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# *Examining Self-Regulatory Factors that Influence the Academic Achievement Motivation of Underprepared College Students*

**Abstract**

To create good educational interventions and assess their effectiveness, it is important for postsecondary educators to understand the complex nature of student academic achievement motivation and self-regulation. The purpose of this study was to examine the achievement motivation of underprepared college students and their uses of self-regulated learning strategies in a Personalized System of Instruction (PSI) General Psychology course. This study explored whether high and low performing college students in this course differed in learning beliefs, self-efficacy, self-regulation, control of time and study environment, and effort regulation as measured by pretest and posttest scores on the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991).

Many underprepared students enter college despite histories of poor prior academic performance. In the 50 U.S. states and the District of Columbia students can earn a high school diploma without acquiring the academic skills necessary for success in higher education (Honawar, 2005). Additionally, more than three-fourths of students who take the ACT exam are not prepared for college level work and more than one third of the students at two-and four-year public and private institutions in the United States take at least one year of remedial courses (Cavanagh, 2004). 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 concerned about poor performance and thus avoid the challenges of difficult tasks or new academic experiences (Dembo, 2004). 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 student academic achievement motivation and offer interventions that foster high levels of academic achievement (Langley, Wambach, Brothen, & Madyun, 2004).

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 (Ryan & Deci, 2000). 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 (Brophy, 2004). Therefore, approaches to the design of effective instructional practices should be guided by knowledge of factors that impede or contribute to academic achievement.

Over the past two decades, achievement goal theory has emerged as one of the predominant motivational frameworks for understanding student's academic achievement motivation (Pintrich & Schunk, 2002). This theory contends that student interpretations of personal achievement outcomes, rather than motivational dispositions or actual outcomes, determine achievement strivings by their effect on cognitive self-regulatory processes. Cognitive self-regulation refers to student's own direction of thought, feeling and action toward the attainment of goals. Self-regulated learners typically have high motivation for learning, and they are also metacognitive and behaviorally active in their learning process (Zimmerman, 2000a). Self-regulated learners are aware of their strengths and limitations, are guided by personally set goals and task-related strategies, change their study strategies if necessary, monitor their behavior toward the goals, and self-reflect on their increasing effectiveness (Zimmerman, 2002). Therefore, students who exhibit higher academic achievement use more self-regulated learning strategies than those who exhibit lower academic achievement, have superior achievement motivation, and are more likely to succeed academically and view their future optimistically (Zimmerman, 2002).

The cause of under-preparation 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, 2001). 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. Self-regulated learners identify a goal to accomplish, and control their behavior, motivation, and cognition in order to attain that goal (Pintrich, 2000). 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 (Pintrich & Garcia, 1991).

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 think that they can control their academic performance, they are more likely to exert the effort necessary to change their learning behavior (Pintrich & Garcia, 1991). 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 (Pintrich & Garcia, 1991). 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 (Pintrich & Garcia, 1991).

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 student 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 (Pintrich & Garcia, 1991). 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 CBI (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 high and low performing 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 high and low performing 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) at the beginning of the semester and again at course end to determine if there were differences between the two groups from pretest to posttest.

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 were 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. It was hypothesized that high and low performing students would differ on the MSLQ in ways indicating that high performers had higher motivation. Results suggested that these students differed on the self-efficacy, effort regulation, and time and study environment scales (Langley, Wambach, Brothen, & Madyun, 2004).

## Method

*Participants*

The participants in this study were 230 first year General College students at the University of Minnesota. 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 nine 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 class day, 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 were asked their permission for the confidential use of their course performance and other academic records.

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 self-regulation and motivation for academic achievement was related to course performance, the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991) was used.

*Instrument*

Pintrich and Garcia (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 student 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 specifically relevant to the course from the subscales pertaining to learning beliefs (how well students believe they can learn the material in the course), self-efficacy (how confident students are about their capabilities to perform), self-regulation (how well students monitor their progress and success), control of time and study environment (how well students manage their study time and preparation), and effort regulation (how consistently students work towards academic achievement in the course).

