryan, 2008; Ryan & Deci, 2000). External regulations refer to external contingencies that have not been internalised, for example, reward and punishment. Introjected regulations refer to external contingencies that have been only partially internalised, for example, in the form of guilt and pride, but not integrated within one's personal values system. Alternatively, autonomous motivation is comprised of identified and intrinsic regulations. Identified regulations refer to external contingencies that have been internalised considerably, accepted by the self and incorporated into one's personal values system. Intrinsic regulations refer to motivation that originate internally, within the self (e.g. interest and enjoyment) and do not involve the internalisation of external contingencies (Deci & Ryan, 2008; Ryan & Deci, 2000).

Research has suggested that students higher in autonomous motivation tend to process information in more depth (Grolnick & Ryan, 1987), be more creative (Koestner, Ryan, Bernieri, & Holt, 1984) and make more progress towards their goals (Sheldon & Elliot, 1998). On the other hand, when students are high in controlled motivation, their effort and performance can be adversely affected (Deci & Ryan, 2008; Ryan & Deci, 2000; Sheldon & Elliot, 1998).

Sheldon and colleagues conducted a series of studies that examined the degree to which students had autonomous vs. controlled motivation for their self-set personal goals (Sheldon & Elliot, 1998, 1999; Sheldon et al., 2004; Sheldon & Houser-Marko, 2001; Sheldon & Kasser, 1998). They asked students to list a set of goals and report the level of autonomous vs. controlled motivation they had for each goal. Across these studies, Sheldon and his colleagues found positive relationships between autonomous motivation and goal progress. Students made more progress on goals that they rated higher on autonomous motivation and less progress on goals that they rated lower on autonomous motivation.

In a study with first-year college students, Sheldon and Houser-Marko (2001) created a single variable named 'self-concordance' by subtracting controlled motivation from autonomous motivation and found that self-concordance had a small ($r = .18$) but significant correlation with semester GPA. In a more complicated path model, self-concordance was found to indirectly impact semester GPA through goal attainment. In their study, the researchers averaged self-concordance ratings across all of the goals students listed without regard to the type of goal. A domain-specific approach should also be considered when researchers focus on academic goals specifically and their relationships with academic achievement. Focusing specifically on academic goals might be more helpful when trying to explain differences in students' academic achievement. Furthermore, research needs to examine autonomous and controlled motivation in conjunction with other goal properties such as goal specificity, expectation beliefs and value perceptions.

Personal goal-based research

Personal goal-based research has tended to be published in personality and social psychology journals and has focused on using properties of self-set personal goals to explain variation in goal progress, goal attainment and subjective well-being (Koestner et al., 2002; Sheldon & Elliot, 2000). A major advantage of personal goal-based research is that the goals people list are more 'personologically' valid than goals provided to students by experimenters (Sheldon & Elliot, 2000). People's personal goals have also been suggested to be more directly linked to motivation

and achievement compared to experimentally manipulated goals. For example, Locke and Latham (2002, p. 709) suggested that the effects of goal manipulations on performance were mediated by people's personal goals and that personal goals have often been found to be the '… most immediate, conscious motivational determinants of action'. This suggests that self-set goals might tend to be better predictors of outcomes compared to ratings of experimenter-provided goals. However, few studies have focused on the relationships between self-set academic goals and academic achievement.

Personal goal-based research provides useful methodologies for measuring properties of self-set goals (e.g. Emmons, 1986; Kane et al., 2001; Little, 1983; Sheldon & Elliot, 2000). Typically, participants are asked to list a set of goals and then the properties of those goals are measured by: (1) having participants rate survey items for each goal on one or more dimensions (e.g. autonomous motivation for a goal) and/or (2) having experimenters rate each goal on one or more dimensions (e.g. specificity of a goal). Ratings on each goal property are then averaged across the set of goals and used to predict person-level outcomes (e.g. well-being).

