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Academic Achievement Motivation: Differences Among Underprepared Students Taking a PSI General Psychology Course

Abstract

To create good educational interventions and assess their effectiveness, it is important for developmental educators to understand the complex nature of students' academic achievement motivation and self-regulation. The purpose of this study was to illustrate an approach to this by identifying underprepared college students' motivation and use of self-regulated learning strategies in a Personalized System of Instruction (PSI) General Psychology course. This study explored whether successful and unsuccessful college students in this course differed in learning beliefs, self-efficacy, self-regulation, time and study environment, and effort regulation as measured by the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991). Results suggest that these students differ on the self-efficacy, effort regulation, and time and study environment scales.

Underprepared students enter college despite histories of poor prior academic performance. A 1995 Survey by the National Center for Education Statistics (NCES) found that 78 percent of higher institutions that enrolled freshman offered at least one remedial reading, writing, or mathematics course. Some of the students enrolled in these remedial courses may be characterized by learned helplessness and fail to put forth reasonable efforts when necessary. Others may appear to be motivated, but are primarily worried about poor performance and thus avoid the challenges of difficult tasks or new academic experiences (Dweck, 1975). Academic aptitude alone does not explain why some of these students are successful and others are not. Academic achievement motivation may be a critical factor in understanding the success of underprepared college students. The challenge for developmental educators is to understand the development of students' academic achievement motivation and create interventions that foster high levels of academic achievement (Bempechat & Wells, 1989).

Academic achievement motivation affects not only how well a student learns new skills and information, but also how well the student uses existing skills and knowledge in both familiar and novel situations (Lepper, 1983). There is convincing evidence that a variety of achievement deficits, such as those observed in underprepared students, are the result of motivational problems rather than factors directly attributable to specific cognitive abilities (Resnick & Klopfer, 1989). Therefore, approaches to the design of effective instructional practices should be

guided by knowledge of factors that impede or contribute to academic achievement motivation.

A fairly recent model that attempts to explain academic achievement motivation is achievement goal theory (Ames, 1992; Urdan, 1997). This theory contends that individuals' interpretations of their achievement outcomes, rather than motivational dispositions or actual outcomes, determine achievement strivings by their effect on cognitive self-regulation processes. Cognitive self-regulation refers to students being actively engaged in their own learning, including analyzing the demands of school assignments, planning for and utilizing their resources to meet these demands, and monitoring their progress toward completion of assignments (Pintrich, 1999). In order for students to accept responsibility for their own learning, they must be motivated to succeed and possess the skills and abilities to engage in appropriate self-regulated learning strategies (McCombs, 1988).

The cause of underpreparation for college may be partially explained by the examination of self-regulated learning strategies. These strategies have been defined as a set of metacognitive, motivational, and behavioral techniques a learner may use to control his or her own learning process (Zimmerman, 1990). Zimmerman suggests that in a given situation, self-regulated learners are aware of the information and skills they must possess, and they take the steps necessary to acquire these skills. In addition, self-regulated learning strategies imply a high level of cognitive engagement, making connections with existing knowledge, organizing a specific approach to learning a task, and continuously monitoring progress (Corno & Mandinach, 1983). Self-regulated learners identify a goal to accomplish, and control their behavior, motivation, and cognition in order to attain that goal (Pintrich, 1995).

Self-regulated learning strategies are strongly associated with motivational factors. Control of learner beliefs, self-efficacy, self-regulation, control of time and study environment, and effort regulation are five motivational factors that have been useful in fostering academic success. Control of learner beliefs refers to student beliefs that efforts to learn will result in positive outcomes. This motivational factor pertains to the belief that outcomes are contingent on one's own effort. If students feel that they can control their academic performance, they are more likely to exert the effort necessary to change their learning behavior (Garcia & Pintrich, 1994).

The second motivational factor, self-efficacy refers to performance expectations, and relates specifically to task performance. Self-efficacy is a self-appraisal of one's ability to master a task. Self-efficacy includes judgments about one's ability to accomplish a task as well as the confidence in one's skills to perform a task. Garcia and Pintrich (1994) have found that motivational factors such as self-efficacy have substantial impacts upon self-regulated learning.

