

PSYC422 LECTURE 1

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OUTLINE

- 1.1: Things you need to know about PSYC422 (an incomplete list)
- 1.2: Psychology as a science - what characteristics of science are important?
- How is Psychology doing on those?
- Pseudoscience - how to spot it
- 1.3: Practical stats section:
 - Resources
 - Intro to jamovi and brief demo on my own data

ASSESSMENTS

- Online Quiz component - 20% (3 knowledge (m/c and short answer), 3 stats, mark = best 5).
- Discussion Board posts - 10% (about 1500 words, responses to prompts through trimester, min = 5 posts)
- Written assignment - critical thinking blog post - 30% (scaffolding workshop at Intensive)
- Final Exam - 40% (multiple choice and short answer, online)

READINGS ETC.

- These are on the [Unit Guide](#) (**please read it before posting any questions on Moodle**) and also set out in each Topic
- Textbook: [Research Methods in Psychology \(4th American Edition\)](#) (open textbook)
- Specific chapter readings are set out for each week
- There will also be other weekly readings from various sources

INTENSIVE SCHOOL - APRIL 2023

- Held online from 21st - 22nd April (mandatory)
- Concurrent with PSYC 421
- There are NO ASSESSMENTS AT INTENSIVE!
- Also no formal lectures - set of interactive workshops and tutorials
- Includes “scaffolding” workshops for assignment.

WHAT'S NEW THIS YEAR

- New edition of open textbook (available as a paper book on [Amazon](#) too)
- “Flipped classroom” model for Intensive School (no lectures)
- All quizzes online, best 5 count
- Half knowledge, half stats
- You don’t need SPSS though! ([jamovi](#) is fine - you’ll pick it up quickly, very similar and free)
- There are a whole set of H5P learning modules for jamovi on [Moodle](#) if you want them! (in the Resources section)

SCIENCE MAKES SYSTEMATIC OBSERVATIONS

DOES PSYCHOLOGY?

- Similar to knowing things from experience, but more systematic
- Including:
 - Precise definitions
 - Reliable and valid measuring tools
 - Generally accepted methodologies
 - A system of logic for drawing conclusions

SCIENCE PRODUCES PUBLIC KNOWLEDGE

DOES PSYCHOLOGY?

- The objective scientist was believed to be almost machine-like in the search for truth.
- In science this usually takes the form of defining terms and research procedures precisely enough so any other person can systematically repeat the study, presumably achieving the same observable outcome.
- Objectivity in psychological science has been a problem historically.

SCIENCE PRODUCES TENTATIVE CONCLUSIONS

DOES PSYCHOLOGY?

- Related to the data-driven attitude that characterises researchers is the recognition that conclusions drawn from data are always tentative and subject to revision based on future research.
- The tentative nature of scientific research is a feature of scientific thinking that is often difficult for the general public to understand; people seem to believe the outcome of well-executed scientific research will be the authoritative and the final answer to some question.

BUT: JAMES HEATHERS TWEET



James Heathers
@jamesheathers

"Science is self-correcting" - sure, *when we correct it*,
not because of Magical Progress (tm).

4:57 AM · Mar 26, 2017 · Twitter Web Client

98 Retweets 327 Likes

Reply Retweet Like Share

And a related thread here...

