

Assignment 1: Experimental Design

My research question will be: Do we learn while we sleep?

My experiment will be to ask each participant to memorise a piece of text and then the next morning, and then answer a short 10-question quiz about that piece of text. The independent variable would be the time that each participant sleeps that night; the time would vary from having no sleep at all up to 9 hours for a full night's rest. The dependent variable would be to see how well they do in the test.

If this experiment was designed with no limitations to time or money, my procedure would be through an online survey to gather data and analyse the results quickly by plotting on a scatterplot. My resources required are willing participants and internet access and my procedure would go as following:

1) Gather 1000 people from each age category. The age categories would go like this:

- 10 years old to 19 years old
- 20 years old to 29 years old
- 30 years old to 39 years old
- 40 years old to 49 years old
- 50 years old to 59 years old
- 60 years old to 69 years old
- 70 years old to 79 years old
- 80 years old +

The age categories will be split into two groups, one for each gender, thus 500 males and 500 females for each age category.

2) Each person would be sent an online form. The online form's first page would be a series of questions:

- How old are you?
- Are you male or female?
- You are assigned to ... hours of sleep tonight

The form would randomly generate a number between 0 – 9, incrementing in 0.5 values (a person could get assigned to 6 hours and 30 minutes of sleep)

3) The next page would be asking the individual to memorise a piece of text because there will be a short quiz on that piece of text the next day at 9am.

- The form would be sent out at 9pm so it gives a 12-hour period of which an individual can do whatever they want.
- Since the form sent to everyone contains the same piece of text and test questions, if each individual keeps to the assigned hours of sleep, the experiment will show how sleep affects learning.

But these are some of the extraneous variables I cannot control:

- Whether the participant actually sleeps the number of hours assigned
- If the participant cheats or not
- How much the participant has studied the piece of text
 - Due to how seriously the test is taken

- How good/bad the participant is at studying
- People studying in different ways
 - If the study technique used was effective or not
 - How gender affects their memorising aptitude
 - How gender affects their study technique
 - How age affects their memorising aptitude
 - How age affects their study technique
- If the individual has any mental disorders
 - E.g. dyslexia, AD(H)D, Alzheimer's, Schizophrenia

With the experiment complete, the results will be gathered and compiled separately for each age group with the gender colour-coded. With the results gathered like that, more information could be decoded to see if age and or gender does affect learning as well as number of hours slept. It can be tested geographically as well: this study could be set only in North America, then be repeated for each country till there is a global study; and to make the results more general, the number of participants can be increased indefinitely.

With all the data then gathered into one scatterplot, if my results are correct with the extraneous variables minimised as much as possible, it would hopefully show a positive correlation that as the hours of sleep increase, the answers to the question also increase, thus concluding the fact that sleeping well does help you learn. This can be due to the fact that you are well rested and the new synapses made are strengthened and reinforced overnight.