Course Review

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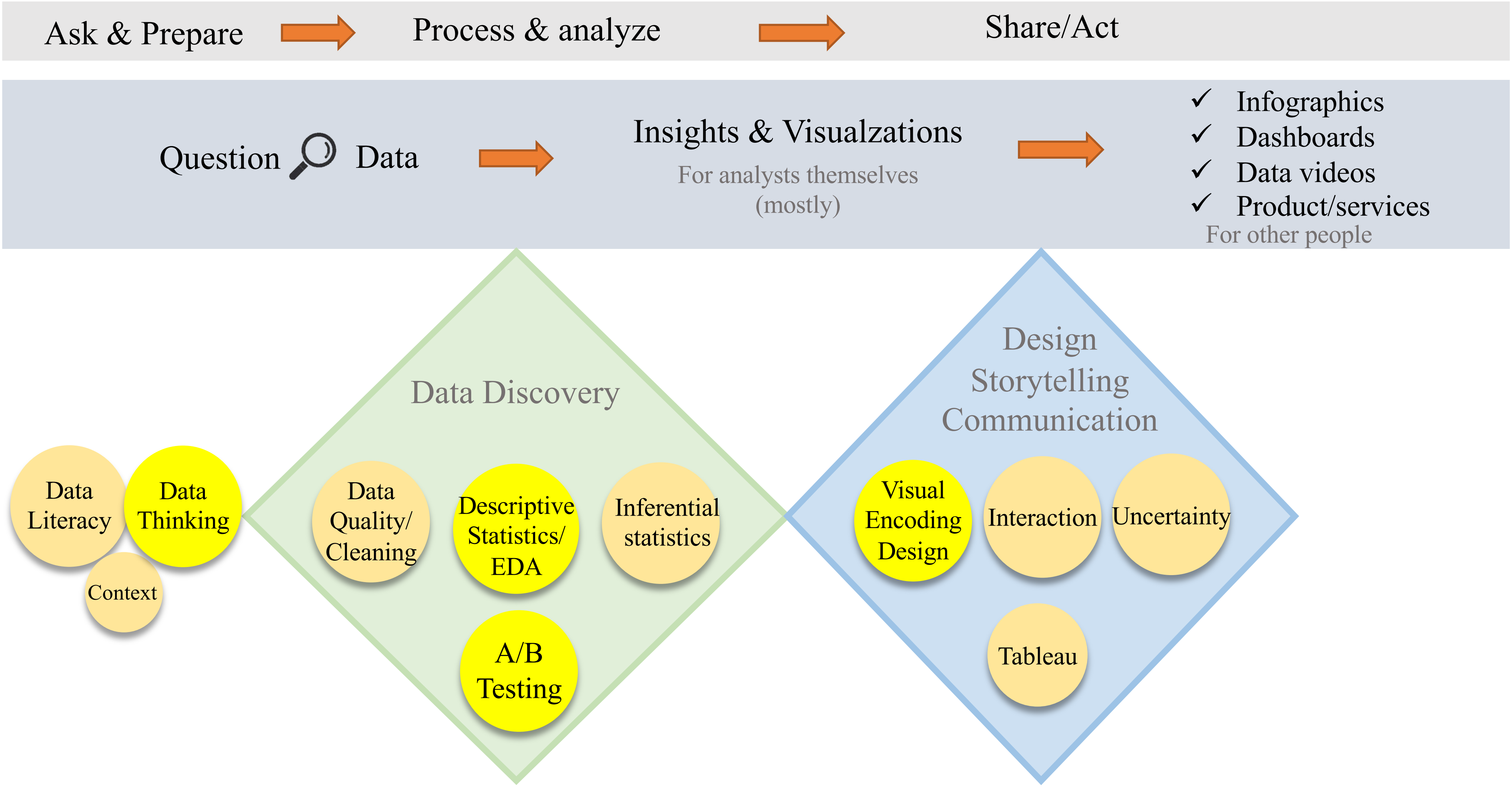
Southern University of Science and Technology

Design and Learning with Data



Ask & Prepare → Process & analyze → Share/Act

Question 🔍 Data → Insights & Visualzations

For analysts themselves (mostly)

→

- ✓ Infographics
- ✓ Dashboards
- ✓ Data videos
- ✓ Product/services

For other people

Data Literacy

Data Thinking

Context

Data Discovery

Data Quality/ Cleaning

Descriptive Statistics/ EDA

Inferential statistics

A/B Testing

Design Storytelling Communication

Visual Encoding Design

Interaction

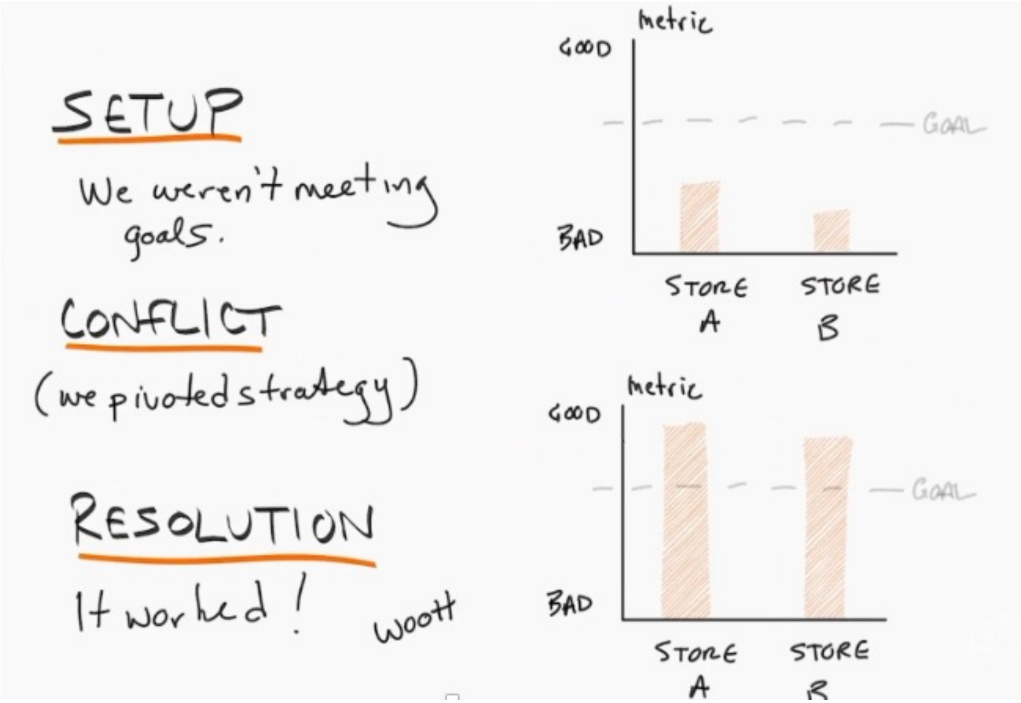
Uncertainty

Tableau

Data Literacy

Data Storytelling

- The ability to effectively communicate insights from a dataset using narratives and visualizations.