Personal goal-based research has tended not to differentiate between different categories of goals listed by students (e.g. academic, social and work/occupational) and instead averages goal properties across all of the goals listed by participants in order to gain summary information about the person's goal system. However, this approach assumes that goal properties are not systematically different between different categories of goals. Cantor and Fleeson (1994) argued that ignoring differences in the content domains of goals and averaging across all goal categories would result in a loss of important information. Responding to Cantor and Fleeson (1994), Sheldon and Elliot (2000) investigated this issue and found systematic differences in the strength of goal properties depending on the goal category (students were asked to set goals that corresponded to their roles as a student, child, romantic partner, friend and employee). Participants rated student and employee goals higher on external motivation compared to friendship and romantic goals. For all goal categories, except friendship goals, goal progress was found to be associated with increased satisfaction in that area. These findings indicate that differentiating goal categories can lead to increased information about a person's goals. Consistent with this idea, when concerned with outcomes specific to a goal category it might be important to focus on goals from that category. For example, looking at academic goals might help us to better understand students' academic achievement. Because the outcome variable in the present study was semester GPA, we thought that using students' academic goals would lead to stronger relationships with semester GPA compared to using all of the goals students listed.

Overview of the present study

The major purpose of this study was to investigate the relationships among properties of college students' self-set academic goals and academic achievement. Using a personal goal-based research methodology, we asked college students enrolled in a learning-to-learn course to list 20 goals that they currently had. Students were asked to rate the following properties for each of their goals: value, expectation of success and autonomous and controlled motivation. In addition, trained experimenters rated the specificity of each goal listed by students. These ratings on each goal property were then averaged across students' academic goals and used in analyses predicting

students' semester GPA for the semester they listed their goals. The basic premise of the present study was that variation in students' semester GPA could be partially explained by properties of their self-set academic goals that they listed at the beginning of the semester. We hypothesised that goal properties would be positively related to students' semester GPA with the exception of controlled motivation, which was expected to have a negative relationship.

One difference in the design of our study compared with other personal goal-based research was that we averaged student and experimenter ratings of the properties of each goal across students' academic goals instead of averaging goal property ratings across all of the goals students listed. We hypothesised that averaging goal property ratings across academic goals would result in stronger relationships between goal properties and semester GPA than using the more traditional approach of averaging goal property ratings across all of the goals students listed. Since the number of academic goals listed by a student could vary, we included the per cent of academic goals listed as an independent variable in our analyses. One reason for which it was important to include this variable in our analyses was because, we wanted to test our hypotheses after controlling for differences in the per cent of academic goals listed by students. Another reason was because we were interested in its relationship with academic achievement. The per cent of academic goals listed might reflect the relative value students place on the academic domain, compared to goals from other categories (e.g. social goals). Accordingly, the per cent of academic goals listed was hypothesised to be positively related to semester GPA. In sum, we made the following hypotheses: (1) each goal property will uniquely predict semester GPA and have a positive relationship with semester GPA; with the exception of controlled motivation which will have a negative relationship; (2) the per cent of academic goals listed will uniquely and positively predict semester GPA and (3) averaging goal property ratings across academic goals only will result in stronger relationships between goal properties and semester GPA than using the more traditional approach of averaging goal property ratings across all of the goals students listed.

Methods

Participants

A total of 130 university students were sampled from 10 different sections of a 3-credit learning-to-learn course offered during the spring semester through the department of educational psychology at a highly selective public university in the South Central USA. The course is designed to help students apply ideas from the theories of learning, motivation and self-regulation to how they study and learn. The course was open to all students and enrolled a diverse body of students from different departments across the campus. None of the students were enrolled in a developmental education or 'remedial' course because no such course existed at this institution during the time this study was conducted. Students may have taken the course for a variety of different reasons (e.g. wanting to develop or hone their learning strategies, wanting to take what they believed to be an easy course and having to take the course due to academic probation). In addition, students who are struggling academically but who are not on academic probation are often encouraged to take this course by their academic advisors. Students who enrolled in this course, however, had varying levels of academic achievement upon entry. Students'

average cumulative GPA, the semester prior to enrolling in this course, was 2.48 and SD = .91 (30.8%, $n = 40$, had a cumulative GPA below 2.00 and were thus on scholastic probation; 32.3%, $n = 42$, had a cumulative GPA between 2.00 and 2.99 and 36.9%, $n = 48$, had a cumulative GPA between 3.00 and 4.00).

