HOMEWORK 3 SOLUTIONS - 90 total points
STAT 201-502

Lecture 4 & 5 Material

1 It is believed that smokers may have a more difficult time quitting smoking if they live with another smoker. How can an experiment explore the effects of Zyban with a placebo on quitting smoking with subjects in different living situations? Suppose the researchers split the subjets into two groups: those who live with another smoker and those who do not live with smokers. Within each group, the subjects are randomly assigned to take Zyban or a placebo. In this study 250 of the 429 study subjects live with nonsmokers and 179 live with another smoker.

  a. What are the explanatory and response variables?
    The explanatory variable is medicine and the response variable is success in quitting smoking.
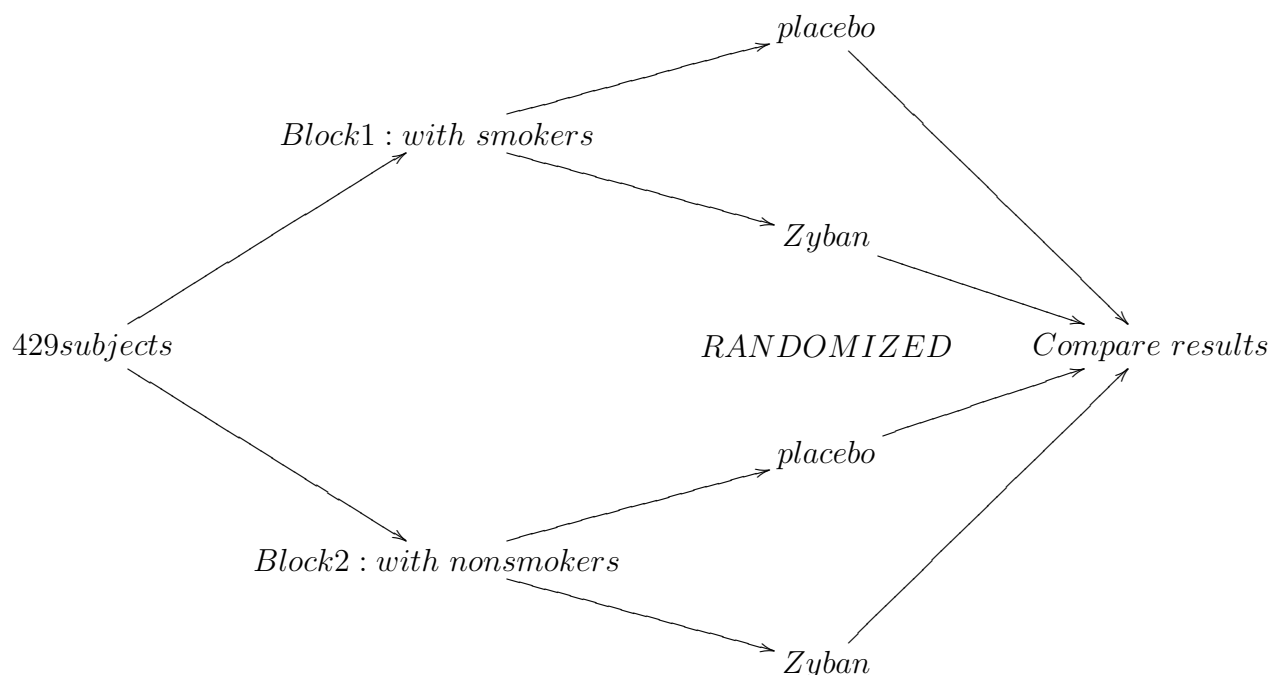
  b. Are there any blocking factors?
    They divide the subjects into groups first: "those who live with another smoker and those who do not live with smokers". The blocking factor is smoking living situation.

  c. How many factors are there? How many levels for each factor?
    The factor is medicine with two levels: Zyban or placebo(no Zyban).

  d. Draw a diagram of the experiment design.

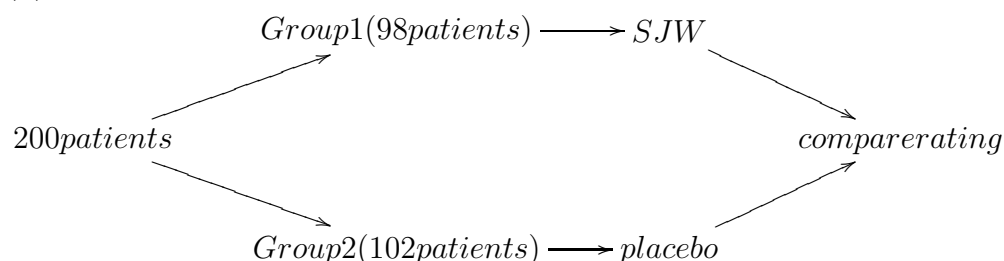## 2 Do textbook problems 3.4, 3.25, 3.37, 3.47a, 3.81, 3.84, 3.92

3.4:
(a) This is an observational study because no treatment is imposed on the subjects (children); they (or their parents) choose how much TV they watch. The explanatory variable i hours watching TV and the response variable is "later agressive behavior".
(b) A child who watches a lot of television is probably more likely to spend less time doing homework, playing sports, or having social interactions with peers. He or she may also have less contact with or guidance from his/her parents.

3.25
(a)"Randomized" = patients were randomly assigned the treatment (to recieve St-John's-wort or placebo), "double-blind" = treatment assigned to subject was unknown by doctors, administrators or subjects, "placebo-controlled" = one treatment was a placebo used to show phycological effect of taking any medicine
(b)

$$Group1(98patients) \longrightarrow SJW$$

$$200patients$$

$$comparerating$$

$$Group2(102patients) \longrightarrow placebo$$

3.37:
(a)population = adults age 18+ in the US, sample size = 1002
(b)Perhaps people are more inclined to respond with the first or last option they hear because it is what they remember best. Rotating the order of the options would cancel out any effect on the response of such inclinations.

3.47
(a)We divide the population of 9,000 into 200 groups where we will choose 1 person from each group randomly. $\frac{9,000}{200} = 45$ people in each group. So choose 1 person from the first group at random using Table B and then choose every 45th person from there.

3.81
(a)matched-pairs design
(b)sample survey with a stratified sample: smokers and non-smokers
(c)randomized experiment with block on gender

3.84
(a)sample survey
(b)experiment
(c)observational study

3.92 Use a block design: Separate men and women, and randomly allocate each gender among the six treatments.