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Measuring Motivation and Volition of Nursing Students in Nontraditional Learning Environments

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The purpose of this study was to identify the best fitting model to represent interrelationships between motivation, volition, and academic success for adult nursing students learning in nontraditional environments. Participants ($N = 297$) completed a survey that incorporated two measures: the Motivated Strategies for Learning Questionnaire (MSLQ) and the Academic Volitional Strategies Inventory (AVSI) as well as demographic information. Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) were used for data analysis. In Phase 1, EFA resulted in factors that generally aligned with previous theoretical factors as defined by the psychometrics used. In Phase 2 of the analysis, CFA validated the use of predefined factor structures. In Phase 3, SEM analysis revealed that motivation has a larger effect on grade point average (GPA; $\hat{\beta} = .28$, $p < .01$) than volition ($\hat{\beta} = .15$, $p < .05$). The covariance between motivation and volition ($r = .42$, $p < .01$) was also found to be significant. These results suggest that there is a significant relationship among motivation, volition, and academic success for adult learners studying in nontraditional learning environments. These findings are consistent with and elaborate the relationship between motivation and volition with a population and setting underrepresented in the research.

Keywords: volition; motivation; distance education; academic success; factor analysis; structural equation modeling

A better understanding of the relationships among factors contributing to the academic success of adult learners is of interest to a variety of stakeholders. Students, faculty, administrators, regulators, and accrediting bodies all have a vested interest in enhancing the theoretical and empirical knowledgebase underpinning adult higher education. Concerns over equity, standards, and student motivation have spurred researchers to ask what factors influence academic success for adult learners and how these factors can be supported and enhanced (Apple, 1996; Karoly, 1993; Kenny, Kidd, Nankervis, & Connell, 2011). The increasing need for a highly educated workforce has increased interest in understanding how adults become successful, lifelong learners (Ebersole & Patrick, 2011; Maehl, 2000). Understanding factors that influence academic success for adult

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learners is of immediate importance because adult students make up between 40% and 80% of the students in higher education (Ebersole & Patrick, 2011; Pearson, 2004). Many of these adult students come from groups traditionally underserved by higher education and are underrepresented in disciplines such as nursing.

Although research focusing on academic success and persistence of younger learners studying in classroom environments has been studied extensively, it has not been sufficiently addressed for adult students learning outside of the traditional classroom environment (Ross-Gordon, 2011). Specifically, additional inquiry is needed to understand the relationships among major constructs involved with self-directed learning—also referred to as self-regulated learning (SRL)—and how these constructs interrelate when learning occurs outside of classroom environments (Brockett & Hiemstra, 1991). Motivation and volition have been identified as two major social cognitive constructs highly relevant to SRL, yet current theoretical models are not defined for adult learners.

The purpose of this study is to better understand the nature of motivation and volition for nursing students in nontraditional learning environments (i.e., students earn credits vis-à-vis competency-based assessments and by completing online coursework). More specifically, the present study will identify the best fitting model to represent the interrelationships between motivation, volition, and academic success for these students. The objectives of the study are to

- examine the validity of the Motivated Strategies for Learning Questionnaire (MSLQ) and the Academic Volitional Strategies Inventory (AVSI) for adult students in a nontraditional learning environment and
- identify the relationships among motivation, volition, and academic success for adult students studying outside of traditional classroom environments.

THEORETICAL AND EMPIRICAL BASIS

Much of the research on SRL is grounded in social cognitive, operant, information processing, phenomenological, and volitional theoretical perspectives. Zimmerman and Schunk (2001, 2008) note that in the past, SRL was believed to involve separate mind and body processes as well as internal and external environmental conflicts experienced in striving for autonomy and control over the environment. More current perspectives embrace the notion of dynamic adaptation between internal and external environments and recognize the covert, behavioral, and environmental aspects of SRL. For example, Eccles and Wigfield (2002) reviewed the literature on motivation, a key element of SRL, and organized various theoretical perspectives by categorizing them according to their primary focus (e.g., expectancy, reasons for engagement, expectancy and value constructs, and integration of motivation and cognition). This combining of perspectives on SRL allows for a more holistic view of the complex human phenomena related to learning and academic achievement and is essential for integration of knowledge from which meaningful research questions can be derived.

There is agreement in the literature that SRL consists of cognitive, metacognitive, motivational, environmental, and behavioral components (Barnard-Brack, Lan, & Paton, 2010; Boekaerts & Corno, 2005; Butler & Winne, 1995; Lopez, 1999; Zimmerman & Schunk, 2001, 2008). Research has focused on all components and processes of SRL to varying degrees, but cognitive and metacognitive strategies are the aspects most frequently studied

(Barnard-Brack, et al., 2010; Corno, 2001; McCann & Garcia, 1999). For instance, there is a substantial body of research related to motivation and volition that has evolved over the past 60 years, which addresses cognitive and affective aspects of goal setting and striving as well as learner differences (Ackerman & Woltz, 1994; Bartels, Magun-Jackson, & Ryan, 2011; Eccles & Wigfield, 2002; Pintrich & De Groot, 1990; Weiner, 1990). However, most research has been conducted on young students in traditional classroom environments and thus cannot be generalized to adults learning outside of the classroom environment.

Hypothesized Model

This study attempts to identify the best fitting model to represent interrelationships between motivation, volition, and academic success of adult learners in a baccalaureate nursing program who engage in distance learning via online courses and assessments. Figure 1 illustrates the hypothesized relationships between the relevant constructs of SRL based on this review of the literature. Based on the review of the literature, it is hypothesized that motivation and volition are significantly related yet conceptually distinct constructs, both impacting academic success.