Demographic data were collected by the instructors. One hundred and eighteen students reported their gender: female (58%, $n = 68$) and male (42%, $n = 50$). One hundred and twelve students reported their year in school: first-year students (29%, $n = 32$), sophomores (42%, $n = 47$), juniors (20%, $n = 23$) and seniors (9%, $n = 10$). Students' ethnicity was only collected by instructors in 5 of the 10 course sections used for this study (60 students): African-American (5%, $n = 3$), Asian (20%, $n = 12$), Caucasian (48%, $n = 29$), Hispanic (23%, $n = 14$) and Native American (3%, $n = 2$).

Procedures

At the beginning of the semester, students were asked to list 20 goals. They were told:

> At any point in our lives each of us has many different goals. We want you to think about the different goals you have at this point in your life. These goals can be both academic and non-academic. There are no right or wrong answers. We want to know what your goals are, not what you think they should be or the goals you think other people have.

Similar to Emmons' (1986) goal listing procedures, no limits were placed on the type of goals students could set (e.g. academic goals only and semester long goals only). This was done to obtain a more authentic listing of students' current goals which may vary in a number of ways. Furthermore, no examples of goals were provided to try to avoid cueing students about what goals to set. For each of the 20 goals, students were asked to answer two single-item measures assessing value and expectation of success and an 11-item measure assessing autonomous and controlled motivation. Each rating was on a 7-point Likert scale.

Measures

Expectancy beliefs and value perceptions

Each student's expectation for achieving a goal was measured with a single item 'How likely do you think it is that you will reach this goal?' They rated this item on a 7-point Likert scale that ranged from 1 'Not At All Likely' to 7 'Extremely Likely'. The value students placed on each goal was measured with a single-item, 'How important is this goal to you?' They rated this item on a 7-point Likert scale that ranged from 1 'Not At All Important' to 7 'Extremely Important'.

Autonomous and controlled motivation

Students rated their autonomous and controlled motivation for each goal using the Autonomous and Controlled Motivation Goals Scale. This scale was an 11-item assessment that we derived from the Academic Self-regulation Questionnaire (Ryan & Connell, 1989) and Sheldon and Elliot's (1998) assessment of autonomous and controlled motivation. Items were rated on a 7-point Likert scale that ranged from 1 'Not at all True of Me' to 7 'Extremely True of Me'. Sample items assessing

autonomous motivation include 'I have this goal … because working towards this goal is enjoyable' or 'I have this goal … because this goal is in line with the kind of person I am or want to be'. These items were then averaged together to measure students' autonomous motivation for each goal. Sample items assessing controlled motivation include 'I have this goal … because somebody else wants me to or thinks I ought to', or ' I have this goal … because I will get rewarded in some way if I achieve this goal'. These items were then averaged together to measure students' controlled motivation for each goal. Using students' academic goals, the Cronbach's alpha reliability coefficients were computed for autonomous motivation ($\alpha = .80$) and controlled motivation ($\alpha = .71$). This was done by first averaging each item across students' academic goals and then entering those item averages into a reliability analysis for each autonomous and controlled motivation scale.

Academic achievement (semester GPA)

With students' consent, their GPA for the semester they listed their goals (not cumulative GPA) was obtained from the university's data archives and used as an indicator of academic achievement.

Researcher training and inter-rater reliability for ratings goals

After students turned in their goals along with answered measures, four researchers rated students' goals on various dimensions in order to generate goal variables to use in data analyses. As a first step, four trained researchers examined students' goals and broke compound goals (goals that contained more than one goal category) into multiple single goals. As a second step, they categorised students' goals into four groups that are considered to comprehensively capture college students' typical and prevalent goals: (1) academic, (2) social, (3) work/occupational or (4) other personal goals. As a last step, the trained researchers rated three elements related to the specificity of each goal – whether the goal was (1) measurable, (2) contained a start-date and (3) contained an end-date. Students' academic goals were then selected and properties of these academic goals were used in predicting their academic achievement, semester GPA. This stepwise approach was used because accuracy would likely be lost if the researchers were required to rate more than one property of a goal at a time. Also, it was necessary to separate compound goals into single goals before rating them on other dimensions.

