Multiple Linear Regression

Research objective: You are interested in predicting cognitive strategy use at the end of the semester (strategyt3) from a series of academic emotions at the beginning (enjoyt1, hopet1, anxietyt1, shamet1, boredt1), middle (enjoyt2, hopet2, anxietyt2, shamet2, boredt2), and end of the semester (enjoyt3, hopet3, anxietyt3, shamet3, boredt3). You are interested in answering the following research question: What is the predictive effect of a series of positive (enjoyment, hope) and negative (anxiety, shame, and boredom) academic emotions on students' end-of-semester cognitive strategy use? Also, do emotions at different time points in the semester (beginning, middle, and end) contribute unique incremental variance to the prediction of end-of-semester cognitive strategy use.

Data submitted to a series of standard/simultaneous linear regression. Result of the models with narrative writing performance as the criterion were statically significant for model one, $F(5,86) = 3.60$, $p = .005$, $R^2 = .173$, model two, $F(5,86) – 3.73$, $p = .004$, $R^2 = .245$, and model 3, $F(5,76) = 9.66$, $p = .001$, $R^2 = .508$. The analysis indicates that academic emotions measures at various points significantly predict cognitive strategy use at the end of the semester. Each model demonstrated incremental improvement. This suggest that both positive and negative emotions play a critical role in influencing students' cognitive strategies.

Hierarchical findings

In the first model, the results showed enjoyment ($b = .253$, $p = .023$, $\beta = .330$), hope ($b = .271$, $p = .038$, $\beta = .263$) and anxiety ($b = .299$, $p = .039$, $\beta = .415$) as significant positive predictors of cognitive strategy use, while shame ($b = -.294$, $p = .035$, $\beta = -.439$) was a significant predictor. Boredom ($b = .159$, $p = .086$, $\beta = .247$) showed no significance. This model highlights the complex relationship between academic emotions emphasizing the beneficial role of positive emotions and negative impact of shame.

In the second model, the results showed a significant positive predictor, hope ($b = .438$, $p = .002$, $\beta = .463$). Other predictors that did not reach statistical significance, enjoyment ($b = .132$, $p = .349$, $\beta = .159$), anxiety ($b = .238$, $p = .127$, $\beta = .318$), shame ($b = -.128$, $p = .429$, $\beta = -.148$) and boredom ($b = -.026$, $p = .799$, $\beta = -.042$). This model highlights that the only significant predictor was hope, indicating a strong positive relationship with cognitive strategy.

In the third model, the results showed a significant positive predictor, hope ($b = .548$, $p = .0004$, $\beta = .542$). A significant negative predictor, shame ($b = -.433$, $p = .004$, $\beta = -.569$), and enjoyment ($b = -.300$, $p = .0019$, $\beta = -.374$) showed a significant negative relationship. Other predictors that did not reach statistical significance, anxiety ($b = .233$, $p = .161$, $\beta = .290$), and boredom ($b = -.105$, $p = .302$, $\beta = -.168$). This model highlights the significant predictor was hope, indicating a strong positive relationship with cognitive strategy, while shame was a significant predictor. Enjoyment, showed a significant negative relationship with cognitive strategies in this model.

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.416[a]	.173	.125	.61645	.173	3.600	5	86	.005
2	.573[b]	.328	.245	.57269	.155	3.729	5	81	.004
3	.768[c]	.589	.508	.46227	.261	9.663	5	76	<.001

a. Predictors: (Constant), boredom survey 1, anxiety survey 1, hope survey 1, enjoyment survey 1, shame survey 1

b. Predictors: (Constant), boredom survey 1, anxiety survey 1, hope survey 1, enjoyment survey 1, shame survey 1, hope survey 2, boredom survey 2, shame survey 2, enjoyment survey 2, anxiety survey 2

c. Predictors: (Constant), boredom survey 1, anxiety survey 1, hope survey 1, enjoyment survey 1, shame survey 1, hope survey 2, boredom survey 2, shame survey 2, enjoyment survey 2, anxiety survey 2, hope survey 3, enjoyment survey 3, shame survey 3, boredom survey 3, anxiety survey 3

d. Dependent Variable: cognitive strategy use - survey 3

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.840	5	1.368	3.600	.005[b]
	Residual	32.681	86	.380		
	Total	39.521	91			
2	Regression	12.955	10	1.296	3.950	<.001[c]
	Residual	26.566	81	.328		
	Total	39.521	91			
3	Regression	23.280	15	1.552	7.263	<.001[d]
	Residual	16.241	76	.214		
	Total	39.521	91			

a. Dependent Variable: cognitive strategy use - survey 3

b. Predictors: (Constant), boredom survey 1, anxiety survey 1, hope survey 1, enjoyment survey 1, shame survey 1

c. Predictors: (Constant), boredom survey 1, anxiety survey 1, hope survey 1, enjoyment survey 1, shame survey 1, hope survey 2, boredom survey 2, shame survey 2, enjoyment survey 2, anxiety survey 2

d. Predictors: (Constant), boredom survey 1, anxiety survey 1, hope survey 1, enjoyment survey 1, shame survey 1, hope survey 2, boredom survey 2, shame survey 2, enjoyment survey 2, anxiety survey 2, hope survey 3, enjoyment survey 3, shame survey 3, boredom survey 3, anxiety survey 3