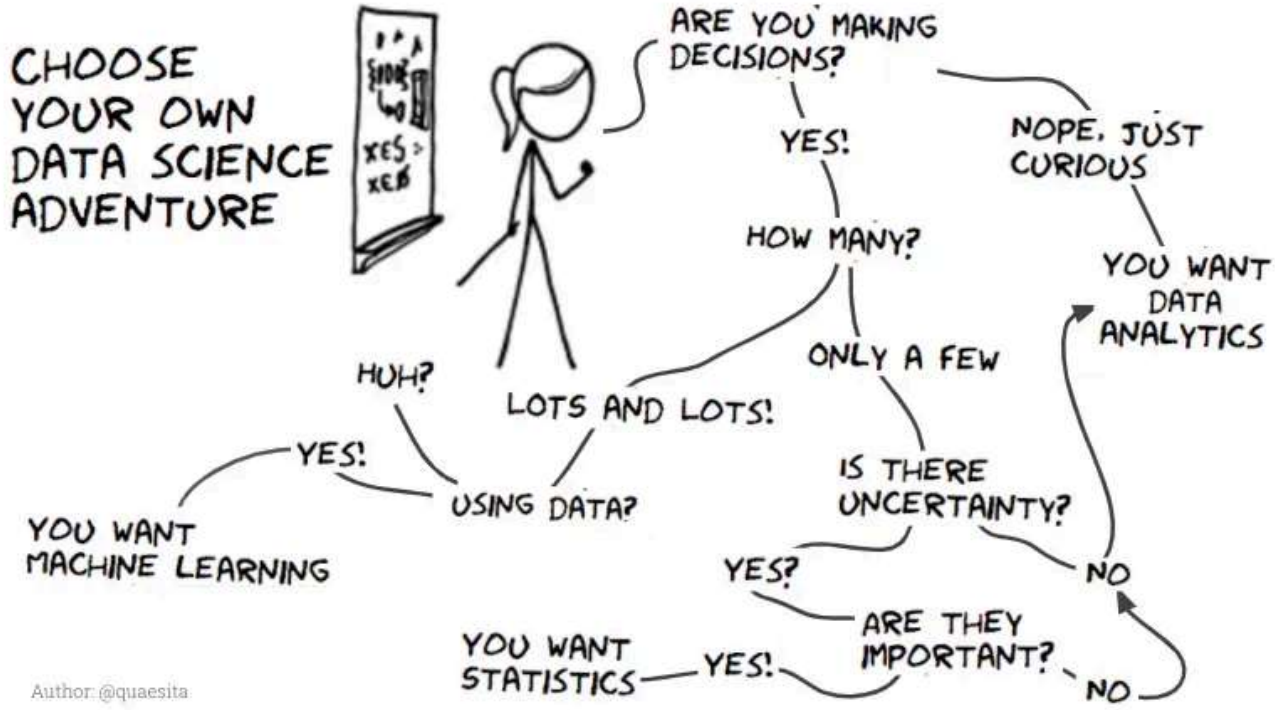
Statistics: The Complete Mini-Course

Choose your own learning adventure below

CASSIE KOZYRKOV
SEP 04, 2020



One of my goals for this newsletter is to help turn the jumble of my scattered musings into coherent learning journeys for you, arranged by theme and searchable by keyword. How do you use them? Simply skim the headings and dive into whatever is interesting. (Completionist? Go top to bottom.)

Since I'm a recovering statistician, here comes my attempt to do it for statistics!

Which brings me to...

Don't waste your time on statistics!

Hah, couldn't resist. No seriously, though, it's best not to assume you need statistics for everything. (That's a classic lie told to sell stats classes, textbooks, and other paraphernalia.) ***If you're not sure whether statistics is for you or what the point of it is***, explore this section.

Formats:

- Blog - bit.ly/quaesita_pointofstats
- Podcast - bit.ly/dipod_pointofstats
- Video - bit.ly/quaesita_stc010

What even is (are?) data?!