SCIENCE ASKS ANSWERABLE QUESTIONS

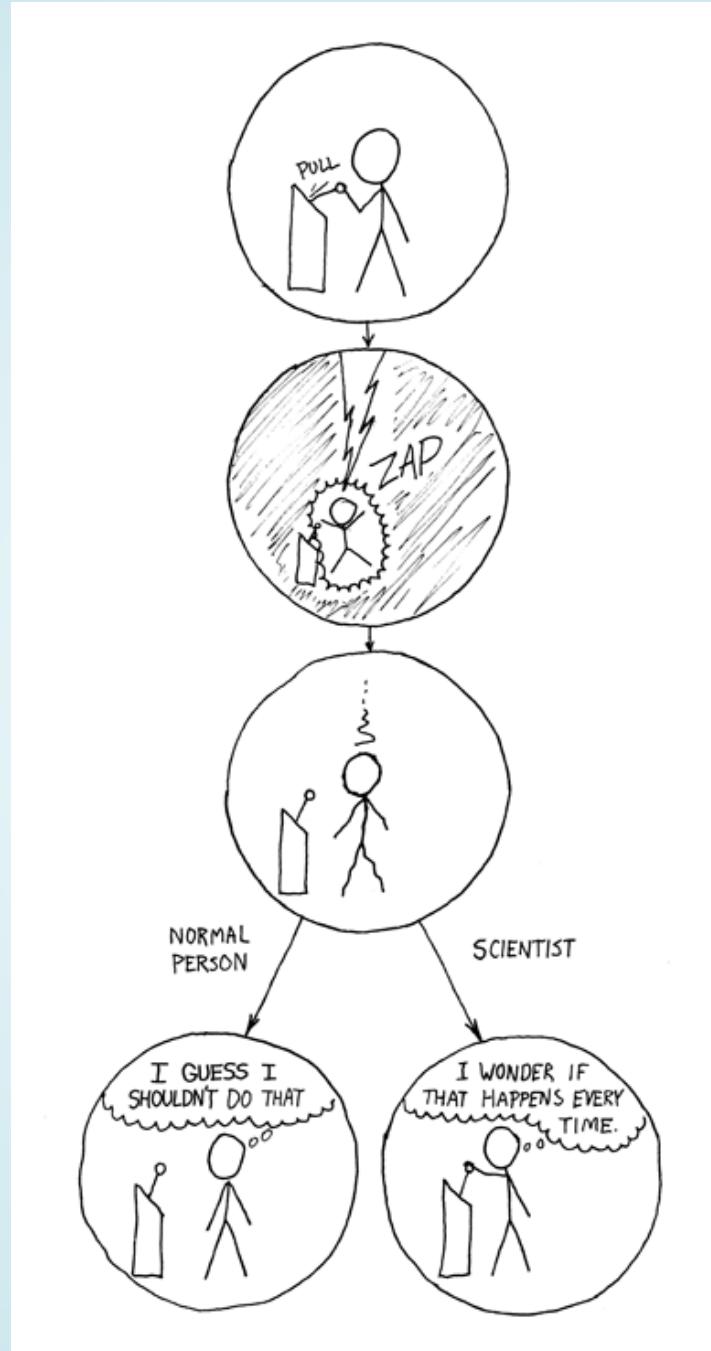
DOES PSYCHOLOGY?

Empirical questions can be answered through the systematic observations and techniques that characterise scientific methodology.

SCIENCE HAS THEORIES THAT CAN BE FALSIFIED

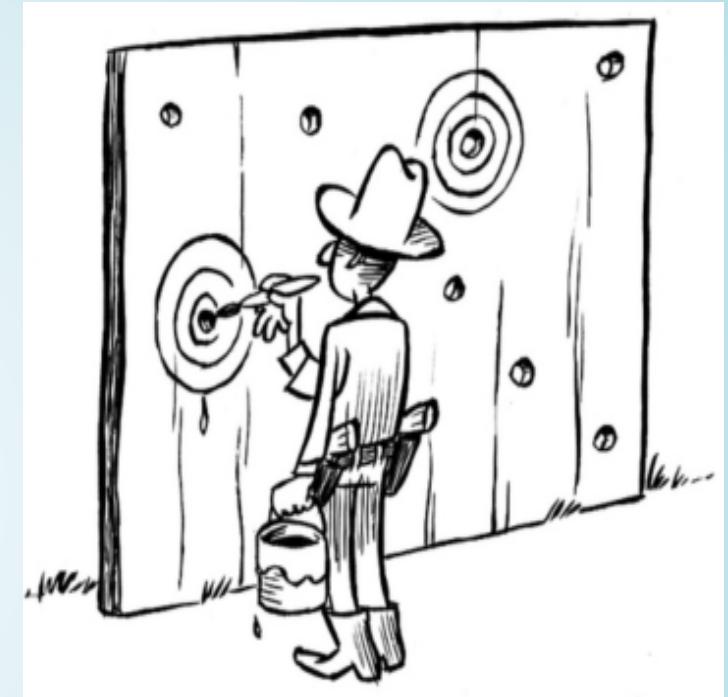
DOES PSYCHOLOGY?

