Using the LASSI to Predict First Year College Achievement: Is a Gender-specific Approach Necessary?

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LASSI responses were combined with SAT and GPA information from 342 first year college students to examine relationships between study habits, motivation, gender and achievement. Gender pervasively influenced the results. Despite lower SAT scores, females attained higher first year college GPAs. LASSI responses differed by gender with females scoring higher on five sub-scales. Male students were disproportionately represented in the lowest quartile group for three LASSI sub-scales. Predictors of first year GPA also differed by gender, explaining 27% and 19% variance for female and male students respectively. Overall, students scoring in the lowest quartile on Time Management or Attitude earned GPAs which were significantly poorer than their peers' GPAs. SATs correlated with LASSI subscales but with gender differences. Results point to the use of LASSI sub-scale scores and a gender-specific approach to identify students at risk of academic failure.

The route to appropriate academic intervention begins with identification of those at risk of failure. A commonly used diagnostic tool at the college level is the Learning and Study Skills Inventory (LASSI; Weinstein & Palmer, 2002; Melancon, 2002; Olaussen & Braten, 1998). The LASSI purports to assess students' self-regulated learning skills and achievement motivation. Assessments of this nature are useful since these constructs have been linked with academic achievement (Alexander & Murphy, 1998; Pintrich & DeGroot, 1990). Therefore the LASSI has the potential to identify students whose weak study skills and habits could put them at risk of failure. In fact, Proctor, et al., (2007) used the LASSI to differentiate high- from low-achieving students. In their study, college students with a GPA of 2.5 or lower scored significantly lower than students with a GPA of 2.5 or higher on eight of the ten sub-scales.

An important question that follows is whether LASSI scores predict short- and longer-term achievement. Prus, et al. (1995) examined the relationship between the LASSI and SAT

scores, grade point average, and retention in first year college students including an analysis by gender and ethnicity. They found some weak relationships among the variables and concluded that the LASSI was limited in its ability to predict achievement. More recently, Cano (2006) investigated the relationship between LASSI scores and first and final year college student achievement. He found that two groupings of sub-scales explained approximately 11% and 18% of the total variance in first and final year grades respectively. These two groups were labeled affective strategies (Time Management, Motivation, Concentration, and Attitude) and goal strategies (Anxiety, Test Strategies, and Selecting Main Ideas). A third group, Comprehension Monitoring (Information Processing, Self-Testing, and Study Aids), was not predictive at either year of enrollment. The study focused on the latent composition of the LASSI, meaning that aggregate latent constructs instead of sub-scale scores were used as predictor variables. The contribution of specific sub-scale scores to achievement was left in question.

Several studies have found gender differences in GPA favoring female students (Chee, Pino & Smith, 2005; Clifton, et al., 2008; Sheard et al, 2009). LASSI norm data is not reported by gender (Weinstein & Palmer, 2002) and Prus, et al. (1995) found only slight differences among males and females. Little research has been done to investigate gender differences in LASSI scores and the role that such differences may play in predicting achievement outcomes.

Our initial goal was to identify individuals with weak learning skills and maladaptive motivation patterns upon entrance to college to see if these students' GPA outcomes were significantly different from higher-skilled and more suitably motivated peers. Second, we were interested in the direct contribution of sub-scale total scores to academic outcomes, since this information is more typically available to the average college adviser or counselor, and since the factor structure of the LASSI has been called into question (Melancon, 2002; Murphy &

Alexander, 1998). Moreover, since the skills and habits captured in the sub-scales are supposedly responsive to intervention (Haught, 1998; Proctor, et al., 2007), understanding which areas constrain or promote achievement is of interest to both students and counselors. Finally, we were interested in examining gender differences in sub-scale scores, first year GPA, SAT scores, and in the relationships among the variables.

METHOD

Participants

Participants were recruited through first year seminar sections at a branch campus of a land grant university. The total sample included 392 first year college students (n = 206 males, n = 186 females), of traditional age (*M*= 18.44 years, *SD* = 0.98 years). However, data analysis pertaining to achievement was conducted on scores from the 342 first year college students (n=205 males, n=137 females), of traditional age (*M*= 18.40 years, *SD* = 0.81 years), who gave permission to the researchers to access their academic records on an on-going basis. This included retrieving SAT scores along with current and future GPA information. Due to attrition from fall to spring semester, 327 complete academic records were retrieved when examining first year GPA. Minorities comprised 23% of the sample, comparable to the proportion of minorities in the entering class of students at the college. In this sample, female first year students entered college with significantly lower SAT Verbal (*M* = 454.99, *SD* = 75.26 for females, *M* = 499.30, *SD* = 73.49 for males, $t_{(360)}$=-7.44, p<0.001) and SAT Math scores (*M* = 465.1, *SD* =76.25 for females, *M*= 527.6, *SD* = 83.36 for males, $t_{(360)}$=-5.67, p<0.001).

