



The Internet Journal of Allied Health Sciences and Practice

<http://ijahsp.nova.edu>

A Peer Reviewed Publication of the College of Health Care Sciences at Nova Southeastern University

Dedicated to allied health professional practice and education

<http://ijahsp.nova.edu> Vol. 10 No. 1 ISSN 1540-580X

Students' Academic Motivations in Allied Health Classes

Trent Maurer, Ph.D¹

Deborah Allen, Ph.D., FNP-C, BC²

Delena Bell Gatch, Ph.D³

Padmini Shankar, Ph.D, RD, LD⁴

Diana Sturges, M.D., PPM, HPM⁴

1. Associate Professor, Department of Hospitality, Tourism, & Family and Consumer Sciences, Georgia Southern University, Statesboro, Georgia
2. Assistant Professor, School of Nursing, Georgia Southern University, Statesboro, Georgia
3. Associate Professor, Department of Physics, Georgia Southern University, Statesboro, Georgia
4. Associate Professor, Department of Health & Kinesiology, Georgia Southern University, Statesboro, Georgia

United States

CITATION: Maurer T, Allen D, Gatch DB, Shankar P, Sturges D. Students' Academic Motivations in Allied Health Classes. *The Internet Journal of Allied Health Sciences and Practice*. Jan 2012. Volume 10 Number 1.

ABSTRACT

Purpose. Human Anatomy & Physiology [HAP] courses are considered "difficult" by both faculty and students, and many students fail to pass the courses. An attempt was made to understand how students' academic motivations may contribute to their success or failure in these courses. **Method.** The project used a non-experimental design with a convenience sample. Students in five sections of HAP I and HAP II were invited to complete an anonymous 42-item questionnaire that included an adapted version of the Academic Motivation Scale [AMS], six demographic questions, and eight questions about their academic behaviors in and perceptions of their HAP course. A total of 461 students (69% response rate) completed the questionnaire. Analyses included 1) reliability for the seven AMS subscales, 2) correlations among the subscales, among the eight questions about their behaviors and perceptions, and between the subscales and the behavior and perception questions, and 3) a multivariate multiple regression with the AMS subscales as independent variables and the behavior and perception questions as dependent variables. **Results.** The AMS was successfully adapted to apply to HAP courses with reliabilities comparable to previously published data. Students' levels of intrinsic motivation and amotivation, but not extrinsic motivation, were significantly related to their academic behaviors and perceptions of the courses. **Conclusions and Recommendations.** Despite high levels of extrinsic motivation, extrinsic motivation did not appear related to students' academic behaviors. HAP instructors may need to consider alternate routes to influencing students' academic success behaviors, as it appears that attempts to influence their extrinsic motivations may not essentially translate to changes in academic behavior.

INTRODUCTION

Statement of the Problem

Human Anatomy & Physiology [HAP] courses are considered "difficult" by both faculty and students.^{1,2} At our institution, students taking HAP I and HAP II need to earn a grade of "C" or better for the courses to count towards their degree program. The HAP classes are required of all allied health majors, including nursing. As an important component in health care delivery, allied health professions comprise about 60% of the health workforce according to the Center for the Health Professions.³ These professions face significant future challenges ranging from shortages to demands for new competencies.³ As more and more students enter the allied health field, the enrollment in these courses is skyrocketing. The American Association of Colleges of Nursing indicated

in their 2010 annual report that enrollment in entry level baccalaureate nursing programs in the U.S. showed increases every year between 2001-2010, with the highest being 16.8% in 2003 and the lowest being 2.2% in 2008.³ Most students taking the class at our institution are pre-nursing majors, although we have also noted an increase in exercise science and nutrition majors. As enrollment continues to increase, attrition is an issue to be addressed as well, since as many as 50% of the students enrolled in the class fail to earn at least a "C," and must either retake the course, change their major, or drop out. It has been reported previously that nursing students traditionally experience difficulties with the science subjects in nursing curricula.⁴ Nilsson also found that the degree of difficulty/heavy demand on studies is one of the factors in explaining low motivation of nursing students.⁵

