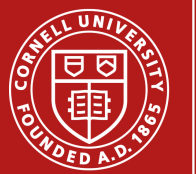


Johnson
Cornell
SC Johnson College of Business

Research Methods for the 2020s:

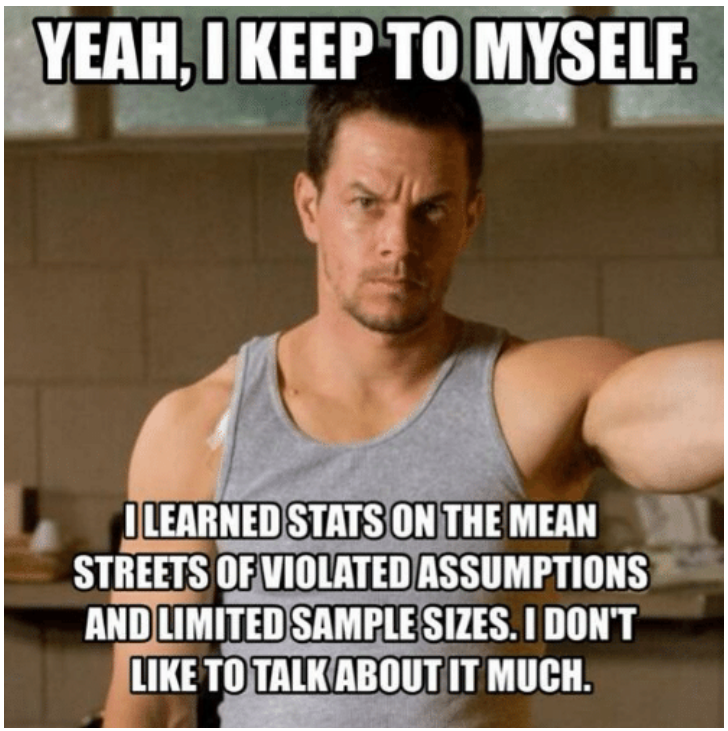
Experimental Design and Analysis for the Discerning Modern Behavioralist

Ryan Guggenmos

2020 AAA ABO Midyear Meeting PhD Consortium - My Basement

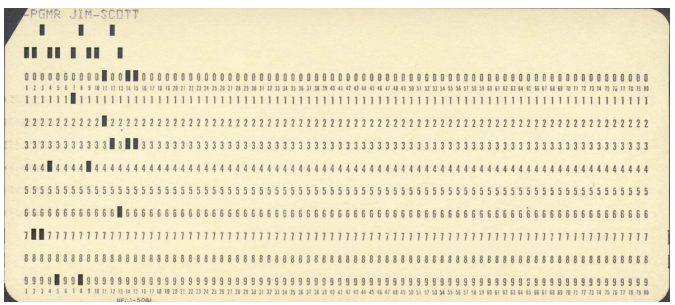
What exactly are "Research Methods for the 2020s?"

Gifs and Memes?

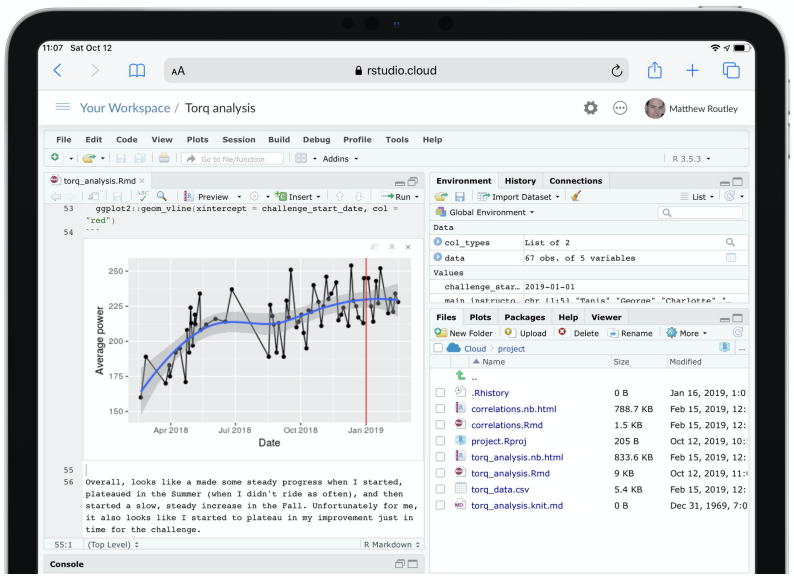


Methods for the 2020s

Advances in methodology are being driven by advances in computing and other technologies.



vs.



