Multiple Measurements Regarding the Competence of the Andragogical Learner: Results Sections

Student`s Name

Institution of Learning

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Inferential Correlational Data: Hypothesis Testing

Classical inferential statistics based on experimental designs with a large number of participants and populations are structured for the most part in such a way so that the researcher can possibly reject a null hypothesis. Most traditional research is aimed at being able to say that a certain null hypothesis has a very low probability of being correct, thereby yielding evidence that an alternative hypothesis of difference may exist. The ability to reject a null hypothesis also means that the groups measured (usually a large sample size, much like that of this study's total population of 400 participants or more) are not different, however it does not mean that the null hypothesis is wrong. What is critical in studies where the total population and the participant sampling will be lower in terms of data points, is that the statistical interpretation of the inferential data to that of the practical interpretation (Abel & Campbell, 2009).

The number of hypotheses to be tested is important to consider when the dataset is considered statistically small. The rationale used to interpret that statement is that the more hypotheses a study has, the more likely it becomes that some of the analyses will produce inaccurate or unreliable conclusions, whereas the fewer the number of hypotheses that are tested, the better chance of producing meaningful results from the data (Bouffard, et el, 1998).

Hypotheses testing were performed using various statistical approaches and represented the best possible analyses given the finite stratified random sampling of the adult learner participants, circumscribed within a uniquely delineated adult learner

population. The hypotheses tested were all stated in the null form. Each of the hypotheses will be discussed in a singularly cogent manner. The dependent variables utilized variation in their scaling which necessitated the conduction of the analyses using standardized Z-scores (Canipe, 2001). Sustained and continued work *in situ* at College C indicates the need to standardize the scales for all three psychometric measurements from this study so that a broader landscape beyond that established by this study of adult learning can be elucidated.

H_o1: *There is no difference in class rank, age group, or gender on the Self – Directed Learning Readiness Scale – Adults (SDLRS – A), the Motivated Strategies for Learning Questionnaire (MSLQ), and the Academic Motivation Scale – College 28 (AMS – C 28).*

Multivariate General Linear Model (GLM)

The multivariate GLM is a model used to put into practice MANOVA statistical measures and it is applicable where there is presence of more than one dependent and independent variables (IVs)

The SPSS GLM performed generated various outputs needed for this study. Table 21 shows the GLM output on numbers per response group for each independent variable incorporated in the analysis. The independent variables include the class rank, age group and gender variables. The table presents the value labels defined for levels of the between-subjects factors, which serves as useful reference when interpreting the results. In the table, it is shown that gender 1 and 2 correspond to male and female, respectively. Other output variables are shown by the preceding syntax as described in the table.

Table 21

Between-Subjects Factors

		Value Label	N
Class Rank	1	Freshman	15

	2	Sophomore	13
	3	Junior	13
	4	Senior	17
Age Group	1	25-34 years	21
	2	35-44 years	25
	3	45-54 years	9
	4	55+ years	3
Gender	1	Male	12
	2	Female	46

Box's Test of Equality of Covariance Matrices

The box test of equality of covariance matrices theory is used to check whether variance-the covariance matrices contained by each cell of the mean are tested from the same population variance-covariance matrix. The test is known to be very sensitive and hence can report statistically important outcomes or insignificant results that should be disregarded especially where the unit sizes are the same and the sample size is bigger.

The insignificant p-value associated with Box's test of equality in table 22 indicates that the assumption of homogeneity of covariance matrices has been satisfied and interpretations of the results are meaningful.

Table 22

Box's Test of Equality of Covariance Matrices[a]

Box's M	26.517
F	1.268
df1	12
df2	497.328
Sig.	.234

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.
a. Design: Intercept + LastEdu + CurrentCourse + Major + CurrentCourse * Major

The p-value of M is <.05 as shown in table 22 hence, the

covariances are significantly diverse. This rejects the null hypothesis since the co-variances are not consistent. To proof this, the p-value of F distribution needs to be greater than .05 to maintain homogeneity assumption of box's M tests. Since the Box's M test is exceptionally sensitive to destructions of the normality assumptions, these results may appear less valuable.

Multivariate Analysis

Multivariate result presents crucial information on the degree to which unambiguous Independent Variables and a mixture of Independent Variables are linked with the collective Dependent Variables. The test allows one to identify whether a specific independent variable has a logical consequence across a range of sub-scales. If it does not reveal, then it is possible that the independent variable has potentially conflicting results on correlated sub-scales, which may not make any meaning from the view of more exhaustive analysis supposing these subscales are not negatively correlated. The multivariate tests are used to analyze the significant effects for the dependent variables. The test focuses on the independent variables and their relations.

In examining the results of the *F-test*s as shown in table 23, the results labeled intercept are usually ignored. The values in the significant section (sig) display the *p-values* for the four multivariate tests that were carried out. The results in the second part of the table (highlighted sig. column) show that the interface effects among the variables are significant i.e. they show *($p< .05$)*, which means that there is a significant effect except for *age group** that confirm no significance in all tests although *Roy's largest root* is more moderate.

The Interpretation of the MANOVA requires a decision on the use of which of the four (4) tests of significance: Wilk's Lambda is widely used since it offers a good balance between power and assumptions. Pillai's Trace is useful when sample sizes are small, cell sizes are unequal, or covariances are not homogeneous. Hotelling's Trace is useful when examining differences between two groups and Roy's Maximum Root has utility when the dependent variables are strongly correlated and the assumptions are met.

Table 23

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.066	.772[a]	3.000	33.000	.518
	Wilks' Lambda	.934	.772[a]	3.000	33.000	.518
	Hotelling's Trace	.070	.772[a]	3.000	33.000	.518
	Roy's Largest Root	.070	.772[a]	3.000	33.000	.518
ClassRank	Pillai's Trace	.398	1.782	9.000	105.000	.080
	Wilks' Lambda	.637	1.822	9.000	80.464	.077
	Hotelling's Trace	.517	1.820	9.000	95.000	.074
	Roy's Largest Root	.387	4.514[b]	3.000	35.000	.009
AgeGroup	Pillai's Trace	.233	.984	9.000	105.000	.458
	Wilks' Lambda	.779	.964	9.000	80.464	.476
	Hotelling's Trace	.267	.939	9.000	95.000	.496
	Roy's Largest Root	.180	2.100[b]	3.000	35.000	.118
Gender	Pillai's Trace	.124	1.559[a]	3.000	33.000	.218
	Wilks' Lambda	.876	1.559[a]	3.000	33.000	.218
	Hotelling's Trace	.142	1.559[a]	3.000	33.000	.218
	Roy's Largest Root	.142	1.559[a]	3.000	33.000	.218
ClassRank *	Pillai's Trace	.974	2.105	24.000	105.000	.005
	Wilks' Lambda	.282	2.196	24.000	96.311	.004
AgeGroup	Hotelling's Trace	1.722	2.272	24.000	95.000	.003
	Roy's Largest Root	1.134	4.963[b]	8.000	35.000	.000
ClassRank *	Pillai's Trace	.564	2.700	9.000	105.000	.007
	Wilks' Lambda	.495	2.999	9.000	80.464	.004
Gender	Hotelling's Trace	.907	3.192	9.000	95.000	.002
	Roy's Largest Root	.768	8.958[b]	3.000	35.000	.000
AgeGroup *	Pillai's Trace	.268	1.755	6.000	68.000	.122
	Wilks' Lambda	.740	1.787[a]	6.000	66.000	.115
Gender	Hotelling's Trace	.340	1.815	6.000	64.000	.110
	Roy's Largest Root	.304	3.445[b]	3.000	34.000	.027
ClassRank *	Pillai's Trace	.324	2.191	6.000	68.000	.054
	Wilks' Lambda	.697	2.178[a]	6.000	66.000	.056
AgeGroup *	Hotelling's Trace	.405	2.161	6.000	64.000	.058
	Roy's Largest Root	.308	3.494[b]	3.000	34.000	.026
Gender						