Few studies have researched motivations of the allied health student population. Some of them have concentrated on examining motivations for entering the health field. Choosing the medical profession is generally associated with altruistic motivations such as accomplishing a difficult task and helping human kind above financial reward.⁶ Pharmacy majors are influenced by a desire of a career in the health field and a desire to help and so are speech and language therapy students.^{7,8} Massage therapy students are motivated more strongly by intrinsic than extrinsic values, while occupational therapy and physiotherapy students in Germany indicated high values on both extrinsic autonomous identified regulation and intrinsic motivation.^{9,10} Entering nursing is associated with altruism and opportunities that nursing presents, although extrinsic, goal oriented factors such as becoming a nurse were reported in other studies.^{5,11,12}

Several studies also examined changes in motivation throughout the program of study. Data from Sweden indicated a significant decrease in motivation with the number of semesters among nursing students, and males show lower motivation than females.⁵ Massage therapy students showed a significant decrease in intrinsic motivation and an increase in extrinsic motivation.¹³

Faculty place more emphasis on student motivation and attitudes towards learning as central to learning than students.¹⁴ Further, students are increasingly taking a consumerist approach to higher education, suggesting a shift from intrinsic to extrinsic motivations.¹⁵ Recent literature has noted high extrinsic goal orientation among a sample of nursing students, including high achieving nursing students.¹⁶ Nursing students who indicated higher scores on extrinsic goal orientation perceived learning is a "means to an end".¹⁷ This is potentially problematic because students whose motivations are more intrinsic do better in school, with lower rates of withdrawal, lower rates of absenteeism, lower dropout rates, lower feelings of anxiety about school, and higher levels of academic performance.¹⁸ These findings suggest examining students' motivations may be important to predicting their performance in HAP courses. Considering the important role of allied health professionals and especially the crucial role of nurses, it is important to identify students' motivations, as these students will work directly with clients in the allied health field.¹⁹

In an attempt to understand what factors are related to the motivation of undergraduate allied health students, how students' motivation may contribute to their success or failure in these courses, as well as what can be done to increase their motivation, we undertook the current study. Since there are fewer published articles that focus on students' motivation and academic performance in science classes, our focus is to gain an understanding of what motivates the allied health majors in general in HAP courses and how these factors relate to their academic performance.

Self-Determination Theory

Self-determination theory [SDT] is an empirically based macrotheory of human motivation first proposed by Deci and Ryan.²⁰ Whereas many other theories have treated motivation primarily as a unitary concept, SDT began by differentiating between types of motivation. The theory focuses on the types or quality of motivation an individual possesses, rather than the total amount of motivation possessed by an individual. In addition, it distinguishes between self-determined and controlled types of intentional regulation. When a behavior is self-determined, the regulatory process is choice. But when the behavior is controlled, the regulatory process is compliance or defiance. In SDT, motivation can be conceptualized on a continuum comprised of three major types of motivation: Intrinsic Motivation, Extrinsic Motivation, and Amotivation. Motivations along the continuum differ in the extent in which they are self-determined. Intrinsic Motivation represents the most self-determined type of motivation, in which behaviors are performed for the sake of enjoyment. Extrinsic Motivation, when behaviors are done to achieve a goal or reward beyond the activity itself, lies along the center of the continuum. Conversely Amotivation, which refers to the absence of motivation, lies at the opposite end of the self-determination continuum.

Intrinsically motivated behaviors are engaged in for the pleasure and satisfaction derived from their performance. Intrinsically motivated individuals tend to have an internal locus of control. These individuals are enthusiastic about learning new things, are driven to accomplish, and seek intellectual stimulation. There are three sub-factors within Intrinsic Motivation: Intrinsic Motivation—To Know, Intrinsic Motivation—To Accomplish, and Intrinsic Motivation—To Experience Stimulation. Intrinsic Motivation—To Know occurs when an individual engages in a behavior for the satisfaction experienced while learning or trying to understand something new. Intrinsic Motivation—To Accomplish arises when an individual engages in a behavior for the

pleasure experienced while trying to accomplish a task or create something. Intrinsic Motivation—To Experience Stimulation is when an individual engages in a behavior in order to experience stimulating or exciting sensations.