- Empirical question -> hypothesis
- A good theory must be precise enough to be disproven
- *Falsification*



BUT: HARKING

- “Hypothesising After Results are Known”
- Why is this a bad thing?
- The Texas Sharpshooter Fallacy (see also [this post](#))
- Increases risk of Type I error (false positives)
- Original article (Kerr, 1998!)



ALSO BUT:

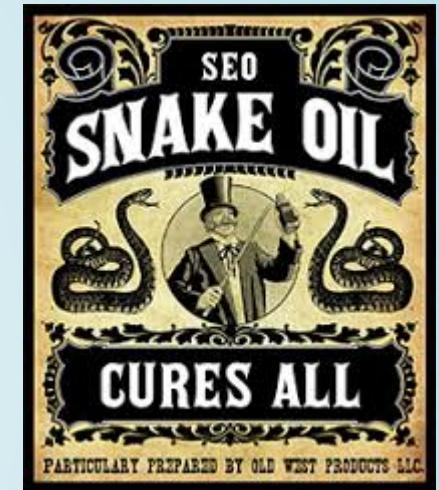
DOES PSYCHOLOGY HAVE GOOD THEORIES?

- Psychology has long been criticised for being weak on theory
- See, for instance, Muthukrishna, M, and J Henrich. "A problem in theory." *Nature Human Behavior* (2019).
- A really good Twitter thread on this topic - see below
- Eiko Fried on Twitter

RECOGNISING PSEUDOSCIENCE

WE CAN, RIGHT?

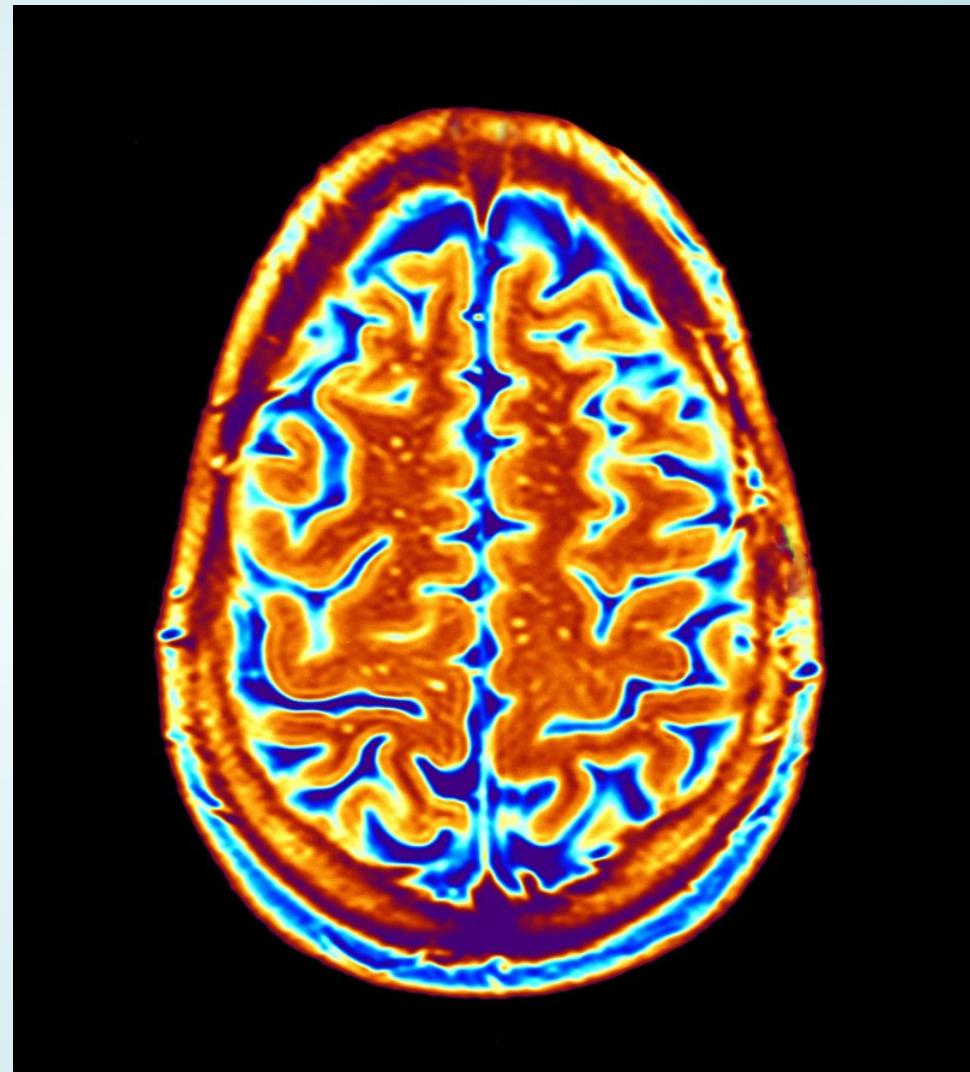
- Associates with true science
- Reliance on anecdotal evidence
- Sidesteps the falsification requirement
- Reduces complex phenomena to simplistic concepts