Motivation and Volition

Motivation and volition are major constructs within most models of SRL. Despite the long history and growing body of research, there is disagreement on the nature of motivation and its relationship to volition and academic success. In fact, some theorists and researchers conceptualize motivation as distinct from and a precursor to volition (Bartels et al., 2011). Yet, it is common to find volitional and motivational concepts combined and measured as one construct (Boekaerts & Corno, 2005; Corno, 2001; Kuhl, 1987; Pintrich, 2004; Zhu, 2004). Kuhl (1987) purported that motivation only impacts decisions to act, whereas volitional intent, manifested as cognitive control strategies, keeps one focused on intentions despite other opportunities and distractions. Likewise, Zhu (2004) argues that volition is different from intentions, which are influenced by motivation and goals and that it is the gap between intention and action where volition comes into play. His argument is supported by the fact that making a decision to act or move in a particular direction or manner is not sufficient to make the action occur. Zhu describes *akrasia*, or weakness of

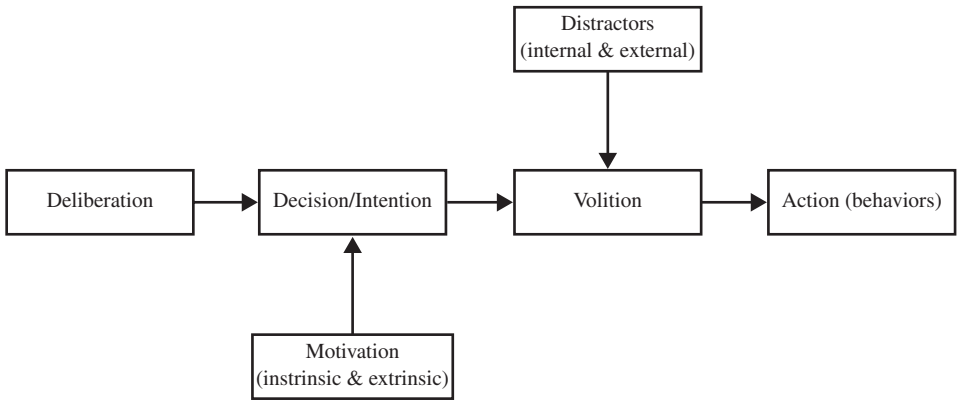

Figure 1. Relationships between motivation, intention, volition, and action.

will, as instances when someone has made a decision to act; that is, the person is motivated to act and has set a goal but for various reasons is unable to carry out the intended actions necessary to achieve the goal. Corno (2001) agrees that volition is a post-decisional process that protects intention to learn by energizing and maintaining actions toward goals. This view of volition identifies it as the key to follow-through by controlling impulses and keeping one focused on set goals. Zhu argues that "intentions to act are not sufficient in initiating all kinds of intentional action and controlling their execution—they must be supplemented by volitions" (p. 185). Furthermore, volitional intensity corresponds to the level of effort exerted toward an intended action or goal and thus strategies aimed at volitional control can be viewed as important for SRL and academic success.

Focusing on volition, McCann and Garcia (1999) identified two categories of volitional control: (a) strategies for regulating motivation and (b) emotions in academic goal striving situations. The same authors also identify three types of volitional strategies: (a) *self-efficacy enhancement*, (b) *stress reduction*, and (c) *negative-based incentives*, which are all aimed at regulating motivation and emotions to actualize set goals. Self-efficacy beliefs are perceptions of the self, involving personal judgments of how well one can organize and implement behaviors in various situations (Bandura, 1984). Self-efficacy judgments are well documented in the literature as independent of goal setting, self-monitoring, and self-appraisal (Bandura, 1984; Karoly, 1993; Pajares, 2003). Orbell (2003) focused on personality systems, interactions theory, and the theory of planned behavior in a longitudinal study to investigate the differences between students who are able to translate intentions into actions and those who are not. She found that volitional components improved prediction of studying after accounting for past behavior.

Stress reduction consists of strategies aimed at managing feelings of anxiety. Because Freud (1936, as cited in Spielberger, 1983) first identified anxiety as the basis for neurosis, research about the construct slowly proliferated in the literature. Since that time, study into the human experience of anxiety has revealed two related but distinctive facets of the construct: one is a transitory emotional state that varies according to the situation (state anxiety) and the other is a relatively stable level of anxiety that people carry with them in most situations (trait anxiety). According to Spielberger (1983), it has been well established that anxiety and performance have a curvilinear relationship. It may be hypothesized that low anxiety may not cause sufficient conation or tension within the person to cause initiation of volitional strategies and that high anxiety may somehow serve as a barrier to effective mobilization of volitional strategies.

Lastly, negative-based incentives are perceived as negative ramifications of straying away from goal-related tasks and thus not meeting desired goals. These negative inducements can be either internal or external and is thought to serve to keep one striving toward set goals and focused on intentions (McCann & Garcia, 1999; McCann & Turner, 2004).

Often, learners do not have an awareness of the importance of volitional strategies in reaching their academic goals. McCann and Turner (2004) emphasize that "the key to success in learning is in students translating their self-regulatory knowledge into action" (p. 170). Even adult learners with highly evolved study skills and work habits may be overwhelmed by competing priorities and multiple demands that impact volitional intent. For these reasons, it is important to achieve a better understanding of the nature of volition and motivation in adult students.

Many authors have posited that self-efficacy is important for an individual to become self-regulated (Zimmerman & Risemberg, 1997; Zimmerman & Schunk, 2001). However, it has not been sufficiently studied as an important aspect of volition. The relationships

between self-beliefs and academic success were the focus of a meta-analytic review that established small but favorable influences of various self-beliefs, including self-efficacy, on levels of achievement (Valentine, DuBois, & Cooper, 2004).

METHOD

Participants

All nursing students enrolled in the baccalaureate degree program at Excelsior College at the onset of this study were invited to participate. The respondents ($N = 303$) identified themselves as White ($n = 249$), Black or African American ($n = 25$), Hispanic or Latino ($n = 5$), Asian ($n = 6$), Multiracial ($n = 5$), and other ($n = 12$). Overall, the sample comprised 260 females (86.1%) and 42 males (13.9%) with a mean age of 46.75 years ($SD = 98.5$). The mean for total grade point average (GPA) is 3.15 ($SD = 0.39$). See Table 1 for a comparison of this sample to the college population (from which this sample was drawn) and national nursing population (Health Resources and Services Administration, 2004).

