Unit 1: Introduction To Scientific Research

* The scientific method ensures reliable and meaningful research
  + Discover new information to understand how the world work
* Seven steps to the scientific method that guides quality of research
  + Construct a theory: Collect a general set of ideas about the way the world works
  + Generate hypothesis: Makes a specific prediction about the relationship between variables involved in the theory
  + Choose research method: Determine the way in which the hypothesis will be tested
  + Collect data: Take measurements of the outcomes of the test
  + Analyze data: Understand the data and discover trends or relationships between the variables
  + Report findings: Publish articles in scholarly journals. Revised by scholars before published
  + Revise existing theories: Incorporate new information into our understanding of the world
* Paradigm shift: Dramatic change in the way of our thinking

Unit 2: Conducting An Experiment

* Anecdotal evidence: Evidence gathered from others or self experience
* Anecdotal evidence is insufficient to draw scientific conclusions
  + Single experience might not be representative of all possible experience
  + Your personal experience might not represent the experience of others
  + Cannot be sure that result is due to energy drinks alone, because there can be other factors
* Experiment: Scientific tool used to measure the effect of one variable on another
* Independent variable: Variable manipulated by scientist
* Dependent variable: Variable being observed by the scientist
* Scientists need to properly manipulate the independent variable while measuring the result on the dependant variable

Unit 3: Control Groups

* Experimental group: Receive a manipulation of the independent variable
* Control group: Will not receive any manipulation
* Differences between both groups should be minimal as possible to prevent biases and ensure that the results are different due to the independent variable
* Within-Subjects Design: Manipulating the independent variable within each participant to minimize the effect of external variables on the dependant measure
  + Ensure similarity between experimental groups
  + i.e. Eric takes energy drinks when writing half of his tests and then compares the performance for when he drank and when he did not drink
* Problems with Within-Subjects Design
  + Because the same subject needs to be tested repeatedly, it can be time consuming and costly to have a subject complete the entire experiment
  + Experimenter is subject to the practice effect, where he naturally gets better at every test with practice
* Between-Subjects Design: One group acts as the experimental group, and the other acts as the control. Both groups must be similar as possible to mitigate confounding variable errors
* Confounding variable: A variable other than the independent variable that has an effect on the results

Unit 4: Sampling

* Strict selection criteria can hinder generalizability
* Results from very specific groups of participants cannot be generalized to other groups
* Population: All undergraduate students in Canada
* Sample: A number of undergraduates from University of Toronto
* The best sample is a random sample chosen from the entire population
* Random assignment: Assigning subjects to either the experimental or control group at random to avoid any biases that may cause differences between the groups of subjects

Unit 5: Conducting An Experiment

* Placebo effect: When an individual responds to a treatment that has no related therapeutic effect
* Blinding subjects eliminates the placebo effect. When participants do not know whether they belong to the experimental or control group, or which treatment they are receiving, the experiment is blind
* Experimenter bias can influence results as well, intentionally or unintentionally. Actions made by the experimenter may promote the result they hope to achieve
* Double-blind experiments minimize experimenter and subject bias. When experiments in which neither the experimenter nor the participants know which group each participant belongs to

Unit 1: Introduction To Scientific Research

* Descriptive statistics provide summary stats such as mean, medium, and mode
* Histogram: Type of graph used to report the number of times groups of values appear in a data set
* Frequency Distribution: Type of graph illustrating the distribution of how frequently values appear in the data set
* Normal distribution: A distribution with a characteristic smooth, symmetrical, bell-shaped curve containing a single peak
* Measures of central tendency
  + Mean: The average value of a data set
  + Medium: The centre value in a data set when the set is arranged numerically
  + Mode: The value that appears most frequently in a set. It can be used for non-numerical data
* Outliers: Extreme points, distant from others in a data set
* Measures of central tendency do not sufficiently summarize the data
* Measures of variability tell us how “spread out” the data is
* Standard deviation: Measure of the average spread a data point has from the mean
  + Smaller spread = Smaller standard deviation
  + Larger spread = Larger standard deviation

Unit 2: Inferential Statistics

* Inferential Statistics: Statistics that allow us to use results from samples to make inferences about overalll, underlying populations
* T-Test: A statistical test that considers each data point from both groups to calculate the probability that two samples were drawn from the same population
* P-value: A value expressing the probability calculated by the t-test
  + Must be less than 0.05. This means that there is a less than 5% chance that the results are by chance. The results are 95% accurate

Lecture Notes

* Psych is all about:
  + Understanding human thought and behaviour
* Psychology is challenged with ancient puzzles
  + How are memories stored and retrieved?
  + How does the mind-body connection affect emotions?
  + How is this information coded in the brain?
* Cognitive dissonance is a counterintuitive finding with profound implications
  + In order to justify “bad” actions, people change their beliefs