The basic procedures used to train the researchers and calculate inter-rater reliability scores were the same for rating compound goals, goal categories and goal specificity. First, the researchers created a framework for rating students' goals based on the theories and research reviewed previously. Then, the researchers randomly selected a subset of approximately 5% of students' goals, and all four researchers rated this subset of goals. Inter-rater reliability coefficients were calculated between each possible pair of raters (six pairs in total) using Pearson product–moment correlation coefficients. In addition, the researchers discussed all discrepancies between ratings of students' goals and decided how to rate these goals as well as similar goals that might occur in the future. The researchers' aim was to obtain inter-rater reliability coefficients above $r = .90$ for each pair of raters. If this level of consistency among raters was not obtained, the researchers randomly selected, and subsequently rated, another subset of approximately 5% of students' goals. No more than two iterations were ever

needed to reach adequate consistency among raters (i.e. $r > .90$). After this level of consistency was reached, the researchers were permitted to code the remaining goals independently. Accordingly, students' goals were randomly divided into four sets and each researcher was assigned one set and rated that set independently. The researchers were instructed to mark all goals that they had difficulty in rating, and they discussed and resolved, as a group, how to rate each of these goals. Below, we report our preliminary analyses of our ratings of students' goals.

Results

Preliminary analyses

Compound goals

An examination of students' listings of 20 goals revealed that some of their goals were compound goals, that is, contained more than one goal (e.g. 'Graduate college and find a better job' and 'Get homework done early and be more sociable'). Because a compound goal could span multiple goal categories (e.g. social and academic) and could vary in its level of specificity, four trained researchers identified compound goals (coded as 1 = compound goal and 0 = single goal) and broke them into distinct single goals. Goals identified as being in the academic category were selected for the subsequent analysis. The inter-rater reliabilities were above $r = .90$ for each pair-wise comparison of experimenter ratings of compound goals. Out of 2989 distinct single goals, 728 had been part of a compound goal. On average, students listed 22.99 (SD = 3.54) goals.

Goal categories

Students' academic goals needed to be identified in order to investigate the relationships between properties of those goals and academic achievement. It was also of interest to examine the per cent of goals students had in other categories. Goal researchers have divided students' goals into various categories (Cantor, Norem, Niedenthal, Langston, & Brower, 1987; Carroll, & Durkin, 1997; Ford, 1992; Nuttin, 1985; Sheldon & Elliot, 2000). In this study, trained researchers coded students' goals into one of four categories: academic, social, work/occupational and other personal goals. The major purpose of this study was to identify and examine academic goals; however, we were also interested in the per cent of goals students listed in the other categories so we coded these categories as well.

Academic goals referred to goals that were focused on the individual's role as a student. Goals related to grades, attendance, studying behaviours, learning skills, placement exams, future plans about graduate school, etc. were categorised as academic goals (e.g. 'Go to graduate school' and 'Earn a 2.75 GPA for the spring semester').

Students also listed non-academic goals and we categorised these goals as social, work/occupational or other personal goals. Social goals referred to goals focused on the individual in interpersonal relationships. Goals related to students' relationships, with treatment of, or reactions to family, friends, spouses, children, acquaintances or others in general, were categorised as social goals (e.g. 'Have a good loving marriage' and 'Not fight with my roommates'). Work/occupational

goals referred to goals that were focused on the individual as a worker and could concern their current or future jobs or careers. Goals focused on deciding between different careers, getting a job, salary/wages, finding a job with certain characteristics, completing work-related tasks, developing/improving work skills, etc. were classified as work/occupational goals (e.g. 'Become 100% sure I'm choosing the right career' and 'To make more money this summer at a new position, than I did last summer'). Other personal goals were the most general category and referred to goals that were related specifically to the individual, not to goals focused on academic, social or work-related issues. Goals related to students' material possessions, health, exercise, spirituality, religion, travel, recreation, general self-improvement, etc. were categorised as personal goals (e.g. 'Buy my own house' and 'Cut down on chocolate').

Each possible pair of raters coded goals in the same category over 90% of the time and inter-rater reliabilities were above .90 for each pairwise comparison of experimenter ratings of academic goals specifically. The per cent of goals students listed in each category are as follows: academic goals ($M = 24.75\%$, $SD = 12.57$), social goals ($M = 18.38\%$, $SD = 10.44$), work/occupational goals ($M = 6.61\%$, $SD = 5.47$) and other personal goals ($M = 49.97\%$, $SD = 13.27$).