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, and the items were summarized and averaged to determine the scale scores. The scales are modular and can be used to fit the needs of the 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 and DeGroot (1990) reported the following reliability coefficients for internal consistency of the subscales: learning beliefs ($\alpha$ = .68), self-efficacy ($\alpha$ = .93), self-regulation ($\alpha$ = .79), time and study environment ($\alpha$ = .76), and effort regulation ($\alpha$ = .69).

*Procedure*

The computer courseware allowed the assessment of student performance at any time. At the six-week point in the semester, the 118 highest and 112 lowest performing students were selected for this study. Students were contacted during their respective class periods either in person or by a message posted on their personal course login page requesting their participation in the study. The 230 participants were asked to complete a pre MSLQ questionnaire at the six-week point in the semester as well as a post MSLQ questionnaire at course end, which required approximately 10–15 minutes of the student's time. The MSLQ questionnaires were completed on the computer either in the classroom or on any computer connected to the Internet. At course end, student responses were then retrieved from the course database to be analyzed.

## Results

Given the fact that a shortened version of the scale was used, the reliability coefficients for the shortened version of the MSLQ pretest scales for the current study are as follows: learning beliefs ($\alpha$ = .66), self-efficacy ($\alpha$ = .91), self-regulation ($\alpha$ = .76), time and study environment ($\alpha$ = .64), and effort regulation ($\alpha$ = .64). The reliability coefficients for the shortened version of the MSLQ posttest scales for the current study are as follows: learning beliefs ($\alpha$ = .80), self-efficacy ($\alpha$ = .90), self-

regulation (α = .83), time and study environment (α = .84), and effort regulation (α = .78).

Table 1
*Reliability Analysis for the MSLQ Measure*

| Variable | Original | Pretest | Posttest |
|---|---|---|---|
| Learner Beliefs | α = .68 | α = .66 | α = .80 |
| Self-Efficacy | α = .93 | α = .91 | α = .90 |
| Self-Regulation | α = .79 | α = .76 | α = .83 |
| Time & Study Environment | α = .76 | α = .64 | α = .84 |
| Effort Regulation | α = .69 | α = .64 | α = .78 |

The independent sample *t*-tests assuming equal variances for the pretest indicated that there were no significant differences on the MSLQ between the high and low achieving student groups in learning beliefs, $t(230) = .67$, $p = .67$ (two-tailed); self-efficacy, $t(230) = .47$, $p = .47$ (two-tailed); self- regulation, $t(230) = .41$, $p = .41$ (two-tailed); time and study environment, $t(230) = .26$, $p = .26$ (two-tailed); and effort regulation, $t(230) = .40$, $p = .40$. The effect size calculations using $S^2$ pooled standard deviations for the MSLQ pretest measures indicated that there was no practical difference at the beginning of the course and are reported as follows: Learning Beliefs: $S^2 = -0.06$, Self-Efficacy: $S^2 = 0.10$, Self-Regulation: $S^2 = -0.12$, Time & Study Environment: $S^2 = 0.15$, and Effort Regulation: $S^2 = 0.11$. (See Table 2). These results are particularly important, because they show that there were no differences in reported MSLQ measures between the high and low performing students at the beginning of the course.

Table 2
*Independent Samples t-test for the Pretest MSLQ Measures*

| | Achievement Group Statistics | | | | |
|---|---|---|---|---|---|
| | High | Low | *t* | *P* (2-tail) | Effect Size |
| | (N = 118) | (N =112) | | | |
| Learner Beliefs: | | | | | |
| Mean | 22.86 | 23.06 | .43 | .67 | –0.06 |
| Standard Deviation | 3.4 | 3.6 | | | |
| Self-Efficacy: | | | | | |
| Mean | 45.23 | 44.61 | –.73 | .47 | 0.10 |
| Standard Deviation | 6.33 | 6.62 | | | |
| Self-Regulation: | | | | | |
| Mean | 56.85 | 57.80 | .82 | .41 | 0.11 |
| Standard Deviation | 9.11 | 8.31 | | | |
| Time & Study Environment: | | | | | |
| Mean | 44.22 | 43.36 | –1.10 | .26 | 0.15 |
| Standard Deviation | 5.78 | 5.70 | | | |
| Effort Regulation: | | | | | |
| Mean | 22.21 | 21.81 | –.84 | .40 | 0.11 |
| Standard Deviation | 3.64 | 3.53 | | | |