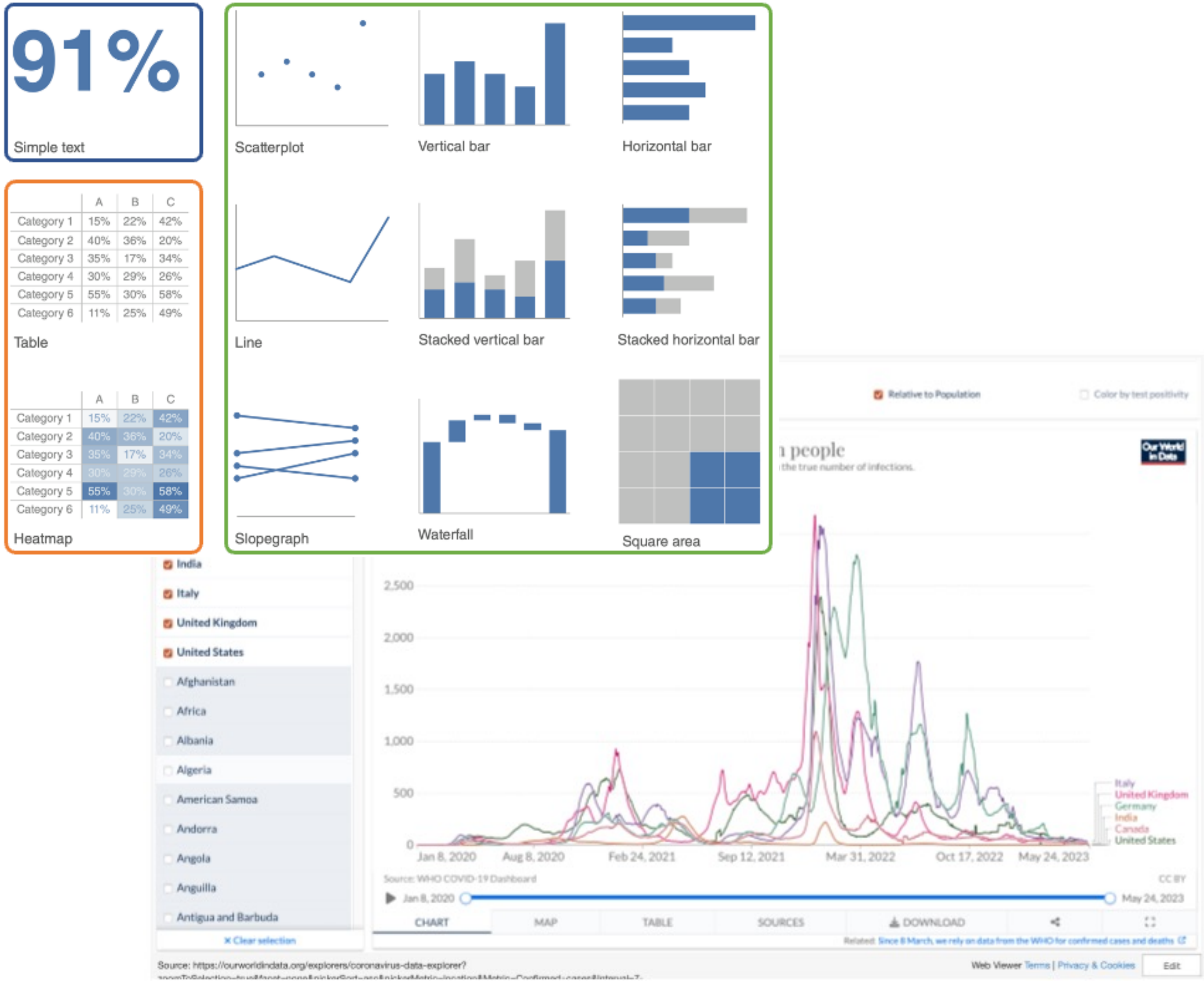


苏炳添vs博尔特 差距还有多远?

本视频引用 chenqin 的回答进行创作

Data Literacy

Data Visualization



	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

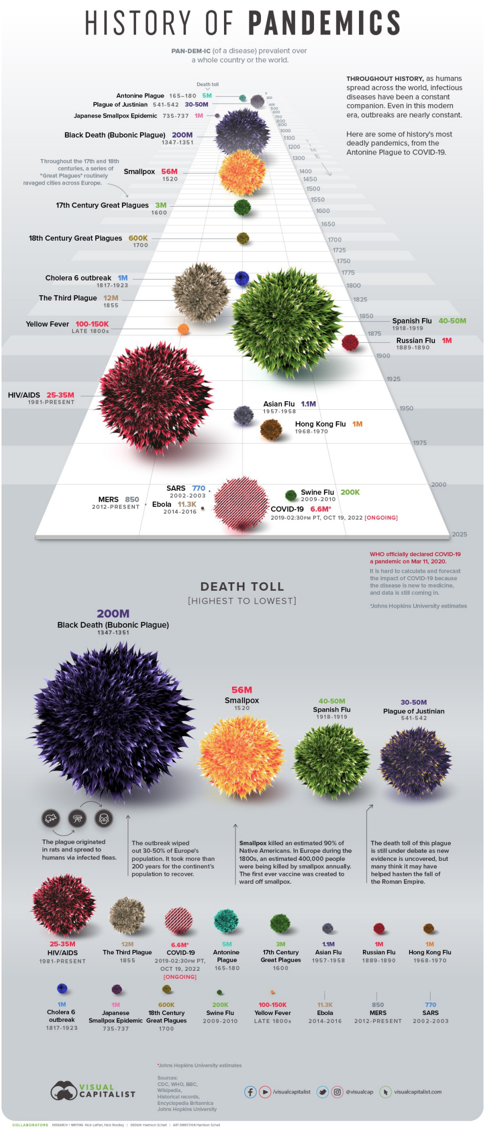
Table

	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

Heatmap

Related: Since 8 March, we rely on data from the WHO for confirmed cases and deaths

Source: https://ourworldindata.org/explorers/coronavirus-data-explorer?zoomToSelection=true&facet=none&pickerSort=asc&pickerMetric=location&Metric=Confirmed+cases&Interval=7-



HISTORY OF PANDEMICS

PAN·DEM·IC (of a disease) prevalent over a whole country or the world.

THROUGHOUT HISTORY, as humans spread across the world, infectious diseases have been a constant companion. Even in this modern era, outbreaks are nearly constant.

Here are some of history's most deadly pandemics, from the Antonine Plague to COVID-19.

Throughout the 17th and 18th centuries, a series of "Great Plagues" routinely ravaged cities across Europe.