Extrinsically motivated behaviors, on the other hand, are instrumental in nature. They are performed not out of interest but because they are believed to be instrumental to some separable consequence. There are three sub-factors included in Extrinsic Motivation: Identified, Introjected, and External Regulation. The most self-determined type of Extrinsic Motivation is Identified Regulation. In this case, an individual truly values a behavior even though they are not doing it because they like it. Introjected Regulation is when one engages in a behavior to maintain personal expectations or avoid guilt. External Regulation, which is the least self-determined type of Extrinsic Motivation, is when an individual engages in an activity solely as a means to obtain an external reward or to avoid punishment.

When applied to the realm of education, SDT is primarily concerned with promoting in students a confidence in their own capacities and attributes, a valuing of education, and an interest in learning. Self-determined motivation has been linked to various education outcomes across the age span, from early elementary school to college students. Pintrich and De Groot linked intrinsic motivation and autonomous forms of extrinsic motivation to positive academic performance.²¹ Student motivation has been found to be a predictor of course attendance, course grades, and persistence in program of study.^{22,23,24}

Academic Motivation Scale

The Academic Motivation Scale operationalizes SDT by measuring degrees of self-determined motivation in academic contexts. Vallerand and colleagues developed and validated the AMS for the purpose of assessing three types of Intrinsic Motivation (To Know, To Accomplish, and To Experience Stimulation), three types of Extrinsic Motivation (Identified, Introjected, and External), and Amotivation.²⁵ The AMS has been shown by Grouzet, Otis, and Pelletier to be time- and gender-invariant.²⁶ Prior investigations with the AMS have all operationalized it at the global level, referencing higher education and going to college more generally. In this investigation, we propose to adapt the AMS to HAP courses specifically.

Hypotheses

1. The AMS scale can be applied to a specific course, not just higher education globally: Reliabilities for subscales will be comparable with reported reliabilities.
2. Student motivation will influence study habits and efforts, as measured by their likelihood of continuing with their major, their overall GPA, their class attendance, their class preparation, their study time, the perceived level of difficulty of the class, their overall level of motivation, and their anticipated grade in the class
3. Students will report higher scores for Extrinsic Motivation than Intrinsic Motivation, which will both be higher than Amotivation.

METHOD

Participants

Participants were 475 students enrolled in one of five undergraduate classes in HAP I (4 sections) or HAP II (1 section) at a large public southeastern university. Total enrollment for the five sections was 665. Of the 475 students, 14 did not fully complete the survey, yielding a final number of 461, representing a response rate of 69%. Sixty-nine percent of the participants (N=318) were female, 29.3% were male (N=135), and 1.7% (N=8) did not report their gender. The majority (68.5%) of the participants were White (N=316), with 21.9% (N=101) African-American, 1.7% (N=8) Hispanic, 1.7% (N=8) Asian-American, 3.9% (N=18) "Other," and 2.2% (N=10) not reporting ethnicity. In terms of class standing, 12.1% (N=56) were freshmen, 49.0% (N=226) were sophomores, 26.7% (N=123) were juniors, 7.6% (N=35) were seniors, 1.5% (N=7) were "Other," and 3.0% (N=14) did not report class standing. Sixty-seven percent (N=309) were enrolled in HAP I and 29.5% (N=136) were enrolled in HAP II, with 3.5% (N=16) not reporting which class enrolled. Nearly all participants (N=406, 88.1%) were taking the class because it was specifically required as part of their curriculum, with 2.6% (N=12) not reporting. In terms of major, 41.9% (N=193) were nursing, 7.2% (N=33) were athletic training, 21.3% (N=98) were exercise science, 3.5% (N=16) were nutrition, 3.3% (N=15) were health education and promotion/community health, 1.5% (N=7) were health and physical education, 6.9% (N=32) were biology/pre-med, 12.6% (N=58) were "other," with 2.0% (N=9) not reporting.

Materials

Participants received a 42-item questionnaire. The first six questions were demographic questions, as reported above. The next eight questions were dependent variables and queried students about their likelihood of continuing with their major, their GPA, their class attendance, their class preparation, their study time, their perceived level of difficulty of the class, their overall level of motivation, and their anticipated grade in the class. See Appendix A.