This gives us more options than ever, so what do you need to know?

What can methods do for us?

Strong experimental design and analyses, allow us to:

- Makes inferences about causal relationships
- Learn about how, why, and when an effect may occur
- Test theories about outcomes and processes

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Leverage the competitive advantages of your research method(s).

Design and analysis issues can keep us from being able to capitalize on our competitive advantage.

Inferences from these experiments may be incorrect or incomplete.

What can't analysis do for us?

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- Allow you to draw strong casual inference from observational data

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- Make your variables of interest interesting (esp. jointly interesting)
- Give you an interesting accounting research question*

* with some small exceptions (e.g., audit sampling, methods papers)


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H1: The difference in investors' willingness to invest under low versus high levels of stress will be greater when the humidity is high versus when it is low.

Is H1 supported?

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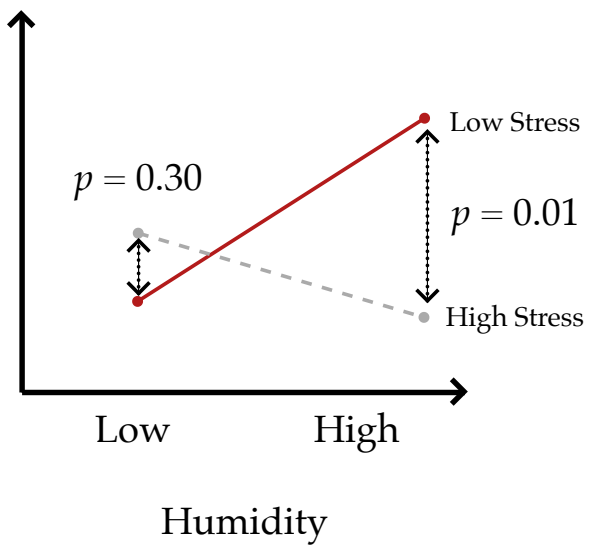

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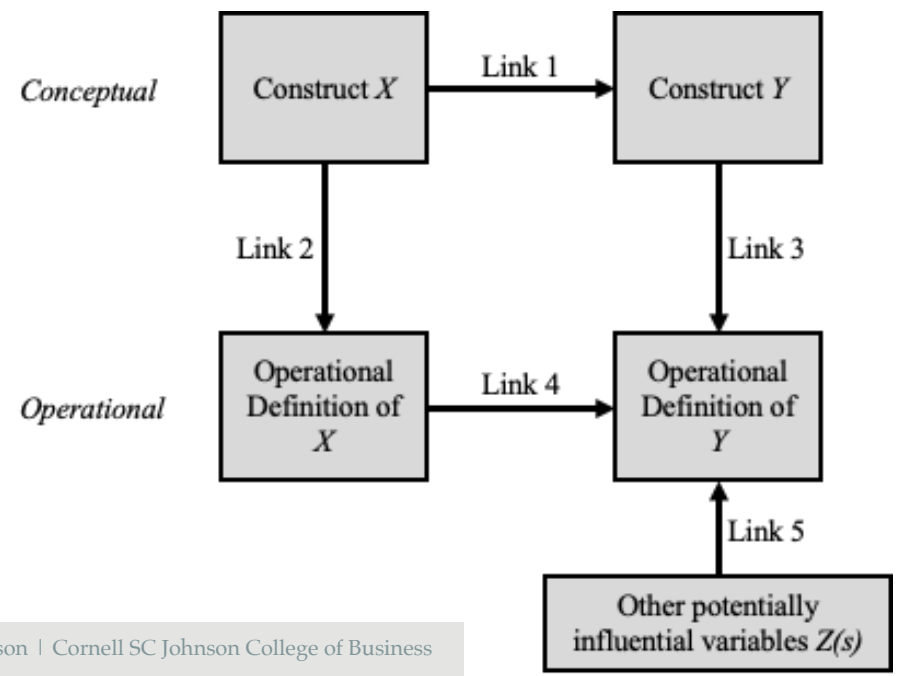
Methods: Design and Analysis

Predictive Validity Framework (a.k.a. Libby Boxes)

"Link 4 assesses the relations between the operational independent and dependent variables."