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + ClassRank + AgeGroup + Gender + ClassRank * AgeGroup + ClassRank * Gender + AgeGroup * Gender + ClassRank * AgeGroup * Gender

The Multivariate Tests (Pillai's, Wilks', Hotelling's, and Roy's) that were used to test the MANOVA null hypothesis indicates that the mean on the combined variable is the unchanged across groups rejected.

Follow-Up Tests – Univariate ANOVAs

Levene test in table 24 scrutinizes the degree to which the standard deviation gains contrast from one unit to another of the mean for definite Dependent Variables. Levene's test is very critical because any serious divergence from the unit variance could lead to undependable statistical conclusions.

Table 24

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
Standardized AMS-C28 z score	1.210	22	35	.300
Standardized SDLRS-A z score	1.787	22	35	.061
Standardized MSLQ z score	1.063	22	35	.426

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + ClassRank + AgeGroup + Gender + ClassRank * AgeGroup + ClassRank * Gender + AgeGroup * Gender + ClassRank * AgeGroup * Gender

Following examination of Levene's test of homogeneity of variances as shown in table 24, all assumptions have been satisfied and the small sample size (n = 58) requires interpretation of the Pillai's Trace. Pillai's Trace indicates that no difference in performance on the AMS-C28, SDLRS-A, or MSLQ were detected based on class rank (p = .080), age group (p = .458), or gender (p = .218). Post hoc testing was not indicated as no significant differences were detected.

Univariate Analysis

The between-subjects tests present the findings about whether the precise Independent Variables or a grouping of Independent Variables are considerably connected to specified Dependent Variables. Table 25 reports the outcome of the univariate tests that illustrates the effect of each independent variable on different dependent variables. The highlighted part is the most essential part for this study. The p-values demonstrate conflicting results of some groupings having significant effect on the results of the standardized *z-score* tests like SDLRS-A for class rank age group (p = .001), AMS-C28 class rank-Gender (p = .004), SDLRS-A class rank-Gender (p = .001), and MSLQ age group Gender (p = .017). However, the rest of the groups show non-significant effect i.e. AMS-C28 class rank age group (p = .475), MSLQ class rank age group (p = .220), MSLQ class rank Gender (p = .161), AMS-C 28 age group Gender (p = 270), SDLRS-A age group Gender (p = .504), AMS-C 28 class rank age group (p = 279) and MSLQ age group Gender (.678).

Table 25

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Standardized AMS-C28 z score	28.647[a]	22	1.302	1.607	.102
	Standardized SDLRS-A z score	38.241[b]	22	1.738	3.243	.001
	Standardized MSLQ z score	27.141[c]	22	1.234	1.446	.161
Intercept	Standardized AMS-C28 z score	1.283	1	1.283	1.584	.217
	Standardized SDLRS-A z score	.590	1	.590	1.102	.301
	Standardized MSLQ z score	1.405	1	1.405	1.647	.208

ClassRank	Standardized AMS-C28	4.582	3	1.527	1.885	.150
	z score Standardized SDLRS-A	5.034	3	1.678	3.131	.038
	z score Standardized MSLQ z	1.515	3	.505	.592	.624
	score Standardized AMS-C28	.387	3	.129	.159	.923
AgeGroup	z score Standardized SDLRS-A	1.833	3	.611	1.140	.346
	z score Standardized MSLQ z	1.920	3	.640	.750	.530
	score Standardized AMS-C28	1.153	1	1.153	1.423	.241
Gender	z score Standardized SDLRS-A	.011	1	.011	.021	.886
	z score Standardized MSLQ z	.271	1	.271	.318	.576
	score Standardized AMS-C28	6.285	8	.786	.970	.475
ClassRank * AgeGroup	z score Standardized SDLRS-A	18.631	8	2.329	4.345	.001
	z score Standardized MSLQ z	9.746	8	1.218	1.428	.220
	score Standardized AMS-C28	12.941	3	4.314	5.325	.004
ClassRank * Gender	z score Standardized SDLRS-A	11.262	3	3.754	7.004	.001
	z score Standardized MSLQ z	4.661	3	1.554	1.821	.161
	score Standardized AMS-C28	2.204	2	1.102	1.360	.270
AgeGroup * Gender	z score Standardized SDLRS-A	.748	2	.374	.698	.504
	z score Standardized MSLQ z	7.804	2	3.902	4.574	.017
	score Standardized AMS-C28	2.144	2	1.072	1.324	.279
ClassRank *						

AgeGroup * Gender	z score Standardized SDLRS-A	2.518	2	1.259	2.349	.110
	z score Standardized MSLQ z score	.669	2	.335	.392	.678
Error	Standardized AMS-C28	28.353	35	.810		
	z score Standardized SDLRS-A	18.759	35	.536		
	z score Standardized MSLQ z score	29.859	35	.853		
Total	Standardized AMS-C28	57.000	58			
	z score Standardized SDLRS-A	57.000	58			
	z score Standardized MSLQ z score	57.000	58			
Corrected Total	Standardized AMS-C28	57.000	57			
	z score Standardized SDLRS-A	57.000	57			
	z score Standardized MSLQ z score	57.000	57			

a. R Squared = .503 (Adjusted R Squared = .190)

b. R Squared = .671 (Adjusted R Squared = .464)

c. R Squared = .476 (Adjusted R Squared = .147)

The results in table 25 are from the three separate univariate ANOVAS that were carried out to investigate the effects of one or more independent variable on more than one dependent variable. This analysis focuses on how the independent variables affect each dependent variable.

Profile Analysis

The estimates for particular Independent Variables (class rank, age and gender) and specified Dependent Variables (self-directed learning and motivation) in the tables (26a, b, and c) give valuable information that comprise of the mean, standard error (i.e. take standard deviation (stD) divide it with the square root of sample size), and lower bound vs. the upper bounds of 95% confidence time interval. The mean and standard error give adequate information to make conclusions about the possibility of certain mean score being considerably diverse.

The confidence interval (CI) in table 26 (a, b, and c) shows that, if the lower and upper bounds for a confidence interval (CI) related to particular mean do not go beyond the CI of another mean score, then the disparity amid the two mean scores is likely to be statistically considerable. The estimated marginal means, shows whether the individual independent variable contrast with dependent variables. Profile plots based on the standardized scores are provided as a means of displaying the non-statistically significant differences among the independent and dependent variables. It should be noted that while not specified in H01, interactions were detected between class rank*age group (p = .005) and class rank*gender (p = .007).