The remaining 28 questions were adapted from Vallerand et al.'s AMS.²⁷ Whereas the original AMS was designed as a global measure of academic motivation, in this study it was adapted to apply specifically to the study of the human body and allied health professions. The AMS consists of seven subscales, each of which is assessed with four items on a seven-point Likert scale: Amotivation, External Regulation, Introjected Regulation, Identified Regulation, To Experience Stimulation, To Accomplish, and To Know. See Appendix A. Reliabilities for the seven subscales in the original AMS, expressed as Chronbach's alpha, are presented in Table 1 as "Reported alpha." Results of confirmatory factor analyses with the original AMS upheld the seven-factor structure (Normed Fit Index=0.93) and the one-month test-retest correlation was $r=0.79$.²⁷

Procedure

The project used a non-experimental design with a convenience sample. Students in five sections of HAP I and II were invited to participate in a brief in-class survey. Students were given 15 minutes to complete the survey and enter their responses via clickers (i.e., classroom electronic response systems). Because the data was collected using the clickers' anonymous mode, students remained anonymous. The project was approved by the university's IRB and passive consent was used to further protect student anonymity. For students who forgot their clickers, they could indicate their responses on the paper version of the survey, which was collected at the end of the administration period. No incentives for participation were offered.

RESULTS

Preliminary analyses

Reliability analyses indicated that all seven subscales of the adapted AMS had adequate internal reliability, as measured by Chronbach's alpha. Additionally, with the exception of the To Know and Introjected Regulation subscales, all pairings were significantly different at $p < .001$. See Table 1. Correlational analyses revealed significant relationships both between the independent and dependent variables and within them, necessitating further multivariate analyses. See Table 2 in Appendix B.

Table 1. Reliability analyses and rankings for AMS subscales

Subscale	<i>M</i>	<i>SD</i>	Observed alpha	Reported alpha	Hypothesized Ranking	Actual Ranking
External Regulation	21.79	5.57	.81	.83	1	2
Introjected Regulation	19.76	6.00	.85	.84	2	4
Identified Regulation	23.53	4.35	.75	.62	3	1
Stimulation	15.61	6.15	.87	.86	4	6
Accomplishment	18.44	5.77	.85	.85	5	5
To Know	19.97	5.60	.88	.84	6	3
Amotivation	6.24	4.07	.76	.85	7	7

Note. Alpha is Chronbach's alpha.

Multivariate Analyses

A multivariate multiple regression (GLM) with the seven AMS subscales as independent variables and all eight dependent variables was conducted. Three subscales yielded significant models: IM-To Know (Pillai's Trace = .05, $F(8, 363) = 2.24$, $p < .05$, partial $\eta^2 = .05$), IM-To Accomplish (Pillai's Trace = .04, $F(8, 363) = 2.10$, $p < .05$, partial $\eta^2 = .04$), and Amotivation (Pillai's Trace = .21, $F(8, 363) = 12.35$, $p < .001$, partial $\eta^2 = .21$). Seven dependent variables yielded significant models: Continue ($F(7,370) = 11.30$, $p < .001$, partial $\eta^2 = .18$), GPA ($F(7,370) = 2.21$, $p < .05$, partial $\eta^2 = .04$), Readings ($F(7,370) = 3.91$, $p < .001$, partial $\eta^2 = .07$), Studying ($F(7,370) = 3.62$, $p < .01$, partial $\eta^2 = .06$), Difficulty ($F(7,370) = 4.82$, $p < .001$, partial $\eta^2 = .08$), Motivated ($F(7,370) = 17.12$, $p < .001$, partial $\eta^2 = .25$), and Grade ($F(7,370) = 7.07$, $p < .001$, partial $\eta^2 = .12$).

IM-to Know significantly influenced hours spent studying ($F(1,370) = 10.19$, $p < .01$, partial $\eta^2 = .03$), with students reporting higher motivation to know reporting more hours studying. IM-to Accomplish significantly influenced motivation to do well in the course ($F(1,370) = 10.94$, $p < .01$, partial $\eta^2 = .03$), and expected grade ($F(1,370) = 6.46$, $p < .05$, partial $\eta^2 = .02$), with students reporting higher motivation to accomplish reporting higher motivation to do well in the course and higher expected grades.