RECOGNISING PSEUDOSCIENCE WE CAN, RIGHT?

- People in the late nineteenth century could send away to the New York firm of Fowler and Wells for a 'Symbolic Head and Phrenological Map' for 10 cents.
- For another \$1.25, the head and map would be accompanied by a copy of *How to Read Character: A New Illustrated Handbook of Phrenology and Physiognomy*.
- Of course, we don't believe that sort of thing any more - do we?

SCIENCE VS. PSEUDOSCIENCE



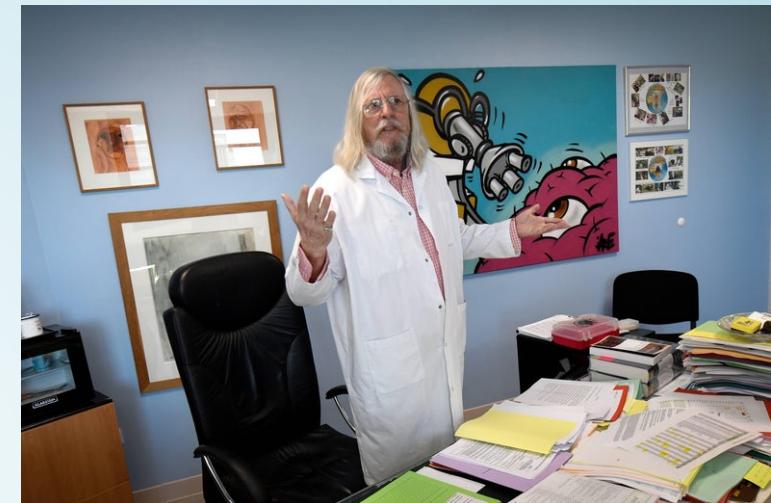
"How Brain Scans Can Diagnose Autism with 97% Accuracy!" (TIME Magazine)

PAPERS & CRITICISM

- Article in Time Magazine
- Original article in PLoS One
- Another paper about machine learning and autism
- A thoughtful critical piece by Jon Brock
- What do you think?

