Linguistic Data:

Research Ethics
&
Statistics

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IRB & Research Ethics

IRB: Human Subjects Research

- *If your projects meets these criteria, you must seek IRB approval **before** starting!*

- Human
  - Plus special procedures for vulnerable populations like children or prisoners

- Subjects:
  – Direct interaction, *or* access to private data

- Research:
  – Academic research to be shared (publication, presentation at conference, etc.)
  - *Does not apply to class activities (if **only** for class)*

UCR IRB

- Most Linguistics research applies to:
  - Institutional Review Board - Socio-Behavioral (IRB-SB)
  - https://research.ucr.edu/ori/committees/irb.aspx

- Unless you are doing medical studies (etc.):
  - Institutional Review Board - Clinical-biomedical (IRB-Clin)
  - https://research.ucr.edu/ori/committees/irb-clin.aspx

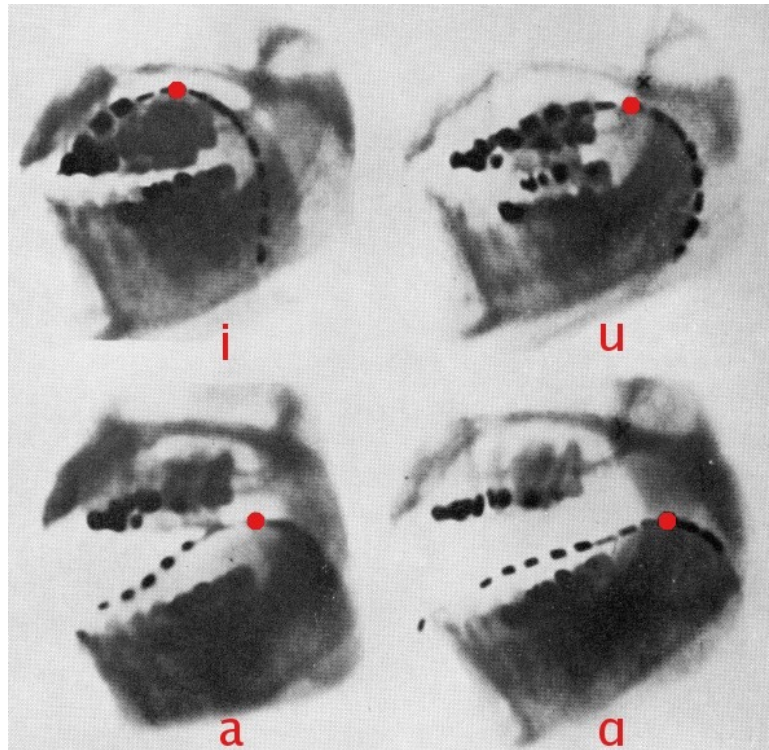   - *Students must submit applications with sponsoring faculty member*

Why IRB?

- Institutional Review Boards were mandated following the **Belmont Report**
  - Response to various unethical studies, including:
    - Tuskegee syphilis study (1932-72, US government)
      - African-Americans were promised treatment for syphilis, but instead were left untreated as a control group
    - Milgram's simulated torture experiments (1960s, Yale)
      - Subjects pressed a button to deliver an electric shock to correct someone's behavior (it was fake, with an actor)
    - Stanford prison experiment (1971)
      - Undergraduates were randomly assigned as prisoners or guards, and eagerly took these roles too far

Not all *useful* research is *ethical*…

- Consider early X-ray research for phonetics!
  - *(Dangers were not yet known!)*

- Images of Daniel Jones *(researcher)*

  - https://en.wikipedia.org/wiki/Cardinal_vowels

IRB summary

- Review studies for approval
  - Most (typical) studies can be approved, sometimes with modification
    - » *Might take weeks or months*
- Risk-benefit analysis
  - Studies considered "no more than minimal risk" are classified as "exempt" but *still need* to be reviewed and approved as exempt (not exempt from oversight)
    - Riskier studies require IRB board or board member approval
- Require **informed consent**
  - Subjects must understand their participation and their rights, and must give consent

Statistics

Causation vs. Correlation

- If ice cream sales increase, so do drownings…

  – *We do need to find correlations, but we also need to interpret them with a plausible hypothesis*

Statistics in the news...

NEWS > **NATIONAL NEWS** · News

At least 1 car crashes into a 7-Eleven every day, on average, $91M settlement reveals