Amotivation significantly influenced: Continue ($F(1,370) = 36.57$, $p < .001$, partial $\eta^2 = .09$), GPA ($F(1,370) = 6.50$, $p < .05$, partial $\eta^2 = .02$), Readings ($F(1,370) = 4.41$, $p < .05$, partial $\eta^2 = .01$), Difficulty ($F(1,370) = 17.10$, $p < .001$, partial $\eta^2 = .04$), Motivated ($F(1,370) = 53.93$, $p < .001$, partial $\eta^2 = .13$), and Grade ($F(1,370) = 31.50$, $p < .001$, partial $\eta^2 = .08$). Students who reported higher levels of Amotivation reported less likelihood of continuing with their major, lower GPA, doing less

of the readings, perceiving the course as more difficult than expected, less motivation to do well in the course, and lower expected grades in the course.

DISCUSSION

This study explored students' academic motivations in HAP courses to better understand how those motivations may contribute to students' success. Results obtained offered support for all three hypotheses. Specifically, the observed reliabilities for the seven AMS subscales were comparable with previously reported reliabilities, suggesting that it appears possible to adapt the AMS from global higher education motivations to specific course motivations. Second, student motivation did appear to influence study habits and efforts, with higher levels of Intrinsic Motivation—To Know predicting time spent studying, and higher levels of Intrinsic Motivation—To Accomplish predicting higher levels of motivation to succeed in the course and higher expected grades. Further, higher levels of Amotivation were strongly associated with reduced likelihood of continuing with current major, lower overall GPA, reduced levels of reading completion, increased perceptions of the course as difficult, lower levels of motivation to succeed in the course, and lower expected grades. Third, students reported higher average scores for the three Extrinsic Motivation subscales than the three Intrinsic Motivation subscales (with the notable exception of Intrinsic Motivation-To Know), both of which were higher than the Amotivation subscale.

Curiously, despite the fact that students' average scores for Extrinsic Motivation were higher than their scores for Intrinsic Motivation, which is consistent with prior anecdotal reports about students' shift to a more consumerist approach to education, none of the three Extrinsic Motivation subscales were significantly related to any of the student study habits and efforts.¹⁵ That is, although these students appear to be largely extrinsically motivated to succeed in HAP courses, those high levels of extrinsic motivation do not translate into any changes in behavior. This suggests the very unusual possibility that for these students, their behaviors may not be connected to their motivations, at least their extrinsic motivations. If that is the case, then the central tenet of SDT, that motivations influence behavior, may not fully apply.

The potential ramifications of this possibility for instruction in HAP courses are profound. As the data here shows, students are more extrinsically motivated to succeed in HAP courses than intrinsically motivated to succeed. Yet, that extrinsic motivation does not result in any change in behaviors that would affect their likelihood of success. Further, HAP instructors may have relatively high levels of control over factors that could affect extrinsic motivation, especially at the External Regulation level (e.g., attendance policies, homework assignments, quizzes, etc.), but very little control over students' own intrinsic motivations, which by definition cannot be externally influenced. This possibility is further reinforced by our data concerning the Intrinsic Motivation-To Know, Intrinsic Motivation-To Accomplish, and Amotivation subscales. Students who were more intrinsically motivated reported higher levels of time spent studying and specific motivation to succeed in HAP courses, whereas students who were amotivated reported lower levels of behaviors likely to lead to success in the course. Taken together, these findings suggest that HAP instructors might be quite incapable of influencing student behaviors that would lead to success in HAP courses by means of addressing motivation. The types of motivation that instructors can influence, and that students report the highest levels of, do not translate into changes in academic behaviors. Rather, the types of motivation most strongly related to student success behaviors, Intrinsic Motivation and Amotivation, originate within the student and are largely impervious to outside influence. A more autonomy-supportive medical education (being meaningfully involved in students' learning and listening to what students want) may result in increased autonomous motivation.²⁸ If HAP instructors want to improve student success in HAP courses, they will need to look beyond student motivation and identify other factors that could potentially influence student academic behaviors.

Limitations and Future Directions

The findings reported above should be interpreted in light of several project limitations. First, the data for this study comes from five sections of HAP courses at a single university. Although the sample size was large, it is unknown if these results can be extrapolated to populations of students at other institutions. Replications of this project at other universities could address that question.