Libby, Bloomfield, and Nelson (2002)



Using Stats!

The missing link...

Link 4 is Statistical Conclusion Validity (SCV).

Statistical Conclusion Validity (SCV) requires that:

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Statistical Conclusion Validity (SCV) requires that:

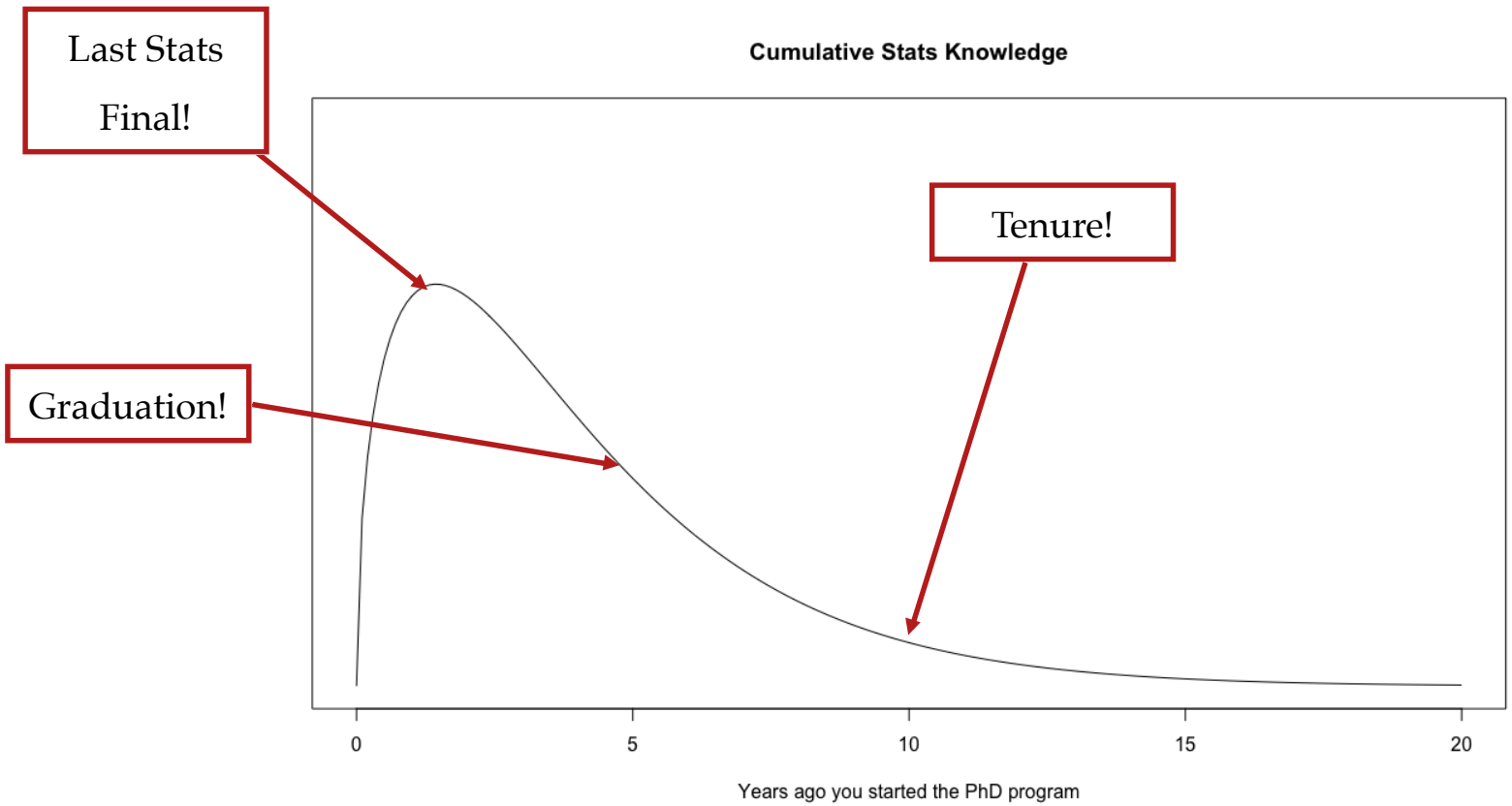
- the statistical analysis chosen matches the design employed; and
- the analysis is applied in a way that does not distort the expected probability of Type I or Type II error.

