There's no limit to how complicated things can get, on account of one thing always leading to another. -- E. B. White

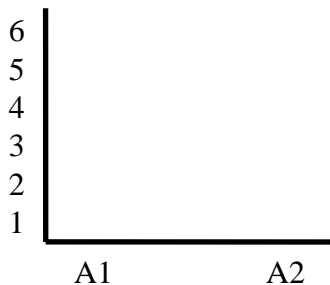### Main Effects & Interactions   _____/80

In any factorial design there are two basic types of effects that can emerge: Main effects and interactions. **Main effects** represent the influence of a single variable, *regardless of the levels of any other independent variables in the study*. A main effect indicates that a single independent variable has had a significant impact on the dependent variable. **Interactions**, on the other hand, indicate that the influence of one independent variable *depends on the levels of one or more other independent variables*.

Consider, for example, the causes of heart disease. If you ask me whether hypertension is a risk factor for coronary disease, I can say "yes" without need for qualification. Hypertension is a main effect variable for coronary heart disease. Regardless of other risk factors you may or may not have, the higher your blood pressure, the greater your risk for developing coronary heart disease. On the other hand, if you ask if Type A behavior is a risk factor for heart disease, I have to say that "it depends." It depends, for example, on whether you have a family history of heart disease and it depends on whether you experience a lot of day-to-day stress. Only when stress is high and you have a family predisposition for heart disease does Type A confer any additional risk. Type A behavior is an interaction variable with regard to coronary heart disease.

Main effects and interactions can occur alone or together in the same data set. Moreover, they produce distinct patterns of data that can be recognized in visual displays. This assignment is designed to give you practice recognizing main effects and interactions. [**DUE: One week from today.**]

Outcome #1:

	A1	A2
B1	6	3
B2	3	6

Graph y-axis: 6 5 4 3 2 1, x-axis: A1 A2

1 Is there a main effect of independent variable A?   Yes/No

   Overall means of A1_____ A2_____

2 Is there a main effect of independent variable B?   Yes/No
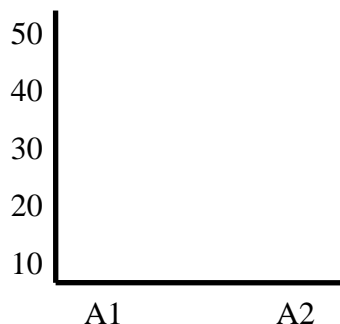
   Overall means of B1_____ B2_____

3 Is there an A x B interaction?   Yes/No

4 Roughly graph the results.

                                            13 pts.

Outcome #2:

	A1	A2
B1	20	30
B2	40	10

Graph y-axis: 50 40 30 20 10, x-axis: A1 A2

1 Is there a main effect of independent variable A?   Yes/No

   Overall means of A1_____ A2_____

2 Is there a main effect of independent variable B?   Yes/No

   Overall means of B1_____ B2_____

3 Is there an A x B interaction?   Yes/No

4 Roughly graph the results.

Outcome #3:

	A1	A2	A3
B1	6	6	6
B2	3	9	3

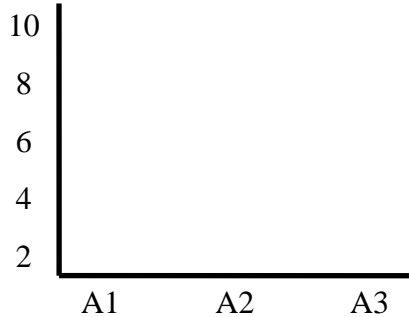1 Is there a main effect of independent variable A?   Yes/No

   Overall means of A1_____ A2_____ A3_____

2 Is there a main effect of independent variable B?   Yes/No

   Overall means of B1_____ B2_____

3 Is there an A x B interaction?   Yes/No

4 Roughly graph the results.

```
10
 8
 6
 4
 2
     A1        A2        A3
```

Outcome #4:

	A1	A2	A3	A4
B1	3	3	4	2
B2	6	6	5	7

1 Is there a main effect of independent variable A?   Yes/No

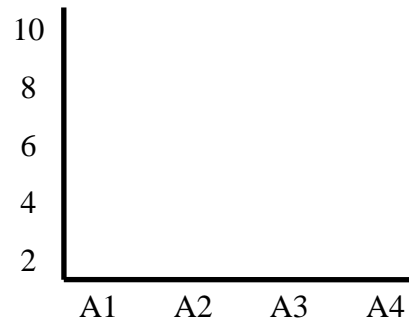   Means of A1_____ A2_____ A3_____ A4_____

2 Is there a main effect of independent variable B?   Yes/No

   Overall means of B1_____ B2_____

3 Is there an A x B interaction?   Yes/No

4 Roughly graph the results.

```
10
 8
 6
 4
 2
     A1     A2     A3     A4
```

Outcome #5:

	A1	A2	A3	A4
B1	45	15	35	25
B2	15	35	25	45

1 Is there a main effect of independent variable A?   Yes/No
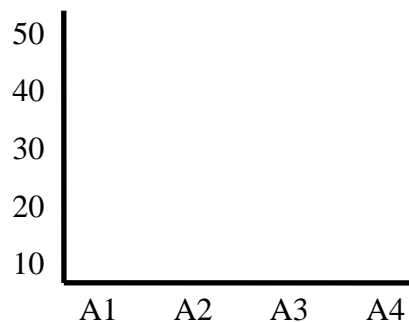
   Means of A1_____ A2_____ A3_____ A4_____

2 Is there a main effect of independent variable B?   Yes/No

   Overall means of B1_____ B2_____

3 Is there an A x B interaction?   Yes/No

4 Roughly graph the results.

```
50
40
30
20
10
     A1     A2     A3     A4
```