Grad Stats, Fall 2001 **Second Exam**

Question A

A health psychologist wants to understand some of the variables that might be related to good health behaviors. From a survey of 252 respondents, she has data available for the following variables:

Health	A scale assessing behaviors such as diet, exercise, smoking, etc. The scale is scored so that high scores indicate healthier behaviors.
BDI	Beck Depression Inventory. Higher scores indicate greater depression.
Esteem	Rosenberg's Self-Esteem measure with higher scores indicating higher self-esteem.
Age	age in years
Sex	male and female
Marital	marital status with three levels: single, married, formerly married (which includes separated, divorced, widowed)

Use the variables above and any you might construct from them to specify the **Model A/C** comparisons you would use to answer the following questions for the researcher. Hints: (a) Unless the problem specifically says it is NOT a Model A/C question, provide the models. (b) As usual, provide specific definitions for any variables you construct to code categorical variables or to deviate variables. (c) The first letter of each of the above variables is unique so you can just use that instead of writing out the complete variable name.

1. Do health behaviors generally improve with age?

2. Assuming they do improve with age, determine whether the average score on the Health scale for this researcher's sample differs significantly from the mean of 15.6 that was reported for a national study.

3. Do females have better health behaviors on average than males? (Ignore age and other variables for now).

4. Ignoring the other variables, do the mean health score differ by marital group? (You may want to read the next question before answering this one.)

5. Ignoring variables other than marital status, do those currently married have higher mean health scores than the mean scores of the other two groups?

6. As a group, do the two psychological variables (BDI and Esteem) and the age variable predict health scores?

7. As a group, do the two psychological variables predict health behavior scores over and above age?

8. Is age partially redundant with the two psychological variables?

9. Ignoring the other variables, within levels of sex, is higher depression associated with lower health behaviors?

10. [This is not a Model A/C question.] When a respondent was married, the researcher also surveyed that person's spouse. What complications might this pose for the analysis?

Question B

Shortly after September 11, a number of social psychology graduate students in the Department gathered data from 98 respondents about their reaction to the attacks and what they considered to be appropriate responses. Specifically, among other variables, the following measures were taken:

Party	Political party preference, coded as "ind" for independent, 'rep' for republican, or 'dem' for democrat.

Party was recoded into two contrast coded predictors:

P1	=-2*(party='ind')+1*(party='rep')+1*(party='dem');
P2	=0*(party='ind')+1*(party='rep')-1*(party='dem');
Angry	15 point rating scale of extent to which attacks made them feel angry
Sad	15 point rating scale of extent to which attacks made them feel sad
Fear	15 point rating scale of extent to which attacks made them feel fearful
Extrmil	7 point rating scale indicating agreement with statements that the United States should take very strong military action in response

On the following pages is SAS output. First comes the results of PROC CORR (univariate statistics on all the variable as well as bivariate correlations among them). Then comes the output from a series of PROC REG models in which Extrmil was the dependent variable. The following SAS code was used to generate this output:

```
proc corr;var extrmil angry fear sad p1 p2;
proc reg;
model extrmil=angry/clb;
model extrmil=angry fear sad/tol pcorr2 ss2 clb;
model extrmil=p1 p2/tol pcorr2 ss2 clb;
model extrmil=p1 p2 angry/tol pcorr2 ss2 clb;
model extrmil=p1 p2 angry fear sad/tol pcorr2 ss2 clb;
run;
```

Based on these analyses, answer the following questions

1. Ignoring other variables, were people who felt more anger in response to the attacks more likely to agree that strong military action was the appropriate response? (Give Pre, F*, pa-pc, N-pa, and a one sentence conclusion.)

2. Over and above anger, were the other two emotion questions (Fear and Sad) useful in predicting agreement with Extrmil? (Give Pre, F*, pa-pc, N-pa, and a one sentence conclusion.)

3. Are angry emotional responses to the event predictable from responses to the other two emotion questions (Fear and Sad)? (Give Pre, F*, pa-pc, N-pa, and a one sentence conclusion.)

4. Is political party preference a useful predictor of Extrmil? (Give Pre, F*, pa-pc, N-pa, and a one sentence conclusion.)

5. Among Democrats, what is the mean value of Extrmil?

6. In Model three, where Extrmil is regressed on P1 and P2, provide short interpretations for the intercept (4.135) and the slope for P1 (0.128).

7. Do the three emotion variables (Angry, Fear, Sad) predict Extrmil over and above political party preference? (Give Pre, F*, pa-pc, N-pa, and a one sentence conclusion.)

The CORR Procedure

6 Variables: extrmil angry fear sad p1 p2

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
extrmil	98	4.10816	1.42494	402.60000	1.00000	7.00000
angry	98	11.01276	2.75231	1079	3.00000	15.00000
fear	98	12.06888	2.63863	1183	4.00000	15.00000
sad	98	13.10459	1.94311	1284	7.00000	15.00000
p1	98	0.11224	1.37640	11.00000	-2.00000	1.00000
p2	98	-0.15306	0.82926	-15.00000	-1.00000	1.00000

