COURSE PROJECT

Exploring and Visualizing Data

## Instructions

Use this document to record your work on Part One of the course project. You will submit a digital copy of this document once you have completed this part of the project. Instructions for submitting this document can be found on the Module One Course Project page. Information about the grading rubric is available on the Module One Course Project page. Do not hesitate to contact your course facilitator if you have any questions about the project.

**Note:** Though your work will only be seen by those grading the course and will not be used or shared outside the course, you should take care to obscure any information you feel might be of a sensitive or confidential nature.

Part One

# Use Data to Identify Associations

## Scenario:

In this part of the course project, you will consider how to design an experiment to test the effectiveness of a new drug that may cure headaches in college students. You decide to define “curing a headache” as meaning the headache is gone within 1 hour of taking the drug. You want to design a small, randomized, and controlled trial with 40 college students. All students will be given what they think is a treatment. However, only 20 of these students will receive the new drug, whereas 20 will receive a placebo, which means they will receive a substance that has no therapeutic effect.

You suspect that heavy computer users (subjects who work with computers for more than 6 hours/day) may get more severe headaches and may not respond as well to the new drug. For this reason, you decide to collect information on the number of hours/day students use computers before the trial begins, and before you assign students to a treatment or control group.

To complete this part of the course project, answer the following questions:

1. Describe the population, sample, and unit of observation in this study.

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| Population: All college students  Sample: 40 college students  Unit of observation: 1 student |

1. Which of the following will be a better choice to select a representative sample?
2. Select all students from one first-year Biology course
3. Randomly select 40 students from the college registrar’s student records

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| Randomly select 40 students from the college registrar’s student records |

Briefly explain your choice (1-2 sentences).

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| Since our population is all college students (not just 1st year biology students), we should select randomly from the entire student body. |

1. Describe the treatment group, control group, and one observed confounding factor in   
   this study.

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| Treatment group: 20 college students who receive the drug.  Control group: 20 college students who receive the placebo.  Confounding factor: heavy computer users (subjects who work with computers for more than 6 hours/day) may get more severe headaches and may not respond as well to the new drug. |

1. Suppose you find that 20 of the 40 enrolled students are heavy computer users. How would this affect your assignment of students to treatment and control groups?

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| I would try to ensure that ~10 heavy computer users are in each of the treatment and control groups (blocking). |

1. Given this scenario, name a different confounding factor that is not observed during this   
   study scenario. Explain how this unobserved confounding factor could influence the results   
   of this study.

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| Existing mental health factors such as anxiety, depression, and/or chronic migraine headaches. Students who struggle with anxiety and depression may be more susceptible to headaches than those who don’t. |

*To submit this assignment, please refer to the instructions in the course*.