The third motivational factor, metacognitive self-regulation is comprised of three general processes: planning, monitoring, and regulating. Planning activities, such as goal setting, help to activate relevant aspects of prior knowledge that make organizing and comprehending the material easier. Monitoring activities include tracking one's attention as one reads to ensure understanding of the material. Regulating refers to the fine-tuning and continuous adjustment of one's cognitive activities. Regulating activities are assumed to improve performance by allowing learners to correct their behavior as they proceed on a task (Garcia & Pintrich, 1994).

The fourth motivational factor, time and study environment, involves scheduling, planning, and managing one's study time. This includes making effective use of one's time, and setting realistic goals. Study environment management refers to the setting where student class work is done. Ideally, the learner's study learning environment should be organized and relatively free from distractions. The fifth motivational factor, effort regulation, includes students' commitment to complete study goals and to control effort and attention in the face of distractions and uninteresting tasks. This type of regulation is important to academic success because it regulates the continued use of learning strategies (Garcia & Pintrich, 1994). These five factors may be especially useful in discovering how students behave in environments where they can make choices about their own learning pace or amount of effort placed on a task. For example, tasks that are completed outside of class (reading, taking practice quizzes, completing workbook assignments) often have a strong impact on student performance in college courses.

Several studies suggest that variables associated with self-regulated learning strategies are particularly germane to the performance of learners in learner-controlled computer-based instruction (CBI;Williams, 1996). Learner controlled CBI allows learners to proceed through instruction at their own rate. Williams found that many students perform poorly in such environments suggesting that they lack effective use of self-regulated learning strategies and metacognitive skills. For example, in research on the relationship between self-regulatory skill and instructional control, Young (1996) found that learner use of self-regulated learning strategies influences achievement in learner-controlled CBI. Furthermore, research results on the relationship between motivational and instructional control suggests that motivated learners perform successfully under learner-controlled computer based instruction (Milheim & Martin, 1991).

The purpose of the current study was to illustrate the usefulness of assessing student motivation by identifying the motivating and self-regulating factors that distinguish successful and unsuccessful underprepared college students in a computer assisted personalized system of instruction (PSI) General Psychology course. The course provided an environment where student motivation was especially important for success and was easily related to relevant course behaviors. This study explored whether successful and unsuccessful students in this course differed in control of learner beliefs, self-efficacy, self-regulation, time and study environment, and effort regulation as measured by the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991). A pilot study served to determine if high and low achieving students differed in their levels of achievement motivation for the course, and to indicate whether it was reasonable to expect to find strategy differences between them (Langley, 2002). Results from the pilot using a sample size of 20 suggested that four of the five motivational factors may be statistically significant. The motivational factor pertaining to time and study environment was not found to be statistically significant. A follow up study in a subsequent semester was then conducted to relate student motivation for academic achievement in the class to measures of cognitive self-regulation. We hypothesized that high and low performing students would differ on the MSLQ in ways indicating that high performers had higher motivation.

Method

Participants

The 75 participants identified for the study were first year college students in a large Midwestern University. This study was conducted during the Spring semester. These students were admitted to undergraduate study through a special admissions and academic services program for academically underprepared college freshman. Students were enrolled in one of six 40-student sections of a computer-assisted General Psychology course that met four days each week in a classroom containing 40 computer workstations and an 8-computer quiz area. On the first day of classes, students were told that as part of their experience they would be participating in a research study. Students read and signed an informed consent form that described the research and asked their permission for the use of their course performance and other academic records confidentially.

For each chapter of the text, the students were required to complete course assignments that included reading the textbook, answering study questions in a study guide that was graded and returned, completing pre-quiz exercises available in a laboratory classroom and at other times from any computer connected to the internet, and taking computerized proctored progress quizzes available only in the classroom. At course end, students took a 50-item comprehensive final examination. Accumulated points based on the students' best scores on course assignments determined their final grades. Past studies have suggested that perseverance in completing the assignments is a strong predictor of student success (Brothen & Wambach, 2000). To determine whether student motivation for academic achievement was related to course performance, the MSLQ (Pintrich et al., 1991) was used to measure students' academic achievement motivation.

Instrument

Pintrich et al. (1991) present the general theoretical framework that underlies the MSLQ. Generally, it is a self-report instrument based on a general cognitive view of motivation and learning strategies. There are two sections, a motivation section, and a learning strategies section. The motivation section consists of 31 items that assess student goals and value beliefs for a course, beliefs about skill to succeed in the course, and anxiety about tests in a course. The learning strategies section has 31 items regarding students' use of different cognitive and metacognitive strategies and 19 items concerning student management of different resources. The instrument used for this study was a pared down version consisting of 36 items relevant to the specific course from the subscales pertaining to learning beliefs, self-efficacy, self-regulation, control of time and study environment, and effort regulation.