A MORE RECENT EXAMPLE

- Hydroxychloroquine anyone?
- Slate article [here](#)
- Pubpeer commentary [here](#)
- And [here](#) (on published version)
- Later RCTs showed it was ineffective
- But damage had been done



PRACTICAL SECTION (STATS DEMOS AND RESOURCES)

FREE ALTERNATIVES TO SPSS

- [jamovi](#) (good for parametric and non-parametric stats
 - lots of add-ons including moderation/mediation - based on R)
- [JASP](#) (good for Bayesian statistics)
- [Posit \(formerly R Studio\)](#) (very powerful & flexible, fairly steep learning curve, great plots)
- [PSPP](#) - most SPSS-like but clunky

LEARNING RESOURCES

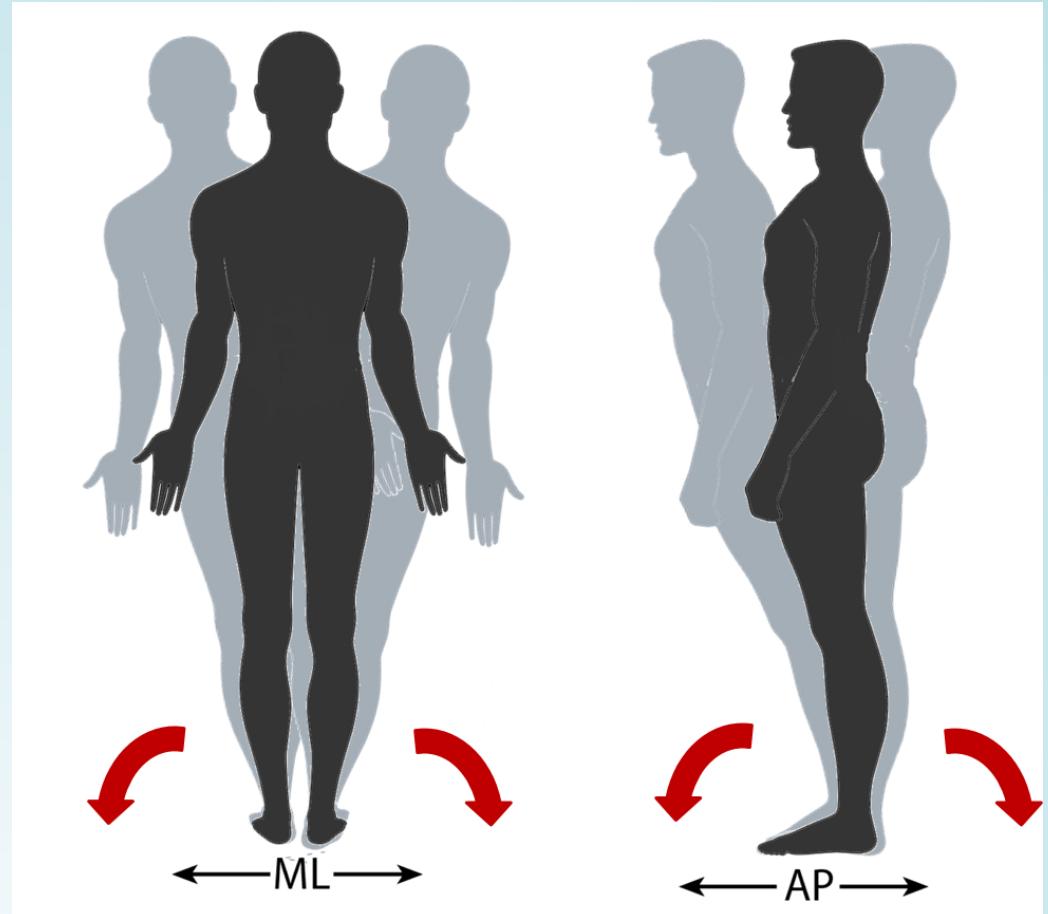
ALL FREE!

- Fantastic **FREE book** by Danielle Navarro about learning statistics with jamovi (more in here than just jamovi - some great info about stats and research methods)
- Online **FREE course** on jamovi with video tutorials (by datalab)
- For SPSS - YouTube is great!
- **Statistics of DOOM** YouTube Channel (thanks Bernie!)