Without adequate SCV, we might not be able to trust our results.

This is a really big deal, but how do we know whether we've met these requirements?

Shadish, Cook, and Campbell (2002)

Don't be this person - #1



Read the plan and instructions!

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- What am I trying to show with these data?

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- Are there other tests that I should consider?

Must know: Core Analyses

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- Simple Effects Tests
- Simple comparisons between cells
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Plus: Any technique used in a paper authored or co-authored by you. This goes double for your JMP.

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This isn't a good look for you and could be interpreted as a "signal" by the reviewer.

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These are different!

- Basic Structural Equation Modeling (SEM)
- Basic Simultaneous Regression (PROCESS)
- Basic Bayesian null effect testing

Good to know: Other Topics

These are good to know if they are used in your topical area (or for generally being a good consumer of research).

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You are less likely to get credit for a cutting-edge technique or a really cool analysis - so try not to fall down a rabbit hole.

(I'm still working on taking this advice...)


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Gomila (2020 Journal of Exp. Psych: General)

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- Process testing has become nearly ubiquitous in experimental accounting research.
- We argue that process evidence is not always necessary to make a significant contribution to the accounting literature, but can add value to a paper.
- The ability of a process analysis to provide useful evidence rests on the researchers' ability to conduct the analysis in a way that minimizes the threats to validity that are common to the method used.

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- What conditions exacerbate or mitigate the effect?

This information is often interesting or helpful,
but may or may not be a study's main research question.

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- Triangulation
  - Multiple experiments (within or across papers)
  - Multiple methods (within or across papers)

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Our paper does not say that you:

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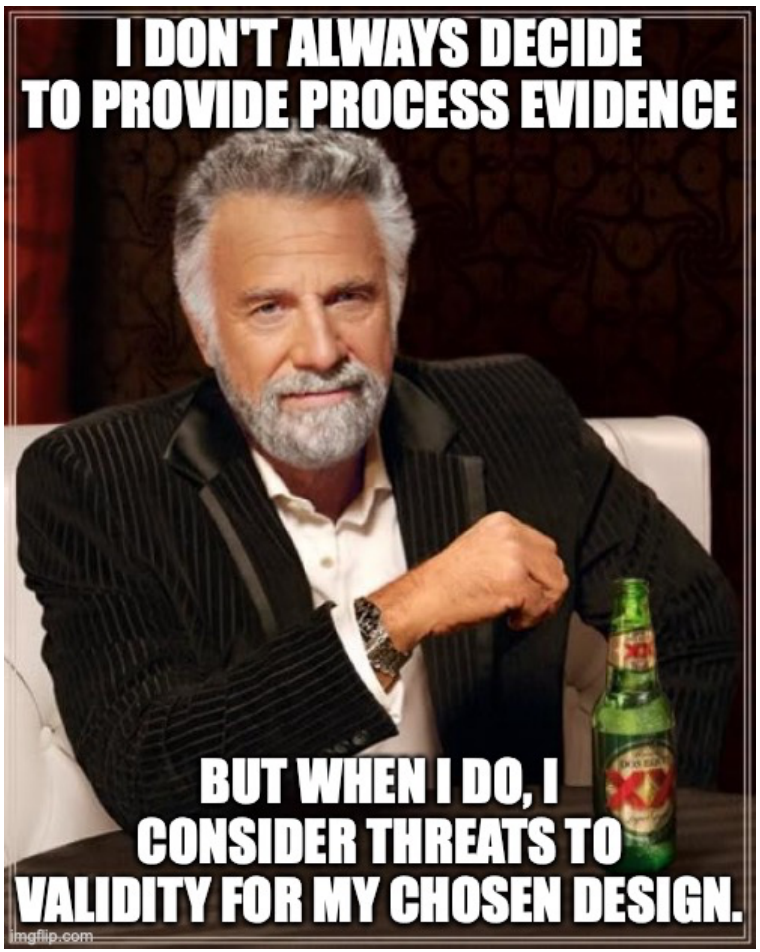
- don't need process evidence for your paper.