The independent samples t-tests assuming equal variances for the posttest MSLQ measures between the two groups indicated that there were significant differences in self-efficacy, $t(230) = -8.18$, $p < .001$ (two-tailed); time and study environment, $t(230) = -6.21$, $p < .001$ (two-tailed); and effort regulation, $t(230) = -6.60$, $p < .001$ (two-tailed). At course end, the effect size calculations using $S^2$ pooled standard deviations for the MSLQ posttest measures indicated that there was a large practical difference in Self-Efficacy: $S^2 = 1.08$, Effort Regulation: $S^2 = 0.87$, and Time & Study Environment: $S^2 = 0.82$, which suggests that these measures show large differences between the two groups. Learning beliefs, $S^2 = 0.25$ and self-regulation, $S^2 = 0.33$ were not significant (See Table 3). That is, high performing students felt more confident in their ability to master the course, better able to manage the amount of time spent studying, more able to study in a good learning environment, and were more equipped to regulate how much they exerted to succeed.

Table 3
*Independent Samples t-test for the Posttest MSLQ Measures*

| | Achievement Group Statistics | | | | |
|---|---|---|---|---|---|
| | High (N = 118) | Low (N =112) | *t* | *P* (2-tail) | Effect Size |
| Learner Beliefs: | | | | | |
| Mean | 23.24 | 22.19 | –1.92 | .056 | 0.25 |
| Standard Deviation | 3.91 | 4.36 | | | |
| Self-Efficacy: | | | | | |
| Mean | 45.27 | 37.02 | –8.18 | .000 | 1.08 |
| Standard Deviation | 6.52 | 8.68 | | | |
| Self-Regulation: | | | | | |
| Mean | 54.30 | 50.80 | –2.50 | .013 | 0.33 |
| Standard Deviation | 10.74 | 10.67 | | | |
| Time & Study Environment: | | | | | |
| Mean | 41.00 | 33.70 | –6.21 | .00 | 0.82 |
| Standard Deviation | 8.10 | 9.74 | | | |
| Effort Regulation: | | | | | |
| Mean | 21.50 | 17.54 | –6.60 | .00 | 0.87 |
| Standard Deviation | 4.10 | 4.92 | | | |

The paired samples *t*-tests indicated that the low performing students demonstrated significantly reduced expression from the pretest to the posttest on four of the five MSLQ measures: self-efficacy $t(112) = 10.14$, $p < .001$; self-regulation, $t(112) = 7.47$, $p < .001$; time and study environment $t(112) = 10.60$, $p < .001$; and effort regulation $t(112) = 9.01$, $p < .001$. Control of learner beliefs expression was close to significant from pretest to posttest, $t(112) = 1.96$, $p = .052$. Effect Size calculations using Cohen's D for the paired samples *t*-test for the low performing students showed large practical significance on time and study environment, $d = -1.00$; self-efficacy, $d = -0.96$; effort regulation, $d = -0.85$, and moderate practical significance in self-regulation, $d = -0.71$. (See Table 4).

Table 4
*Low Performing Students Paired Samples t-test*

| Low Achievement Group Statistics | | | | | | |
|---|---|---|---|---|---|---|
| | Pretest | Posttest | Difference | *t* | *P* (2-tail) | Effect Size |
| Learner Beliefs: | | | | | | |
| Mean | 23.05 | 22.19 | .87 | 1.96 | .052 | –0.19 |
| S.D. | 3.56 | 4.36 | 4.67 | | | |
| Self-Efficacy: | | | | | | |
| Mean | 44.61 | 37.02 | 7.59 | 10.14 | .00 | –0.96 |
| S.D. | 6.62 | 8.68 | 7.92 | | | |
| Self-Regulation: | | | | | | |
| Mean | 57.79 | 50.77 | 7.03 | 7.47 | .00 | –0.71 |
| S.D. | 8.31 | 10.67 | 9.96 | | | |
| Time & Environment: | | | | | | |
| Mean | 43.36 | 33.68 | 9.68 | 10.59 | .00 | –1.00 |
| S.D. | 5.70 | 9.74 | 9.67 | | | |
| Effort Regulation: | | | | | | |
| Mean | 21.81 | 17.54 | 4.28 | 9.01 | .00 | –0.85 |
| S.D. | 3.53 | 4.92 | 5.02 | | | |