Materials and Procedure

Following informed consent procedures, participants completed the 80-item, Likert scale LASSI on the Internet (Weinstein & Palmer, 2002). Groups of sub-scales and sample items are

shown in Table 1. Data were downloaded in raw score and percentile form using the normative data (Weinstein & Palmer, 2002). Data were analyzed using SPSS 17.0.

RESULTS

Internal consistency reliability

Sub-scales demonstrated excellent internal consistency reliability. Highest to lowest alpha values were: Anxiety (α = .85), Information Processing (α = .83), Self-Testing (α = .83), Selecting Main Ideas (α = .83), Time Management (α = .82), Motivation (α = .81), Concentration (α = .80), Study Aids (α = .76), Test Strategies (α = .75), and Attitude (α = .67). These values are almost identical to those provided in the LASSI User's Manual (Weinstein & Palmer, 2002), even though our sample was much smaller than the norm sample.

Descriptive statistics for LASSI sub-scales

Descriptive statistics for LASSI sub-scales are shown in Table 2. Gender differences were significant for five of the ten sub-scales. After Bonferroni corrections, females scored significantly higher on Attitude, $t_{(383)}$=-5.79, p<0.01, Motivation, $t_{(383)}$=-3.68, p<0.01, Self-Testing, $t_{(383)}$=-2.75, p<0.01, and Time Management, $t_{(383)}$=-3.02, p<0.01. Females also scored significantly lower on Anxiety $t_{(383)}$=5.39, p<0.01. It is noted that the gender differences were most pronounced for the Affect/Motivation sub-scale cluster, they were moderate for the Self-regulation group, and were non-existent for the Skill-specific sub-scales category.

Relationships between LASSI and GPA for male and female students

Female students obtained higher GPAs (M = 2.98, SD =0.68) after the first year of college than male students (M = 2.68, SD = 0.90) in the sample, $t_{(314.90)}$ =3.41, p<0.01. Correlations between first year GPA and the LASSI sub-scales for males and females are shown

in Table 3. Overall, the LASSI was significantly related to GPA for the total sample for five sub-scales: Concentration, Time Management, Study Aids, Attitude, and Motivation. The pattern was very different, however, when examined by gender. Motivation remained significantly related to academic achievement for both females and males but the other sub-scales indicated gender differences. Test Strategies was the only other sub-scale related to academic achievement for females but this was not true for males. In contrast, Concentration, Time Management, and Attitude were significantly correlated with GPA for males but not females.

Relationships between SAT and LASSI scores, and GPA

As expected, SAT scores were significantly related to first year GPA for the total sample as well as the gender based sub-samples (Table 4). Table 4 also reveals the relationships between the LASSI and SATs for females and males. For the total sample, six of the ten LASSI sub-scales were related to both SAT Math (SATM) and SAT Verbal (SATV) scores. In addition, Concentration correlated with SATV and Attitude was related to SATM. However, when analyzed by gender, only the Anxiety and Information Processing sub-scales show a pattern similar to the whole sample. Concentration was related to SATM and SATV for females but not males while Time Management was related to both SAT tests for males but not females. Self-testing was related to SATM for females and SATV for males. Study Aids was related to both SATM and SATV for males but only SATM for the females. Selecting Main Ideas and Test Strategies were related to both SATM and SATV for males but not to SATM for females. Finally, the Attitude and Motivation sub-scales were related to SATV for females but not for males.

For female students, a regression analysis using SAT scores and LASSI sub-scales explained almost one third of the total variance (R^2 = .27), which was highly significant $F_{(4,154)}$ = 13.76, p<0.001 (Table 5). SAT Verbal (β = 0.26, p<0.01) and SAT Math scores (β = 0.21, p<0.05) predicted 21% of the total variance (cumulative R^2 = .21), and the sub-scales Motivation (β = 0.29, p<0.001) and Attitude (β = -0.23, p<0.01) explained the additional variance. For male students, approximately one fifth of the total variance was explained (R^2 = .19), which was statistically significant, $F_{(4,168)}$ = 9.84, p<0.001. SAT Math (β = 0.39, p<0.001) accounted for one tenth of the total variance (R^2 = .10), but also important were Attitude (β = 0.18, p<0.05), Test strategies (β = -0.25, p<0.001) and Time Management (β = 0.19, p<0.05). For males, SAT Verbal scores did not enter significantly into the regression equation.