Measures

Volition. The independent variable, volition, was operationalized using the three subscales (self-efficacy enhancement, stress reduction, and negative-based incentives) of the AVSI. The total and subscale scores yield continuous data. The AVSI is a measure of students' tendencies to initiate and support focus on established academic goals (McCann & Garcia, 1999; McCann & Turner, 2004). Unlike other available measures used to assess related constructs, such as motivation, the AVSI focuses exclusively on actions

TABLE 1. Demographics of Participants Compared to College and National Populations

Category	Sample	College	National
Gender			
Female	86.1%	83.5%	94.2%
Male	13.9%	16.5%	5.8%
Ethnicity			
White	82.2%	73.7%	81.8%
Black or African American	8.3%	15.0%	4.2%
Asian	2.0%	5.1%	3.1%
Hispanic or Latino	1.7%	4.7%	1.7%
Multiracial	1.7%	1.0%	1.4%
Other	4.0%	1.5%	7.5%
Age (years)			
Median	46.9	46.5	47.0
Mean	46.8	44.3	46.8

taken to stay on task after goals have been established. Rather than a total measure of one's volition, the scale is intended for use within a particular content area (McCann & Turner, 2004).

The inventory consists of 20 statements that people use to describe actions taken to protect intention to learn. These items measure if particular strategies are used as well as the frequency with which such actions are taken to stay on task when difficulty, disinterest, or distraction occurs (McCann & Garcia, 1999; McCann & Turner, 2004). For example, one of the items within the negative consequences scale is, "I think about how disappointed others (family/friends) will be if I do poorly." Respondents are instructed to check "yes" or "no" indicating whether they use the strategy listed; if they respond "yes," they are instructed to identify the frequency that they use the strategy. Frequency is measured using a 5-point scale with anchors of the scales being 1 = *I almost never do this* and 5 = *I almost always do this.* Possible scores on the inventory range from 0 to 100. Because the AVSI is created for use in a traditional classroom setting, some items were modified for use by students studying independently outside of a classroom setting. However, the required changes were minimal and not thought to significantly impact the validity or reliability of the tool.

McCann and Turner (2004) report that acceptable measures of validity and reliability have been established for AVSI. Reliability data includes measures of stability and internal consistency. The alpha for the entire 20-item revised scale range from .89 to .93 over four administrations. Alphas for the subscales of the original instrument indicated acceptable internal consistency for self-efficacy enhancement at .82 and negative-based incentives at .73. The stress reduction subscale did not fair as well with an alpha level of .69. Content and construct validity have been assessed with several populations including college students (McCann & Garcia, 1999). Convergent and divergent validity assessments were conducted using various measures of related constructs, such as motivation and self-regulation. Similar directionality but modest correlations were found between these measures and the AVSI, which suggests that volition should be viewed and measured as a distinct entity. Factor analysis used to establish construct validity during development of the AVSI indicated three distinct subscales of volition: self-efficacy enhancement, stress reduction, and negative-based incentives.

Motivation. The independent variable, motivation, is operationalized using the three motivational scales of the MSLQ (Pintrich, Smith, Garcia, & McKeachie, 1993). The MSLQ is a self-report instrument including scales designed to assess college students' orientations on three broad motivational constructs: expectancy, value, and affect. The "Motivation" section of the instrument consists of 31 items. An example of one of the items within the affect scale is, "When I take a test I think about how poorly I am doing compared with other students." Students are instructed to identify the degree to which the statement is true of them. Responses are quantified using a 7-point Likert scale with anchors being 1 = *not at all true of me* and 7 = *very true of me.* Because the tool is created for use in a traditional classroom setting, some items were modified for use by students studying independently outside of a classroom. However, the changes are minimal and not thought to significantly impact validity or reliability. Possible scores on the entire questionnaire range from 0 to 217. Pintrich et al. (1993) report that the entire tool shows reasonable construct validity and scale scores correlating with final course grades. The motivational scales indicated acceptable levels on the expectancy component ($\alpha = .93$) but was weak on the value-component-extrinsic goal orientation ($\alpha = .62$).

Academic success. The dependent variable, academic success, is operationally defined as current GPA drawn from a student information systems database.

In addition to measurements of the scores on the independent and dependent variables, additional items were added to the survey to obtain information on key demographics. Specifically, gender, age, socioeconomic status, and race were included. In summary, the complete survey included all 20 items from the revised AVSI (McCann & Turner, 2004), all 31 items from the three motivational scales of the MSLQ (Pintrich, Smith, Garcia, & McKeachie, 1991), as well as items requesting demographic information.

Data Analysis

Data analysis was conducted in three phases using exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM). EFA was conducted to explore the latent structures of all 51 items from the AVSI and MSLQ combined as compared to the structures defined by the measurements. With the latent structure presented by the EFA sufficiently aligned with the theoretical latent structures defined by the AVSI with three latent variables and the MSLQ with six latent variables, a CFA was performed using AMOS (Arbuckle, 2006a) on the AVSI and MSLQ latent models separately (see Figures 2 and 3). Once good model fit was achieved, the items for each of the nine latent variables were summed and used as the measurement variables in evaluating the final structural models (see Figure 4).

RESULTS

Phase 1: Exploratory Factor Analysis

Both the AVSI and MSLQ define latent structures in their manuals. However, given that these measures were validated against a very different population sampled here, an EFA was performed to compare the latent structure of our data to that of the AVSI and MSLQ. Mulaik and Millsap (2000) define this step as testing the *unrestricted model*. This step is often omitted in SEM; however, given the unusual nature of our sample and population regarding the measures used, the EFA provided a means of validating the latent structures.

