Effect of motivational behaviors and race/ethnicity on academic success in physical therapy students: a preliminary study

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Abstract

Objectives: Doctor of Physical Therapy (DPT) program admissions criteria and markers indicative of academic success appear to be mismatched. Acceptance into a DPT program implies that students have developed self-regulated learning strategies however, motivation behaviors are not typically assessed during the admissions process. The aim of this study was to determine direct effects of motivational behaviors and race/ethnicity on academic success and the moderating effect of race/ethnicity on motivational behaviors.

Methods: Thirty-three first-year DPT students participated during their first foundational course, clinical anatomy. Motivation subscales from the motivated strategies for learning questionnaire (MSLQ) were used to assess student motivation behaviors which were then compared to course grades.

Results: Self-efficacy for learning and performance was significantly correlated with course grade [r(31)=0.44, p< 0.05]. Course grade differed at a statistically significant level by race/ethnicity [t(31)=2.93, p<0.01]. Race/ethnicity (B=0.05, SE=0.01, β=0.42, p<0.008) and self-efficacy for learning and performance (B=0.02, SE=0.01, β=0.39, p<0.01), remained significantly related to course grade.

Conclusion: Self-efficacy for learning and performance and ethnicity are factors that determine academic success and could be utilized in DPT programs to aid in the development of teaching strategies to support students.

Keywords: academic success, anatomy, ethnicity, motivation, physical therapy, race

Introduction

Currently, physical therapy education is faced with two interlinked concerns, that of a persistent failure rate in Doctor of Physical Therapy (DPT) programs and lack of student diversity in DPT programs.[1–4] First, the attrition rate in DPT programs has been reported at approximately 6%.[5–7] Secondly, diversity in DPT programs in the United States of America are not representative of the projected patient population of 76.3% Caucasian, 18.5% Latino/Hispanic, 13.4% African Americans, with the exception of the Asian population which is projected at 5.9%.[1,8,9]

Admission into a DPT program is typically based upon cognitive markers such as, college GPA and GRE test scores that indicate a student's academic ability.[3] However, even using these markers, there are DPT students who are not successful at maintaining the academic standards of a program.[5–7]

Attrition rates from DPT programs has been shown to be greater for students of groups that are underrepresented in the profession, especially when the program is not in an Historically Black Colleges and Universities (HBCUs) or Hispanic serving Universities.[9,10] Some studies have indicated that underrepresented students may have increased difficulty with standardized testing,

or reduced confidence associated with entering a predominantly Caucasian profession.[1,11,12] Other studies have indicated that students of color, enrolled in programs that are rich in diversity, for example HBCUs, have not displayed academic or testing difficulties.[2–4,10]

There has been an increasing emphasis to improve diversity in DPT education on the National level as well as through the Mission and Vision goals within The Philadelphia College of Osteopathic Medicine Georgia (PCOM) and PCOM Department of Physical Therapy.[12,13] Some of the initiatives in the PCOM Department of Physical Therapy involve reaching out to students in undergraduate and secondary education in order to promote a clearer understanding of education and careers in physical therapy among underserved populations. Further, improved program and career visibility can be gained by providing admissions counseling and educational sessions to showcase physical therapy and other healthcare careers at local HBCUs as well as by recruiting and hiring a diverse faculty to be more representative of the community.[13,14]

The DPT program at PCOM has adopted, from its inception, a holistic admissions review process where applicants are considered for admissions based upon markers that are broader than GRE scores and undergraduate GPA. The admissions review process involves an interview, conducted by faculty and current students, to assess components of emotional intelligence, familiarity with the physical therapy profession, the applicant's life experiences, and to assess the prospective applicant's desire and reason for wanting to become a physical therapist.[14]