I DON'T ALWAYS DECIDE
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imgflip.com


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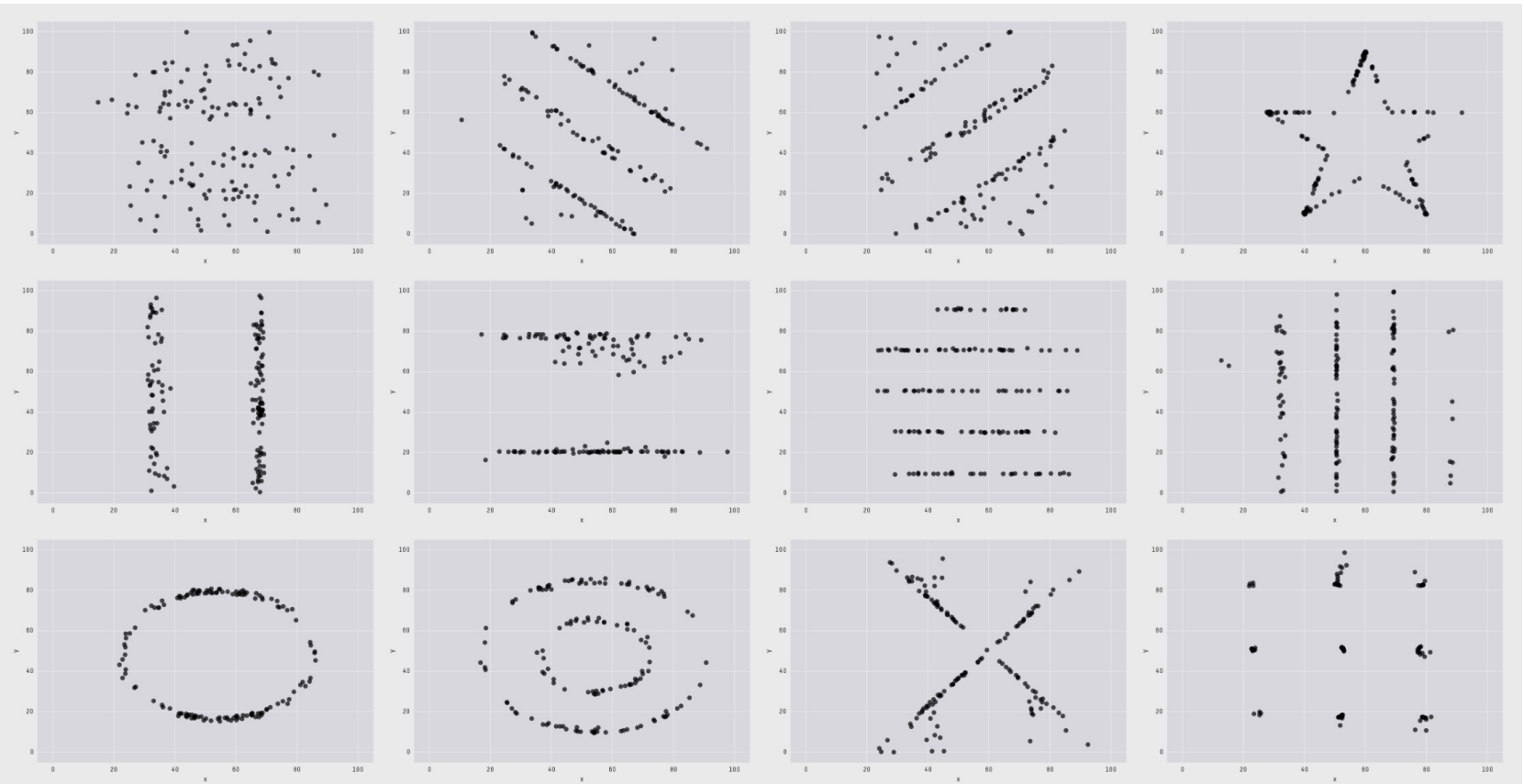
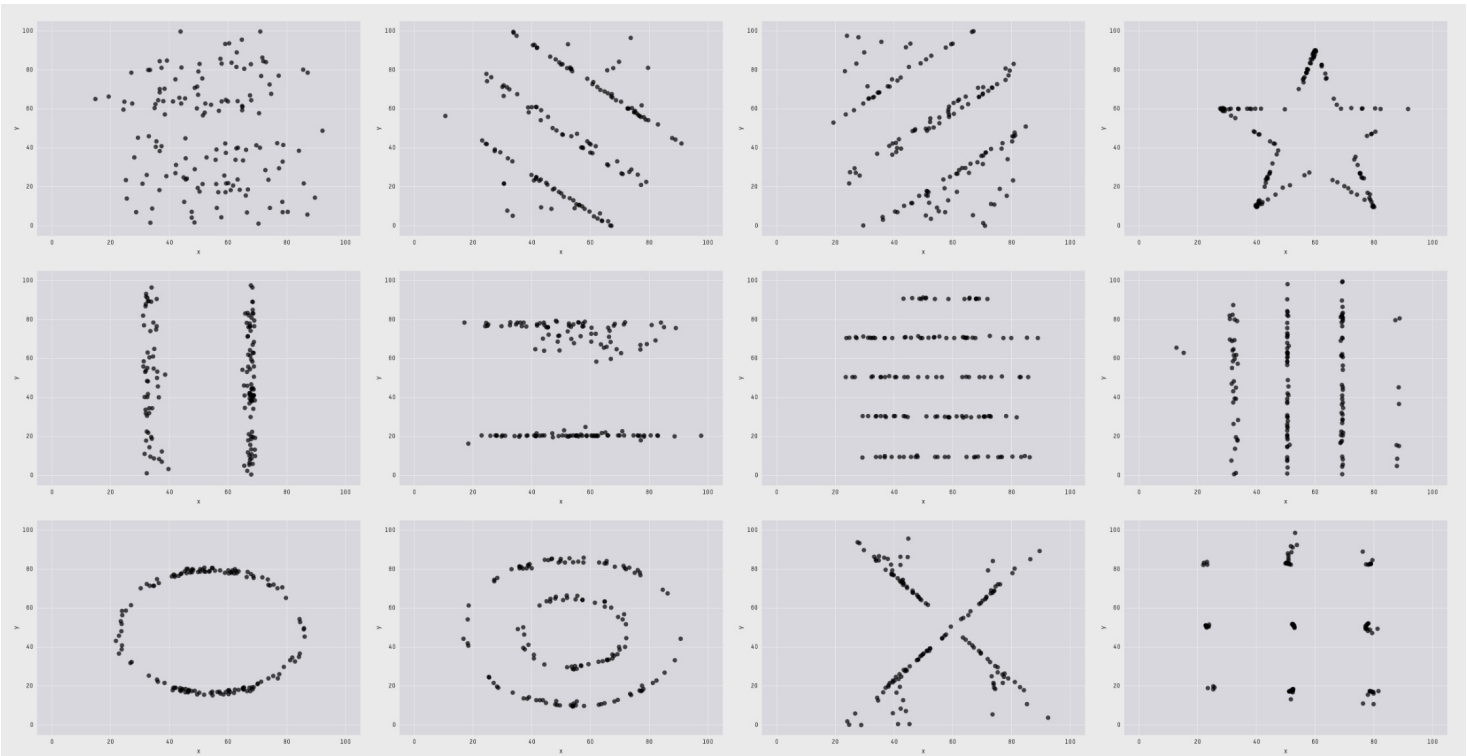
r = -0.06	X	Y
mean	54.26	47.83
Std. dev.	16.76	26.93



Visualize

All of them.

