

Name: _____

Random Assignment Lab

The following exercise is designed to demonstrate how random assignment creates relatively equivalent groups and how statistical control can be used to help reduce the influence of 3rd variables when random assignment is not possible. The exercise is designed to help you understand the concepts we have been working on in class and help you prepare for the exam. You should use this time not to rush through the work, but to master the concepts and not get lost in the calculations. Don't leave lab today until you feel you understand these concepts.

Part I - Random Assignment

First, work on random assignment. Get the Random Assignment Magic file. It has data for 30 participants for use in a study. In your study, there will be an experimental group and a control group in which you will randomly assign subjects. Your first task is to randomly assign the subjects to conditions by flipping a coin and then assigning each subject to either the Experimental Condition ("Heads") or the Control condition ("Tails"). You assign your subjects on the Groups tab of the Random Assignment Magic file by flipping a coin and then entering a H or T on the spreadsheet. When you do that, the subject with all their individual differences will get assigned to the proper condition. We will test if those individual differences will be randomized (equalized) across conditions.

Turn to the Results tab and record for each variable the mean and st. deviations for each of the variables broken down by assigned condition. The computer calculates these automatically for you once the assignments to conditions are made.

Now, report the mean and standard deviation for age and height for the control and experimental groups separately.

	N	Gender	ADHD	Age	Height	Hunger	Self-Esteem	IQ	Depression
Exper. Mean									
Stdev									
Control Mean									
Stdev									

The computer also calculates either a two-sample z-test (Gender and ADHD) or a two-sample t-test (Age, Height, Hunger, Self-Esteem, IQ, Depression) as appropriate. You need to compare each calculated value (t or z) to the critical value from the appropriate table ($\alpha = .05$) and make a reject or fail to reject decision for each variable.

Pick the IQ variable and calculate the independent t-test using the formula you learned in class. Be sure to turn in your work and show how you got the same answer as in the spreadsheet.

	Gender	ADHD	Age	Height	Hunger	Self-Esteem	IQ	Depression
Mean Diff								
z/t (obs)								
df								
Decision								

Type the answers to the following questions in a word document. Please number each item

1. What is randomization and why do we do it?
2. If random assignment were successful, would you reject or fail to reject the null hypothesis in these z and t-tests? Why?
3. Overall, does it appear that random assignment created equivalent groups?
4. If random assignment did not work for some of these variables, why not?

Now we are going to do the above task of randomly assigning subjects one more time. Clear out the old H & T's on the Groups tab, flip 30 more times to randomly assign again. Turn to the results tab type in your name and print out the results. (You may record them, as above, if you can't get the printer to work). Once you randomly assigned cases and studied the results from both trials. Answer the following questions.

5. Did random assignment ever fail to work? That is, did it ever not equalize the IV groups on the individual difference variables? If it did fail to equalize the groups, where did it fail and why do you think that is?

Part II Non-Random Assignment

In this study we will look to see if there are Gender differences on EMOTION-MEM. The DV of interest in this study is a measure of accuracy in identifying emotional expression as displayed on a human face (the EMOTION-MEM column). Scores are out of 20 points. You can see the full data set on the Study Data tab.

To do this, assign all the females (Gender=1) to Group 1 (assign them an H on the Group tab). Assign all the males (Gender=0) to Group 2. (Hint: You can do this fast by putting everyone in GROUP 1 by copy and pasting an H down and then selectively changing on the Gender=2 participants to be a T

1. Do male and female subjects differ on EMOTION-MEM? Report the t-test results and your conclusions.
2. Do the subject groups (Males vs. Females) differ on any of the individual differences measures? If so which? If they do, what problems might that cause when we try to look at gender differences on EMOTION-MEM? (HINT: think about the threats to internal validity that we discussed. Which ones are likely to be a problem here.)

Turn in your typed answers and other printouts.

Part III - Non-Random Assignment with Statistical Control of a 3rd Variable

Now we are going to look at the data when random assignment is not possible. **Place all the individuals who in their youth were diagnosed as having attention deficit disorder (ADHD = 1) into one group (assign them an H) and then non-ADHD group (ADHD=0) to the other group (assign them a T).** You can get this by copying and pasting the H and T column from the study tab to the group tab. This will put participants in the right group on the results tab. Obviously this diagnostic category cannot be randomly assigned. First, check all the individual difference measures on the Results tab to see if subjects differ on any other individual difference measure (besides ADHD).

1. Do the subject groups (ADHD vs. Non-ADHD/Control) differ on any of the other individual differences measures? If so which? If they do, what problems might such differences cause when we try to look at ADHD differences on some dependent measure of interest - (say memory for faces). Which ones are likely to be a problem here.)
2. Do ADHD and control subjects differ on EMOTION-MEM? This result is also on the results tab. Excel will calculate the t-test results. Report the results and your conclusions.

Now you are to statistically control for differences in IQ between the ADHD and Non-ADHD groups. The regression between IQ and EMOTION-MEM is on the Regression tab.

3. Do ADHD and control subjects differ on EMOTION-MEM after we control for differences in IQ? Report the results and your conclusions.
4. What can we conclude about ADHD's effect on memory for the emotion displayed on faces both before and after correcting for IQ? This method helps us control for the 3rd variable, are there others we should worry about?