Ultimately, there appears to be a mismatch between the markers designed to predict success and actual success in DPT education.[2,7,8,10] Progressing from undergraduate school to the rigors of graduate level DPT education has been described as a formidable venture for students.[15] Cognitive markers alone may not provide a clear prediction of a student's ability to succeed. With attrition rates and diversity initiatives in mind, an examination of components of motivation, may provide insight into the make-up of a successful student entering DPT education. Students who are accepted into DPT programs may possess the cognitive components of self-regulated learning (SRL) required for academic success, but they may be lacking motivational behaviors required to continue driving SRL.[3] Self-regulated learning has been described by a set of cognitive strategies and processes that combined with motivational beliefs and abilities, allows learners to execute performance.[16–18] However, motivation may be the key guiding force because motivation initiates behavior and helps guide that behavior to successful goal attainment.[16,19,20]

Motivation is comprised of a set of behaviors that include goal orientation, self-efficacy for learning and performance, perceptions of the task including difficulty and task value, and affective reactions.[16,17] Motivation may be the pivotal factor in determining success because learners may possess strategies in the cognitive, behavioral, and context areas, but without properly aligned goals, positive self-efficacy, interest and drive, success will likely be unattainable.[17,21]

A review of the literature suggests that academic success is comprised of relationships between self-regulated learning strategies, such as deep learning and resource management, and motivational beliefs, self-efficacy for learning and performance and task value.[16–20] Measuring motivational behavioral factors related to academic success would appear to be beneficial in understanding how some students excel while others have difficulty maintaining academic success.[16,22–24]

However, there is a dearth of information regarding motivation behavioral traits for first-year DPT students. Previous studies utilizing the Motivated Strategies for Learning Questionnaire (MSLQ) to study motivation in physical therapy education have not examined graduate level physical therapy education programs or did not assess the impact of race/ethnicity on motivation or academic success or did not compare motivation scores to academic success.[24–27] Therefore, the purposes of this study were to determine: 1) the correlation between motivational behaviors and academic success, 2) the moderating effect of race/ethnicity on motivation behaviors and academic success in a foundational clinical anatomy course, 3) the predictive nature of motivation behaviors and race/ethnicity on academic success.

Materials and Methods

Newly admitted DPT students enrolled in PT 601G Clinical Anatomy course were eligible to participate in the study. The study was presented in an information session to the cohort of 40 students by a department administrator. Thirty-three students consented to enroll in the study (response rate 33/40, 82%). Ethics approval for this study was granted by the College Institutional Review Board (IRB) (protocol number H19-033E).

This study was a postpositive relational quantitative study which used the motivation section of the MSLQ to assess student motivational behaviors. The motivation section consists of seven subscales with questions designed to assess intrinsic and extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for learning and

performance, and test anxiety.[28] Each question describes a behavior that is ranked by the subject using a seven-point Likert scale ranging from one (not at all true of me) to seven (very true of me) (**Appendix 1**).[28,29] The MSLQ motivation subscales have been shown to have good reliability and to be predictive of performance for college students at the course level[28,30] and medical students.[31]

A pair of research questions was developed for each motivational behavior examined. The first research question of each pair asked if there was a direct relationship (correlation) between self-assessment values on the MSLQ for that motivation subscale and clinical anatomy course grade. The second research question of the pair introduced race/ethnicity as an interaction term and asked if there was a moderating effect of a student's race/ethnicity on the motivation behaviors.

The students were given information on where to obtain a summary of the study and consent forms if they wished to participate. Student participation was hidden from the primary investigator, who was the course director, until after course grades had been assigned. At no point did the primary investigator speak about the project to the students.

During the third week of the Clinical Anatomy course (PT601G), each student received an email with a Survey Monkey® (San Mateo, CA) link which contained questions about participant demographics and the motivation subscales of the MSLQ (**Appendix 1**). Once PT 601G had been completed and the final grades submitted, the students who participated in the study were linked by computer to their student course grades, without revealing their names to the course director.