If you're new to data (or someone who pronounces it as though it has a capital D), it's probably a good idea to cover this topic before wading into the rest of the swamp...

Included topics: ***information, data, software, data summaries, plots, histograms, distributions, and a few other tidbits.***

Formats:

- Blog - bit.ly/quaesita_hist
- Podcast - bit.ly/dipod_hist

Statistics for people in a hurry

Ever wished someone would just give you ***the big picture of statistics*** in plain English? Let me try to grant that wish for you! I'll zoom through all the main ideas in statistics in 8 minutes! Or just 1 minute, if you stick to the large font bits. The links inside the blog take curious readers to my explanations of the highlighted topics.

Formats:

- Blog - bit.ly/quaesita_statistics
- Podcast - bit.ly/dipod_statistics

Statistics for people time on their hands

Want to take a whole video course on statistics? Curious to find out what it was like to be Google's most popular course of all time, Statistical Thinking? Not all 10 hours of footage have been uploaded, so bookmark the playlist if you're hungry for the whole enchilada.

- Video - bit.ly/statthinking

Um... this is awkward, but what *is* a statistic?

The way we use the terms these days, it turns out that analytics is the discipline that's about calculating statistics, but statistics is the discipline that's all about going beyond those statistics. (Speaking of awkward.) But what *is* a statistic? To find out, leap into my ***intro to statistics vocabulary***, including ***sample***, ***population***, ***observation***, ***statistic***, ***parameter***, ***estimate***, and ***hypothesis***.

Formats:

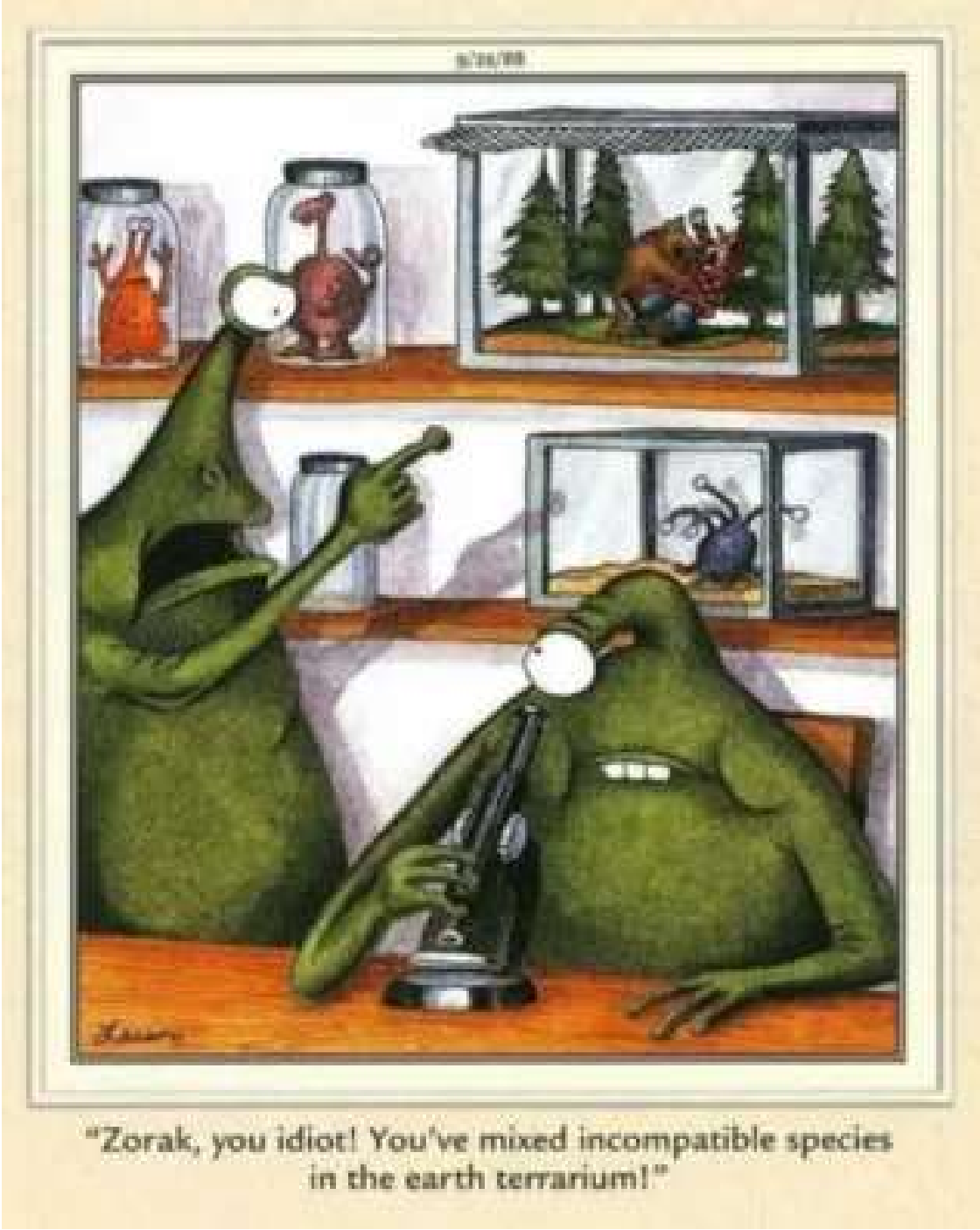
- Blog - bit.ly/quaesita_vocab
- Podcast - bit.ly/dipod_vocab
- Video - bit.ly/quaesita_stc002 through bit.ly/quaesita_stc008