Following the procedures outlined by Pruzek (2005), an EFA was performed using the maximum likelihood extraction method with a varimax rotation. The Kaiser–Meyer–Olkin measure of sampling adequacy was .867 and Bartlett's test of sphericity was significant (χ^2 [1,275] = 7,433.4, $p < .001$). Appendix A provides factor loadings for the 51 items across the six factors. Of the 51 items, 11 did not load on a single factor with a factor loading greater than 0.3. Only one item was identified to load significantly across two factors.

The six factors identified are labeled as Factor 1, self-efficacy; Factor 2, task value; Factor 3, negative-based incentives; Factor 4, stress reducing actions; Factor 5, self-efficacy enhancements; and Factor 6, external goal orientation. Examining the items that composed each of these factors, it was concluded that these factors sufficiently aligned with the MSLQ expectancy component factor, MSLQ value component factor, AVSI negative-based incentives factor, AVSI stress reducing actions factor, AVSI self-efficacy enhancements factor, and MSLQ value component factor (also represented by intrinsic and extrinsic goal orientation factors), respectively. Given this strong alignment to the predefined factor structure and to be consistent with the current literature using the AVSI and MSLQ, the nine-factor structure defined by the literature was used as the basis for the structural model.

Phase 2: Confirmatory Factor Analysis

A CFA was performed for the AVSI, MSLQ, and a composite model. The general approach was to iteratively evaluate model fit after (a) covarying error terms with a modification index greater than 10 within latent variables, (b) covarying error terms with a modification index greater than 10 between latent variables, and (c) removing variables that loaded on more than one latent variable. Figures 2 and 3 represent the final models for the AVSI and MSLQ, respectively, and Appendix B contains the correlation matrix and descriptive statistics for the factors.

Four indices were used to assess goodness of fit for a model (Arbuckle, 2006b; Bollen, 1989; Byrne, 2010): The χ^2, degrees of freedom ratio (values less than 5 are desirable), the comparative fit index (CFI; values greater than .90 are desirable), the Tucker–Lewis index (TLI; values greater than .90 are desirable), and the root-mean-square error of approximation (RMSEA; values less than .06 are desirable). As shown in Table 2, good model fit was achieved by the second model variation.

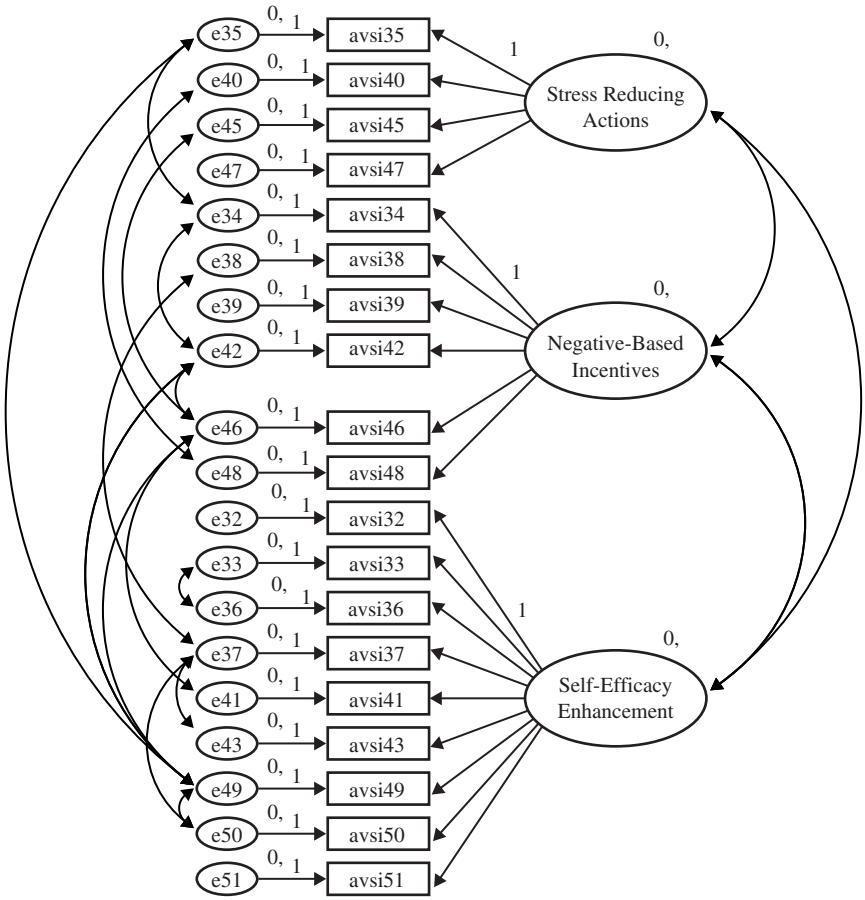

Figure 2. Final confirmatory factor analysis (CFA) model of Academic Volitional Strategies Inventory (AVSI).