The clinical anatomy course (PT601G), used for the current investigation, was a seven-credit course offered during the summer term (10 weeks) which was the first term of year one for newly admitted DPT students. The course was comprised of 156 contact hours at a ratio of two hours of lecture to 10 hours of laboratory. The lecture component of the course consisted of a variety of face-to-face teaching and learning techniques which included traditional lecture, clinical case examination, interleaving, elaborative interrogation, drawing, and flipped classroom. The laboratory portion of the course consisted of instructor and self-guided full-body cadaver dissection with five students working as a team to dissect each specimen. Evaluation in the course was comprised of two multiple-choice written examinations (each 10% of the grade), a combination of weekly written and laboratory quizzes (17% of the grade), a multiple-choice final examination (17% of the grade), participation and pro-

fessionalism (3% of the grade), palpation practical examination (17% of the grade) and two oral laboratory examinations (each 13% of the grade) the format of which has been previously described.[32]

The demographic information, course grades, and motivation subscale scores were tabulated using Microsoft Excel for Mac (Version 16.36, Microsoft Corp., Redmond, WA, USA). The data was analyzed using Statistical Package for Social Sciences (SPSS Version 25, Armonk; NY, USA). Subject age, gender identification, race/ethnicity, motivation subscales (independent variable), and course grade (dependent variable), were analyzed using descriptive statistics.

Normality of the distribution of the data for each independent and dependent variable was assessed. Bivariate level direct effects between the explanatory variables and dependent variable (course grade) were examined using Pearson r correlations, independent t-test, and one-way ANOVA. Independent t-test was used to determine which demographic characteristics were significantly related to the dependent variable. All study variables related to the dependent variable at a statistically significant level ($p < 0.05$) in bivariate analysis were included as covariate variables in the regression models incorporated in the multivariate analysis.

Multiple linear regression was used to test the direct effects of the independent variables, as well as the indirect moderating effect of race/ethnicity on the independent variables and their effect on the dependent variable of academic success. Specifically, a separate multiple linear regression model was created that modeled the dependent variable as a function of each independent variable, as well as the study variables significantly related to the dependent variable in bivariate testing. If the independent variable was significantly related to the dependent variable at this step, the direct effect was supported.

Next, an interaction term was added to the multiple linear regression model (the independent variable by the moderating variable) and the analysis was repeated. If the interaction term was statistically significant within this analysis, then the indirect effect examining moderating effects of race/ethnicity was supported.

All test assumptions associated with the parametric analysis were checked, including normality, linearity, homoscedasticity, and no undue influence of outlier scores, to assure the validity of the inferential analysis.

In terms of statistical power regarding the multiple linear regression model, the G*power software indicated that a medium/large size effect (f=0.25) using a model

with three predictors with power set at 0.80 and alpha set at 0.05, would require a sample size of 34 study participants.[33] The current study's sample size of 33 study participants provided approximately sufficient statistical power for the current analysis given the variability noted in available software, such as G*power to determine sample size.[34] Further, given that the impetus for examining the problem was inspired by experiences within a specific group of students at a specific time in DPT education then subject selection became constrained to those conditions.

Results

Data indicated that the sample was about half female (n=17; 45.5%), predominantly of a Caucasian racial/ethnic identity (n=23; 67.0%) and had an average undergraduate GPA of 3.47 (**Table 1**).

The means, standard, deviations, skewness, and kurtosis of the data for each independent variable or motivational behavior and for the dependent variable of academic success, described by course grade, were analyzed. The data for each MSLQ subscale had a normal distribution as evidenced by the skewness and kurtosis being less than three times their respective standard deviations (**Table 2**).

Analysis indicated that course grade differed at a statistically significant level by race/ethnicity, [t(31)=2.93, p<0.01]. Specifically, those subjects who identified as Caucasian evidenced a higher course grade (0.93±0.03) relative to those subjects identifying as non-Caucasian (0.90±0.02). Analysis also indicated that course grade did not differ at a statistically significant level by gender, [t(30)=0.58, p=0.57] (**Table 3**).

Pearson r correlations indicated that academic success was not significantly related to intrinsic goal orientation [r(31)=0.12, p=0.50], extrinsic goal orientation [r(31)=-0.10,

p=0.58], task value [r(31)=0.01, p=0.94], control of learning beliefs [r(31)=0.20, p=0.26], or test anxiety [r(31)=0.28, p=0.12] (**Table 4**).