Estimated Marginal Means

Table 26a

Class Rank

Dependent Variable	Class Rank	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Standardized AMS-C28 z	Freshman	.209[a]	.329	-.459	.877
	Sophomore	-.148[a]	.323	-.804	.508
score	Junior	-.686[a]	.316	-1.329	-.044
	Senior	.137[a]	.245	-.360	.634
Standardized SDLRS-A z	Freshman	-2.575E-5[a]	.268	-.544	.543
	Sophomore	.208[a]	.263	-.326	.742
score	Junior	-.620[a]	.257	-1.143	-.098

	Senior	-.260[a]	.199	-.665	.144
Standardized MSLQ z score	Freshman	.388[a]	.338	-.297	1.074
	Sophomore	-.702[a]	.332	-1.376	-.029
	Junior	-.368[a]	.325	-1.027	.291
	Senior	.084[a]	.251	-.426	.595

a. Based on modified population marginal mean.

It is estimated that the more the marginal means of dependent variables differ by the factor level, the stronger the relation will become for that dependent factor. Table 26a indicates a strong relationship since the marginal means have a bigger difference between the factor levels. When examining the upper and lower bounds in the table, it is clear that there is a large difference in CI, which means the comparisons are significant.

Table 26b

Age Group

Dependent Variable	Age Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Standardized AMS-C28 z	25-34 years	-.192[a]	.260	-.720	.336
	35-44 years	-.347[a]	.229	-.812	.119
score	45-54 years	.008[a]	.330	-.661	.678
	55+ years	.194[a]	.520	-.861	1.249
Standardized SDLRS-A z	25-34 years	-.361[a]	.212	-.790	.069
	35-44 years	-.311[a]	.186	-.690	.067
score	45-54 years	-.115[a]	.268	-.660	.429
	55+ years	.453[a]	.423	-.405	1.311
Standardized MSLQ z score	25-34 years	-.265[a]	.267	-.807	.277
	35-44 years	-.023[a]	.235	-.500	.455
	45-54 years	.074[a]	.338	-.613	.761
	55+ years	-.803[a]	.533	-1.886	.280

a. Based on modified population marginal mean

Table 26b also signifies a strong relationship since the marginal means have a bigger difference between the factor levels. When investigating its upper and lower bounds in the table, it is clear that there is a large difference in CI, which means the comparisons are significant. The same results are revealed in table 26c, which also shows disparity in confidence interval indicating a significant effect.

Table 26c

Gender

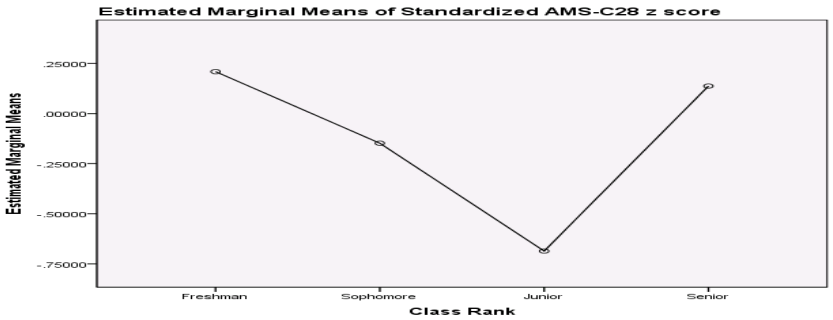
Dependent Variable	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Standardized AMS-C28 z score	Male	-.425[a]	.280	-.993	.143
	female	.049[a]	.173	-.303	.401
Standardized SDLRS-A z score	Male	-.359[a]	.228	-.821	.103
	female	-.058[a]	.141	-.344	.229
Standardized MSLQ z score	Male	.003[a]	.287	-.580	.586
	female	-.286[a]	.178	-.647	.075

a. Based on modified population marginal mean.

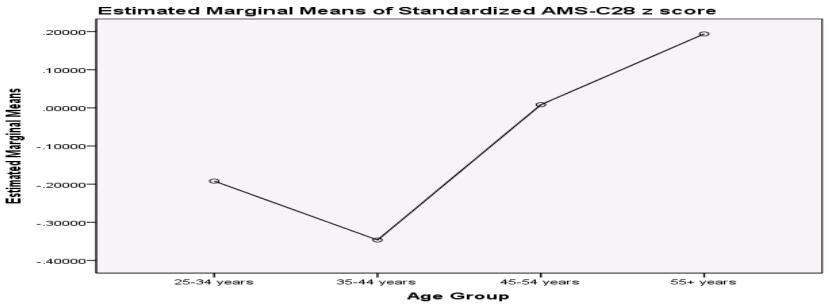
Profile Plots

The profile plots at this point (see graphs 1-9) displays the equivalent estimated marginal mean findings in graphical form. Each dot in the graph of the profile plot specifies the estimated marginal mean of the independent variable at one level of a given factor. The profile plot graphs illustrates if the estimated marginal means are increasing across different levels. The profile plots in this section shows the same results from the estimated marginal mean graphically for easy understanding. The profile plot in these graphs indicates whether the estimated marginal means are decreasing or increasing across the factor levels (Aderinto, 2006).

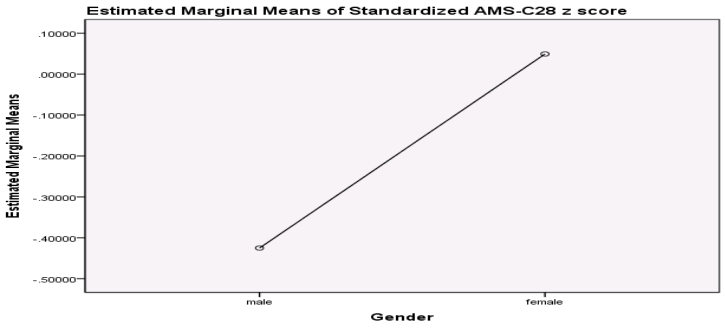
1. Class Rank (AMS-C28 z Score)



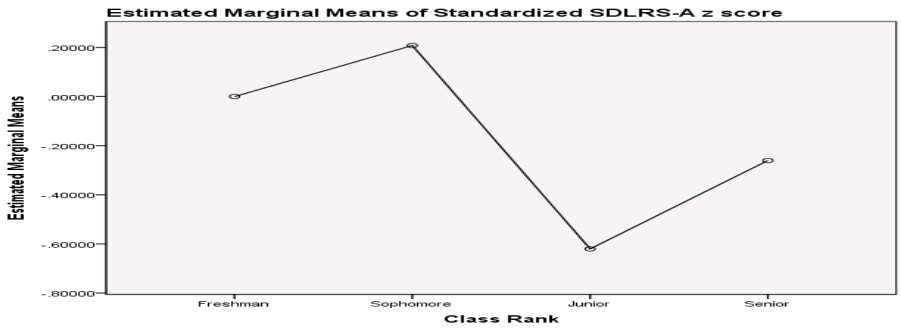
2. Age Group (AMS-C28 z Score)



