

Psychology 407
Assignment J

1) To assess the effects of anxiety on test performance, three sets of instructions to examinees were used: (1) instructions designed to reduce anxiety, (2) neutral (standard) directions, or (3) directions designed to produce anxiety. Students were classified by sex, then randomly assigned to one of three test conditions: A_1 (anxiety-reducing), A_2 (neutral), A_3 (anxiety-producing). Within each level of factor A , 10 boys and 10 girls took a standardized verbal ability test (B_1) and 10 boys and 10 girls took a standardized math ability test (B_2) previously calibrated to be of the same difficulty level as the verbal test. Assume factor C is gender (C_1 and C_2 are boys and girls in some order).

The resulting means based on the 10 observations per cell are given below along with the various sums of squares:

$A_1B_1C_1$	$A_1B_1C_2$	$A_1B_2C_1$	$A_1B_2C_2$	$A_2B_1C_1$	$A_2B_1C_2$	$A_2B_2C_1$	$A_2B_2C_2$	$A_3B_1C_1$	$A_3B_1C_2$	$A_3B_2C_1$	$A_3B_2C_2$
12.7	14.0	16.0	10.5	13.0	13.2	12.6	10.2	12.1	16.3	12.2	13.2

	Sum of Squares
A	34.20
B	36.30
C	1.20
AB	15.20
AC	122.60
BC	132.30
ABC	25.80
Error	2947.50

i) Complete the appropriate ANOVA table and carry out the relevant significance tests.

ii) Interpret the results of the 3-factor interaction test in (i) (whether significant or not) by graphing sets of specific 2-factor interactions. In how many ways (i.e., sets of specific 2-factor interactions) could you do this?

iii) Given the results of (i), explain what is occurring substantively by graphing appropriate sets of means (e.g., think specific effects and interactions).

iv) Indicate schematically how this three-way ANOVA could be rephrased as a regression model and indicate explicitly what the design matrix would look like. (You only need to provide representative rows in the design matrix that would be repeated for all of the 10 observations in each cell).