

# The Reaction Time Assignment

## Introduction and Objective

Our objective is to determine the diurnal pattern of reaction time. The class members will be the subjects, and the measurement technique will be to use the 30 cm ruler as demonstrated in class. The fall of the ruler before it is caught is a measure of the reaction time. Actually, the distance measure can be converted into a time with the formula

$$\text{time} = (\text{distance in cm}/490)^{1/2} .$$

So, for example, if the ruler falls 15 cm, the time elapsed would be 0.175 seconds. Typical reaction times range from 0.15 seconds to 0.25 seconds. Does it make any difference whether one uses distance or time for the analysis?

## Data Collection

To plan the data collection, we need to think about the analysis. Are there conditions of the data collection that might add to its variability, but that we can account for, if we have the conditions data? For example, might the previous nights sleep be a factor? What about the timing of the measurement relative to the previous meal consumed? Coffee/Tea?

Another aspect of the study might be the characteristics of the subject: age, sex, general fitness, ...

Of course, the time-of-day would be important to record, and perhaps even to control. The "prior knowledge" I mentioned suggested that the diurnal trend might not be linear, but possibly something like a quadratic. We probably want a time in the morning, one mid-day, and one in the evening, at least.

We only have eight class members, and so it would be best to combine the data from all eight. So we need to agree to a common data collection protocol. Lets work this out in class on Tuesday, Sept 19 (tomorrow). Probably it would be best to work in pairs – partly because the data collection requires another person, and partly so the write-up can be vetted by another person. Note the name of your "assistant" in your submission. Although you will work in pairs for the data collection and review of the write-up, I expect each of you to submit your own write-up. Your analysis will be your own as well.

## Timing of the study

We will introduce the A3 study during the second hour of the seminar Tuesday Sept 19. You will be working on the final draft for A2 for submission Thursday, Sept 21. The Thursday seminar will include further discussion of the A3 data collection protocol and some thoughts on the analysis as well. Plan to collect the data by Friday, Sept 22. Send me your data electronically and I will accumulate it over the weekend and re-distribute it

to you. We will discuss how to do the data analysis on Tuesday, Sept 26, and continue this discussion on Thursday Sept 28. Then you will submit your draft report on Tuesday, October 3. I will respond by Thursday Oct 5 and you submit a final report Tuesday, Oct 10. This is a lot of time for A3, but then it is a bigger assignment than the others. Plan to spend more time on it, preparing discussion questions, reading the Tips sheet, thinking about the data collection needs, etc.

### **The report:**

Read over the "Tips" sheet I handed out on day 1.

### Readership:

The first thing to consider is the readership of the report. This is something we need to specify now to guide your report style. In this case, I think you can assume that **I** am the intended reader. So you can use statistical jargon without ambiguity, as long as you know what it means!

### Structure:

Your first assignment was a paragraph explaining a statistical concept. Very little structure was needed to the write up. The second assignment did require some structure (paragraphs, section headings) but since it was a summary of what you thought would be useful for students, it was not a formal report. However, assignment 3 requires a summary of a complete study, and so it needs a bit more structure than the other assignments. You may need sections "Introduction", "Objective", "Study Design", "Data Analysis", "Discussion" and possibly "Conclusion". These are meant to be suggestions, not required structure.

### Data Analysis:

In the Data Analysis section, there are two kinds of things to report: 1. You may want to mention any interesting features you discovered from your graphical inspection of the data, and 2. You may want to mention the results of your analysis as it pertains to your study objective. In neither case is it appropriate to include computer outputs that include irrelevant graphs or tables! Be very selective in deciding what detail to include in the body of your report. Even appendices should not include everything you did. Include an Appendix if it is really necessary to back up a claim, and would be too distracting to put in the body of the report.

### Length of the Report:

There is no specified length. You need to write what is necessary to describe the important parts of the study. Be guided by your overall objective.