However, analysis did indicate that course grade was significantly related to self-efficacy for learning and performance [r(31)=0.44, p<0.05]. Where higher self-efficacy for learning and performance scores were associated with a higher course grade (**Table 4**).

One-way ANOVA indicated that the overall model examining the moderating effect of race/ethnicity on the relationship between self-efficacy for learning and performance (SEL) and course grade was statistically significant [F(32)=6.51, p<0.002] and explained 40% of the variance in the dependent variable (R^2=0.40, adjusted R^2=0.34).

Table 1

Descriptive analysis of demographics of study participants (n=33).

Mean age (years)	Range
24.7±3.0	21–36
Gender	**n (%)**
Male	15/33 (45.45)
Female	17/33 (51.52)
Unreported	1/33 (3.03)
Race/ethnicity	**n (%)**
Caucasian	23/33 (67.0)
Non-Caucasian	10/33 (33.0)
Non-Caucasian Breakdown	**n (%)**
African American	2 (0.06)
Asian	6 (0.18)
Hispanic	1 (0.03)
Middle Eastern	1 (0.03)
Undergraduate GPA	**Mean (range)**
n=31	3.47±0.30 (3.0–4.2)

Table 2

Descriptive analysis: motivation subscale scores and course grade.

Variable	Mean±SD	Min-max	Scale range	Skewness (SE)	Kurtosis (SE)
Intrinsic goal orientation	5.48±0.83	3–7	1–7	-0.99 (0.41)	2.04 (0.80)
Extrinsic goal orientation	5.30±1.03	3–7	1–7	-0.48 (0.41)	-0.37 (0.80)
Task value	6.75±0.36	6–7	1–7	-1.61 (0.41)	1.77 (0.80)
Control of learning beliefs	6.14±0.67	5–7	1–7	-0.43 (0.41)	-1.15 (0.80)
Self-efficacy for learning and performance	5.61±0.67	4–7	1–7	0.10 (0.41)	0.04 (0.80)
Test anxiety	4.26±1.36	2–7	1–7	0.11 (0.41)	-0.78 (0.80)
Course grade	0.92±0.03	0.87–0.96	0–1.0	0.10 (0.41)	-0.93 (0.80)

Linear regression indicated that the interaction term between self-efficacy for learning and performance and race/ethnicity was not statistically significant (B=0.01, SE=0.01, β=1.66, p=0.18) (**Table 5**).

One-way ANOVA testing of grade for the course as a function of self-efficacy for learning and performance (SEL) and race/ethnicity, indicated that the overall model was statistically significant (F(32)=8.57, p<0.001) and explained 36% of the variance in the dependent variable (R^2=0.36, adjusted R^2=0.32). Furthermore, within the full multivariate model race/ethnicity remained significantly related to course grade, (B=0.05, SE=0.01, β=0.42, p<0.008), where a Caucasian racial identity was related to higher course score (**Table 6**).

Additionally, self-efficacy for learning and performance remained significantly related to course grade (B=0.02, SE=0.01, β=0.39, p<0.01), where higher self-efficacy for learning and performance scores explained higher course grades (higher academic success).

Discussion

This is the first study to examine the roles that motivation and ethnicity may have played in determining course grade in a DPT anatomy course. There was a positive correlation between the motivation subscale of self-efficacy for learning and performance and course grade and a positive correlation between race/ethnicity and course grade. Multivariate analysis demonstrated that course grade was a function of self-efficacy for learning and performance and race/ethnicity.

The current findings are consistent with previous literature demonstrating that self-efficacy was positively related with academic performance.[26,35,36] Notably, the motivation subscale of self-efficacy for learning and performance stood out as being independent of learning strategies with a positive contribution to academic performance directly

and was deemed a valuable indicator of students who may be at risk for failing.[35] A positive correlation has also previously been demonstrated between academic performance and self-efficacy; however, the predictive value of self-efficacy for learning and performance was not previously examined.[26] The current study demonstrated the predictive value of self-efficacy for learning and performance on course grade.