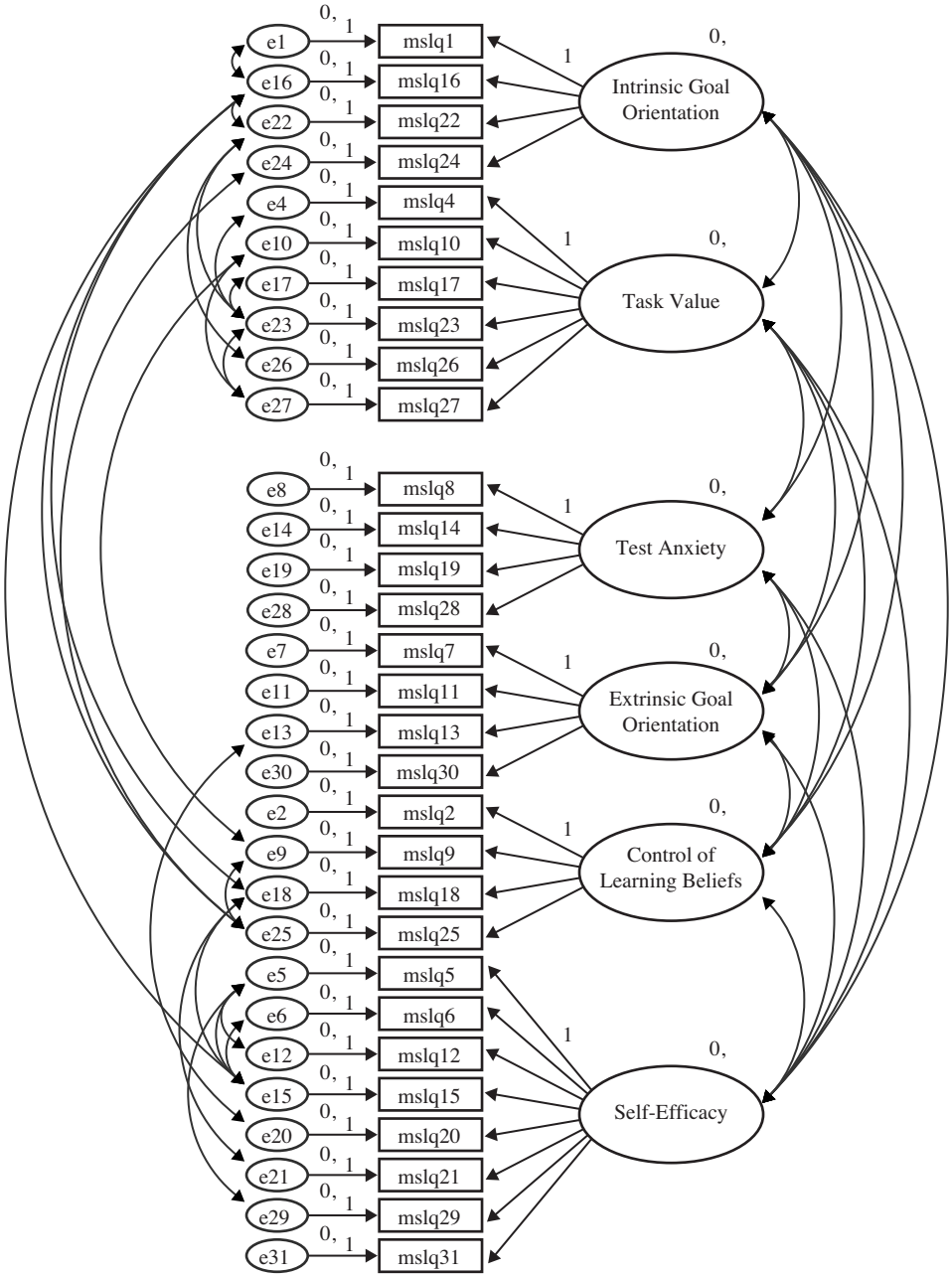

Figure 3. Final confirmatory factor analysis (CFA) model of Motivated Strategies for Learning Questionnaire (MSLQ).

TABLE 2. Model Fit Statistics for Confirmatory Factor Analysis

	MSLQ			AVSI			Composite		
	M_0	M_1	M_2	M_0	M_1	M_2	M_0	M_1	M_2
χ^2	1,198.8	777.9	697.0	549.1	351.6	273.6	119.1	24.1	16.6
df	419	397	368	167	154	135	17	13	12
χ^2/df	2.861	1.959	1.894	3.288	2.283	2.027	7.004	1.854	1.382
TLI	.811	.902	.913	.702	.833	.868	.769	.967	.985
CFI	.829	.917	.926	.738	.865	.896	.860	.985	.994
RMSEA	.079	.057	.055	.088	.066	.059	.142	.054	.036
$\Delta\chi^2$		420.9	80.9		197.5	78		95	7.5
Δdf		22	29		13	19		4	1

Notes. MSLQ = Motivated Strategies for Learning Questionnaire; AVSI = Academic Volitional Strategies Inventory; TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.

With good model fit achieved for the AVSI and MSLQ separately, a composite model was constructed whereby the items for each of the latent variables were summed and used as measurement variables in this new composite model. This approach is used to maximize the parsimoniousness of the structural model and is commonly done in the SEM literature. It should be noted that the MSLQ latent variable for affect component was eliminated to establish better model fit. Removal is justified because the affect component of the MSLQ focuses exclusively on test anxiety, whereas the three subscales of the AVSI sufficiently capture the multidimensionality of affect. Figure 4 represents the final composite model that is used as the foundation for the structural model.

Phase 3: Causal Structure

For the final phase of the analysis, we model the relationship between motivation and volition with academic success (i.e., GPA). Figure 5 represents the model tested. Path coefficients and model fit statistics were calculated for the entire sample as well as females, males, and high- and low-achieving students. Appendix C contains summary statistics for each model.

For the entire sample, motivation had a larger direct effect on GPA ($\hat{\beta} = .28, p < .01$) over volition ($\hat{\beta} = .15, p < .05$). There was also considerable covariance between motivation and volition ($r = .42, p < .01$). When examining subgroups within this sample, statistical significance of at least the 0.05 level was generally not achieved. However, these statistics are reported here as they provide some insight into how motivation and volition may vary for certain groups of students and provide the impetus for further research (see Appendix C for complete statistics). Of particular interest are the differences between high- and low-achieving students. Specifically, the direct effects of motivation on GPA are positive for high-achieving students ($\hat{\beta} = .115, p < .275$) and negative for low-achieving students ($\hat{\beta} = .062, p < .605$). Volition, however, has the inverse relationship with motivation negatively predicting GPA for high-achieving students ($\hat{\beta} = .140, p < .156$) and positively effecting GPA for low-achieving students ($\hat{\beta} = .195, p < .111$).