Wait, what's the difference between analytics and statistics?

I'm glad you asked! Understanding this will save you a lot of stress if you work with data. Learn more about the ***professions of analytics and statistics*** here.

Formats:

- Blog - bit.ly/quaesita_versus
- Video - bit.ly/quaesita_ytversus



Bonus: Can analysts and statisticians get along?

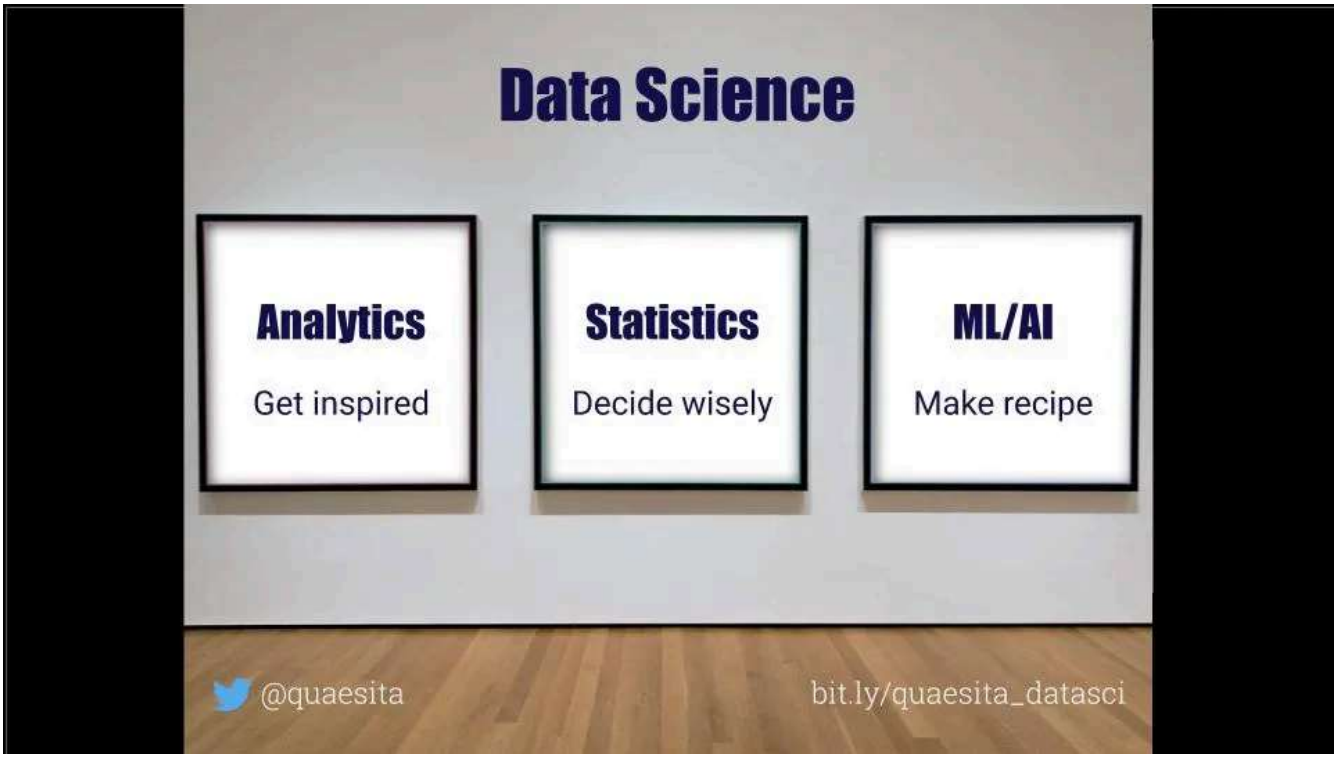
Incompatible species in the terrarium? Blog - bit.ly/quaesita_battle