Death toll
Antonine Plague 165–180 5M
Plague of Justinian 541-542 30-50M
Japanese Smallpox Epidemic 735-737 1M
Black Death (Bubonic Plague) 200M 1347-1351
Smallpox 56M 1520
17th Century Great Plagues 3M 1600
18th Century Great Plagues 600K 1700
Cholera 6 outbreak 1M 1817-1923
The Third Plague 12M 1855
Yellow Fever 100-150K LATE 1800s
Spanish Flu 40-50M 1918-1919
Russian Flu 1M 1889-1890
HIV/AIDS 25-35M 1981-PRESENT
Asian Flu 1.1M 1957-1958
Hong Kong Flu 1M 1968-1970
SARS 770 2002-2003
MERS 850 2012-PRESENT
Ebola 11.3K 2014-2016
Swine Flu 200K 2009-2010
COVID-19 6.6M* 2019-02:30PM PT, OCT 19, 2022 [ONGOING]
TIME
0
200
400
500
600
700
800
900
1000
1100
1200
1300
1400
1450
1500
1550
1600
1650
1700
1725
1750
1775
1800
1825
1850
1875
1900
1925
1950
1975
2000
2025

WHO officially declared COVID-19 a pandemic on Mar 11, 2020.

It is hard to calculate and forecast the impact of COVID-19 because the disease is new to medicine, and data is still coming in.

*Johns Hopkins University estimates

DEATH TOLL [HIGHEST TO LOWEST]

200M
Black Death (Bubonic Plague)
1347-1351
56M
Smallpox
1520
40-50M
Spanish Flu
1918-1919
30-50M
Plague of Justinian
541-542
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12M The Third Plague 1855
6.6M* COVID-19 2019-02:30PM PT, OCT 19, 2022 [ONGOING]
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1M Japanese Smallpox Epidemic 735-737
600K 18th Century Great Plagues 1700
200K Swine Flu 2009-2010
100-150K Yellow Fever LATE 1800s
11.3K Ebola 2014-2016
850 MERS 2012-PRESENT
770 SARS 2002-2003

The plague originated in rats and spread to humans via infected fleas.

The outbreak wiped out 30-50% of Europe's population. It took more than 200 years for the continent's population to recover.

Smallpox killed an estimated 90% of Native Americans. In Europe during the 1800s, an estimated 400,000 people were being killed by smallpox annually. The first ever vaccine was created to ward off smallpox.

The death toll of this plague is still under debate as new evidence is uncovered, but many think it may have helped hasten the fall of the Roman Empire.

*Johns Hopkins University estimates

Sources:
CDC, WHO, BBC,
Wikipedia,
Historical records,
Encyclopedia Britannica
Johns Hopkins University

VISUAL CAPITALIST

/visualcapitalist @visualcap visualcapitalist.com

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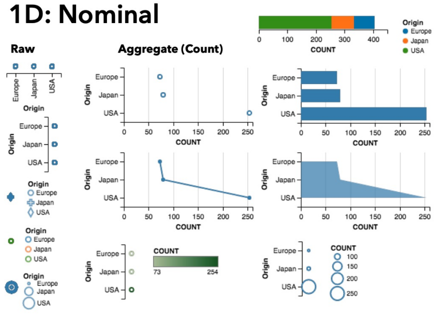
Data Literacy

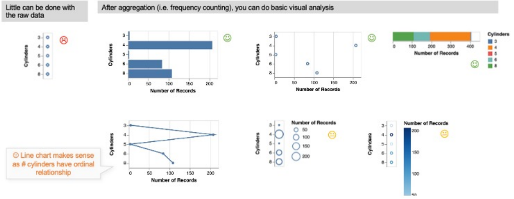
Dimensional Visualization of Data

1D: Nominal



1D Ordinal

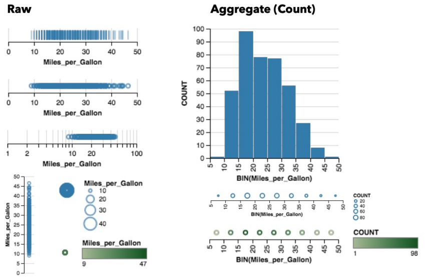
- When you are interested in a single column containing ordinal values (i.e., counting and ranking are allowed)
  - E.g., **# of cylinders** column of the car dataset


Little can be done with the raw data

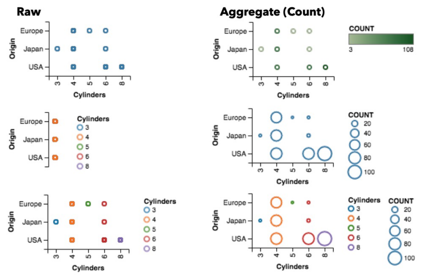
After aggregation (i.e. frequency counting), you can do basic visual analysis

☹ Line chart makes sense as # cylinders have ordinal relationship

1D: Quantitative

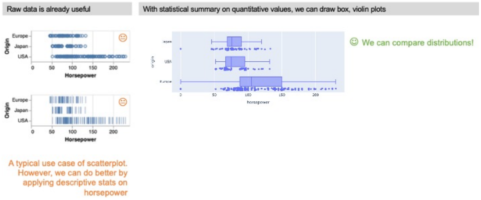


2D: Nominal x Nominal



2D Nominal x Quantitative

- If you are interested in how one nominal and one quantitative columns
  - E.g., origin and horsepower columns of the car dataset

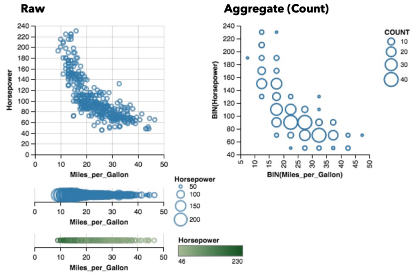

Raw data is already useful

With statistical summary on quantitative values, we can draw box, violin plots

☺ We can compare distributions!

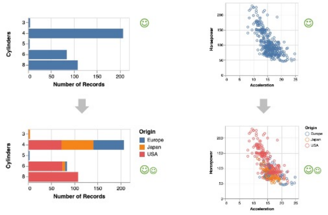
A typical use case of scatterplot. However, we can do better by applying descriptive stats on horsepower

2D: Quantitative x Quantitative



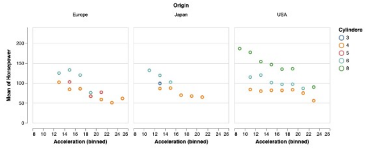
3D ANY

- Each visualization can accommodate 1-2 extra columns with color or size encodings. Why not explore higher-dimensions?



Higher Dimension

- Single charts usually cannot accommodate larger than 5 dimensions.
  - However, we can use **composite charts**.
  - For example, we have used scatterplot matrix in the previous tutorial.