The first subscale, learning beliefs, consisted of 4 items related to student beliefs that efforts to learn will result in positive outcomes. An example of a question from this type of scale would read, "If I study in appropriate ways, then I will be able to learn the material in this course." The second subscale, self-efficacy, consisted of 8 items that assessed student performance expectations and judgments about ability to accomplish a task. An example of a question from this type of scale would read, "I'm confident I can understand the basic concepts taught in this course." The third

subscale, self-regulation, consisted of 12 items related to attention focusing and persistence. An example of a question from this type of scale would read, " I rarely find time to review my notes or readings before a quiz." The fourth subscale, time and study environment consisted of 8 items related to student ability to manage and regulate time and study environments. An example of a question from this type of scale would read, "If I get confused reading the book in class, I make sure I sort it out afterwards." Finally, the effort-regulation subscale consisted of 4 items related to one's commitment to carrying out study goals. An example of a question from this type of scale would read, " If I try hard enough, then I will understand the course material."

Students were asked to rate their behaviors with a 7-point Likert scale from 1 = not at all true of me, to 7 = very true of me. Summing the items and taking an average determine the scale scores. The scales are modular and can be used to fit the needs of the instructor or researcher. Items marked as "reversed" within each scale are reversed coded items and must be reversed before an individual's score can be computed. If an item has to be reversed, a person who has circled 1 for that item now receives a score of 7 and so on. Pintrich et al. (1991) reported the following reliability coefficients for internal consistency of the subscales: learning beliefs (α = .68), self-efficacy (α = .93), self-regulation (α = .79), time and study environment (α = .76), and effort regulation (α = .69).

Procedure

Our computer courseware allowed us to assess student performance at any time (Brothen & Wambach, 2000). At the six-week point in the semester, the 50 highest and lowest performing students were identified for this study. Students were contacted during their respective class periods either in person, or by letter placed in their study guides requesting their participation in the study. Of the high fifty performing students originally identified for the study, forty-seven students responded and agreed to participate. Of those identified as the low fifty performing students, only 28 responded and agreed to participate. The 75 participants were asked to complete the MSLQ, which required approximately 10 – 15 min. of the student's time. The MSLQs were completed in the computer classroom as a paper-pencil questionnaire.

Results

In order to provide background information about the sample used in the study, high school rank, and ACT composite scores were obtained. The average high school rank for the 47 high academic achieving students was 55.30, and the average high school rank for the 28 low achieving students was 52.21. The average ACT composite score for the high academic achieving group was 20.27, and for the low academic achieving group the average ACT composite was 18.81. High school rank and ACT composite scores were not significantly different between groups. MSLQ means and standard deviations for high and low performing students are in Table 1. The two-sample independent t-tests assuming equal variances indicated that there were significant differences on the MSLQ in student self-efficacy, t (75) = 6.32, p < .001 (two-tailed), effort regulation, t (75) = 3.65, p < .001 (two-tailed), and time and

study environment, t (75) = 3.73, $p < .001$ (see Table 1). That is, high performing students felt more confident in their ability to master the course, better able to regulate their effort, and more able to manage their time. Differences between groups on control of learner beliefs and self-regulation were not statistically significant. Effect Size calculations using Cohen's d are as follows: Learning Beliefs: d = 0.44 Self-Efficacy: d = 1.51, Self-Regulation: d = 0.13, Time & Study Environment: d = 0.78, and Effort Regulation: d = 0.35. The same three MSLQ scales that differed between the high and low performing groups were positively correlated with final grade. Pearson correlations (two–tailed) between them and final grade were: self-efficacy, $r = .450$, $p < .001$, effort regulation, $r = .333$, $p < .003$, and time and study environment, $r = .253$, $p < .03$. The higher motivation revealed on the MSLQ translated to higher grades. The other two scales did not correlate significantly.