The current study demonstrated significant correlations between race/ethnicity and course grade. However, did not demonstrate a moderating effect of race/ethnicity on academic success for any of the motivation behaviors. Race/ethnicity remained significantly related to course grade where a Caucasian racial identity was related to higher course scores. Some previous studies have indicated that students from underrepresented groups may have increased difficulty with standardized testing, possibly due to academic and non-academic issues.[1,10–12,14] Low self-efficacy combined with perceived difficulty of trying to enter a profession that historically has been predominantly Caucasian, can create a barrier to success for students from underrepresented groups.

The current findings highlight the importance of self-efficacy for learning and performance in determining aca-

Table 3

T-test of academic success (course grade) and categorical variables.

Variable	n	Mean±SD	t/F(df)	p-value
Gender			0.58 (30)	0.57
Male	15	0.92±0.03		
Female	17			
Race/ethnicity			2.93 (31)	0.006
Caucasian	23	0.93±0.03		
Non-caucasian	10	0.90±0.02		

Table 4

Pearson r correlations: academic success (course grade) & MSLQ subscales.

Variable	1	2	3	4	5	6	7
1. Academic success	–	0.12	-0.01	0.01	0.20	0.44*	-0.28
2. Intrinsic goal orientation		–	-0.03	0.37*	0.38*	0.60†	-0.07
3. Extrinsic goal orientation			–	0.07	0.12	0.13	0.29
4. Task value				–	0.54†	0.41*	0.01
5. Control of learning beliefs					–	0.65†	-0.13
6. Self-efficacy for learning and performance						–	-0.24
7. Test anxiety							–

*p<0.05; †p<0.01.

Table 5

A linear regression model examining the moderating effect of race/ethnicity (RE) on the relationship between self-efficacy for learning and performance (SEL) and course grade (n=33).

Variable	B	SE	β	p-value
Race/ethnicity	-0.07	0.07	-1.17	0.32
SEL	0.005	0.01	0.12	0.61
SEL by RE	0.02	0.01	1.66	0.18

Model: $F(32)=6.51$; $p<0.002$; $R^2=0.40$; adjusted $R^2=0.34$.

Table 6

Final multivariate model for testing grade for course as a function of self-efficacy for learning and performance (SEL) and race/ethnicity (RE).

Variable	B	SE	β	p-value
RE	0.02	0.01	0.42	0.008
SEL	0.02	0.01	0.39	0.01

Model: $F(32)= 8.57$; $p<0.001$; $R^2=0.36$; adjusted $R^2=0.32$.

demic success. In the case of creating a successful learning environment for students from underrepresented groups, strategies to improve self-efficacy may need to begin in undergraduate school, prior to applying to a DPT program. A variety of non-school related factors, such as family obligations and support, socioeconomic status, and cultural experiences can shape how students see their abilities to attain success.[37]

However, the perceived racial barriers that may limit success in DPT education are also present in those processes leading up to and including admissions review. A lack of representation of students from underrepresented groups in DPT education may stem from a lack of adequate exposure and advisement of physical therapy as a graduate degree and career option.[14,38] Black and Latinx students have noted that their undergraduate experiences were limited in providing guidance, resources, and support for entering a DPT program.[14]

The perceived racial barriers toward success, or toward continuing on to DPT education, reduce self-efficacy thereby reducing the likelihood for success when applying to DPT school and consequently may hinder success after the student enrolls in a DPT program.[14,37] Strategies to combat these barriers, such as positive reinforcement, mentoring by physical therapists, and career counseling, need to be implemented early in a student's education to combat the challenges faced by students from underrepresented groups who may be considering a career in physical therapy.[14]