☺☺☺ Using subplots we can add another field

Context

The Importance of Context

6 basic problem types

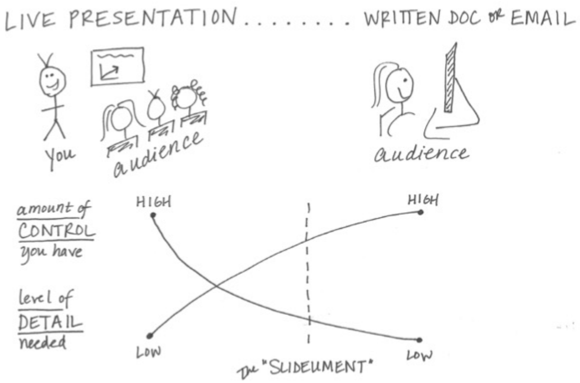
- Making predictions
- Categorizing things
- Spotting something unusual
- Identifying themes
- Discovering connections
- Finding patterns

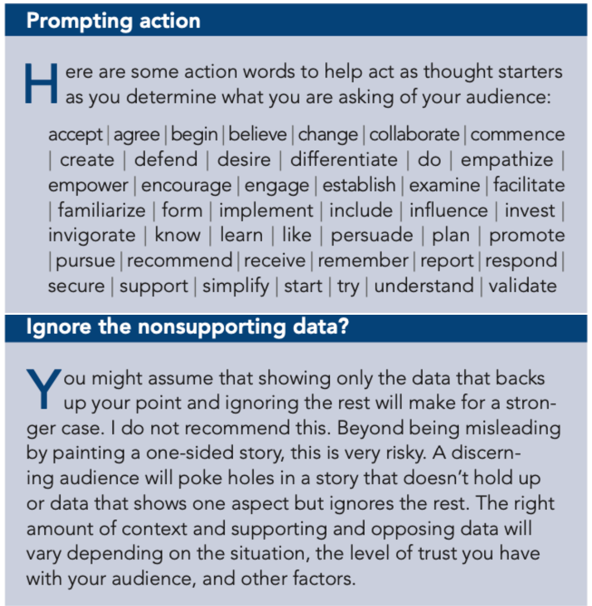
Who, What, and How

- ***To whom are you communicating?***
  - It is important to have a good understanding of who your audience is and how they perceive you. This can help you to **identify common ground** that will help you ensure they hear your message.
- ***What do you want your audience to know or do?***
  - You should be clear how you want your audience to act and take into account how you will communicate to them and the overall tone that you want to set for your communication.
- ***How can you use data to help make your point?***
  - It's **only after** you can concisely answer these first two questions that you're ready to move forward with the third.

Craft effective questions

- SMART methodology
  - Specific — does the question address the problem? Does it have a context?
  - Measurable — does it give the answer that can be measured?
  - Action-oriented — will the info that we get help us devise an action plan?
  - Relevant — is it about a particular problem we are trying to solve?
  - Time-bounded — are the answers relevant to the specific time being studied?


LIVE PRESENTATION . . . . WRITTEN DOC OR EMAIL
You
audience
audience
amount of CONTROL you have
level of DETAIL needed
HIGH
LOW
HIGH
LOW
The "SLIDEUMENT"



Prompting action

Here are some action words to help act as thought starters as you determine what you are asking of your audience:

accept | agree | begin | believe | change | collaborate | commence | create | defend | desire | differentiate | do | empathize | empower | encourage | engage | establish | examine | facilitate | familiarize | form | implement | include | influence | invest | invigorate | know | learn | like | persuade | plan | promote | pursue | recommend | receive | remember | report | respond | secure | support | simplify | start | try | understand | validate

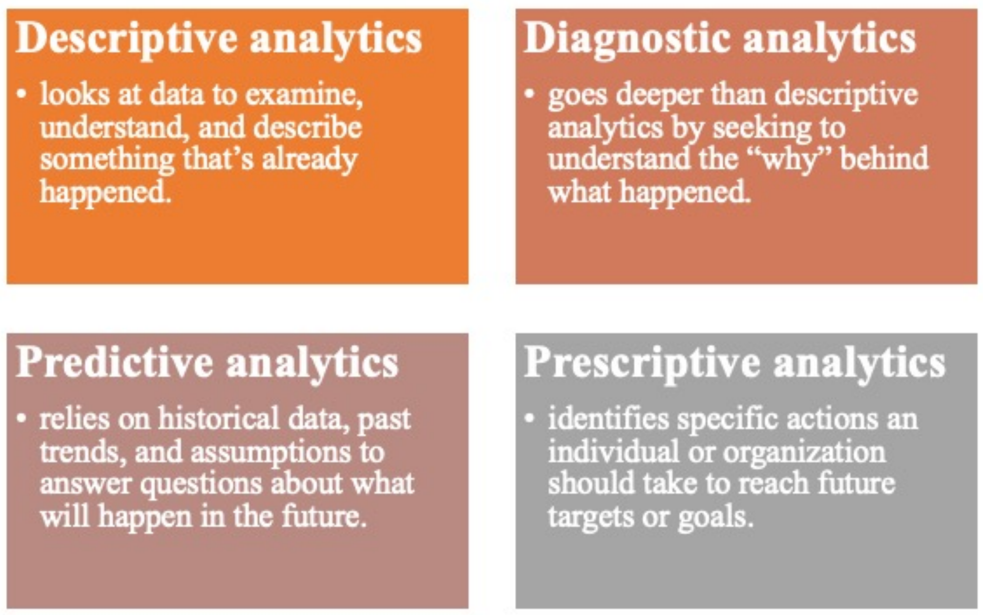
Ignore the nonsupporting data?

You might assume that showing only the data that backs up your point and ignoring the rest will make for a stronger case. I do not recommend this. Beyond being misleading by painting a one-sided story, this is very risky. A discerning audience will poke holes in a story that doesn't hold up or data that shows one aspect but ignores the rest. The right amount of context and supporting and opposing data will vary depending on the situation, the level of trust you have with your audience, and other factors.

Data Thinking

Data X

- **Data science vs Data analytics**
- ***Data ecosystem / Data life cycle / Data Privacy & Ethics***
- ***Data Integrity / Data & Analytics Skills***



Descriptive analytics

- looks at data to examine, understand, and describe something that's already happened.

Diagnostic analytics

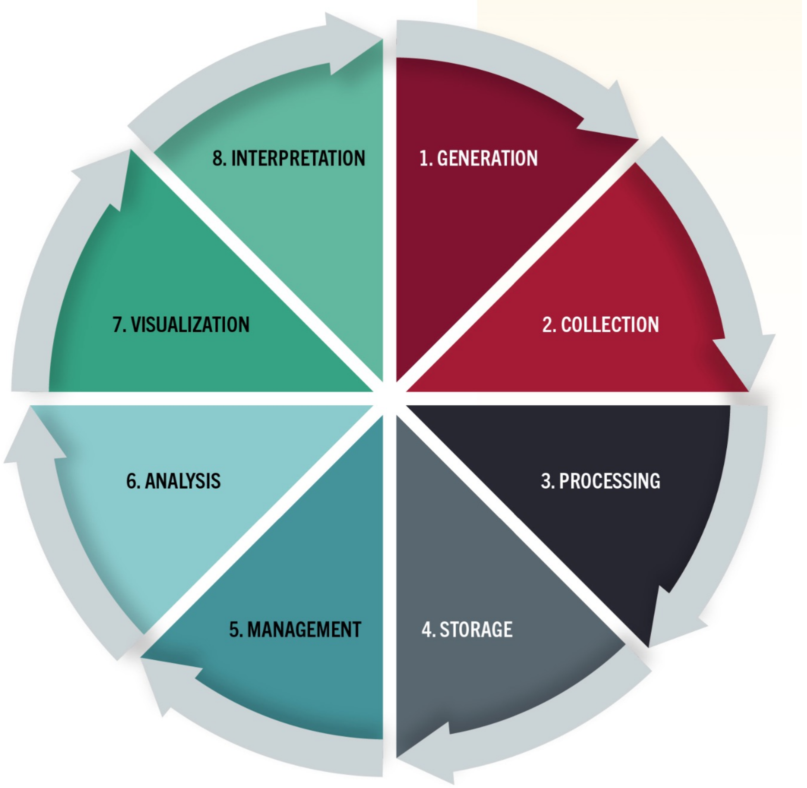
- goes deeper than descriptive analytics by seeking to understand the "why" behind what happened.