Goal specificity

Goal specificity was measured using experimenter ratings. Four trained researchers made judgements about whether students' goals contained: (1) a clear and measurable standard of performance; (2) a start date and (3) an end date. A value of '1' was assigned when each criteria was met. The inter-rater reliabilities for each pair-wise comparison among the four experimenters were above $r = .90$ for each facet of goal specificity. These three ratings were summed together to measure the specificity of each goal. Therefore, students' goal specificity score could range from 0 to 3.

Properties of academic goals

On average, students listed 5.66 ($SD = 2.93$) academic goals. Students' ratings on each goal property (specificity of goals, value of goals, expectation of successfully reaching goals and autonomous and controlled motivation towards goals) were averaged across the academic goals they listed. For example, if a student listed five academic goals, their value for academic goals was calculated by averaging their value

Table 1. Descriptive statistics.

	Possible range	Mean	SD
Per cent of academic goals	0–100	24.75%	12.57
Specificity	0–3	.97	.45
Value	1–7	6.43	.52
Expectation of success	1–7	5.54	.72
Autonomous motivation	1–7	5.02	.91
Controlled motivation	1–7	5.10	.84
Semester grade point average	0–4	2.91	.72

ratings for each of those five goals. Table 1 shows the means and the standard deviations of properties of students' academic goals.

Primary analyses. The focus of this study was on examining the relationship among multiple properties of students' academic goals that they listed at the beginning of the semester and their GPA for that semester. In addition, the per cent of academic goals listed was of interest because it was hypothesised that this variable would be positively related to students' academic achievement.

The means and standard deviations for the per cent of academic goals listed, properties of students' academic goals and semester GPA are presented in Table 1. The correlations among these variables are presented in Table 2. As hypothesised, goal specificity was positively and controlled motivation was negatively correlated with semester GPA (r (128) = .25, $p < .01$ and r (128) = −.37, $p < .01$, respectively). No other variables had significant correlations with semester GPA. Goal properties were significantly inter-correlated with the exception of goal specificity which was only correlated with one other goal property, autonomous motivation (see Table 2). Per cent of academic goals had no significant correlations with any of the other variables in this study.

In order to investigate which variables uniquely predicted semester GPA, we ran a multiple linear regression analysis which is appropriate when examining multiple predictors of one continuous outcome (Bobko, 2001). We entered goal properties (goal specificity, value, expectation of success and autonomous and controlled motivation) and per cent of academic goals as predictor variables of semester GPA. The model was statistically significant (F (6, 123) = 4.65, $p < .01$) and explained approximately 19% ($R^2 = .19$, Adjusted $R^2 = .15$) of the variation in students' semester GPA. Goal specificity ($\beta = .20$, t (123) = 2.31 and $p < .05$) and controlled motivation ($\beta = -.34$, t (123) = −3.71 and $p < .01$) uniquely predicted students' semester GPA (see Table 3). The four other predictor variables that were entered into the model were not statistically significant. Therefore, our first hypothesis that we mentioned earlier was partially supported because two, but not all five, of the goal properties that were investigated uniquely predicted semester GPA. Also, these relationships were in the expected direction, that is, goal specificity was positively related to semester GPA and controlled motivation was negatively related to semester GPA. Our second hypothesis that per cent of academic goals would uniquely predict semester GPA was not supported.

The regression analysis we ran (Table 3) allowed us to examine the main effects of goal properties on semester GPA and test our first two hypotheses. However, we were also interested in examining possible interactive effects of goal properties on

Table 2. Correlations among variables.

	1	2	3	4	5	6	7
1. Per cent of academic goals	1.00						
2. Specificity	.03	1					
3. Value	−.12	−.03	1				
4. Expectation of success	.02	−.04	.37**	1			
5. Autonomous motivation	.08	.21*	.44**	.32**	1		
6. Controlled motivation	0.00	−.12	.34**	.20*	.36**	1	
7. Semester grade point average	−.04	.25**	−.16	−.11	−.06	.−37**	1

*$p < .05$, **$p < .01$.