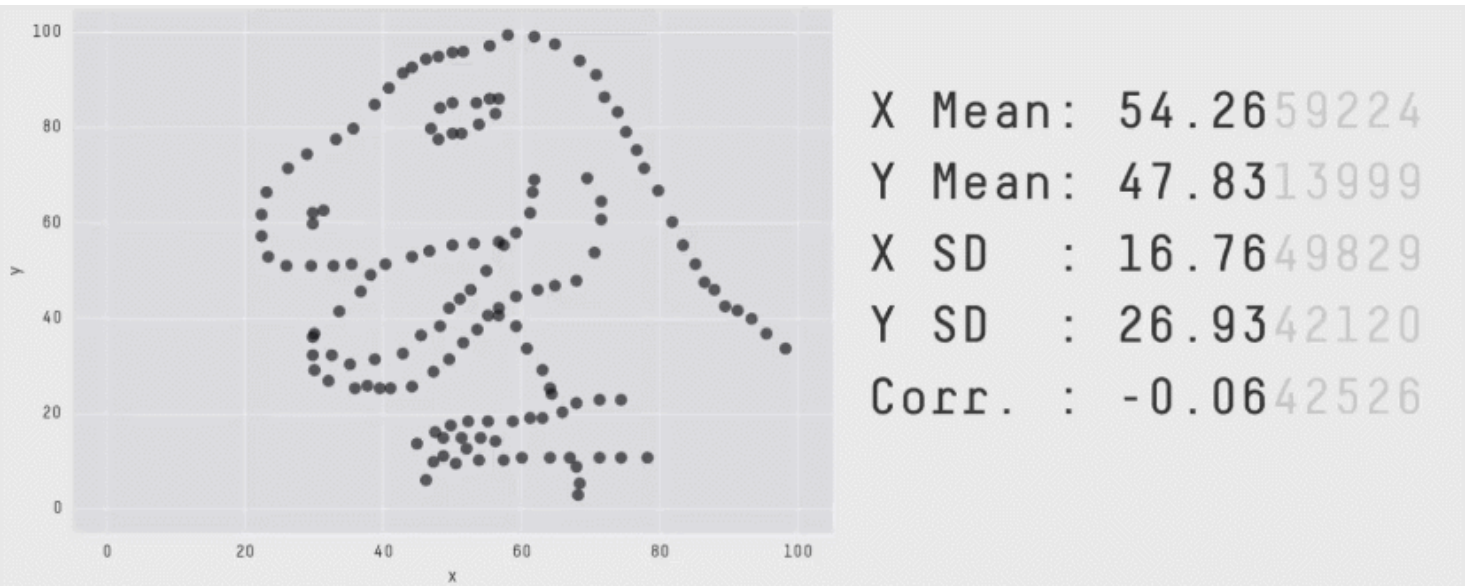


Matejka and Fitzmaurice (2017)

Data visualization isn't optional

"*...make both calculations and graphs. Both sorts of output should be studied; each will contribute to understanding."*

Anscombe (1973)



Matejka and Fitzmaurice (2017)

Be thankful...

If we need a short suggestion of what exploratory data analysis is, I would suggest that

1. It is an attitude, AND
2. A flexibility, AND
3. Some graph paper (or transparencies, or both).

No catalog of techniques can convey a willingness to look for what can be seen, whether or not anticipated. Yet this is at the heart of exploratory data analysis. The graph paper—and transparencies—are there, not as a technique, but rather as a recognition that the picture-examining eye is the best finder we have of the wholly unanticipated.

Tukey (1980 American Statistician)

Closing thoughts.

Data analysis is hard.

- Best practices change frequently.
- Innovations in experimental analysis are not frequently published in accounting journals.
- You often get little credit for it being right, but lose a lot of credit if it is wrong.