Once a student has been accepted into a DPT program, their ability to succeed hinges on self-efficacy for learning and performance. The current findings support the idea that efforts aimed to improve self-efficacy in learners where it may be limited may be beneficial to academic success. Since self-efficacy is rooted in self-perception, teaching strategies must focus on reducing the ambiguity between a student's perceived ability and their actual ability, by providing precise and timely feedback.[39] Other strategies that aid the development of self-efficacy include providing clear instructions and expectation of outcomes, and through teachers enabling modeling and guided skill perfection.[39] Students can also be given a stepwise progression of increasingly difficult tasks that promote mastery, with each step being a small goal that when combined lead to a larger goal. Small incremental steps along with goal setting, allows students to succeed in a way that can bolster self-efficacy and lead to improved confidence.[39–41] In the broader sense, students may need to reflect on the meaning of self-efficacy as it pertains to their specific situation and their perception of the ability to attain success.[40] However, teachers can help by properly coaching, being timely and precise with feedback, and by focusing on those aspects of performance that may have been correct as opposed to concentrating on those that were negative.[39–41]

On a program level, organizational policies that promote and support academic integration and linking of subject material can improve student engagement and thereby improve self-efficacy.[2] Methods of improving self-efficacy such as using collaborative and team-based learning approaches, improved teacher to student communication, and improved assessment techniques have been shown to improve students' academic success rates in one DPT program.[2]

The design of the study, to use one cohort in one class, limited the sample size and therefore limited the generalizability of the results. The diversity of cohort, due to the small sample size, may not have accurately represented diversity in a typical DPT program. Students from the clinical anatomy course volunteered for the study which may have introduced selection bias as those students volunteering may have had stronger self-confidence, self-efficacy, by their choice to participate.

Further, a determination of students who may be the first in their family to obtain a graduate degree or who may have recently immigrated to the United States and for whom English was a second language was not made. The lack of this determination may have affected study participation. For example, students who may not have felt confident with the English language may have failed to participate in the study or during participation may have misun-

derstood some of the questions. Such a determination would also better align the study with the definition of students from underrepresented groups thereby being consistent with American Council of Academic Physical Therapy definition.[42]

It is recommended that the current study be repeated with additional cohorts to determine the utility of using the motivational behaviors of the MSLQ as a preadmission screen to shed light on an applicant's ability to succeed in a DPT program. A qualitative questionnaire to determine each student's diversity background (first-time graduate degree, English comprehension, socioeconomic status, etc…) may improve our understanding of underrepresented group status. Research examining the role of motivation and race/ethnicity in more clinical coursework is recommended. Additionally, an examination of the roles that motivation and race/ethnicity may play in academic success as students' progress through the DPT program school is also recommended.

Conclusion

Behaviors and academic success were examined in light of race/ethnicity. The results suggested that the motivational behavior of self-efficacy for learning and performance and race/ethnicity were significantly related to academic success. Where increased self-efficacy for learning and performance resulted in, and predicted, a higher course grade. Similarly, Caucasian racial identity was also associated with, and predictive of, a higher course grade.

Further, it has been shown that certain components related to self-efficacy can limit motivation in students from underrepresented groups, such as fear of success and fear of failure, or fear of the feeling of not belonging.[37,40] Therefore, the current study provides a rationale for implementing the strategies that bolster self-efficacy and indicates that those strategies may be more closely applied to and benefit students from underrepresented groups.

Conflict of Interest

The authors have no conflict of interest in this work.

Author Contributions

PAF: Protocol/project development, data collection and analysis, manuscript writing/editing; SLG: Project development, manuscript writing/editing; AMRA: Manuscript writing/editing.

Ethics Approval

Approved by the Philadelphia College of Osteopathic Medicine IRB, protocol number H19-033E.

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Appendix 1
Participant demographics and the motivation subscales.

Demographic information

1. Student PCOM email: ....@..............

2. What is your age in years?
    ☐ Please specify: _____
    ☐ I prefer not to answer.

3. How do you currently describe your gender identity?
    ☐ Please specify: _____
    ☐ I prefer not to answer.

4. Undergraduate GPA: _____

5. Grade you expect to get in this class (PT601G) _____

6. Which categories describe you? Select all that apply to you:
    ☐ American Indian or Alaska Native—For example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community
    ☐ Asian—For example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese
    ☐ Black or African American—For example, Jamaican, Haitian, Nigerian, Ethiopian, Somalian
    ☐ Hispanic, Latino or Spanish Origin—For example, Mexican or Mexican American, Puerto Rican, Cuban, Salvadoran, Dominican, Columbian
    ☐ Middle Eastern or North African—For example, Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian
    ☐ Native Hawaiian or other Pacific Islander—For example, Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, Marshallese
    ☐ White—For example, German, Irish, English, Italian, Polish, French
    ☐ Some other race, ethnicity, or origin, please specify: _____
    ☐ I prefer not to answer.