Table 3. Multiple linear regression analysis predicting semester grade point average.

	B	SE	*β*	*t*
Per cent of academic goals	−.31	.48	−.05	−.65
Specificity	.32	.14	.20*	2.31
Value	−.08	.14	−.06	−.59
Expectation of success	−.03	.09	−.03	−.30
Autonomous motivation	.05	.08	.06	.57
Controlled motivation	−.29	.08	−.34**	−3.71

Note: $R^2 = .19$ and Adjusted $R^2 = .15$.
*$p < .05$, **$p < .01$.

semester GPA. To do this, we conducted exploratory analyses that added all possible two-way interaction terms between the five goal properties that we studied (10 interaction terms in total) to our original regression model of main effects one at a time. None of the interaction terms were statistically significant. Thus, the interaction terms were removed and are not reported in Table 3.

In our third hypothesis, we posited that focusing specifically on academic goals would help to better explain differences in students' academic achievement compared to averaging across all goals listed. As we mentioned above, personal goal-based researchers have tended to ignore goal categories by averaging goal properties across all goals listed, even though we acknowledge that this approach might make sense when predicting general well-being of students. The hypothesis was tested by comparing the strength of correlations between goal properties and academic achievement using both approaches (academic goals only and all goals listed). Results suggested that correlations with academic achievement were stronger when using academic goals only. As we already reported above, when averaging across academic goals, goal specificity and controlled motivation were found to be significantly correlated with semester GPA. However, when averaging across all goals, only controlled motivation was found to be significantly related to semester GPA ($r = -.28$, $p < .01$) and this correlation was marginally lower ($t = 1.47$, $p < .10$) than the correlation between controlled motivation and semester GPA when using academic goals only ($r = -.37$, $p < .01$).

Discussion

Results from the regression analysis suggested two properties of college students' self-set academic goals that were uniquely related to academic achievement – goal specificity and controlled motivation. These findings suggest that goal specificity is a significant predictor of academic achievement controlling for students' level of controlled motivation, and that controlled motivation is an important predictor of academic achievement despite the level of specificity of students' academic goals. In addition, given that our exploratory analyses of two-way interactions suggested that there was not an interaction between goal specificity and controlled motivation, it supports that these two variables may have additive, not interactive, impacts on academic achievement.

The regression results for goal specificity suggested that students who listed more specific academic goals at the beginning of the semester were more likely to have higher academic achievement at the end of the semester. This result is consistent with findings from previous research on goal specificity (Locke & Latham, 1990, 2002)

and implementation intentions (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006). As was stated previously in the methods section, goal specificity was calculated by averaging experimenter ratings of whether the goal: contained (1) a clear and measurable standard of performance; (2) a start date and (3) an end date. Having a clear and measurable standard to work towards might help students decide the type and amount of effort to expend in order to reach their goals (Locke & Latham, 1990, 2002). In addition, having clear and measurable goals might make the evaluation of goal progress more accurate and meaningful (Bandura, 1997). Specifying a time frame within which a goal should be accomplished could help cue students when to initiate goal pursuit and help guide them in regulating their goal pursuit in order to reach their own deadlines (Gollwitzer, 1999). Helping students revise their academic goals, so that they are more specific, may help them improve academically.

The regression results also showed that pursuing academic goals for controlled reasons was negatively related to academic achievement. This finding is consistent with self-determination theory research which suggests that having academic goals that are motivated by reward/punishment, external pressures and/or guilt may inhibit students' need for autonomy and negatively affect their motivation to attain their academic goals and achieve in the academic setting (Assor, Vansteenkiste, & Kaplan, 2009; Deci & Ryan, 2008; Reeve, 2009). Given the nature of testing and the various external pressures put on students to achieve academically, feeling controlled motivation towards academic goals might be a common issue that many college students face. Reducing extrinsic punishments and rewards in the academic setting, implementing autonomy-supportive instructional methods and creating environments that foster students' autonomy could help to decrease students' controlled motivation (Assor, Kaplan, & Roth, 2002; Deci & Ryan, 2008; Reeve, 2009; Ryan & Deci, 2000).