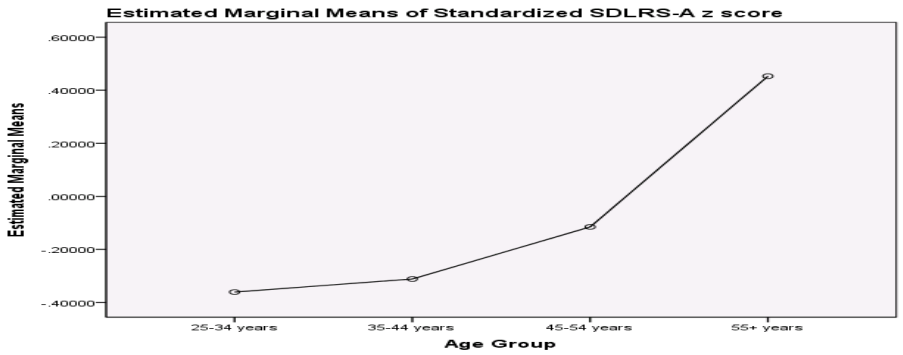
3. Gender (AMS-C28 z Score)



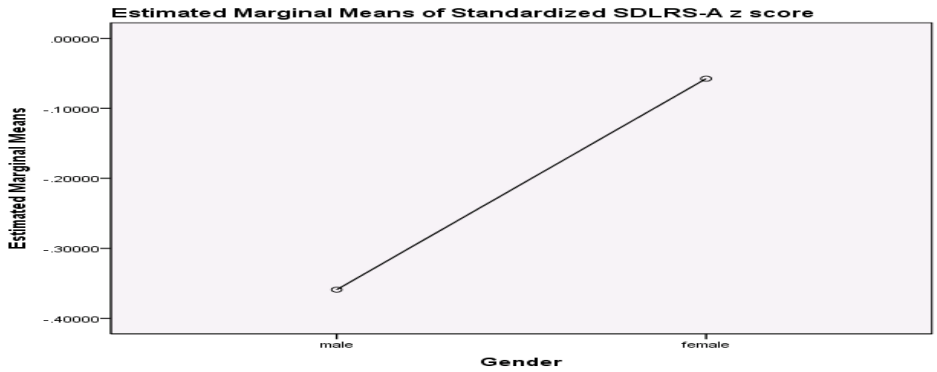
4. Class Rank (SDLRS-A Z score)



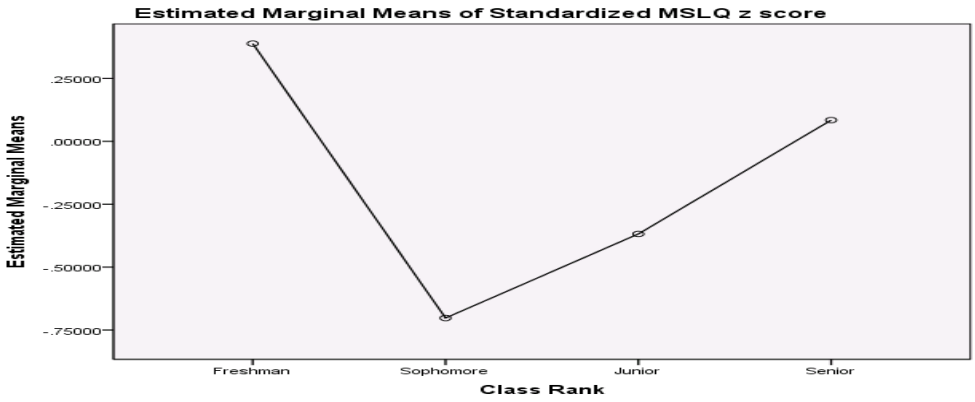
5. Age Group (SDLRS-A Z score)



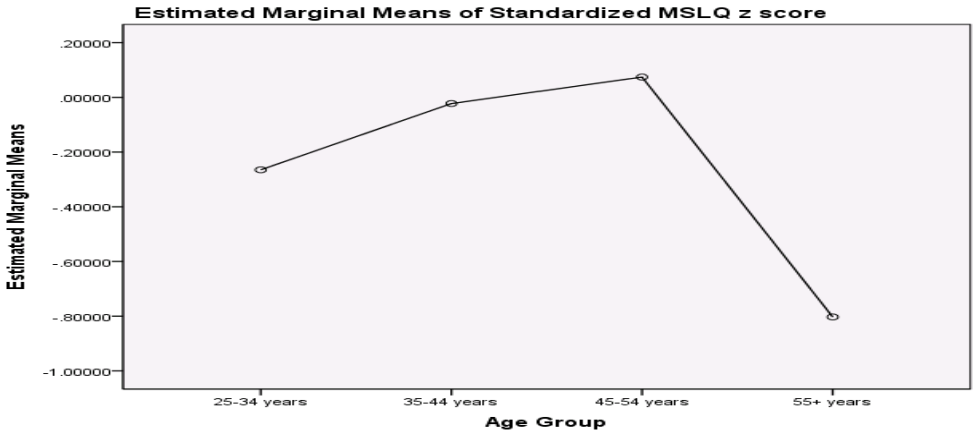
6. Gender (SDLRS-A Z score)



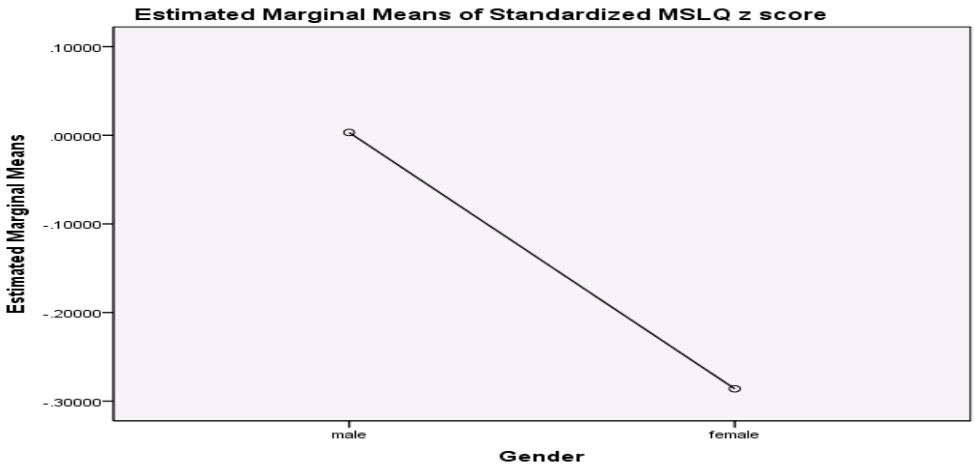
7. Class Rank (MSLQ Z score)



8. Age Group (MSLQ z score)



9. Gender (MSLQ Z score)



H_0 2: *There is no effect of course taken at time of study, academic major, the number of years between last formal education and current program on the SDLRS-A, MSLQ, and AMS-C 28 scores.*

General Linear Model (GLM)

Before running the MANCOVA the homogeneity of regression (slopes) assumption was first tested using the general linear model (GLM) function. Table 27 shows the moderate variables used in this study indicating the current course types and academic major courses undertaken by students at College C. The output variables are shown by the preceding syntax as described in the table.