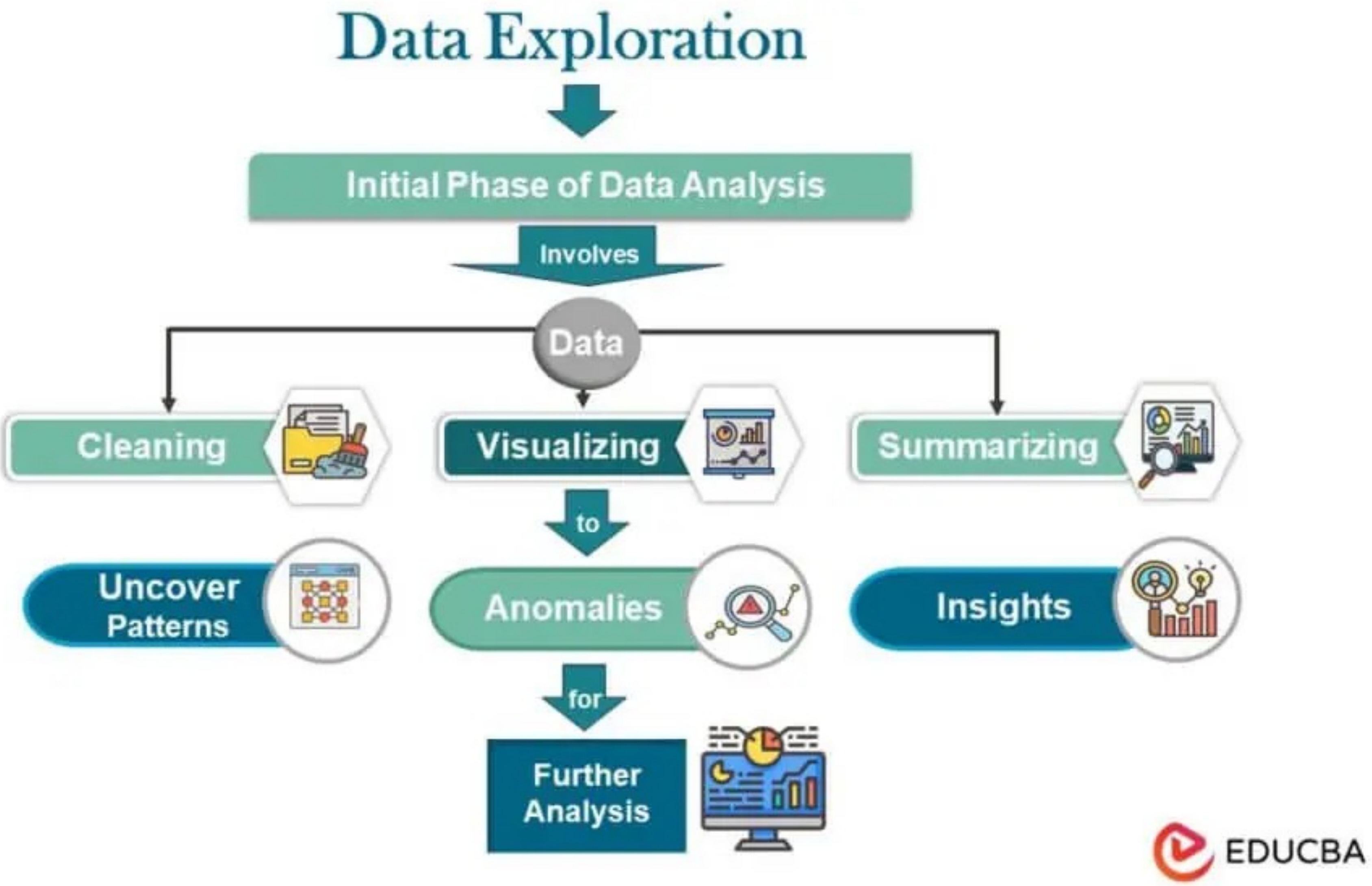
Predictive analytics

- relies on historical data, past trends, and assumptions to answer questions about what will happen in the future.

Prescriptive analytics

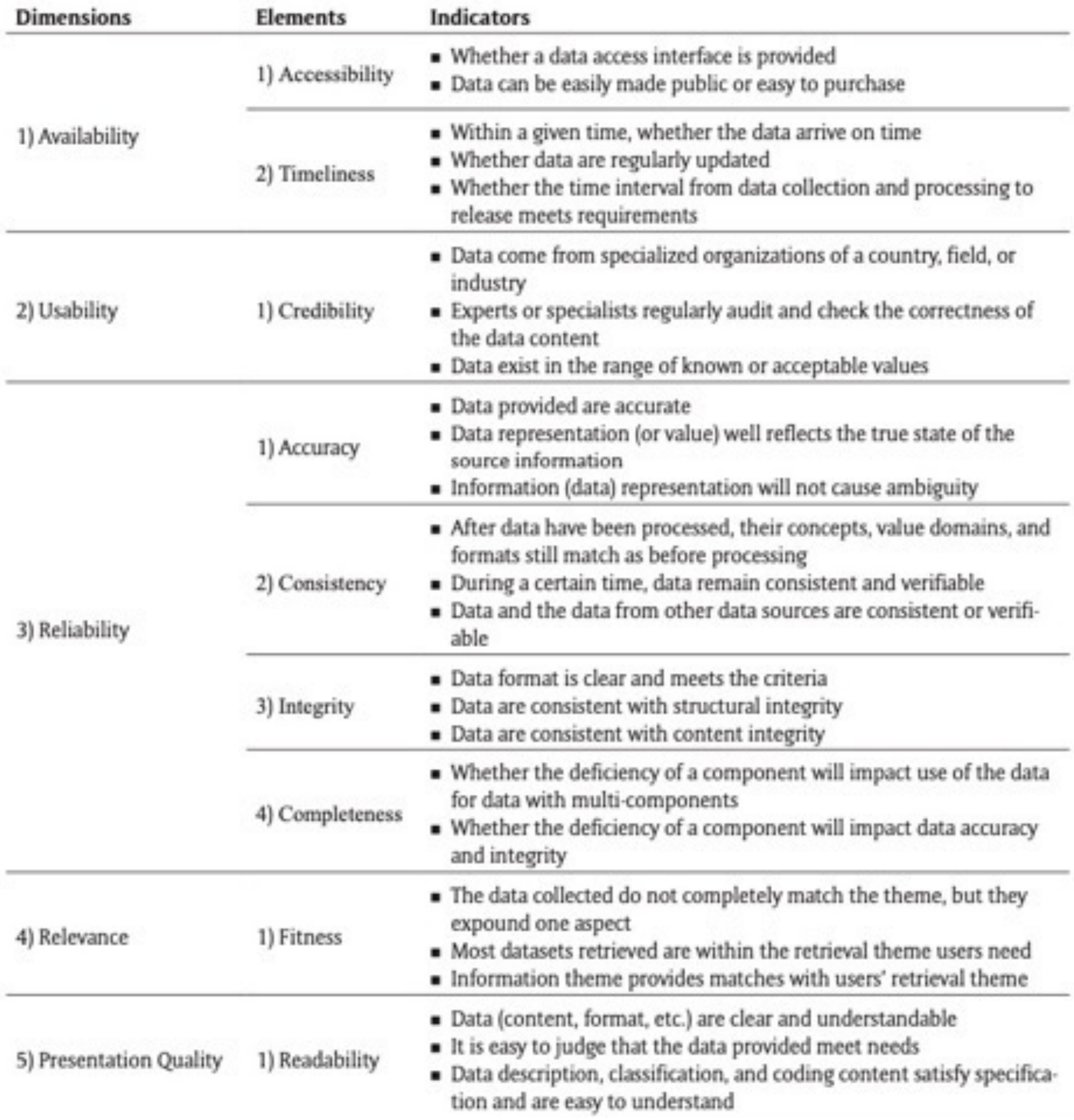
- identifies specific actions an individual or organization should take to reach future targets or goals.