Second, because the data were collected anonymously it was not possible to connect student responses to their actual grades in the HAP courses. It is possible that motivations could be strong predictors of final grades, as has been suggested by prior research.²³ Further research is necessary to examine this possibility. Additionally, longitudinal investigations that followed students throughout the course sequence (i.e., HAP I, HAP II, and subsequent courses) could investigate both stability and change in allied health students' motivations across time and the influence of motivation in initial courses on behaviors and performance in subsequent courses.

Third, while our study focused on motivational aspects of allied health majors in general, future research studies should focus on analyses that target specific majors and their academic performance based on intrinsic and/or extrinsic factors and Amotivation.

Finally, a qualitative or mixed-methods investigation may reveal alternate interpretations of the data or new factors to examine. It is possible that students themselves see their own high levels of extrinsic motivation and recognize that their behaviors are not influenced by that motivation. Students may be able to explain this apparent disconnect or identify additional variables that may mediate or moderate the relationship.

REFERENCES

1. Michael J. What makes physiology hard to learn. Results of faculty survey. *Adv Physiol Educ.* 2007;31:34-40.
2. Sturges D, Maurer TW. *What makes Anatomy & Physiology difficult?* 2011: SoTL Commons: A Conference for the Scholarship of Teaching and Learning; 2011 Mar 9-11; Statesboro, GA.
3. *The Future of Higher Education in Nursing*, Annual Report, 2010. Washington DC: American Association of Colleges of Nursing.
4. Andrew S. Self-efficacy as a predictor of academic performance in science. *J Adv Nurs.* 1998;27:596-603.
5. Nilsson K, Stomberg M. Nursing students' motivation toward their studies—a survey study. *BMC Nurs.* 2008;7:6.
6. Kahler JA, Soule DJ. A survey of students' attitudes toward medical school and factors motivating them to become physicians. *S D J Med.* 1991;44: 269-72.
7. Keshishian F, Brocavich J, Boone R, Pal S. Motivating factors influencing college students' choice of academic major. *Am J Pharm Educ.* 2010;74:article 46.
8. Whitehouse A, Hird K, Cocks N. The recruitment and retention of speech and language therapists: What do university students find important? *J Allied Health.* 2007;36:131-6.
9. Finch P. The motivation of massage therapy students to enter professional education. *Med Teach.* 2004;26:729-38.
10. Volkening U, Ostermann H, Link L, Hubner H. The impact of self-determination on academic motivation of occupational therapists and physiotherapists in continuing higher education in Germany. *The Journal of Continuing Higher Education.* 2010; 58:85-98.
11. McLaughlin K., Moutray M, Moore C. Career motivation in nursing students and the perceived influence of significant others. *J Adv Nurs.* 2010;66:404-12.
12. Rhodes M, Morris A, Lazenby R. Nursing at its best: "Competent and caring". *Online J Issues Nurs.* 2011;16:2.
13. Finch P. The changing motivation of massage therapy students. *Education for Health.* 2007; 20.
14. Lammers WJ, Smith SM. Learning factors in the university classroom: Faculty and student perspectives. *Teach Psychol.* 2008;35:61-70.
15. Labaree DF. *How to succeed at school without really learning: The credentials race in American education.* New Haven, CT: Yale University Press; 1997.
16. Salamonson Y, Everett B, Koch J, Wilson I, Davidson PM. Learning strategies of first year nursing and medical students: a comparative study. *Int J Nurs Stud.* 2009; 46: 1541-7.
17. Pintrich PR, Smith DAR, Garcia T, McKeachie W. *A manual for the use of the motivated strategies for learning questionnaire (MSLQ).* University of Michigan, National Center for Research to Improve Postsecondary Teaching and Learning, Ann Arbor, MI, 1991.
18. Prospero M, Vohra-Gupta S. First generation college students: Motivation, integration, and academic achievement. *Community College Journal of Research and Practice.* 2007;31:963-75.
19. Ballman J, Mueller J. Using self-determination theory to describe the academic motivation of allied health professional-level college students. *J Allied Health.* 2008;37:90-6.
20. Deci EL, Ryan RM. *Intrinsic motivation and self-determination in human behavior.* New York: Plenum; 1985.
21. Pintrich PR, De Groot EV. Motivational and self-regulated learning components of classroom academic tasks. *J Educ Psychol.* 1990;82(1):33-40.
22. Moore S, Armstrong C, Pearson J. Lecture absenteeism among students in higher education: A valuable route to understanding student motivation. *J Higher Educ Pol and Manag.* 2008;30(1):15-24.
23. Wilson JH, Wilson SB. The first day of class affects student motivation—An experimental study. *Teach Psychol.* 2007;34:226-30.
24. Dodge TM, Mitchell MF, Mensch, JM. Student retention in athletic training education programs. *J Athl Train.* 2009;44:197-207.
25. Vallerand RJ, Blais MR, Briere NM, Pelletier LG. Construction and validation of the Academic Motivation Scale. *Canadian Journal of Behavioral Sciences.* 1989;21:323-49.