It should be emphasized that while the arrows in the model might suggest theoretical causal relationships, our data are based on correlational and not experimental data. Thus,

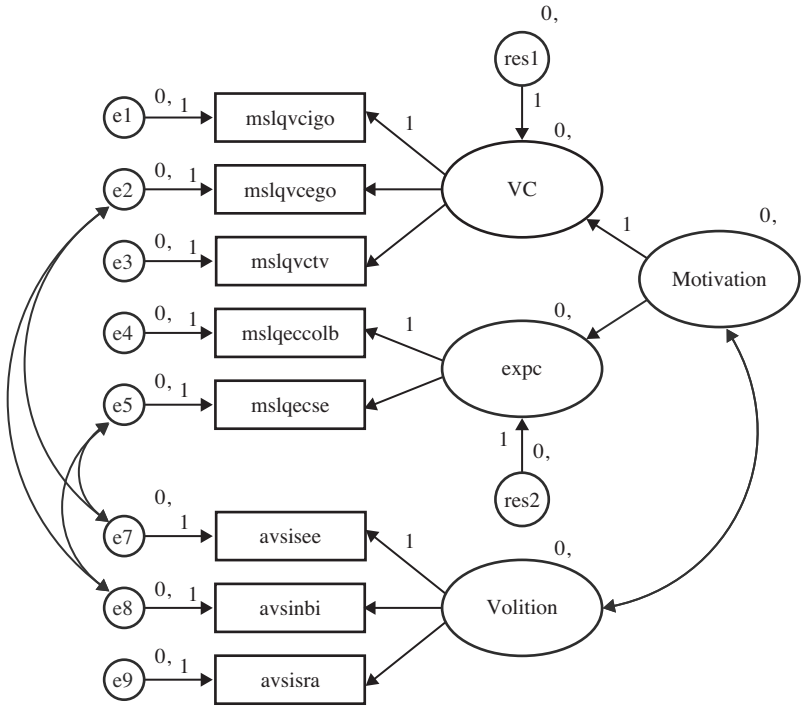

Figure 4. Final confirmatory factor analysis (CFA) model of the composite model.

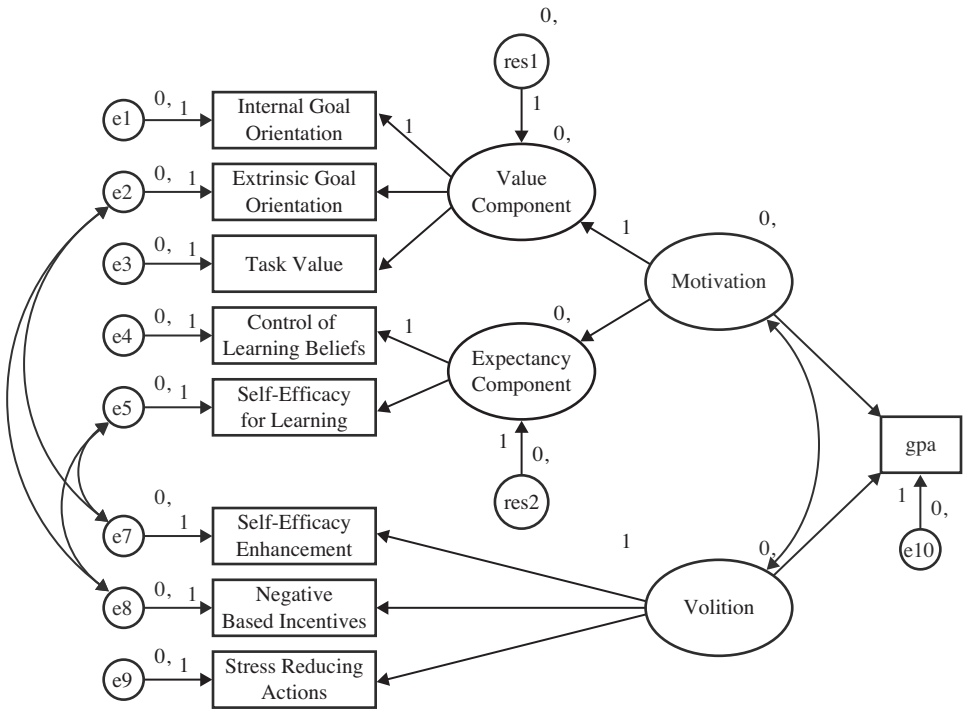

Figure 5. Path model.

the arrows and corresponding path coefficients should be interpreted in much the same manner as traditional regression weights.

DISCUSSIONS AND CONCLUSIONS

The single greatest limitation of this study is the use of GPA as the single measure of academic success. However, this appears to be the nature of research in nursing education and other disciplines. A review of the literature revealed very little discussion regarding the validity of using GPA as a measure of academic success, yet its use is widespread. It is important to note that although many studies rely on self-reported GPA, actual GPA values at the time of analysis were used in this study to strengthen the reliability of the measure.

Furthermore, although the sample was sufficient for achieving good model fit, it is perhaps the source of nonsignificance in the analysis of subgroups. This is particularly apparent when looking at gender differences.

This study reveals that the use of the AVSI and MSLQ, both widely used measures for volition and motivation within the self-regulated learning literature, is indeed valid for nursing students learning outside traditional classroom environments. Furthermore, we have shown that there are significant relationships between motivation, volition, and academic success. This is encouraging because these results suggest that the relationship among these constructs is similar for adult students studying outside a classroom environment and traditional students. However, further research is needed to determine whether these relationships are causal in nature for all students. In addition, analysis of subgroups, particularly the differences between high- and low-achieving students, also warrants further study. Although statistical significance was not achieved, these data suggest that there may be an inverse relationship between motivation and volitional strategy use between these groups. If confirmed by future research, this inverse relationship may provide valuable insight to the differences of volitional strategy use. That is, low-achieving students may appear to employ more volitional strategies than high-achieving students. The implications of this difference may be profound when viewed within the context of teaching volitional strategies, retention of adult learners, and ensuring equity in higher education.