How does statistics fit into data science?

It's a subset! To learn more about the ***data science umbrella*** or look at ***a short history of its subdisciplines***? Explore here.

Formats:

- Blog - bit.ly/quaesita_datasci and bit.ly/quaesita_history
- Podcast - bit.ly/dipod_history



Bayesian vs Frequentist statistics

Ah, you have questions about ***the two major philosophies of statistics***? I have a couple of **videos** you might like.

- Curious to find out whether you think like a Bayesian or a Frequentist? bit.ly/quaesita_ytbayescoin
- What keywords tip you off about whether you're in Bayesian or Frequentist territory? bit.ly/quaesita_stc011

The basics of hypothesis testing

If you'd like to understand the logic of hypothesis testing taught in the typical STAT101 class, start here. Learn about ***default actions, null and alternative hypotheses***, and the one sentence that summarizes everything.

Formats:

- Blog - (1) bit.ly/quaesita_damnedlies, (2) bit.ly/quaesita_fisher, (3) bit.ly/quaesita_yesbutton
- Video - (1-2) bit.ly/quaesita_stc012 , (3) bit.ly/quaesita_stc013

Explaining p-values with puppies

Statistical significance and the dreaded p-value are notorious for being taught terribly to maximize confusion. Let me try undo that damage with puppies...

Formats:

- Blog - bit.ly/quaesita_pesky answers your various p-value questions and includes a link to my puppies intro (bit.ly/quaesita_puppies)
- Video - bit.ly/quaesita_p1 (start here and keep watching p2, p3, p4 if you want more)

Bonus: Thoughts on the p-value controversy

- Blog - bit.ly/quaesita_needles

Probability basics

That said, the first few weeks of stats class often cover something else entirely. Keen to talk about ***probability, combinatorics, and the birthday paradox?***

Formats:

- Blog - bit.ly/quaesita_bday
- Podcast - bit.ly/dipod_bday

Experiments, correlation, and A/B testing

If you're interested in using statistics to answer questions about ***cause and effect***, this trio of blog posts is for you! Here's the suggested order for attacking them in:

- Do you use the word "experiment" incorrectly? bit.ly/quaesita_experiment
- What is correlation? bit.ly/quaesita_correlation
- How do A/B tests work? bit.ly/quaesita_ab

Can we talk about bias now?