Table 27:

Between-Subjects Factors

		Value Label	N
Current Course Type	2	Business	5
	3	Communications	4
	7	Mathematics	12
	8	Physical Education	3
	9	Political Science	5
	10	Religion	17
	12	Sociology	1
	13	Criminology	6
	14	Psychology	3
	15	Theater	2
Academic Major	1	Business Administration	20
	2	Criminology	6
	3	Early Child/Elementary Education	3
	4	Communications	2
	5	Psychology	8
	6	Social Work	2
	7	Sociology	9
	8	Undecided	8

Homogeneity of Covariances

Table 28 indicates that the assumption of homogeneity of covariance matrices has been satisfied and interpretations of the results are meaningful. The homogeneity of the covariances was not violated since the sig. value is not less than .001 (p<.001).

Table 28

Box's Test of Equality of Covariance Matrices[a]	
Box's M	26.517
F	1.268
df1	12
df2	497.328
Sig.	.234
Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.	
a. Design: Intercept + LastEdu + CurrentCourse + Major + CurrentCourse * Major	

The p-value of M is <.05 as shown in table 28 hence, the covariances are significantly diverse. This rejects the null hypothesis since the co-variances are not consistent. To proof this, the p-value of F distribution needs to be greater than .05 to maintain homogeneity assumption of box's M tests. Since the Box's M test is exceptionally sensitive to destructions of the normality assumptions, these results may appear less valuable.

Multivariate Tests

Similar to MANOVA, the interpretation of the MANCOVA requires a decision on the use of which of the four (4) tests of statistical significance and since Pillai's Trace is called for in cases where the sample size is small and the cells are unequal. In examining the results of the MANCOVA, all of the p-values (Sig.) in the "Multivariate Test", look at the highlighted part in table 29. Again all the four tests on the variables are

non-significant. Therefore, it can be concluded that the effects of last education, current course and course major on the self-directed learning and motivation are not significant.

Table 29

Moderate Variables: Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.096	.782[a]	3.000	22.000	.517
	Wilks' Lambda	.904	.782[a]	3.000	22.000	.517
	Hotelling's Trace	.107	.782[a]	3.000	22.000	.517
	Roy's Largest Root	.107	.782[a]	3.000	22.000	.517
LastEdu	Pillai's Trace	.062	.482[a]	3.000	22.000	.698
	Wilks' Lambda	.938	.482[a]	3.000	22.000	.698
	Hotelling's Trace	.066	.482[a]	3.000	22.000	.698
	Roy's Largest Root	.066	.482[a]	3.000	22.000	.698
CurrentCourse	Pillai's Trace	.616	.689	27.000	72.000	.859
	Wilks' Lambda	.488	.670	27.000	64.894	.875
	Hotelling's Trace	.847	.649	27.000	62.000	.892
	Roy's Largest Root	.518	1.383[b]	9.000	24.000	.250
Major	Pillai's Trace	.557	.782	21.000	72.000	.732
	Wilks' Lambda	.521	.773	21.000	63.722	.739
	Hotelling's Trace	.774	.761	21.000	62.000	.752
	Roy's Largest Root	.519	1.780[b]	7.000	24.000	.138
CurrentCourse * Major	Pillai's Trace	1.024	.777	48.000	72.000	.823
	Wilks' Lambda	.273	.754	48.000	66.227	.847
	Hotelling's Trace	1.697	.731	48.000	62.000	.870
	Roy's Largest Root	.969	1.453[b]	16.000	24.000	.199

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + LastEdu + CurrentCourse + Major + CurrentCourse * Major

computed using alpha of .05

Follow-Up Tests – Univariate ANOVAs

Examination of Levene's test of homogeneity of variances in table 30 indicates the assumption of variance assumption has been violated with the MSLQ data (p = .024) but not the other 2 dependent variables. This violation is insufficient at this time to negate interpretation of the results which indicates the independent variables: current course (p = .859) and academic major (p = .732) do not have on effect on the AMS-C28, SDLRS-A, or MSLQ.

Additionally, the covariate, years since last formal education (p = .698), does not have an effect on the dependent variables. With the failure to detect any effect, post hoc testing was not indicated. Profile plots based on the standardized scores are again provided as a means of displaying the non-statistically significant differences among the independent and dependent variables. While not specified in H02, interaction between current course*academic major (p = .823) was also deemed insignificant.

Table 30

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
Standardized AMS-C28 z score	1.394	32	25	.198
Standardized SDLRS-A z score	1.820	32	25	.063
Standardized MSLQ z score	2.186	32	25	.024

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + LastEdu + CurrentCourse + Major + CurrentCourse * Major

Covariate Tests

Parametric tests were performed to examine whether there could be any mean variation that can arise from the independent variables when combined with dependent variables. Table 31 shows the outcomes after creating individual dependent variables. The findings indicate that the overall model is not statistically significant, for example, F =

1.276, p = .300 for current course (AMS-C 28), F = .628, p = .831 major (AMS-C 28), and F = .371, p = 910 (SDLRS-A) variables.

Table 31

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Standardized AMS-C28 z score	32.643[a]	33	.989	.975	.535
	Standardized SDLRS-A z score	26.359[b]	33	.799	.626	.895
	Standardized MSLQ z score	29.104[c]	33	.882	.759	.772
Intercept	Standardized AMS-C28 z score	2.090	1	2.090	2.059	.164
	Standardized SDLRS-A z score	.049	1	.049	.038	.846
	Standardized MSLQ z score	1.375	1	1.375	1.183	.287
LastEdu	Standardized AMS-C28 z score	1.106	1	1.106	1.090	.307
	Standardized SDLRS-A z score	.001	1	.001	.001	.980
	Standardized MSLQ z score	1.031	1	1.031	.887	.356
CurrentCourse	Standardized AMS-C28 z score	11.652	9	1.295	1.276	.300
	Standardized SDLRS-A z score	5.158	9	.573	.449	.894
	Standardized MSLQ z score	7.207	9	.801	.689	.712
Major	Standardized AMS-C28 z score	11.486	7	1.641	1.617	.179
	Standardized SDLRS-A z score	3.316	7	.474	.371	.910
	Standardized MSLQ z score	11.054	7	1.579	1.359	.267
CurrentCourse *	Standardized AMS-C28 z score	10.194	16	.637	.628	.831
	Standardized SDLRS-A z score	15.373	16	.961	.753	.718
Major	Standardized MSLQ z score	11.677	16	.730	.628	.831
Error	Standardized AMS-C28 z score	24.357	24	1.015		
	Standardized SDLRS-A z score	30.641	24	1.277		
	Standardized MSLQ z score	27.896	24	1.162		
Total	Standardized AMS-C28 z score	57.000	58			
	Standardized SDLRS-A z score	57.000	58			
	Standardized MSLQ z score	57.000	58			
Corrected Total	Standardized AMS-C28 z score	57.000	57			
	Standardized SDLRS-A z score	57.000	57			
	Standardized MSLQ z score	57.000	57			

a. R Squared = .573 (Adjusted R Squared = -.015)

b. R Squared = .462 (Adjusted R Squared = -.277)

c. R Squared = .511 (Adjusted R Squared = -.162)

Estimated Marginal Means

The confidence interval (CI) in table 32(a,b, and c) shows that, if the lower and upper bounds for a confidence interval (CI) related to particular mean do not go beyond

the CI of another mean score, then the disparity amid the two mean scores is likely to be statistically considerable.