Groups of low versus high performing students

Using high and low GPA, sub-samples of students were identified; those with a GPA of below a C average or 2.0 (not meeting minimum graduation requirements) (n = 52) and those with a GPA average above 3.5 (qualifying for dean's list) on a 4.0 scale (n = 69). Descriptive statistics for the groups are presented in Table 6. Overall, after Bonferroni corrections were applied, low-performing students differed significantly from their high-performing peers on the Motivation sub-scale only, $t_{(119)}$ = -3.50, p<0.005. Once again gender emerged as an important mediating variable. There were 18 female students in the low GPA group, compared with 34 male students. By contrast, genders were more equitably represented in the high GPA group. There were 35 females in the high GPA group, compared with 34 males. Because females had scored significantly higher than males on five of the LASSI sub-scales, we hypothesized that

males may be over-represented in the low GPA group. A chi-square test revealed statistically significant differences in frequency counts by gender, χ^2 (1, N=121) = 2.96, p<0.05 (one-tailed).

Groups of students with weak versus strong skills and motivation.

To examine GPA differences between students in the low and high sub-scale LASSI groups, independent samples t-tests were conducted using first year GPA as the dependent variable with students grouped by LASSI sub-scale scores to represent the lowest and highest quartiles based on LASSI normative data (Weinstein &Palmer, 2002) (Table 7). After Bonferroni corrections, enduring differences were indicated by weak versus strong Concentration, $t_{(28)}$ = -2.50, p<0.01 and weak versus strong Time management, $t_{(32.28)}$ = -4.34, p<0.001. Poor scores on these sub-scales contributed to substantial discrepancies in GPA at the end of the year; 2.65 versus 3.24 for Concentration and 2.49 versus 3.69 for Time Management (Table 7).

Table 8 expands on this analysis using gender grouping. Gender differences were again apparent when Male students were over-represented in the weak skills groups for the areas of Time Management, Study Aids and Motivation (Table 8).

DISCUSSION

This study furthers our understanding of factors that influence academic success during the first year in college, and reveals a pervasive role for gender in describing entry qualifications, study habits, motivation, and subsequent achievement. In addition to finding that females achieved a higher GPA, females also had more adaptive responses on five of ten LASSI sub-scales. These differences were focused in the Affect/Motivation and Self-regulatory groups of sub-scales. No substantial gender differences in skill-specific (i.e. cognitive) strategies were

found. The results also showed that males were over-represented in the lowest achieving group at the end of the first year, and over-represented in the lowest quartile for Time Management, Study Aids, and Motivation. This finding echoes that of Downing et al., (2008), who found that female college students reported more positive attitudes and more sophisticated use of self-regulation strategies, but augments previous work in that the differential responses are now examined with respect to achievement. In this regard, mixed and gender-specific results were found. Prus, et al. (1995) reported that nine out of ten sub-scales significantly related to GPA for males but this figure was reduced to six for females. Specifically, sub-scales in the skill-specific (cognitive strategy) group did not correlate with female students' GPA. Our data, on the other hand, found only four significant correlations for males (all in the self-regulatory and affect/motivation clusters) and just two for females. Test- taking was significantly related to GPA for the female group but not the male group, and only the Motivation sub-scale was significantly correlated with GPA for both genders. This could be due to a difference in the samples of college students or perhaps the approximately ten year difference between the studies has resulted in different behaviors among today's first year college students. Taken together, these findings suggest that incoming male students who score poorly on the self-regulatory and motivational components of the LASSI may be at risk of poor academic outcomes. Since most college attrition occurs from year one to year two of enrollment and since first year GPA can contribute to eligibility for entrance to competitive majors in the sophomore year, we believe this finding is important and needs to be studied further.

That several LASSI sub-scales were significantly related to both the SATM and SATV scores was an unexpected finding. Why a test of scholastic aptitude with the purpose of predicting achievement during the first year of college is correlated to so many of the study skills

and motivational measures warrants further examination. Furthermore, the gender differences revealed in the correlations of LASSI and SATs may give us clues as to the differing impact of the interaction of affect, skills, and aptitude variables among male and female college students. It is not clear why different self-regulatory variables were related to GPA for female students than for males. It is also unclear why for female students, LASSI scores should be more highly and more equitably correlated with SAT scores than for male students.