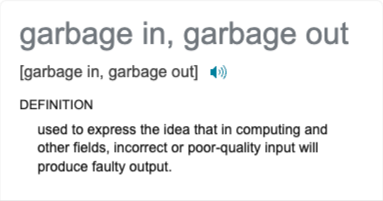

Data Exploration
Initial Phase of Data Analysis
Involves
Data
Cleaning
Visualizing
Summarizing
to
Uncover Patterns
Anomalies
Insights
for
Further Analysis
EDUCBA

Data Quality/ Cleaning

Big Data Quality Assessment Framework



Dimensions	Elements	Indicators
1) Availability	1) Accessibility	▪ Whether a data access interface is provided ▪ Data can be easily made public or easy to purchase
	2) Timeliness	▪ Within a given time, whether the data arrive on time ▪ Whether data are regularly updated ▪ Whether the time interval from data collection and processing to release meets requirements
2) Usability	1) Credibility	▪ Data come from specialized organizations of a country, field, or industry ▪ Experts or specialists regularly audit and check the correctness of the data content ▪ Data exist in the range of known or acceptable values
3) Reliability	1) Accuracy	▪ Data provided are accurate ▪ Data representation (or value) well reflects the true state of the source information ▪ Information (data) representation will not cause ambiguity
	2) Consistency	▪ After data have been processed, their concepts, value domains, and formats still match as before processing ▪ During a certain time, data remain consistent and verifiable ▪ Data and the data from other data sources are consistent or verifiable
	3) Integrity	▪ Data format is clear and meets the criteria ▪ Data are consistent with structural integrity ▪ Data are consistent with content integrity
	4) Completeness	▪ Whether the deficiency of a component will impact use of the data for data with multi-components ▪ Whether the deficiency of a component will impact data accuracy and integrity
4) Relevance	1) Fitness	▪ The data collected do not completely match the theme, but they expound one aspect ▪ Most datasets retrieved are within the retrieval theme users need ▪ Information theme provides matches with users' retrieval theme
5) Presentation Quality	1) Readability	▪ Data (content, format, etc.) are clear and understandable ▪ It is easy to judge that the data provided meet needs ▪ Data description, classification, and coding content satisfy specification and are easy to understand



garbage in, garbage out

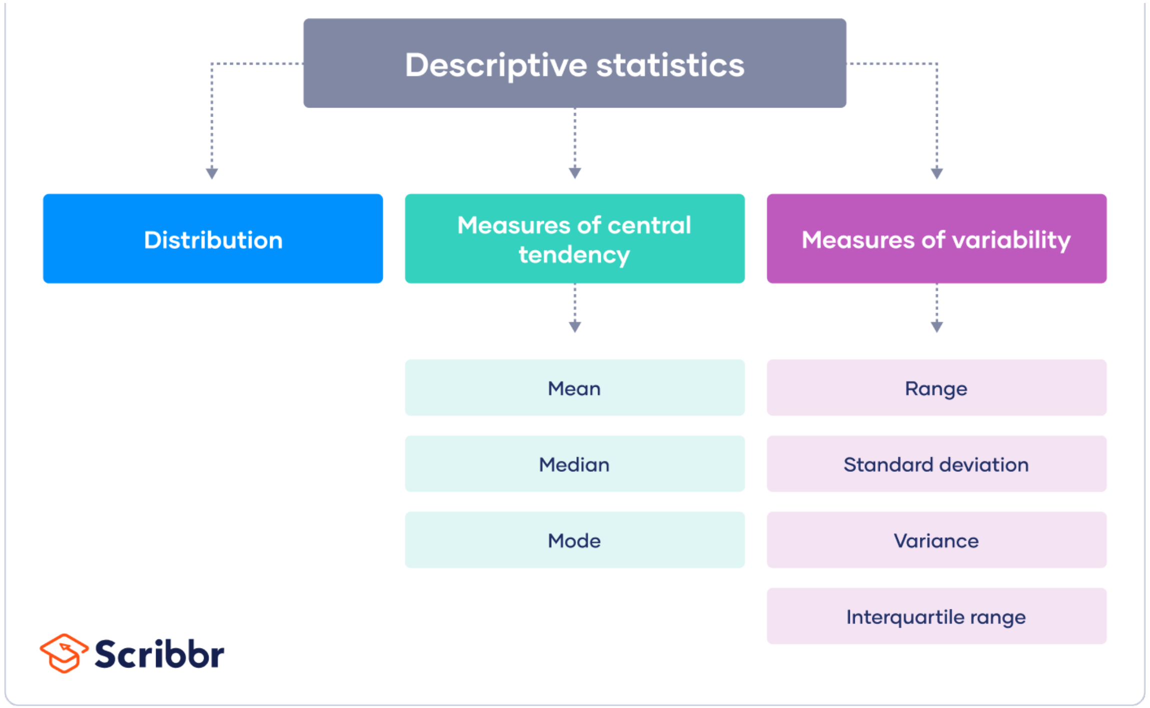
[garbage in, garbage out] 🔊

DEFINITION

used to express the idea that in computing and other fields, incorrect or poor-quality input will produce faulty output.