STATS DEMO EXAMPLE (FROM MY OWN DATA)



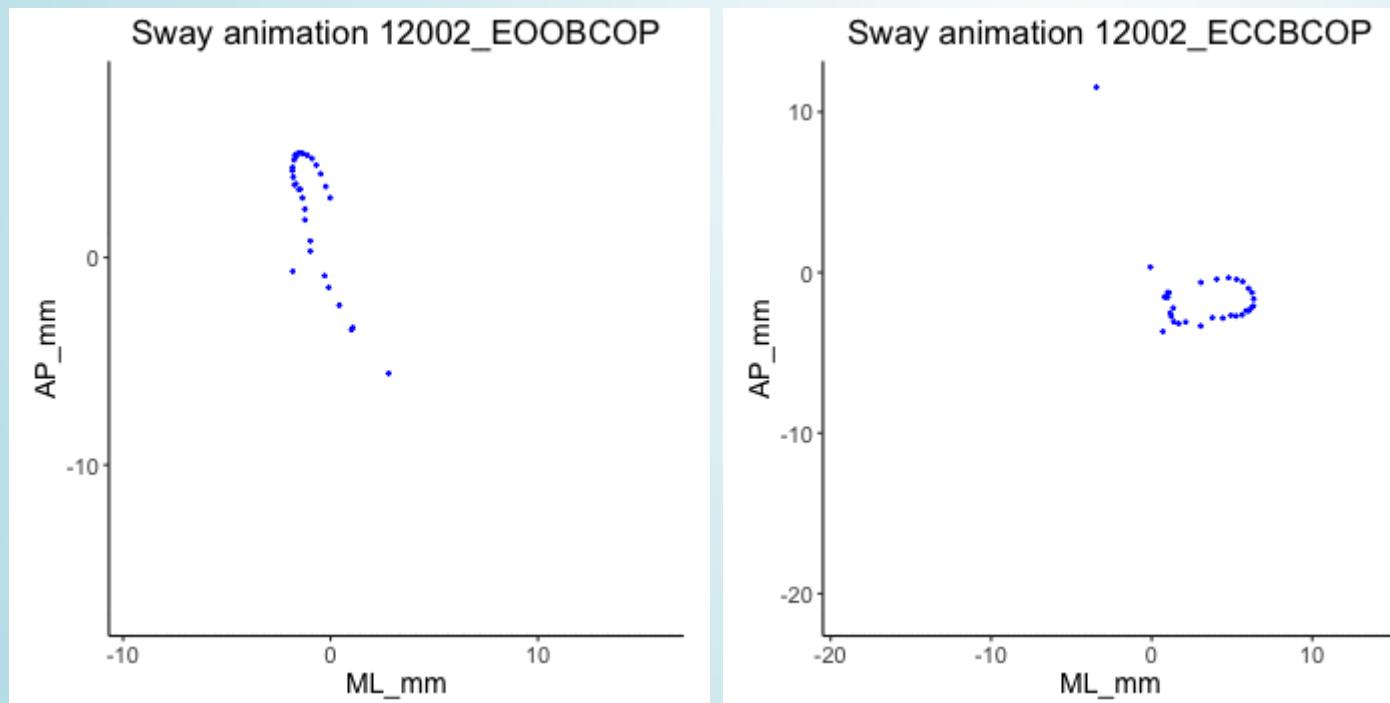
Force plate for measuring postural sway



Sway occurs in the mediolateral (ML) and antero-posterior (AP) directions

STATS DEMO EXAMPLE (FROM MY OWN DATA)

- Force plate measures Centre of Pressure (CoP) as it moves about the centre of balance
- People generally sway more with eyes closed than open



DEMO: INTRO TO JAMOVI

DEMO: FILTERING IN JAMOVI

DEMO: EYES OPEN
VS. CLOSED

DEMO: IS OUR SAMPLE
DIFFERENT TO THE
POPULATION?

DEMO: COMPARING TWO GROUPS

DEMO: CORRELATIONS AND SCATTER PLOTS

A photograph taken from the deck of a sailboat at sunset. The sky is a gradient of orange, yellow, and blue. The sun is low on the horizon. In the foreground, the dark silhouette of the boat's railing and some equipment are visible. The water is calm with gentle ripples.

QUESTIONS? ASK ON
MOODLE!