The addition of LASSI to SAT scores for the regression analysis resulted in an additional six-to-nine percent of the variance in GPA being explained. This contribution is slightly less than the 10% reported by Cano (2006). However, in our analysis once again gender featured prominently. For females, sub-scales in the Affective strategies group were significant when looking at first year GPA. For males, Time Management, Attitude and Test Strategies were significantly related to college GPA after one year. These findings, plus the disproportionate representation of males in the low skills group for the sub-scales of Time Management, Study Aids, and Motivation, suggest that markers of academic success and the potential for academic failure differ for male and female students. Put simply, early indicators of future academic distress differ by gender. These data also suggest that it may be useful to further develop separate norms for the LASSI for males and females, and on a practical level to be mindful of the potential for gender-specific profiles of strength and weakness when planning intervention and skill acquisition programs.

Further research is needed to replicate these findings and to establish whether they can be generalized to other populations, whether specific interventions do in fact ameliorate academic problems over the long-term, and whether it is feasible to appropriate college resources towards the identification of individuals with specific versus general difficulties. However, the data do

suggest that plans for screening and intervention should not make the assumption that early indicators of academic distress and academic achievement are the same for male and female students. Instead, they may benefit from explicitly considering gender as a mediating variable when seeking to answer the question, “What predicts a successful outcome to the first year of college?”

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TABLE 1
Sub-scales and sample items from the Learning and Study Skills Inventory

Sub-scale Name	Sample item
Self-regulation component	
Concentration (CON)	I concentrate fully when studying
Self-testing (SFT)	When preparing for an exam, I create questions that I think might be included
Test Strategies (TST)	I am unable to summarize what I have just heard in a lecture or read in a textbook*
Time Management (TMT)	I find it hard to stick to a study schedule*
Skill-specific component	
Information Processing (INP)	I try to find relationships between what I am learning and what I already know
Selecting Main Ideas (SMI)	I have difficulty identifying the important points in my reading*
Study Aids (STA)	My underlining is helpful when I review text material
Affect and motivation component	
Anxiety (ANX)	I feel very panicky when taking an important test
Attitude (ATT)	I am able to study subjects I do not find interesting
Motivation (MOT)	I set high standards for myself in school

* Item is reverse scored

TABLE 2
Summary of percentile scores on the LASSI (n=342)

Sub-scale	Males		Females		Total sample	
	Mean	SD	Mean	SD	Mean	SD
Self-regulation component						
CON	44.21	26.80	43.00	25.32	43.83	26.18
SFT	37.74*	28.49	45.96	28.51	41.64	28.77
TST	51.07	27.54	47.82	27.11	48.47	27.43
TMT	35.70*	27.17	44.24	27.90	40.16	27.71
Skill-specific component						
INP	46.08	28.65	45.19	27.95	45.38	27.75
SMI	50.58	24.97	45.83	26.70	46.86	26.05
STA	30.20	26.78	48.25	28.22	38.31	28.90
Affect and motivation component						
ANX	53.80*	29.19	38.08	25.65	45.27	28.13
ATT	24.31*	25.42	37.63	24.82	30.77	26.04
MOT	40.27*	27.87	50.46	27.86	45.00	28.21

*$p<0.005$ for means by gender .

TABLE 3
Correlations of first year GPA and LASSI sub-scales for female and male students.

	GPA Total (n = 326) r	GPA Females (n = 157) r	GPA Males (n = 169) r
Self-regulation component			
CON	.11*	.08	.14*
SFT	.06	-.06	.09
TST	.04	.20**	-.06
TMT	.13**	.03	.16*
Skill-specific component			
INP	-.01	-.10	.04
SMI	.02	.11	-.01
STA	.10*	.01	.07
Affect and motivation component			
ANX	-.01	.08	.01
ATT	.15**	-.07	.20**
MOT	.23**	.21**	.20**

* $p<0.05$, ** $p<0.01$

TABLE 4
Correlations of grade point average with SATs and LASSI sub-scales by gender.

	Total (n = 358)		Females (n = 176)		Males (n = 182)	
	SATM	SATV	SATM	SATV	SATM	SATV
	r	r	r	r	r	r
Grade Point Average†	.25***	.20***	.40***	.40***	.31***	.19***
Self-regulation component						
CON	.09	.21**	.18*	.39***	.05	.08
SFT	-.14**	-.15**	-.13*	-.07	-.04	-.14*
TST	-.14**	.30**	.06	.36*	.20**	.23**
TMT	-.19**	-.16**	-.08	.00	-.16*	-.23**
Skill-specific component						
INP	.07	.09	-.08	.09	.16	.11
SMI	.21**	.32**	.11	.35***	.27***	26***
STA	-.24**	-.23**	-.14*	-.10	-.13*	-.20**
Affect and motivation component						
ANX	.25*	.28*	.16*	.16*	.18*	.27***
ATT	-.13*	-.04	-.11	.15*	.07	.02
MOT	.00	-.02	.06	.16*	.10	-.05