Descriptive statistics

Descriptive Statistics



Descriptive statistics

Distribution

Measures of central tendency

Measures of variability

Mean

Median

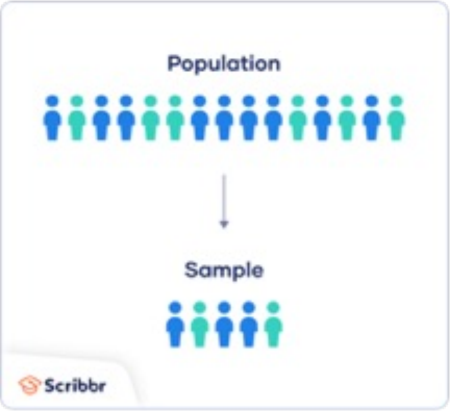
Mode

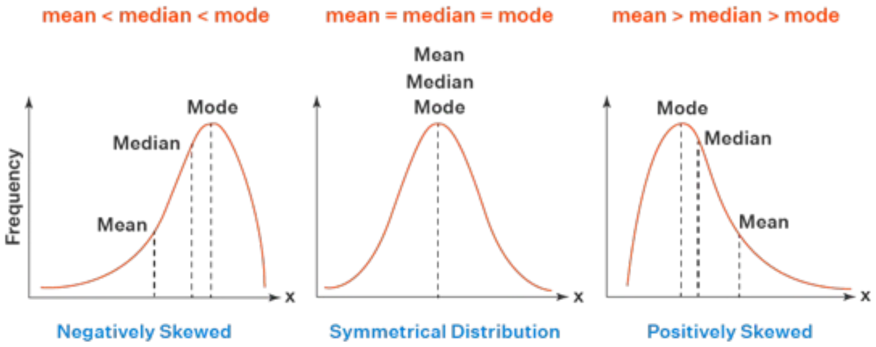
Range

Standard deviation

Variance

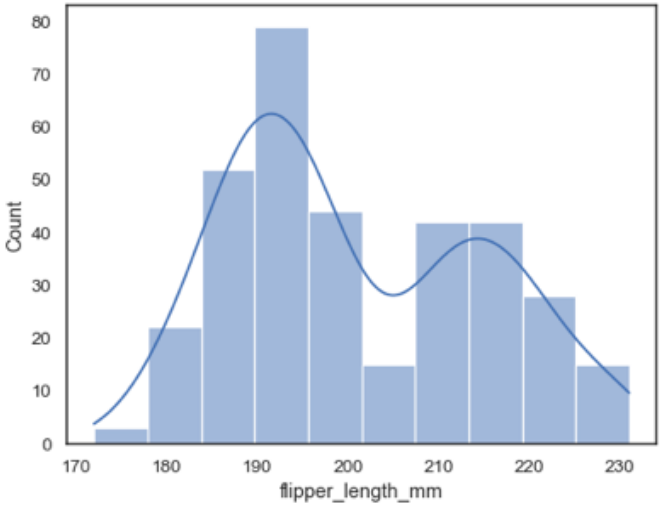
Interquartile range

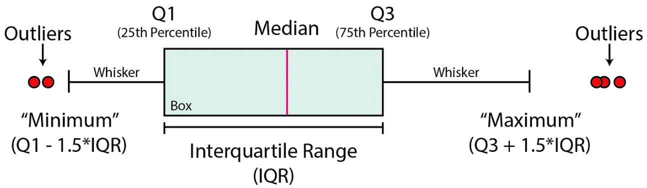


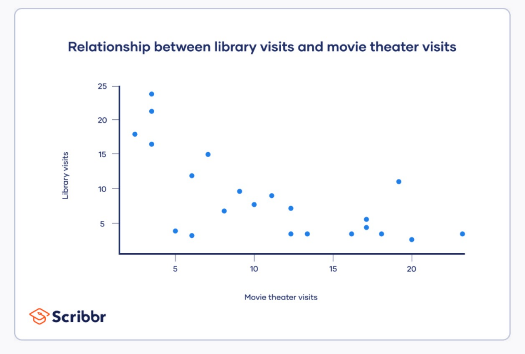


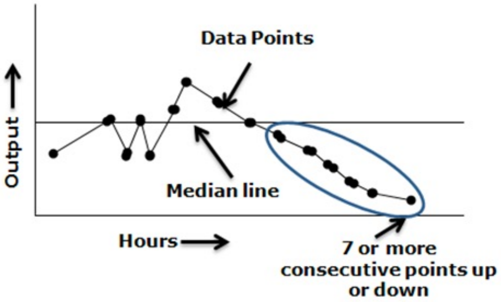
Statistical graphics

Univariate/Multivariate Graphical






Relationship between library visits and movie theater visits



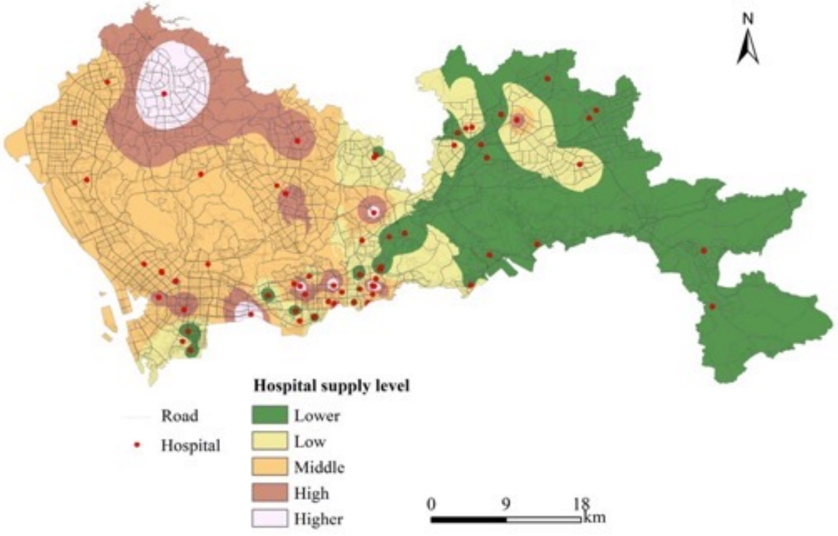
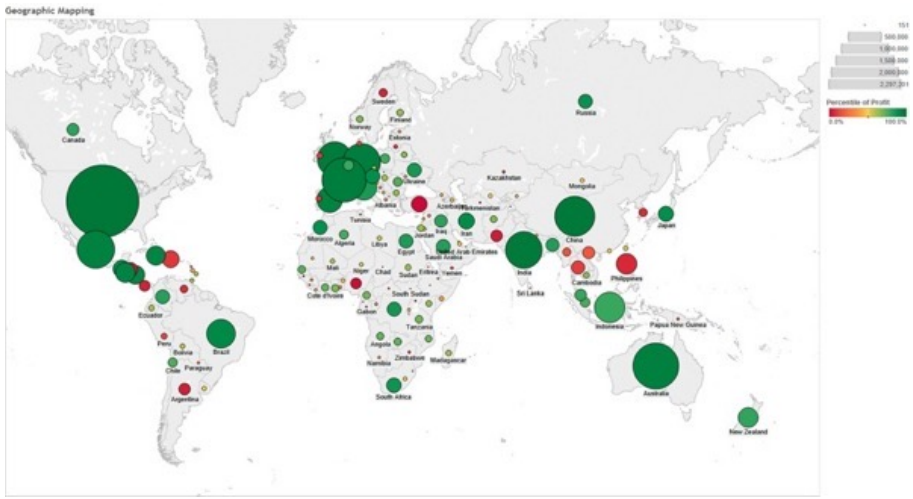
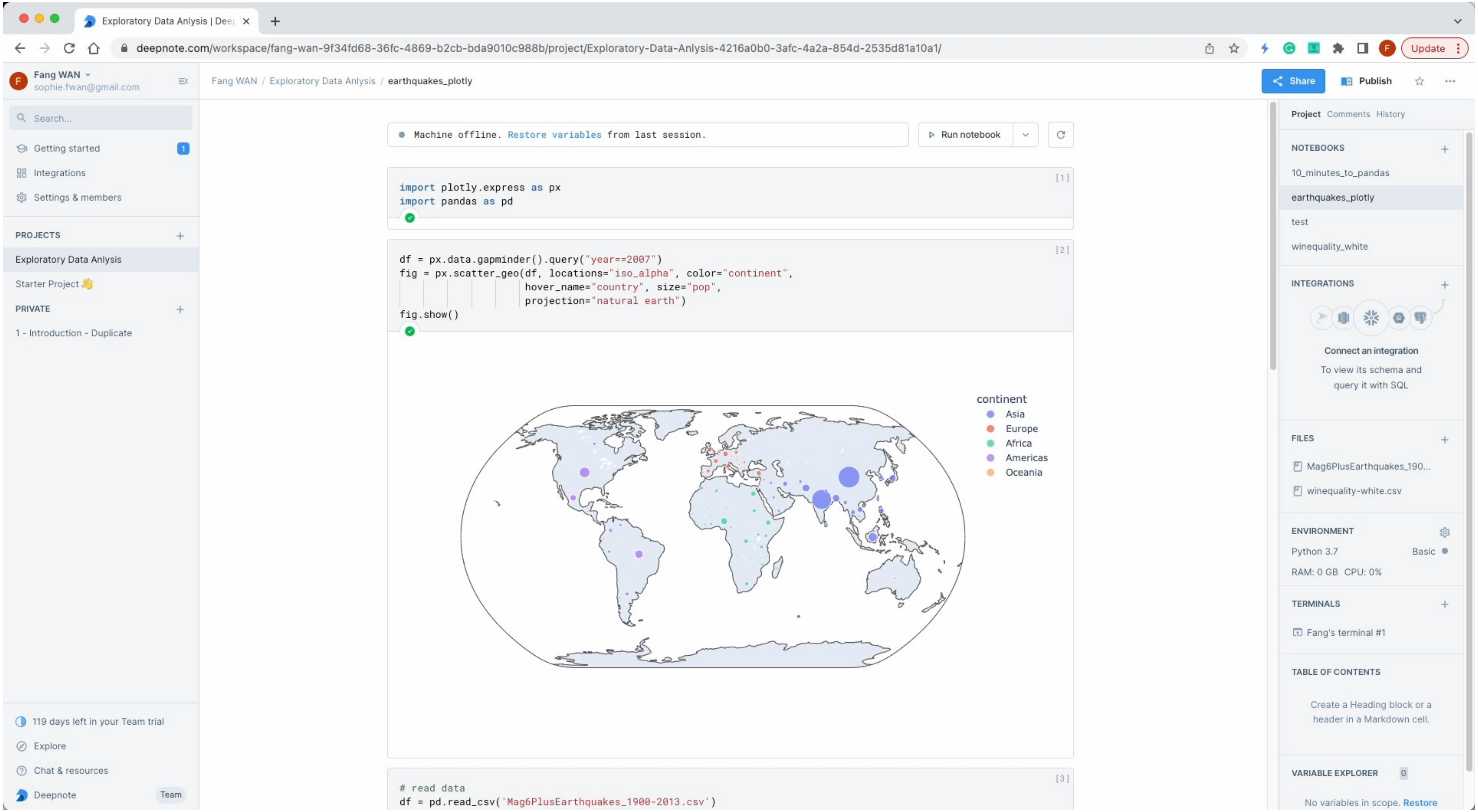


Figure 4. Spatial distribution of road network and hospital supply level in Shenzhen.



Descriptive Statistics/ EDA

With Python



Machine offline. Restore variables from last session.

```
import plotly.express as px
import pandas as pd
```

```
df = px.data.gapminder().query("year==2007")
fig = px.scatter_geo(df, locations="iso_alpha", color="continent",