Table 1

Means, Standard Deviations, Variance & Significance Levels for the Five MSLQ Scales

	High Achieving (N = 47)	Low Achieving (N = 28)
Control of Learner Beliefs:		
Mean	5.99	5.77
Standard Deviation	.86	1.01
P (2-tail)	.30	
Effort-regulation:		
Mean	5.46	4.46
Standard Deviation	1.12	1.19
P (2-tail)	< .001	
Self-efficacy:		
Mean	5.98	4.72
Standard Deviation	.69	1.03
P (2-tail)	< .001	
Self-regulation:		
Mean	4.29	4.07
Standard Deviation	.57	.57
P (2-tail)	.11	
Time and Study Environment:		
Mean	4.52	3.79
Standard Deviation	.82	.80
P (2-tail)	< .001	

Discussion

This study identified the motivating and self-regulating factors that distinguish successful and unsuccessful first year underprepared college students in a learner-controlled computer assisted General Psychology course. We hypothesized that self-regulation factors would account for differences between the successful and unsuccessful students on the Motivated Strategies for Learning Questionnaire (MSLQ). Results indicated that self-regulation and control of learning belief scores did not differ between groups. Instead, it was self-efficacy, time and study environment, and effort regulation that proved to be statistically significant. These scales proved to be practically significant as well, in that they were related to students' final grades.

Self-regulatory processes depend on perceptions of self-efficacy, or a person's confidence that he or she can perform a particular task in a given set of circumstances (Hagen & Weinstein, 1995). Students in the low performing group were not confident that they could do the work expected of them. Their beliefs about their ability to perform were likely influenced by their experience of poor performance. One clue as to why they had not succeeded was their low score on the time and study environment scale. Low performing students perceived themselves to have less control over their time and environment than did high performing students. Time management involves the scheduling, planning, and managing of one's study time. Zimmerman (1994) found that time planning and management training helped students to better self-regulate their use of study time and in turn improved students' grades.

Both high and low performing students equally endorsed items on the control of learner beliefs scale, suggesting they believe that effort determines outcome. However, the low performing students expressed less commitment to expend the effort necessary in order to be successful in the course. Perhaps these students had acquired learned helplessness and believed that no matter how much effort-regulation they exerted, their efforts towards success would not result in the desired outcome. This suggests that cognitive and metacognitive strategies are not stable traits of the learner, but rather that these strategies can be learned and controlled by the students (Garcia & Pintrich, 1994).

This study has implications for developmental educators' practice and research on academic achievement motivation and self-regulated learning strategies. In addition, this study provides developmental educators with a learning profile of high performing students in comparison to low performing students. Finally, this study shows motivational factors that developmental educators should seek to enhance to positively influence student academic achievement motivation. Future research should investigate a variety of achievement motivation models that include confidence or self-efficacy beliefs as they relate to self-regulation. Additional studies should focus on means of boosting these beliefs, as well as examining the limitations of this approach for developmental students.

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References

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

Bempechat, J., and Wells, A. (1989). Promoting the achievement of at-risk students. *Trends and Issues*, 13. New York: ERIC Clearinghouse on Urban Education.

Brothen, T., & Wambach, C. (2000). A research based approach to developing a computer-assisted course for developmental students. In J. L. Higbee & P. L. Dwinell (Eds.), *The many faces of developmental education* (pp. 59-72). Warrensburg, MO: National Association for Developmental Education.

Corno, L., & Mandinach, E. B. (1983). The role of cognitive engagement in classroom learning and motivation. *Educational Psychologist, 18*(2), 88-108.

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

Garcia, T., & Pintrich, P. R. (1994). Regulating motivation and cognition in the classroom: The role of self-schema and self-regulatory strategies. In D. H. Schunk, & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance* (pp. 371-402). Hillsdale, NJ: Erlbaum.

Hagen, A. S., & Weinstein, C. E. (1995). Achievement goals, self-regulated learning and the role of classroom context. In P. R. Pintrich (Ed.), *Understanding self-regulated learning* (pp. 43-56). San Francisco: Jossey Bass.

Harackiewics, J. M. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist*, *33*(1), 1-21.

Young, J. D. (1996). The effect of self-regulated learning strategies on perfor in learner controlled computer-based instruction. *Educational Techr Research and Development, 44*(2), 17-27.

Zimmerman, B. J. (1994). Dimensions of academic self-regulation: A conc framework for education. In D. H. Schunk & B. J. Zimmerman (Eds, *regulation of learning and performance: Issues and educ applications (pp.* 3-21). Hillsdale, NJ: Lawrence Erlbaum.

Zimmerman, B. J. (1990). Self-regulated learning and academic achieveme overview. *Educational Psychologist*, *25*(1), 3-17.