26. Grouzet FME, Otis N, Pelletier LG. Longitudinal cross-gender factorial invariance of the Academic Motivation Scale. *Struct Equ Modeling*. 2006;13:73-98.
27. Vallerand RJ, Pelletier LG, Blais MR, Briere NM, Senecal C, Vallieres EF. The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Ed Psychol Meas*. 1992;52:1003-17.
28. Williams G, Saizow R, Ryan R. The importance of self determination theory for medical education. *Acad Med*. 1999; 74.

APPENDIX A**I. Demographics**

- 1 What is your gender?
 - A Male
 - B Female

- 2 Which of the following most accurately reflects your ethnicity?
 - A White
 - B African-American
 - C Hispanic
 - D Asian
 - E Other

- 3 What is your class standing?
 - A Freshman
 - B Sophomore
 - C Junior
 - D Senior
 - E Grad Student
 - F Other

- 4 Which class are you in?
 - A A & P I
 - B A & P II

- 5 Is this course required for your major?
 - A Yes
 - B No

- 6 What is your major/pre-major?
 - A Nursing
 - B AT
 - C ES
 - D Nutrition
 - E Health Education and Promotion /Community health
 - F Health and PE
 - G Biology / pre-med
 - H Other

- 7 How likely are you to continue with your current major?
 - A Very likely
 - B Somewhat likely
 - C Neither unlikely nor likely
 - D Somewhat unlikely
 - E Not at all likely

- 8 What is your current approximate GPA?
 - A <2.00
 - B 2.00-2.49
 - C 2.50-2.99
 - D 3.00-3.49
 - E 3.50-4.00

- 9 How often do you attend this class?
- A Every time
 - B Almost every time
 - C Most times
 - D Some times
 - E Hardly ever
- 10 How often do you do the assigned worksheets/readings for this class before the class period that they are due?
- A Every time
 - B Almost every time
 - C Most of the time
 - D Some of the time
 - E Hardly ever
- 11 In the average week, how many hours do you spend studying for this class?
- A < 1 hour
 - B 1-3 hours
 - C 3-6 hours
 - D 6-9 hours
 - E More than 9 hours
- 12 How does the difficulty level of the coursework in this class compare to the expectation you had prior to starting the class?
- A I expected it to be much more difficult
 - B I expected it to be somewhat more difficult
 - C It matches my expectations for difficulty
 - D I expected it to be somewhat less difficult
 - E I expected it to be much less difficult
- 13 How motivated are you to do well in this class?
- A I am very motivated to do well
 - B I am somewhat motivated to do well
 - C I am neither motivated nor unmotivated
 - D I am somewhat unmotivated to do well
 - E I am very unmotivated to do well
- 14 What grade do you anticipate you will get in this class?
- A A
 - B B
 - C C
 - D D
 - F F
 - G W

APPENDIX B

Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you are taking this class. Enter only one response for each question.

Does not correspond at all	Corresponds a little		Corresponds moderately		Corresponds a lot		Corresponds exactly
1	2	3	4	5	6	7	

WHY ARE YOU TAKING THIS CLASS?

