Quant. Midterm Cheat Sheet Cheat Sheet

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Conducting Research

A research hypothesis is an idea or conjecture you can test. They are specific, testable, predictions about what will happen under a given set of circumstances.

A theory tends to be more general, and tends to be the result of many tested hypotheses pointing toward the same general way of thinking or to the same conclusion.

Exposure (X) - What are we changing?

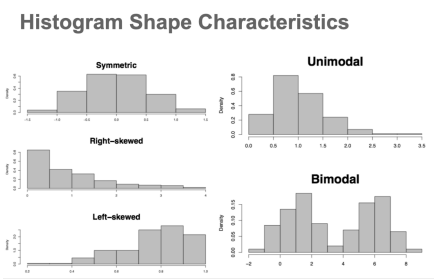
Outcome (Y) - What are we interested in studying?

Population of Interest (P) - Who is our target audience?

Parameter - Population, Statistic - Sample

Possible Reasons for Association - Random Sampling Variability, Confounding, Information Bias, Selection Bias, Causal Relationship

How do we measure X and Y?



Prevalence and Incidence

Prevalence= (number of existing cases)/(total number in population)

Cumulative Incidence=(number of new cases)/(total population at risk over a specified period of time)

Scales of Measurement

Continuous Data - unlimited number of distinct values (age, weight, height)

Binary Data - Two Groups

Ordinal Data - "many" groups with an inherent ordering from smallest to largest

Nominal Data - "many" groups with NO inherent ordering

Hypothesis Testing

X	Y	H_0 and H_A	Statistic	Formula
Binary	• Binary • Independent samples	H_0: $\pi_1 = \pi_2$ versus H_A: $\pi_1 \neq \pi_2$	X^2 Statistic	$\chi^2 = \sum_{i=1}^{N} \frac{(obs_i - exp_i)^2}{exp_i}$ df = (r-1)*(c-1)
Binary	• Continuous • Independent samples	H_0: $\mu_1 = \mu_2$ versus H_A: $\mu_1 \neq \mu_2$	Two-sample t-test	$t = \frac{(\bar{Y}_1 - \bar{Y}_2) - \mu_0}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{(\bar{Y}_1 - \bar{Y}_2) - 0}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$ df = $n_1 + n_2 - 2$
Binary	• Continuous • Paired samples	H_0: $\mu_d = 0$ versus H_A: $\mu_d \neq 0$	Paired t-test	$t = \frac{\bar{Y} - \mu_0}{s_y / \sqrt{n}}$ df = number of pairs - 1
Single group	• Continuous • Compare to known mean	H_0: $\mu_1 = \mu_0$ versus H_A: $\mu_1 \neq \mu_0$	One sample t-test	$t = \frac{\bar{Y} - \mu_0}{s/\sqrt{n}}$ df = n – 1

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