Pearson Correlation Coefficients, N = 98
Prob > |r| under H0: Rho=0

	extrmil	angry	fear	sad	p1	p2
extrmil	1.00000	0.34045 0.0006	-0.04697 0.6460	0.03739 0.7147	0.10466 0.3051	0.14241 0.1619
angry	0.34045 0.0006	1.00000	0.32948 0.0009	0.46203 <.0001	0.15814 0.1199	-0.05898 0.5640
fear	-0.04697 0.6460	0.32948 0.0009	1.00000	0.63284 <.0001	0.02127 0.8353	-0.07169 0.4830
sad	0.03739 0.7147	0.46203 <.0001	0.63284 <.0001	1.00000	0.00038 0.9970	0.04683 0.6471
p1	0.10466 0.3051	0.15814 0.1199	0.02127 0.8353	0.00038 0.9970	1.00000	-0.12028 0.2381
p2	0.14241 0.1619	-0.05898 0.5640	-0.07169 0.4830	0.04683 0.6471	-0.12028 0.2381	1.00000

The REG Procedure
Model: MODEL1
Dependent Variable: extrmil

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	22.82820	22.82820	12.59	0.0006
Error	96	174.12527	1.81380		
Corrected Total	97	196.95347			

Root MSE	1.34678	R-Square	0.1159
Dependent Mean	4.10816	Adj R-Sq	0.1067
Coeff Var	32.78292		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.16706	0.56381	3.84	0.0002
angry	1	0.17626	0.04968	3.55	0.0006

Parameter Estimates

Variable	DF	95% Confidence Limits	
Intercept	1	1.04791	3.28622
angry	1	0.07764	0.27488

The REG Procedure
Model: MODEL2
Dependent Variable: extrmil

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	28.85818	9.61939	5.38	0.0018
Error	94	168.09529	1.78825		
Corrected Total	97	196.95347			

Root MSE	1.33725	R-Square	0.1465
Dependent Mean	4.10816	Adj R-Sq	0.1193
Coeff Var	32.55114		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Type II SS
Intercept	1	3.28462	0.93663	3.51	0.0007	21.99176
angry	1	0.21623	0.05571	3.88	0.0002	26.94403
fear	1	-0.07758	0.06656	-1.17	0.2467	2.42950
sad	1	-0.04743	0.09622	-0.49	0.6232	0.43451

Parameter Estimates

Variable	DF	Squared Partial Corr Type II	Tolerance	95% Confidence Limits	
Intercept	1	.	.	1.42492	5.14433
angry	1	0.13815	0.78424	0.10563	0.32684
fear	1	0.01425	0.59777	-0.20972	0.05457
sad	1	0.00258	0.52742	-0.23847	0.14361

The REG Procedure
Model: MODEL3
Dependent Variable: extrmil

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	6.95803	3.47901	1.74	0.1811
Error	95	189.99544	1.99995		
Corrected Total	97	196.95347			

Root MSE	1.41420	R-Square	0.0353
Dependent Mean	4.10816	Adj R-Sq	0.0150
Coeff Var	34.42406		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Type II SS
Intercept	1	4.13517	0.14555	28.41	<.0001	1614.36640
p1	1	0.12793	0.10509	1.22	0.2265	2.96393
p2	1	0.27024	0.17442	1.55	0.1246	4.80084

Parameter Estimates

Variable	DF	Squared Partial Corr Type II	Tolerance	95% Confidence Limits	
Intercept	1	.	.	3.84622	4.42411
p1	1	0.01536	0.98553	-0.08069	0.33655
p2	1	0.02465	0.98553	-0.07603	0.61651

The REG Procedure
Model: MODEL4
Dependent Variable: extrmil

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	29.01782	9.67261	5.41	0.0018
Error	94	167.93564	1.78655		
Corrected Total	97	196.95347			

Root MSE	1.33662	R-Square	0.1473
Dependent Mean	4.10816	Adj R-Sq	0.1201
Coeff Var	32.53567		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Type II SS
Intercept	1	2.21075	0.56467	3.92	0.0002	27.38483
p1	1	0.07411	0.10049	0.74	0.4627	0.97150
p2	1	0.29387	0.16499	1.78	0.0781	5.66796
angry	1	0.17562	0.04998	3.51	0.0007	22.05980

Parameter Estimates

Variable	DF	Squared Partial Corr Type II	Tolerance	95% Confidence Limits	
Intercept	1	.	.	1.08959	3.33191
p1	1	0.00575	0.96264	-0.12543	0.27364
p2	1	0.03265	0.98390	-0.03372	0.62147
angry	1	0.11611	0.97337	0.07639	0.27486

The REG Procedure
Model: MODEL5
Dependent Variable: extrmil

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	34.72377	6.94475	3.94	0.0028
Error	92	162.22970	1.76337		
Corrected Total	97	196.95347			

Root MSE	1.32792	R-Square	0.1763
Dependent Mean	4.10816	Adj R-Sq	0.1315
Coeff Var	32.32389		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Type II SS
Intercept	1	3.38278	0.93165	3.63	0.0005	23.24786
p1	1	0.06316	0.10012	0.63	0.5297	0.70185
p2	1	0.29294	0.16569	1.77	0.0804	5.51198
angry	1	0.21829	0.05633	3.88	0.0002	26.48565
fear	1	-0.06330	0.06663	-0.95	0.3446	1.59175
sad	1	-0.06691	0.09671	-0.69	0.4907	0.84419

Parameter Estimates

Variable	DF	Squared Partial Corr Type II	Tolerance	95% Confidence Limits	
Intercept	1	.	.	1.53244	5.23311
p1	1	0.00431	0.95731	-0.13568	0.26201
p2	1	0.03286	0.96291	-0.03614	0.62202
angry	1	0.14035	0.75643	0.10643	0.33016
fear	1	0.00972	0.58814	-0.19564	0.06903
sad	1	0.00518	0.51484	-0.25898	0.12515