* p<0.05, **p<0.01 ***p<.001
† N=327, (n=155 females, n=173 males)

TABLE 5

Summary of Simple Regression Analyses for Variables Predicting First Year GPA

	Total (n=280)			Males (n=168)			Females (n=154)		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
SAT Math	0.00	0.00	0.25	0.00	0.00	0.39	0.00	0.00	0.21
SAT Verbal	-	-	-	-	-	-	0.00	0.00	0.26
CON	-	-	-	-	-	-	-	-	-
SFT	-	-	-	-	-	-	-	-	-
TST	0.00	0.00	-0.14	-0.01	0.00	-0.25	-	-	-
TMT	-	-	-	0.01	0.00	0.19	-	-	-
INP	-0.01	0.00	-0.16	-	-	-	-	-	-
SMI	-	-	-	-	-	-	-	-	-
STA	-	-	-	-	-	-	-	-	-
ANX	-	-	-	-	-	-	-	-	-
ATT	-	-	-	0.01	0.00	0.18	-0.01	0.00	-0.23
MOT	0.01	0.00	0.37	-	-	-	0.01	0.00	0.29
R^2	0.15**			0.19**			0.27**		
F	$F_{(4,280)} = 12.26$			$F_{(4,168)} = 9.84$			$F_{(4,154)} = 13.73$		

*$p < .05$. **$p < .01$.

TABLE 6
Mean and standard deviations for low and high achievement groups (n=123)

Sub-scale	Low GPA (<2.0) n=52		High GPA (>3.5) n=69	
	Mean Percentile score	SD	Mean Percentile score	SD
Self-regulation component				
CON	42.11	23.52	53.80	24.99
SFT	40.29	30.31	43.62	30.28
TST	53.50	27.66	55.87	22.29
TMT	36.27	28.01	45.97	29.41
Skill-specific component				
INP	47.15	27.45	44.59	29.54
SMI	49.83	27.06	54.16	24.06
STA	35.21	30.71	40.64	27.29
Affect and motivation component				
ANX	54.19	29.31	52.00	27.39
ATT	25.69	24.40	35.13	25.00
MOT	35.04*	26.52	52.38	27.29

* $p<0.005$.

TABLE 7
Descriptive statistics for first year GPA in weak and strong LASSI groups

Sub-scale	Weak skills group (<25th percentile)			Strong skills group (>75th percentile)		
	Mean GPA	SD	n	Mean GPA	SD	n
Self-regulation component						
CON	2.72*	0.78	104	3.05	0.71	61
SFT	2.79	0.85	130	2.94	0.78	61
TST	2.77	0.65	91	2.81	0.91	79
TMT	2.70	0.88	127	2.96	0.77	52
Skill-specific component						
INP	2.91	0.76	89	2.86	0.80	73
SMI	2.80	0.71	87	2.73	0.91	71
STA	2.74	0.83	142	2.92	0.75	59
Affect and motivation component						
ANX	2.82	0.73	100	2.73	0.93	68
ATT	2.72	0.86	170	2.93	0.65	22
MOT	2.61**	0.86	108	3.00	0.79	58

*$p < .01$. **$p < .005$.

TABLE 8
Frequencies of male and female students in weak and strong LASSI groups (n=342)

Sub-scale	Weak skills (<25th percentile)		Strong skills (>75th percentile)		Chi-Square statistic
	Male	Female	Male	Female	
Self-regulation component					
CON	26	49	35	26	$\chi^2(1, N=165)=0.31$
SFT	81	49	26	35	$\chi^2(1, N=191)=6.53^{**}$
TST	43	48	43	36	$\chi^2(1, N=170)=0.87$
TMT	79	48	17	35	$\chi^2(1, N=179)=12.92^{***}$
Skill-specific component					
INP	48	41	37	36	$\chi^2(1, N=162)=0.17$
SMI	33	54	40	31	$\chi^2(1, N=158)=5.33^{*}$
STA	99	43	17	42	$\chi^2(1, N=201)=28.58^{***}$
Affect and motivation component					
ANX	38	62	51	17	$\chi^2(1, N=168) =22.24^{***}$
ATT	115	55	11	11	$\chi^2(1, N=192) =2.69$
MOT	67	41	23	35	$\chi^2(1, N=166)=7.62^{**}$

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