Table 32a

1. *Current Course Type*

Dependent Variable	Current Course Type	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Standardized AMS-C28 z score	Business	-.562[a,b]	.578	-1.756	.632
	Communications	.036[a,b]	.505	-1.006	1.077
	Mathematics	-.160[a,b]	.365	-.914	.594
	Physical Education	1.257[a,b]	.617	-.016	2.531
	Political Science	.102[a,b]	.471	-.871	1.075
	Religion	-.052[a,b]	.283	-.637	.533
	Sociology	.743[a,b]	1.035	-1.393	2.879
	Criminology	-.507[a,b]	.514	-1.567	.553
	Psychology	1.204[a,b]	.676	-.191	2.598
	Theater	-.224[a,b]	.756	-1.783	1.336
Standardized SDLRS-A z score	Business	-.057[a,b]	.649	-1.396	1.282
	Communications	.209[a,b]	.566	-.959	1.377
	Mathematics	-.223[a,b]	.410	-1.068	.623
	Physical Education	-.184[a,b]	.692	-1.612	1.244
	Political Science	-.226[a,b]	.529	-1.317	.866
	Religion	-.141[a,b]	.318	-.797	.515
	Sociology	1.034[a,b]	1.161	-1.362	3.430
	Criminology	-.095[a,b]	.576	-1.284	1.094
	Psychology	1.051[a,b]	.758	-.513	2.615
	Theater	.348[a,b]	.848	-1.402	2.097
Standardized MSLQ z score	Business	-.741[a,b]	.619	-2.019	.537
	Communications	.435[a,b]	.540	-.680	1.550
	Mathematics	-.211[a,b]	.391	-1.018	.596
	Physical Education	.506[a,b]	.660	-.857	1.869
	Political Science	-.061[a,b]	.505	-1.102	.981
	Religion	-.016[a,b]	.303	-.642	.610
	Sociology	-.017[a,b]	1.108	-2.303	2.269
	Criminology	-.090[a,b]	.550	-1.224	1.045
	Psychology	1.294[a,b]	.723	-.199	2.786
	Theater	-.443[a,b]	.809	-2.112	1.226

a. Covariates appearing in the model are evaluated at the following values: Number years since last formal education = 16.17.

b. Based on modified population marginal mean.

It is expected that the more the marginal means of dependent variables differ by the factor level, the stronger the relation will become for that dependent factor. Table 32a indicates a strong relationship since the marginal means have a bigger difference between

the factor levels, look at AMS-C 28 for Business course its lower bound = -1.756 and upper bound = .632. When examining the upper and lower bounds in the rest of the table, it is clear that there is a large difference in CI, which means the comparisons are significant. Consequently, table 32b indicates a strong relation since the means have bigger differences between factor levels. This test of significance verifies that the correlation created in the sample can be generalized onto the population from which the sample was drawn.

Table 32b

2. Academic Major

Dependent Variable	Academic Major	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Standardized AMS-C28 z score	Business Administration	-.160[a,b]	.270	-.718	.397
	Criminology	-.785[a,b]	.440	-1.694	.124
	Early Child/Elementary Education	-.847[a,b]	.621	-2.129	.435
	Communications	1.165[a,b]	.719	-.318	2.649
	Psychology	.260[a,b]	.376	-.517	1.036
	Social Work	.243[a,b]	.771	-1.349	1.835
	Sociology	.321[a,b]	.525	-.763	1.405
	Undecided	.518[a,b]	.397	-.303	1.338
Standardized SDLRS-A z score	Business Administration	.154[a,b]	.303	-.471	.779
	Criminology	-.349[a,b]	.494	-1.368	.670
	Early Child/Elementary Education	-.621[a,b]	.697	-2.059	.817
	Communications	.260[a,b]	.806	-1.404	1.924
	Psychology	.414[a,b]	.422	-.457	1.285
	Social Work	.314[a,b]	.865	-1.472	2.099
	Sociology	-.031[a,b]	.589	-1.247	1.185
	Undecided	-.160[a,b]	.446	-1.080	.760
Standardized MSLQ z score	Business Administration	-.020[a,b]	.289	-.617	.576
	Criminology	-.945[a,b]	.471	-1.917	.028
	Early Child/Elementary Education	-1.016[a,b]	.665	-2.389	.356
	Communications	.761[a,b]	.769	-.827	2.348
	Psychology	.257[a,b]	.403	-.574	1.089
	Social Work	.855[a,b]	.825	-.849	2.558
	Sociology	.256[a,b]	.562	-.904	1.416
	Undecided	.373[a,b]	.425	-.504	1.251

a. Covariates appearing in the model are evaluated at the following values: Number years since last formal education =

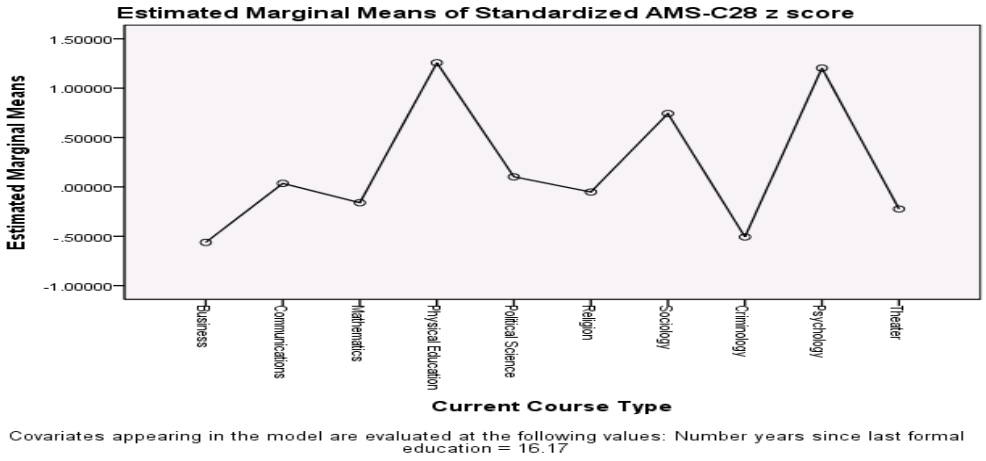
16.17.

b. Based on modified population marginal mean.

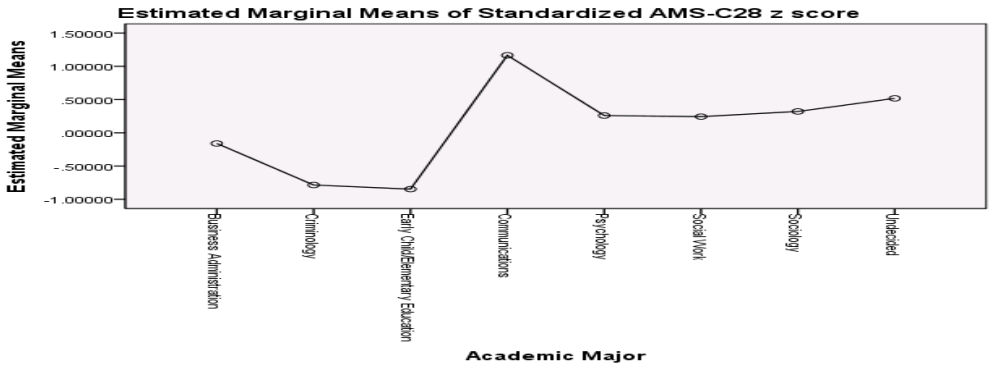
Profile Analysis

The profile plots at this point (see graphs 1-6) displays the equivalent estimated marginal mean findings in graphical form. Each dot in the graph of the profile plot specifies the estimated marginal mean of the independent variable at one level of a given factor. The profile plot graphs illustrates if the estimated marginal means are increasing across different levels.