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APPENDIX A. Factor Loadings for Motivated Strategies for Learning Questionnaire and Academic Volitional Strategies Inventory

		Factors					
Variable	Question	1	2	3	4	5	6
mslq20	I'm confident I can do an excellent job on exams and assignments.	**.810**	.060	−.156	.119	−.032	.111
mslq21	I expect to do well in this program.	**.773**	.242	−.205	.062	.059	.059
mslq15	I'm confident I can understand the most complex material covered in each exam or course.	**.757**	−.014	−.060	.099	−.026	.070
mslq31	Considering the difficulty of this program, the teachers, and my skills, I think I will do well.	**.734**	.286	−.093	.054	.099	.094
mslq29	I'm certain I can master the skills being taught in this program.	**.732**	.157	−.137	.037	.191	−.037
mslq6	I'm certain I can understand the most difficult material presented in the required readings.	.718	.143	−.057	.126	−.041	.046
mslq12	I'm confident I can learn the basic concepts covered in each exam or course.	**.658**	.224	−.078	.038	.227	.016
mslq5	I believe I will receive excellent grades in this program.	**.654**	.277	−.183	.096	−.094	.076
mslq18	If I try hard enough, then I will understand the content covered in each exam or course.	**.630**	.275	−.042	.076	.050	.137
mslq26	In most exams or courses I've taken, I have enjoyed the subject matter.	**.467**	.428	−.007	−.044	.137	−.007
mslq2	If I study in appropriate ways, then I will be able to learn the content required.	**.458**	.299	−.024	.044	.182	−.009

(Continued)

APPENDIX A. (*Continued*)

Variable	Question	Factors					
		1	2	3	4	5	6
mslq23	I think the material in this program is useful for me to learn.	.258	**.866**	.042	.043	.014	.029
mslq17	I am very interested in the content areas covered in this program.	.263	**.747**	.031	.099	.033	.102
mslq4	I think I will be able to use what I learn in this program in the future.	.197	**.732**	.020	.058	.093	.056
mslq22	The most satisfying thing for me in this program is trying to understand the content thoroughly.	.242	**.619**	.123	.139	.000	.117
mslq27	Understanding the subject matter is very important to me.	.384	**.560**	−.034	.061	.199	.070
avsi48	I think about the possible negative consequences of doing poorly on the exam or assignment.	−.120	.110	**.646**	.121	.201	.109
avsi38	I think about the mistakes that I have made in past exams and assignments when I've procrastinated in my studying.	−.105	.079	**.585**	.186	.177	−.002
avsi42	I think about the amount of time that other students probably study for an exam or course and that they'll get better grades than me.	−.272	−.099	**.556**	.257	.000	.151
avsi34	I think about how disappointed others (family/friends) will be if I do poorly.	−.065	−.104	**.549**	.206	.030	.204
mslq14	When I take an exam or a course, I think of the consequences of failing.	−.094	.082	**.508**	−.110	.212	.082
mslq8	When I take an exam, I think about items on other parts of the exam I can't answer.	−.059	.011	**.506**	−.013	−.111	.072

(Continued)

APPENDIX A. (*Continued*)

Variable	Question	Factors					
		1	2	3	4	5	6
mslq3	When I take an exam or complete an assignment, I think about how poorly I am doing compared with other students.	−.354	.030	**.481**	−.007	−.120	.100
avsi39	When I don't feel like studying, or I feel like quitting, I think about the kinds of career choices I may end up with if I'm not successful.	−.061	.004	**.439**	.237	.175	−.019
mslq30	I want to do well in this program because it is important to show my abilities to my family, friends, employer, or others.	.076	.025	**.403**	.083	.132	.389
avsi50	I think about things that make me feel good whenever I am feeling frustrated about what I need to get done for exam preparation or for the course.	.063	.039	.041	**.712**	.098	.041
avsi47	I usually meditate or use some method of relaxation so I am better able to concentrate.	.053	.056	.088	**.576**	.086	.054
avsi49	I think about my strengths and resources that I can draw on to help me with difficult information on exams or assignments.	.309	.110	−.099	**.536**	.205	.052
avsi45	I think of interesting or different ways to make studying more fun or challenging.	.094	.131	.042	**.529**	.152	.010

(Continued)

APPENDIX A. (*Continued*)

Variable	Question	Factors					
		1	2	3	4	5	6
avsi40	I imagine myself answering exam questions or moving through each assignment without much difficulty.	.316	−.029	−.016	**.467**	.057	−.053
avsi44	I think about the sacrifices that I have made or that my family has made to help me through the program.	−.060	.096	.314	**.463**	.251	.019
avsi32	*I promise myself something I want when I complete a specific amount of studying (e.g., going to a movie, getting together with friends, a favorite CD).*	−.007	.010	.169	.393	−.021	.039
avsi51	*I talk aloud to myself about the material I am studying to keep me from getting distracted by other thoughts or activities.*	−.123	−.009	.043	.390	.115	.012
avsi46	*I think about the goals I have set for myself (how what I do now may affect my future).*	.176	.170	.206	.345	.327	.125
avsi35	*If I am having difficulty, I call a friend and discuss the assignment/material with them.*	.183	−.027	.150	.285	.082	.058
avsi36	I tell myself, “You can do this!”	.141	.111	.036	.292	**.601**	.064
avsi33	I remind myself that I usually do fine on exams and assignments when I stick to a study schedule.	.134	.076	−.045	.325	**.513**	.148

(Continued)

APPENDIX A. (*Continued*)

Variable	Question	Factors					
		1	2	3	4	5	6
avsi37	I think about my exam preparation, other coursework, and that if I don't get going or continue with my studying, I'll fall behind in assignments.	.031	.068	.358	.142	**.503**	.132
avsi43	I tell myself, "Get to it and concentrate, this is an important exam or assignment."	.097	.183	.217	.344	**.466**	.054
avsi41	*I think about how great (how relieved) I'll feel when I get finished.*	.111	−.032	.162	.207	.390	.038
mslq11	The most important thing to me right now is improving my overall grade point average, so my main concern is getting good grades.	−.033	.127	.164	.151	.171	**.719**
mslq7	Getting good grades is the most satisfying thing to me right now.	.091	.250	.140	.003	.225	**.692**
mslq13	If I can, I want to get better grades than most of the other students.	.196	−.041	.196	.040	−.078	**.556**
mslq16	*In a program like this, I prefer material that arouses my curiosity, even if it is difficult to learn.*	.332	.177	−.015	.122	.045	.135
mslq1	*I prefer exam and course material that really challenges me so I can learn new things.*	.398	.307	.006	.121	.057	.050
mslq24	*When I have the opportunity, I choose assignments that I can learn from even if they don't guarantee a good grade.*	.117	.304	.132	.143	.013	−.010