Police arrested a Monrovia man after he crashed into a 7-Eleven on S. Baldwin Ave. in Arcadia on Thanksgiving morning, Nov. 24, 2022. (Courtesy of Arcadia Fire Department)
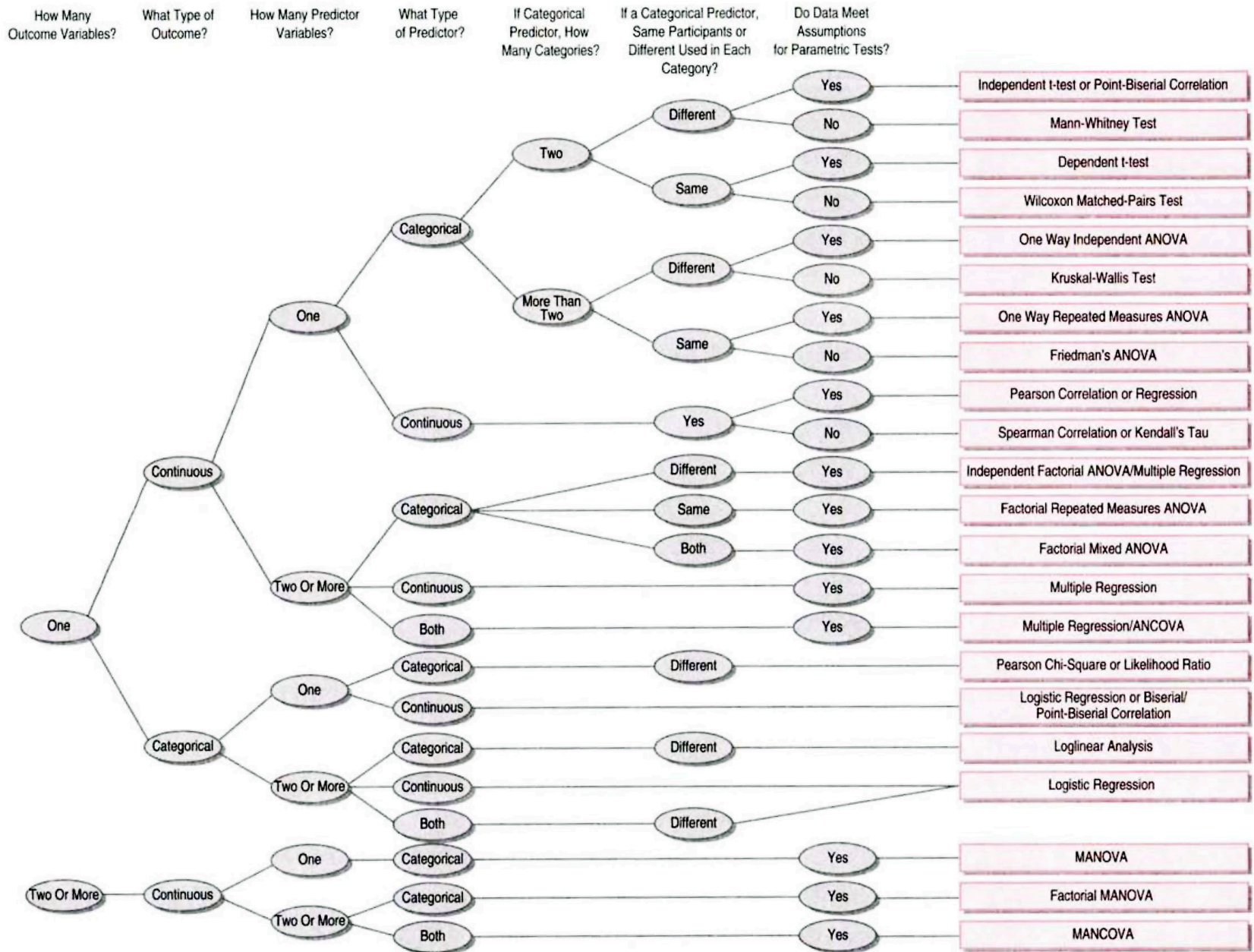
By **CNN COM WIRE SERVICE** |

PUBLISHED: February 8, 2023 at 11:38 a.m. | UPDATED: February 8, 2023 at 6:28 p.m.

By Charlie De Mar | WBBM

Statistics: quick overview

- Statistics help us to interpret data
- Typically we want to know if a result is *unexpected to occur just due to chance*
  - Statistical tests are designed to tell us whether an outcome is sufficiently unlikely given assumptions
    - One assumption is representative data
    - Another is 'all else being equal' (no unknown factors)
    - Typically significance level of .05 (only 1 in 20 times by chance)
      - If the P value (test calculation) is <.05, we accept the results
        - *Relevant comic: https://xkcd.com/882/*

- *Choose a test based on your data (research design)…*

(Source: Field, Andy. 2005. *Discovering Statistics Using SPSS.*)

Example: class enrollment

- Are Linguistics or Psychology majors more likely to enroll in LING 162/PSYC 128?
  - Class enrollment: 25 LING majors & 9 PSYC majors
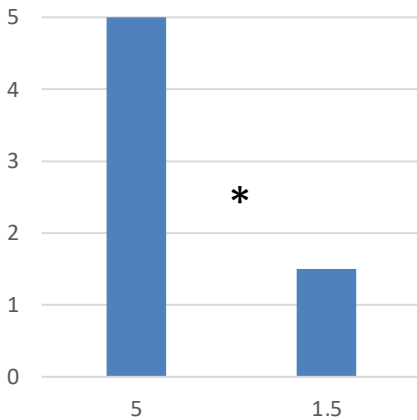 - University (2019): 138 LING & 1,677 PSYC

	LING	PSYC
Enrolled	25	9
Not enrolled	113	1668

- By Fisher's exact test, P < .0001
  - » Linguistics students are more likely to take this class
  - (Actually we should probably consider enrollment *per year*...)

Example *(partial data set)*

- You better study for the exam.

5	5	5	5	5	5	5	5
2	1	1	1	1	1	4	1

- *You bettered study for the exam.
  - (English apparently has no way to make this past tense)

- *These means are different…*
  - *But is that significant?*

Unpaired *t* test results
- P value and statistical significance:
  - **The two-tailed P value is less than 0.0001**
  - By conventional criteria, this difference is considered to be extremely statistically significant.
- Confidence interval:
  - The mean of Group One minus Group Two equals 3.50
  - 95% confidence interval of this difference: From 2.69 to 4.31
- Intermediate values used in calculations:
  - t = 9.2601
  - df = 14
  - standard error of difference = 0.378

Additional readings

- Stopping COVID-19 with Misleading Graphs
  - https://towardsdatascience.com/stopping-covid-19-with-misleading-graphs-6812a61a57c9

- The Simple Reason Why COVID-19 Data Is So Confusing
  - https://towardsdatascience.com/the-simple-reason-why-covid-19-data-is-so-confusing-48a2f614391a

- Scientific accessible overview of statistics:
  - http://www.ncbi.nlm.nih.gov/pmc/articles/pmc3096219/