Please continue to the Questionnaire

The Motivated Strategies for Learning Questionnaire (MSLQ)[28]

The following 31 questions ask about your motivation for and attitudes about this class. Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below each question to answer the questions.

• If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1.

• If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

	1 not true of me	2	3	4	5	6	7 very true of me
1. In a class like this, I prefer course material that really challenges me so I can learn new things.	☐	☐	☐	☐	☐	☐	☐
2. If I study in appropriate ways, then I will be able to learn the material in this course.	☐	☐	☐	☐	☐	☐	☐
3. When I take a test, I think about how poorly I am doing compared with other students.	☐	☐	☐	☐	☐	☐	☐
4. I think I will be able to use what I learn in this course in other courses.	☐	☐	☐	☐	☐	☐	☐
5. I believe I will receive an excellent grade in this class.	☐	☐	☐	☐	☐	☐	☐
6. I'm certain I can understand the most difficult material presented in the readings for this course.	☐	☐	☐	☐	☐	☐	☐
7. Getting a good grade in this class is the most satisfying thing for me right now.	☐	☐	☐	☐	☐	☐	☐
8. When I take a test, I think about items on other parts of the test I can't answer.	☐	☐	☐	☐	☐	☐	☐
9. It is my own fault if I don't learn the material in this course.	☐	☐	☐	☐	☐	☐	☐
10. It is important for me to learn the course material in this class.	☐	☐	☐	☐	☐	☐	☐
11. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	☐	☐	☐	☐	☐	☐	☐
12. I'm confident I can understand the basic concepts taught in this course.	☐	☐	☐	☐	☐	☐	☐
13. If I can, I want to get better grades in this class than most of the other students.	☐	☐	☐	☐	☐	☐	☐

Appendix 1 *[Continued]*
Demographic Information.

	1 not true of me	2	3	4	5	6	7 very true of me
14. When I take tests, I think of the consequences of failing.	☐	☐	☐	☐	☐	☐	☐
15. I'm confident I can understand the most complex material presented by the instructor in this course.	☐	☐	☐	☐	☐	☐	☐
16. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	☐	☐	☐	☐	☐	☐	☐
17. I am very interested in the content area of this course.	☐	☐	☐	☐	☐	☐	☐
18. If I try hard enough, then I will understand the course material.	☐	☐	☐	☐	☐	☐	☐
19. I have an uneasy, upset feeling when I take an exam.	☐	☐	☐	☐	☐	☐	☐
20. I'm confident I can do an excellent job on the assignments and tests in this course.	☐	☐	☐	☐	☐	☐	☐
21. I expect to do well in this class.	☐	☐	☐	☐	☐	☐	☐
22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	☐	☐	☐	☐	☐	☐	☐
23. I think the course material in this class is useful for me to learn.	☐	☐	☐	☐	☐	☐	☐
24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	☐	☐	☐	☐	☐	☐	☐
25. If I don't understand the course material, it is because I didn't try hard enough.	☐	☐	☐	☐	☐	☐	☐
26. I like the subject matter of this course.	☐	☐	☐	☐	☐	☐	☐
27. Understanding the subject matter of this course is very important to me.	☐	☐	☐	☐	☐	☐	☐
28. I feel my heart beating fast when I take an exam.	☐	☐	☐	☐	☐	☐	☐
29. I'm certain I can master the skills being taught in this class.							
30. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	☐	☐	☐	☐	☐	☐	☐
31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	☐	☐	☐	☐	☐	☐	☐