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Because with only a high-school degree I would not find a high-paying job later on. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Because I experience pleasure and satisfaction while learning new things about human body. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Because I think that this class will help me better prepare for the career I have chosen. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. For the intense feelings I experience when I am communicating my own ideas about the human body to others. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Honestly, I don't know; I really feel that I am wasting my time in this class. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. For the pleasure I experience while surpassing myself in my studies of the human body. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. To prove to myself that I am capable of passing this class. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. In order to obtain a more prestigious job later on. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. For the pleasure I experience when I discover new things about the human body I've never seen before. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. Because eventually it will enable me to enter the job market in an allied health field that I like. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. For the pleasure that I experience when I read interesting things about the human body. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I once had good reasons for taking this class; however, now I wonder whether I should continue. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. Because of the fact that when I succeed in this class I feel important. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. Because I want to have "the good life" later on. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

16. For the pleasure that I experience in broadening my knowledge about the human body.	1	2	3	4	5	6	7
17. Because this will help me make a better choice regarding my career orientation.	1	2	3	4	5	6	7
18. For the pleasure that I experience when I feel completely absorbed by what I am reading about the human body.	1	2	3	4	5	6	7
19. I can't see why I am taking this class and frankly, I couldn't care less.	1	2	3	4	5	6	7
20. For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.	1	2	3	4	5	6	7
21. To show myself that I am an intelligent person.	1	2	3	4	5	6	7
22. In order to have a better salary later on.	1	2	3	4	5	6	7
23. Because this class allows me to continue to learn about many things that interest me about the human body.	1	2	3	4	5	6	7
24. Because I believe that this class will improve my competence as an allied health worker.	1	2	3	4	5	6	7
25. For the "high" feeling that I experience while reading about various topics about the human body.	1	2	3	4	5	6	7
26. I don't know; I can't understand what I am doing in this class.	1	2	3	4	5	6	7
27. Because this class allows me to experience a personal satisfaction in my quest for excellence in my allied health studies.	1	2	3	4	5	6	7
28. Because I want to show myself that I can succeed in my allied health studies.	1	2	3	4	5	6	7

Key:

# 2, 9, 16, 23	Intrinsic Motivation - To Know
# 6, 13, 20, 27	Intrinsic Motivation - To Accomplish
# 4, 11, 18, 25	Intrinsic Motivation - To Experience Stimulation
# 3, 10, 17, 24	Extrinsic Motivation - Identified
# 7, 14, 21, 28	Extrinsic Motivation - Introjected
# 1, 8, 15, 22	Extrinsic Motivation - External Regulation
# 5, 12, 19, 26	Amotivation

APPENDIX B
Table 2. Correlations Between Project Variables

	To Know	Accomplish	Stimulation	Identified	Introjected	External	Amotivation	Continue	GPA	Attend	Readings	Studying	Difficulty	Motivated
To Know	—													
Accomplish	.70***	—												
Stimulation	.72***	.71***	—											
Identified	.47***	.47***	.41***	—										
Introjected	.49***	.70***	.48***	.46***	—									
External	.29***	.42***	.25***	.51***	.52***	—								
Amotivation	-.17***	-.15**	-.18***	-.33***	-.11*	-.07	—							
Continue	-.17***	-.16**	-.12**	-.21***	-.11*	-.05	.32***	—						
GPA	-.04	-.00	-.02	.08	-.08	-.05	-.16***	-.16**	—					
Attend	-.03	-.03	-.01	-.08	-.03	-.04	.20***	.10*	-.14**	—				
Readings	-.22***	-.22***	-.20***	-.14**	-.18***	-.04	.15**	.09	-.01	.14**	—			
Studying	.21***	.18***	.17***	.12*	.10*	.09	-.06	-.07	.03	.02	-.20***	—		
Difficulty	-.12*	-.12*	-.11*	-.02	-.03	.04	.20***	.10*	.06	.06	.10*	.13**	—	
Motivated	-.25***	-.29***	-.16**	-.27***	-.26***	-.13**	.39***	.28***	-.08	.20***	.22***	-.14**	.11*	—
Grade	-.12*	-.18***	-.06	-.09*	-.14**	-.03	.27***	.28***	-.30***	.28***	.15**	.09	.35***	.42***

* $p < .05$, ** $p < .01$, *** $p < .001$