1. **Current Course Type (AMS-C28 z score)**

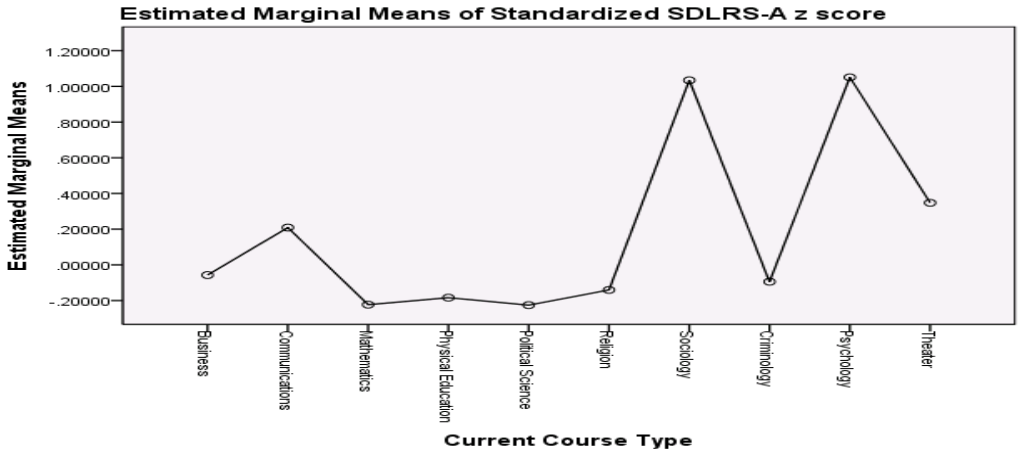


2. **Academic Major (AMS-C28 z score)**



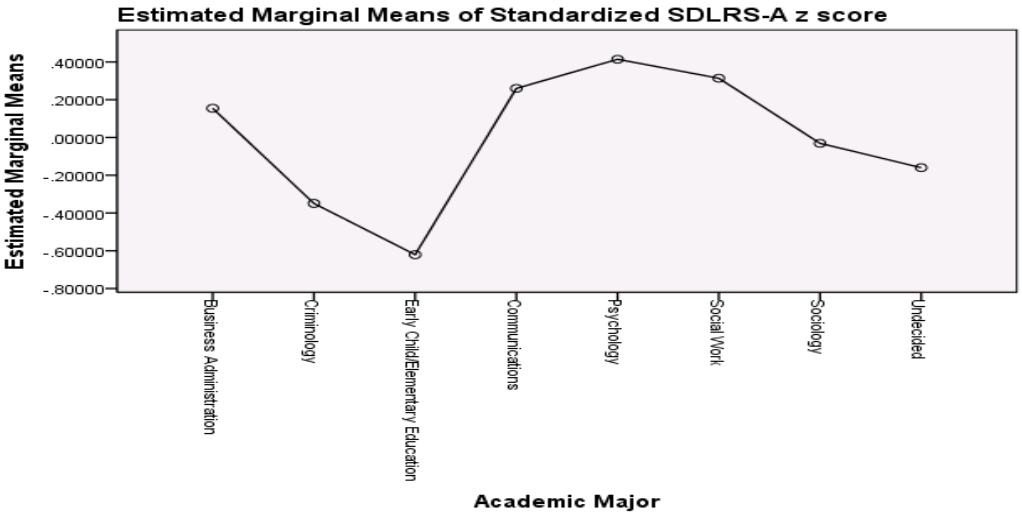
Covariates appearing in the model are evaluated at the following values: Number years since last formal education = 16.17

3. Current Course Type (SDLRS-A z score)



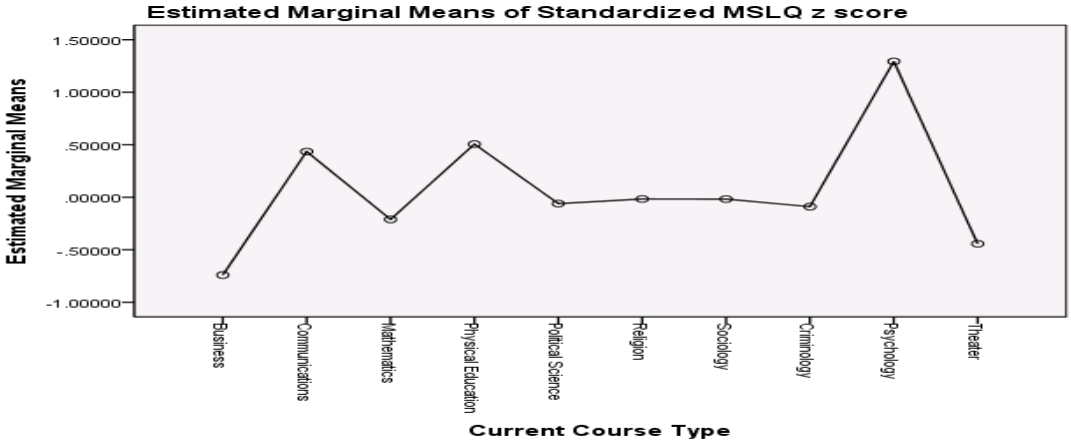
Covariates appearing in the model are evaluated at the following values: Number years since last formal education = 16.17

4. Academic Major (SDLRS-A z score)



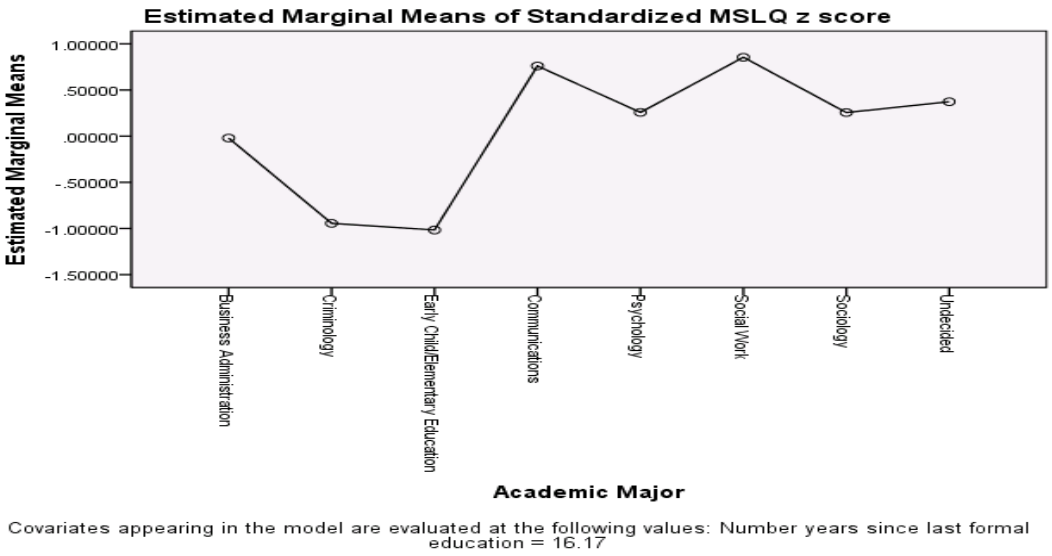
Covariates appearing in the model are evaluated at the following values: Number years since last formal education = 16.17

