

Ximan Liu
1935858
DSC 423
HW10

I have completed this work independently. The solutions given are entirely my own work.

1)

To conduct a fair enough experimental design for the survey, we should follow the rules which are reducing the noise and increasing the signal. Apparently, the comments economist left has a possibly terrible effect for the survey. The mainly ideas are the economist did not reduce the noise, and the signal did not be increased.

Firstly, he seems to have vague factors to be selected and lack of a clear plan for how treatments will be assigned to experimental units. When he uses letters instead of numbers to express the phone to be dialed, the pronunciation or spelling of the letters is easy for the audience to receive wrong information. People cannot even dial the correct number to leave the message.

Secondly, to choose the treatments, the wrong survey object may have an inaccurate effect on the survey itself. Here, the experimental unit is driver, but anyone who hears this broadcast can leave a message on this, so the choice of the research object may be questionable.

Lastly, determining the number of observations needed is quite important. Economists have not clearly set an obvious deadline for making phone calls or leaving information. Whether the economist can receive enough information within a certain period is a dubious challenge.

2)

The experience of Yvette's friends does not provide good evidence that cell phones cause brain tumors. We can set up a testing for a two-factor factorial experiment for "using cell phones" and "brain tumors". As a study shows, "in one study that followed more than 420,000 cellphone users over a 20-year period, researchers found no evidence of a link between cellphones and brain tumors." Since there are no interaction between these two factors and no main effect between these main effects, we can tell no further analysis of the factor showing up.

3)

a) Package liner.

b) Seal temperature. And types of liner.

c) The twelve combinations of seal temperature and types of liner.

d) The measure of the peel strength of each seal.

e)

The measure of the peel strength of each seal:

$$E(y) = \beta_0 + \beta_1 * x_1 + \beta_2 * x_2 + \beta_3 * x_3$$

where

x_1 : = 1 if treatment 2

= 0 if not

x_2 : = 1 if treatment 3

= 0 if not

x_3 : = 1 if treatment 4

= 0 if not

f)

Yes. Block randomization works by randomizing participants within blocks such that an equal number are assigned to each treatment. Diagram for a randomized block design containing $b = 3$ blocks and $p = 4$ treatments. We can make 3 different types of liner run in 4 different temperatures, each time using a different condition.