The current study is unique because it dealt specifically with students' self-set goals rather than assigned goals, focused on academic goals, examined several predictor variables simultaneously from multiple theoretical perspectives and used them to predict a global measure of academic achievement (semester GPA). The naturalistic assessment of students' goal properties used in this study helps to provide ecological validity to the impact of goal properties on academic achievement. These findings also shed light on the specific characteristics of goals that shape student achievement at the general academic achievement level rather than for a specific course. For college students, controlled motivation may be a major motivational barrier for improving their academic achievement, whereas goal specificity may be an important asset helping to facilitate academic achievement.

These findings may be relevant to programme developers, educators, tutors, mentors, academic coaches, academic advisors and other practitioners who assist students in setting and working towards reaching their academic goals. Identifying relationships among properties of students' self-set academic goals and their academic achievement could help inform these practitioners about where to focus their efforts when helping students set academic goals. It would also be important to help students understand that merely setting academic goals may not be sufficient. For goal setting to be effective for students, they may need to revise their goals so that they are more specific and learn to generate motivation for their goals that does not rely on external pressures.

This study also helps to extend personal goal-based research (e.g. Carroll & Durkin, 1997; Emmons, 1986; Kane et al., 2001; Koestner et al., 2002; Little,

1983; Sheldon & Elliot, 2000; Sheldon et al., 2004) by taking a domain-specific approach in categorising goals and specifically focusing on the association between properties of students' academic goals and academic achievement. Findings from this study showed that averaging goal properties across academic goals yielded stronger relationships with semester GPA compared to the more general approach of averaging across all goals to obtain summative information about a person's goal system as a whole. This result is congruent with the correspondence principle (Ajzen & Fishbein, 1977; Davidson & Jaccard, 1979; Kraus, 1995), because academic goals have a higher correspondence with academic achievement. These findings suggest that when concerned with predicting educational outcomes, researchers might find stronger relationships by focusing specifically on academic goals.

Based on the previous research (Sheldon & Houser-Marko, 2001), it was surprising that students' autonomous motivation was not found to be related significantly to academic achievement. Interestingly, however, autonomous motivation was the only variable that had a significant positive relationship with goal specificity. It seems plausible that feeling a greater sense of autonomy towards one's academic goals could lead students to form more specific goals. Future research needs to examine the effect of autonomous motivation on goal specificity and the indirect effect it could potentially have on academic achievement through goal specificity. As prior research has reported that autonomous motivation is positively linked to goal progress (Sheldon et al., 2004), it would be worthwhile to examine broader indicators of academic achievement including academic goal progress and attainment to better understand the role of autonomous motivation.

Results from both correlation and regression analyses also showed that value and expectation of success were not significantly related to semester GPA, which was unexpected given previous research on expectancy-value theory (Eccles, 2005; Wigfield & Eccles, 1992, 2000). These null findings could be related to the possibility that college students might have difficulty in accurately judging their expectation of success to reach their academic goals and might have listed only goals that were valuable for them. In support of the later idea, the data showed little variation in students' value ratings and the distribution of those ratings was positively skewed and had a mean of 6.43 on a scale from 1 to 7 (see Table 1). Because students rated most all of their self-set goals high on value, other measurement techniques, such as rank ordering the goals by how important they are, could be investigated in future research.

A goal listing procedure was used in this study that placed no restrictions on the type of goals students could set. This approach was chosen because it was more naturalistic and allowed students to freely set goals in a variety of categories. Future studies need to investigate goal listing procedures that require students to set academic goals only and focus on identifying sub-categories of students' academic goals.

These findings are based on data from students enrolled in a learning-to-learn course at a highly selective public university. The generalisability of these findings to students enrolled in other courses and attending other four-year colleges and universities, community colleges and technical schools needs to be investigated. In addition, future research should examine possible student background characteristics that may function as antecedents of students' goal properties. For example, parents'/caregivers' education level and college entrance exam scores are often collected and used by colleges to identify students who may be at risk for low academic achievement and attrition (Coyle & Pillow, 2008; Coyle, Snyder, Pillow,

& Kochunov, 2011; Ishitani, 2003, 2006) and it is possible that these variables are also related to students' goal properties.

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