Statistics 5303
Fall 2003

Exam #1 Data

Our first exam is Friday, March 17. The exam is open book and open notes. Analyze the two data sets below and bring notes on your analysis to class on the tenth. Answer the exam questions on these data from your notes; attach your notes to your exam when done. In your analyses, remember to check for assumptions and study interactions. Your analysis should go beyond just the ANOVA and what is significant; it should try to explain what is going on in the data.

This preliminary analysis should be considered part of your exam. Do your own work. Discuss these problems only with the instructor.

(1) Well, election season is almost here again, and it's just about time for all those charming political ads on television. Some of them are really nasty. This experiment is about how people perceive polictical ads.

One-hundred thirteen people were randomly assigned into five groups. Each group will receive some information about a political campaign, and then make a determination about whether the campaign has been using positive or negative advertising. They make that rating on a 1 to 7 scale, with 1 being most positive and 7 being most negative. Group one receives the transcript of a television ad that attacks an opposing candidate. Group two receives the transcript of the ad plus an editorial describing the campaign as generally positive. Group three receives the transcript of the ad plus an editorial describing the campaign as generally negative. Groups four and five receive only the positive and negative editorials, respectively. Some of the questions of interest include: Does media coverage affect perception? Does the actual transcript change the response to media reporting?

The data from this experiment are attached below and also reproduced on the file `ads.txt` on the data button of the class web page.

(2) An important first step in the production of cheese is the addition of rennet to the milk. An enzyme in the rennet curdles the milk leading to the formation of the cheese curds. For production efficiency, it helps to form the curds more quickly (assuming you don't ruin the cheese in the process). This experiment studies the length of time it takes to form the curd under various conditions.

Seventy-two milk samples are randomly assigned to 18 treatments, four samples per treatment. The 18 treatments are the factor/level combinations of three factors: milk solids, pH, and CaCl concentration. There are three levels of milk solids: normal (12%), 1.25X (15%), and 1.5X (18%). There are three levels of pH: 5.6, 6.0, and 6.6. There are two levels of CaCl (0% and .1%). The combinations are run in random order, and the response is the time in minutes until the coagulum is formed.

In addition to the obvious question of which combination yields the fastest curd, we are also interested in the effects of the factors and interactions on the timing of the curd formation.

The data from this experiment are attached below and also reproduced on the file `rennet.txt` on the data button of the class web page.

```
MATRIX         113     2
) Voter perceptions of a negative campaign ad.  The response is the
) rating for the ad, with 1 being very positive and 7 being very
) negative.  There are five groups.  Group 1 read only the ad.
) Group 2 read the ad and an editorial that characterized it as
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) generally positive.  Group 3 read the ad and an editorial that
) characterized it as negative.  Group 4 readly only the positive
) editorial.  Group 5 read only the negative editorial.  Artificial
) data based on Bos (2003).
)"%lf %lf"
            1           4
            1           2
            1           6
            1           4
            1           6
            1           3
            1           4
            1           5
            1           4
            1           4
            1           6
            1           6
            1           3
            1           4
            1           4
            1           4
            1           4
            1           2
            1           4
            1           6
            1           4
            1           5
            1           4
            2           4
            2           5
            2           2
            2           4
            2           6
            2           5
            2           5
            2           2
            2           4
            2           5
            2           5
            2           5
            2           5
            2           4
            2           5
            2           6
            2           4
            2           5
            2           5
```

2	3
2	3
2	4
2	6
2	2
2	5
2	4
2	3
3	7
3	5
3	6
3	4
3	3
3	5
3	7
3	7
3	6
3	5
3	7
3	5
3	5
3	7
3	6
3	5
3	7
3	7
3	6
3	4
3	5
3	6
3	5
4	7
4	3
4	3
4	5
4	5
4	4
4	4
4	4
4	4
4	3
4	2
4	4
4	3
4	5
4	2
4	4

```
             4           3
             4           2
             4           4
             4           1
             4           4
             5           3
             5           5
             5           7
             5           5
             5           6
             5           3
             5           5
             5           6
             5           5
             5           5
             5           4
             5           6
             5           4
             5           7
             5           7
             5           7
             5           6
             5           6
             5           6
```

```
MATRIX          72     4
) Rennet coagulation time in cheese making under various
) conditions.  Factor 1 is the concentration of milk solids
) (12, 15, or 18 percent).  Factor 2 is the pH (5.6, 6.0,
) or 6.6).  Factor is the amount of CaCl added (0 or .1%).
) The response is the clotting time in minutes.  Data from
) Srinivasan (2003).
)"%lf %lf %lf %lf"
             1           1           1        2.14
             1           2           1         4.4
             1           3           1        23.3
             1           1           2        2.55
             1           2           2        1.55
             1           3           2        6.08
             2           1           1        4.26
             2           2           1        4.52
             2           3           1       23.28
             2           1           2        3.02
             2           2           2         3.1
             2           3           2        6.38
```

3	1	1	3.13
3	2	1	4
3	3	1	17.1
3	1	2	4.24
3	2	2	5.04
3	3	2	6.18
1	1	1	3.17
1	2	1	2.28
1	3	1	25.33
1	1	2	6.13
1	2	2	2.36
1	3	2	4.28
2	1	1	3.35
2	2	1	6.11
2	3	1	20.38
2	1	2	3.28
2	2	2	3.2
2	3	2	6.02
3	1	1	5.23
3	2	1	4.34
3	3	1	17.52
3	1	2	4.31
3	2	2	5.55
3	3	2	7.36
1	1	1	3.5
1	2	1	3.34
1	3	1	20.02
1	1	2	3.15
1	2	2	2.34
1	3	2	6.44
2	1	1	3.47
2	2	1	5.07
2	3	1	19.14
2	1	2	4.05
2	2	2	2.44
2	3	2	5.32
3	1	1	4.08
3	2	1	4.19
3	3	1	13.19
3	1	2	4.37
3	2	2	3.12
3	3	2	7.22
1	1	1	2.16
1	2	1	5.11
1	3	1	25.49
1	1	2	2.3
1	2	2	2.19

1	3	2	5.15
2	1	1	4.07
2	2	1	3.56
2	3	1	18
2	1	2	4.1
2	2	2	3.18
2	3	2	7.05
3	1	1	4.14
3	2	1	5.44
3	3	1	15.27
3	1	2	3.24
3	2	2	4.02
3	3	2	11.09