The paired samples t-tests indicated that the high performing students demonstrated significantly reduced expression from pretest to posttest on two of the five MSLQ measures: time and study environment $t(118) = 4.75, p < .001$; and self-regulation, $t(118) = 3.35, p = .001$. In addition, effort regulation expression was close to significance from pretest to posttest measures, $t(118) = 1.98, p = .051$. Effect Size calculations using Cohen's D for the paired samples *t*-test for the high performing students showed small practical significance on time and study environment, $d = -0.44$ and self-regulation, $d = -0.31$. (See Table 5)

Table 5
*High Performing Students Paired Samples t-test*

| | High Achievement Group | | | | | |
|---|---|---|---|---|---|---|
| | Pretest | Posttest | Difference | *t* | *P* (2-tail) | Effect Size |
| Learner Beliefs: | | | | | | |
| Mean | 22.86 | 23.24 | –.38 | –1.14 | .26 | 0.14 |
| S.D. | 3.44 | 3.91 | 3.64 | | | |
| Self-Efficacy: | | | | | | |
| Mean | 45.23 | 45.27 | –0.4 | –.07 | .95 | 0.01 |
| S.D. | 6.33 | 6.52 | 6.76 | | | |
| Self-Regulation: | | | | | | |
| Mean | 56.85 | 54.30 | 2.56 | 3.35 | .00 | –0.31 |
| S.D. | 9.11 | 10.74 | 8.27 | | | |
| Time & Study Environment: | | | | | | |
| Mean | 44.22 | 41.00 | 3.22 | 4.75 | .00 | –0.44 |
| S.D. | 5.78 | 8.10 | 7.37 | | | |
| Effort Regulation: | | | | | | |
| Mean | 22.21 | 21.46 | .75 | 1.98 | .05 | –0.18 |
| S.D. | 3.64 | 4.10 | 4.15 | | | |

## Discussion

This study examined 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. It was 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-efficacy, time and study environment, and effort regulation were statistically significant on the posttest MSLQ measures using the independent samples *t*-test assuming equal variances. Although self-regulation and effort regulation were not statistically significant, it was found that the two measures approached significance.

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 (Zimmerman, 2000). Students in the low performing group were not confident that they could do the work expected of them. Their experiences of poor performance likely influenced their beliefs about their ability to perform. 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 (2001) found that time planning and management training helped students to better self-regulate their use of study time and in turn improved students' grades at course end students in the low performing group.

High performing students also endorsed items on the effort regulation scale, suggesting that they thought that they possessed the ability to control their effort and attention in the face of distractions and uninteresting tasks. 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 student's motivation (Pintrich 2000).

The paired samples *t*-tests indicated that the low performing students engendered significantly lower mean scores from the pretest to the posttest on four of the five MSLQ measures, which shows that at course end the low performing students were less successful in using the same self-regulated learning strategies that they reported using at the beginning of the course. One possible explanation of this may be that at course end the low performing students had a better sense of reality in regards to their performance. Thus, perhaps due to their experience over the course of a full semester, the motivation and self-regulated learning strategies of the lower performing students changed negatively.

For the high performing students the paired samples *t*-tests revealed that their scores were significantly reduced from pretest to posttest on the time and study environment and self-regulation MSLQ measures, which indicated that at course end these students perceived to spend less time scheduling, planning, managing, and regulating their study time while still being successful in the course. Although the difference between the pre- and posttest means for effort-regulation were not statistically significant, it was approaching statistical significance, which suggests that high performing students could exert less energy into their study time at course end while performing successfully. A possible explanation for these outcomes may be that at course end higher performing students also gained a better sense of reality in regards to their performance, but as a result were able to decrease slightly the amount of time and energy exerted into their studies to achieve the desired outcome of academic success.

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

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