You're right, I should probably have gotten to that sooner. Here comes a coronavirus-sponsored ***lesson on statistical bias***...

Formats:

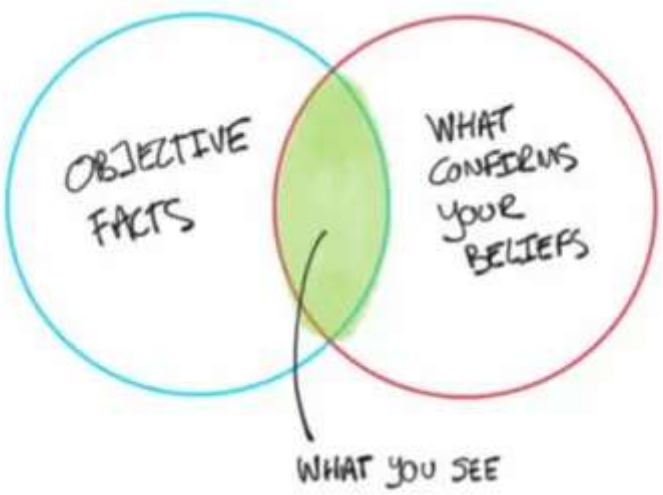
- Blog - bit.ly/quaesita_bias
- Podcast - bit.ly/dipod_bias

Psychological perspective: Attempting statistics is hopeless if...

If you're not aware of your ***cognitive biases***, you'll undermine your ability to make good use of statistics. Here are some tips on how to fight your brain's mischief.

Choose your format:

- Blog - (1) bit.ly/quaesita_inspired and (2) bit.ly/quaesita_confirmation
- Podcast - (2 only) bit.ly/dipod_confirmation



Is statistics subjective or objective?

Subjective. (Sorry!) Want to learn more about the relationship between ***capital-T-Truth, statistics, and science***?

Formats:

- Blog - bit.ly/quaesita_saddest and bit.ly/quaesita_scientists
- Podcast - bit.ly/dipod_saddest

The leader/decision-maker's role in statistics

If you're responsible for calling the shots and you're working with a statistician, what are your responsibilities? These blog posts reveal a few sides of ***the part decision-makers play in the process***. Seeing the common thread is left as an exercise for the reader. (Hint: the statistician might help you get a good answer, but it's up to you - the leader - to carefully frame your question. Otherwise, well, 42.)

1. Data science's most misunderstood hero bit.ly/quaesita_hero
2. Statistics Savvy Self-Test bit.ly/quaesita_savvy
3. Incompetence, delegation, and population bit.ly/quaesita_incomp
4. Populations — You're doing it wrong bit.ly/quaesita_popwrong
5. The saddest equation in data science bit.ly/quaesita_saddest

Left: Hey look, this is a completely desolate place. No one ever goes here. Right: Look again. These photos are data... turns out data can lie. And if you think there's some applicable magic involving 30 datapoints, want to bet I can't find you 3000 tourist landmark photos with no one in them?

Extra credit: A trick question for stats nerds

"Bo did a hypothesis test. Correctly. If the ONLY other thing you knew about it was one of the following, which one gives you the most info?"

A) significance level = 0.08
B) significance level = 0.05
C) p-value = 0.1753
D) p-value = 0.0032

Read the answer here: bit.ly/quaesita_bo

Is any of this available in other languages?

It sure is, thanks to some amazing volunteers who've translated it for you. *(If you'd like to help translate to your language, please read this.)*

- Chinese
- Italian
- Portuguese (BR)
- Spanish
- Others

That's all for now

...Aaaaand that's EVERYTHING I have published on statistics so far. Now in one place for your amusement. As always, if you enjoyed any of it, the loveliest way you can say thank you is to share it with someone who might enjoy it.

Next time, I'll take you on a tour of a different data topic entirely...

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