(Continued)

APPENDIX A. (*Continued*)

Variable	Question	Factors					
		1	2	3	4	5	6
mslq28	*I feel my heart beating fast when I take an exam.*	−.174	−.027	.363	.092	.065	.072
mslq19	I have an uneasy, upset feeling when I take an exam.	−.311	.001	**.409**	−.090	−.021	.080
mslq25	*If I don't understand the material, it is because I didn't try hard enough.*	.136	.141	.111	−.052	.028	.026
mslq9	*It is my own fault if I don't learn the material.*	.179	.056	.123	.017	.036	.098
mslq10	It is important to me to learn the material.	.231	**.418**	−.008	.037	.227	.183

Note. Values in boldface type indicate the item's primary factor loading that is greater than 0.4. Items in italics contain no factor loading greater than 0.4.
Extraction Method: Maximum likelihood. *Rotation*: Varimax with Kaiser Normalization. Kaiser–Meyer–Olkin = .867; Bartlett's test of sphericity $\chi^2 = 7{,}433.406$, $df = 1{,}275$, $p < .001$.
Factor 1= self-efficacy; Factor 2 = task value; Factor 3 = negative-based incentives; Factor 4 = stress reducing actions; Factor 5 = self-efficacy enhancements; Factor 6 = external goal orientation.

APPENDIX B. Correlation Matrix

	1	2	3	4	5	6	7	8	9
1. Intrinsic goal orientation	1.00	.263***	.617***	.425***	.483***	.055	.263***	.076	.257***
2. Extrinsic goal orientation		1.00	.245***	.203***	.150**	.295***	.314***	.388***	.146*
3. Task value			1.00	.466***	.555***	−.054	.254***	.388***	.192**
4. Control of learning beliefs				1.00	.509***	−.082	.199**	.056	.134*
5. Self-efficacy					1.00	−.375***	.204***	−.154**	.303***
6. Test anxiety						1.00	.124*	.500***	−.062
7. Self-efficacy enhancement							1.00	.507***	.570***
8. Negative-based incentives								1.00	.346***
9. Stress reducing actions									1.00
N	302	302	298	302	302	303	301	297	302
Min	4	4	16	10	8	5	6	3	0
Max	28	28	42	28	56	35	45	35	20
Median	22	19	36	22	46	19	31	18	10
Mean	21.32	18.37	35.26	21.85	44.98	19.14	30.56	18.08	9.76
SD	3.96	4.91	5.18	3.59	7.03	6.32	7.14	7.39	4.52

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

APPENDIX C. Parameter Estimates, Path Coefficients, and Model Fit Statistics for Path Models

	M_{full} (n = 297)	M_{high} (n = 197)	M_{low} (n = 100)	M_{male} (n = 41)	M_{female} (n = 256)
			Parameter Estimation[a]		
VC → IGO	.748	.730	.790	.726	.768
VC → EGO	.349	.327	.408	.509	.322
VC → TV	.829	.804	.857	.976	.785
EC → CLB	.621	.591	.713	.900	.575
EC → SEL	.785	.731	.831	.758	.778
Mot → VC	.763	.779	.861	1.046	.723
Mot → EC	1.091	1.007	1.075	.722	1.228
Vol → SEE	.895	.868	.918	.955	.866
Vol → NBI	.554	.570	.557	.687	.548
Vol → SRA	.651	.686	.597	.748	.629
Mot → GPA	.281	.115	−.062	−.062	.274
Vol → GPA	−.150	−.140	.195	−.176	−.129
			Estimated Standardized Path Coefficients		
VC → IGO	.75**	.73**	.79**	.73**	.77**
VC → EGO	.35**	.33**	.41**	.51**	.32**
VC → TV	.83**	.80**	.86**	.98**	.79**
EC → CLB	.62**	.59**	.71**	.90**	.58**
EC → SEL	.78**	.73**	.83**	.76**	.78**
Mot → VC	.76**	.78**	.86**	1.05**	.72**
Mot → EC	1.09**	1.01**	1.07**	.72**	1.23**
Vol → SEE	.89**	.87**	.92**	.95**	.87**
Vol → NBI	.55**	.57**	.56**	.69**	.55**
Vol → SRA	.65**	.69**	.60**	.75**	.63**
Mot ↔ Vol	.42**	.49**	.39*	.56*	.40**
Mot → GPA	.28**	.12	−.06	−.06	.27**
Vol → GPA	−.15*	−.14	.20	−.18	−.13
			Model Fit		
χ^2	38.402	25.937	27.925	25.062	34.467
df	19	19	19	19	19
χ^2/df	2.021	1.365	1.470	1.319	1.814
TLI	.951	.969	.945	.930	.952

(Continued)

APPENDIX C. ***(Continued)***

	M_{full} (n = 297)	M_{high} (n = 197)	M_{low} (n = 100)	M_{male} (n = 41)	M_{female} (n = 256)
			Model Fit		
CFI	.974	.984	.971	.963	.975
RMSEA	.059	.043	.069	.089	.057

Notes. VC = value component; IGO = internal goal orientation; EGO = extrinsic goal orientation; TV = task value; EC = expectancy component; CLB = control of learning beliefs; SEL = self-efficacy for learning; Mot = motivation; Vol = volition; SEE = self-efficacy enhancement; NBI = negative-based incentives; SRA = stress reducing actions; GPA = grade point average; TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.
[a] Parameter estimates are standardized.
* $p<.05$; ** $p<.01$