Question 1

Between-Subject Contrast Codes

| | BED | AN | CONTROLS |
|---|---|---|---|
| X1 | 1 | 1 | -2 |
| X2 | 1 | -1 | 0 |

Within-Subject Codes

| | SAD | NEUTRAL | HAPPY |
|---|---|---|---|
| W0 | 1 | 1 | 1 |
| W1 | 1 | 0 | -1 |
| W2 | -1 | 2 | -1 |

| Source | df | |
|---|---|---|
| Between | | |
| X1 | 1 | Hypothesis A |
| X2 | 1 | |
| Error | 42 | |
| Total Between | 44 | |
| | | |
| Within | | |
| W1 | 1 | Hypothesis B |
| W1 x X1 | 1 | Hypothesis C |
| W1 X X2 | 1 | |
| Error | 42 | |
| | | |
| W2 | 1 | |
| W2 x X1 | 1 | |
| W2 x X2 | 1 | |
| Error | 42 | |
| Total Within | 90 | |
| Total | 134 | |

D. A: $W2 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \varepsilon_i$
C: $W2 = 0 + \beta_1 X1 + \beta_2 X2 + \varepsilon_i$

E. A: $W1 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \varepsilon_i$
C: $W1 = \beta_0 + \beta_2 X2 + \varepsilon_i$

F. A: $W0 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \varepsilon_i$
C: $W0 = \beta_0 + \beta_1 X1 + \varepsilon_i$

G. W3 = (HAPPY-SAD)/2**.5
A: $W3 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \varepsilon_i$
C: $W3 = \beta_0 + \varepsilon_i$

H. A: $W0 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 MOOD + \beta_4 X1xMOOD + \beta_5 X2xMOOD + \varepsilon_i$
C: $W0 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 MOOD + \beta_5 X2xMOOD + \varepsilon_i$

Question 2

A. A: $AVE = \beta_0 + \beta_1 DC + \beta_2 D1D2 + \varepsilon_i$
C: $AVE = \beta_0 + \beta_1 DC + \varepsilon_i$

PRE = .384
F(1, 9) = 5.60
pa – pc = 1
n – pa = 9
p = .04

On average, chimps given drug 2 outperform chimps given drug 1.

B. A: $W1 = \beta_0 + \beta_1 DC + \beta_2 D1D2 + \varepsilon_i$
C: $W1 = 0 + \beta_1 DC + \beta_2 D1D2 + \varepsilon_i$

$$PRE = \frac{SSR}{SSR + SSEa} \quad \frac{10.083}{10.083 + 31.75} = .241$$

PRE = .241
F(1, 9) = 2.86
pa – pc = 1
n – pa = 9
p = .125

The evidence does not suggest that, on average, performance improved linearly across the three days of testing.

C. A: $W1 = \beta_0 + \beta_1 DC + \beta_2 D1D2 + \varepsilon_i$
C: $W1 = \beta_0 + \beta_1 DC + \varepsilon_i$

PRE = .742
F(1, 9) = 25.83
pa – pc = 1
n – pa = 9
p = .0007

The degree to which performance improved across the three days of testing depended upon which drug was administered. The performance of chimps that received drug 1 decreased across the three days, whereas the performance of chimps that received drug 2 improved across the three days.

D. 3.375 is half the difference in the difference in performance on days 1 and 3 for chimps who received drug 1 (-3.5) and chimps who received drug 2 (3.25).

E.

| | D1 | D2 | CONTROL |
|---|---|---|---|
| X3 | 0 | 1 | -1 |

$$SSR = \frac{[1(3.25) - 1(3.00)]^2}{(-1)^2/4 + (1)^2/4} = .125$$

$$PRE = \frac{SSR}{SSR + SSEa} = \frac{.125}{.125 + 31.75} = .0039$$

$$F_{1, 9} = \frac{(PRE/pa\text{-}pc)}{(1\text{-}PRE)/(n\text{-}pa)} = \frac{(.0039/1)}{(1\text{-}.0039)/(9)} = .035$$

$pa - pc = 1$
$n - pa = 9$
$p > .05$

There is no evidence that chimps receiving drug 2 differed from chimps in the control condition in the degree to which their performance improved across the three days.

F. -.75 is two times the difference, on average, between performance on day 2 and the average performance on days 1 and 3. The parameter estimate indicates that performance on day 2 was numerically (although not significantly) worse than the average of days 1 and 3 by .375.