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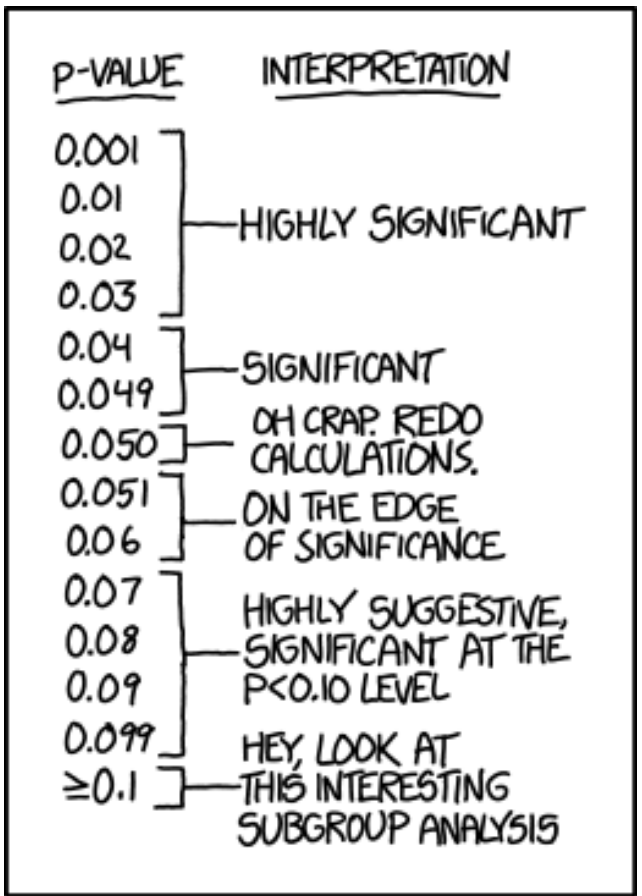
Data analysis has to be right.

- Good analysis always starts with good design.
- If analysis isn't sound, we can't trust the results.
- When experimental methods papers are published in accounting, read them closely and make sure you understand.
- Ask for help!

But most importantly,



www.xkcd.com

Don't be sketchy.

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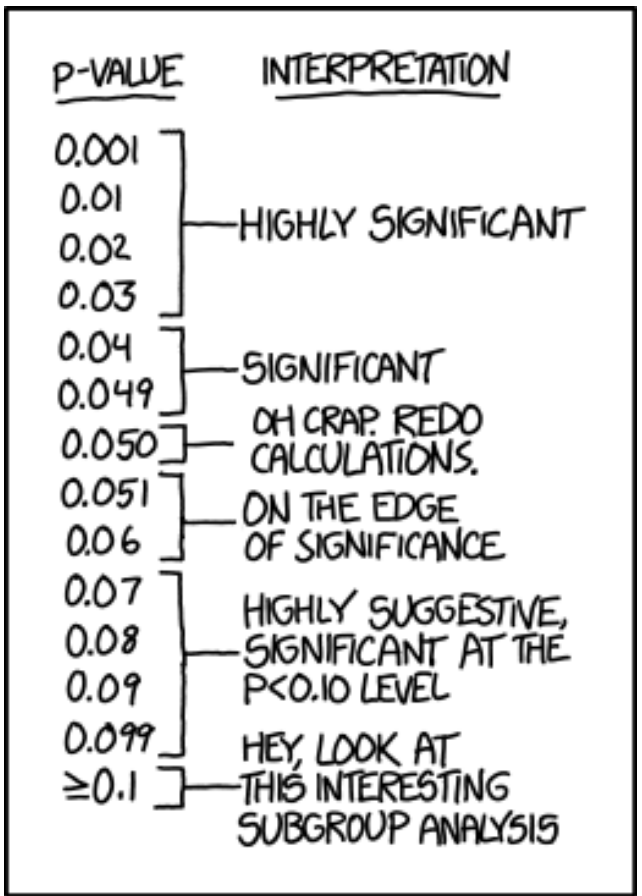

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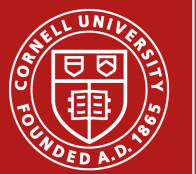

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Thank you.

And good luck with your papers!

Questions?