5. Current Course Type (MSLQ z score)



Covariates appearing in the model are evaluated at the following values: Number years since last formal education = 16.17

6. Academic Major (MSLQ z score)



H_0 3: *There is no relationship between academic major and the SDLRS-A, MSLQ, or AMS-C 28 scores.*

Correlation can be defined as a bivariate measure of the strength of a relationship that exists between two variables. It ranges from random relationship (0) to perfect linear relationship (1) or perfect negative linear relationship (-1). To investigate the correlation in table 33 between academic major and the AMS-C28, SDLRS-A, and MSLQ, a point bi-serial correlation was conducted in SPSS using the command function syntax:

CORRELATIONS = POINTBISERIAL

/VARIABLE = AMS_C28 SDLRS_A MSLQ BY Major

/SIGNIFICANCE = TWOTAIL

/MISSING=PAIRWISE

However, the command function failed to reject H03 since no statistically significant relationship was detected between academic major and the AMS-C28 r_{pb} (58) = .191, $p > .05$, SDLRS-A r_{pb} (58) = .009, $p > .05$, and MSLQ r_{pb} (58) = .145, $p > .05$. These figures point-biserial values which are not acceptable, this indicates that there is no relationship between academic major and the dependent variables. Hence, further theory test is required. The sample data in the table also shows some conflicting p-values. As usual the most dependable p-value tests should range from .0 – 1.0, concentrate largely at the centre i.e. near .5. The highest p-value is (p = .658) which is associated with MSLQ. This test of significance verifies that the correlation created in the sample cannot be generalized onto the population from which the sample was drawn.

Table 33

Correlations: Point bi-serial (eta) Correlation Matrix

		AMS-C28	SDLRS-A	MSLQ	Academic Major
AMS-C28	Correlation	1	.447**	.658**	.191
	Sig. (2-tailed)		.000	.000	.151
	N	58	58	58	58
SDLRS-A	Correlation	.447**	1	.304*	.009

	Sig. (2-tailed)	.000		.020	.947
	N	58	58	58	58
MSLQ	Correlation	.658**	.304*	1	.145
	Sig. (2-tailed)	.000	.020		.279
	N	58	58	58	58
Academic	Correlation	.191	.009	.145	1
	Sig. (2-tailed)	.151	.947	.279	
Major	N	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Note: the correlation was analyzed using composite (mean) from the raw data.

H_0 4: *There is no relationship between age group and the SDLRS-A, or MSLQ, or AMS-C28 scores.*

To investigate the correlation between age group and the AMS-C28, SDLRS-A, and MSLQ, a bi-serial correlation in table 34 was conducted in SPSS using the command function syntax:

CORRELATIONS=BISERIAL

/VARIABLE=AMS_C28 SDLRS_A MSLQ BY Age Group

/SIGNIFICANCE=TWOTAIL

/MISSING=PAIRWISE

The function failed to reject H04 since there was no statistically significant relationship detected between age group and the AMS-C28 *r*b (58) = -.056, $p > .05$, SDLRS-A *r*b (58) = .096, $p > .05$, and MSLQ *r*b (58) = -.121, $p > .05$. This signifies a weak connection between the outcome of age group and the previous test scores in dependent variables. The figures that show negative point-biserial values indicate that there is no relationship between age group and AMS-C 28 and MSLQ. Hence, further theory test is required. Also, the two-tailed test of independence is not significant with $p < 0.01$. Hence the test fails to reject the null hypotheses in that each variable is

independent. This test of significance verifies that the correlation created in the sample cannot be generalized onto the population from which the sample was drawn.

Table 34

Correlations: bi-serial Correlation Matrix

		AMS-C28	SDLRS-A	MSLQ	Age Group
AMS-C28	Correlation	1	.447**	.658**	-.056
	Sig. (2-tailed)		.000	.000	.676
	N	58	58	58	58
SDLRS-A	Correlation	.447**	1	.304*	.096
	Sig. (2-tailed)	.000		.020	.473
	N	58	58	58	58
MSLQ	Correlation	.658**	.304*	1	-.121
	Sig. (2-tailed)	.000	.020		.365
	N	58	58	58	58
Age	Correlation	-.056	.096	-.121	1
	Sig. (2-tailed)	.676	.473	.365	
Group	N	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

H_0 5: *There is no relationship between years since last formal education and SDLRS-A, MSLQ, or AMS-C 28 scores.*

To investigate the relationship between years since last formal education and the AMS-C28, SDLRS-A, and MSLQ, a Pearson's Product Moment correlation matrix (table 35) was generated in SPSS (no command function required). This rejected H05 since there was no statistically significant relationship detected between years since last formal education and the AMS-C28 r (58) = .064, $p > .05$, SDLRS-A r (58) = .140, $p > .05$, and MSLQ r (58) = .029, $p > .05$.

The analysis was carried out on the relationship between the number of years since last formal education and the scores in AMS-C 28, SDLRS-A and MSLQ. The point-biserial correlation analysis found out that the variables are weakly and less perfect linearly connected (r = .658, .140, and .029). This test of significance verifies that the

correlation created in the sample cannot be generalized onto the population from which the sample was drawn.

Table 35

Correlations: Pearson's Product Moment Correlation Matrix

		AMS-C28	SDLRS-A	MSLQ	Number years since last formal education
AMS-C28	Pearson Correlation	1	.447**	.658**	.064
	Sig. (2-tailed)		.000	.000	.635
	N	58	58	58	58
SDLRS-A	Pearson Correlation	.447**	1	.304*	.140
	Sig. (2-tailed)	.000		.020	.296
	N	58	58	58	58
MSLQ	Pearson Correlation	.658**	.304*	1	.029
	Sig. (2-tailed)	.000	.020		.828
	N	58	58	58	58
Number years since last	Pearson Correlation	.064	.140	.029	1
	Sig. (2-tailed)	.635	.296	.828	
formal education	N	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

H_0 6: *There is no relationship between class rank and SDLRS-A, MSLQ, or AMS-C 28 scores.*

To investigate the correlation (see table 36) between class rank and the AMS-C28, SDLRS-A, and MSLQ, a bi-serial correlation was conducted in SPSS using the command function syntax:

```
CORRELATIONS=BISERIAL
/VARIABLE=AMS_C28 SDLRS_A MSLQ BY Class Rank
/SIGNIFICANCE=TWOTAIL
```

/MISSING=PAIRWISE

This also failed to reject H06 since there was no statistically significant relationship detected between class rank and the AMS-C28 r_b (58) = .013, $p > .05$, SDLRS-A r_b (58) = -.124, $p > .05$, and MSLQ r_b (58) = -.022, $p > .05$. The point-biserial correlation analysis found out that the variables are weakly and less perfect linearly connected (r = .013, .124, and .022). This test of significance verifies that the correlation created in the sample cannot be generalized onto the population from which the sample was drawn.

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