                     hover_name="country", size="pop",
                     projection="natural earth")
fig.show()
```

```
# read data
df = pd.read_csv('Mag6PlusEarthquakes_1900-2013.csv')
```

Inferential statistics

Inferential Statistics

Step 1: Write your hypotheses and plan your research design

Step 2: Collect data from a sample

Step 3: Summarize your data with descriptive statistics

Step 4: Test hypotheses or make estimates with inferential statistics

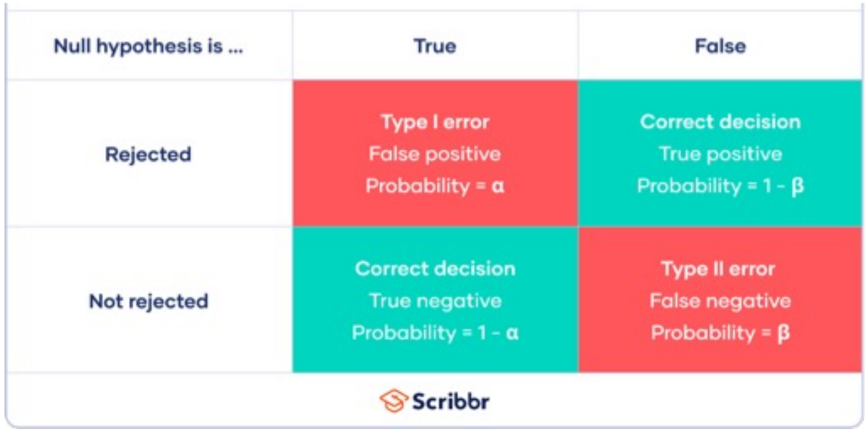
Step 5: Interpret your results

Example: Statistical hypotheses to test an effect

- ***Null hypothesis***: A 5-minute meditation exercise will have no effect on math test scores in teenagers.
- ***Alternative hypothesis***: A 5-minute meditation exercise will improve math test scores in teenagers.

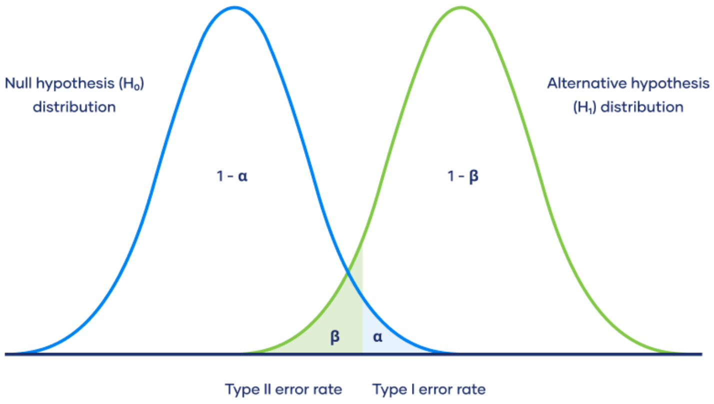
Example: Statistical hypotheses to test a correlation

- ***Null hypothesis***: Parental income and GPA have no relationship with each other in college students.
- ***Alternative hypothesis***: Parental income and GPA are positively correlated in college students.

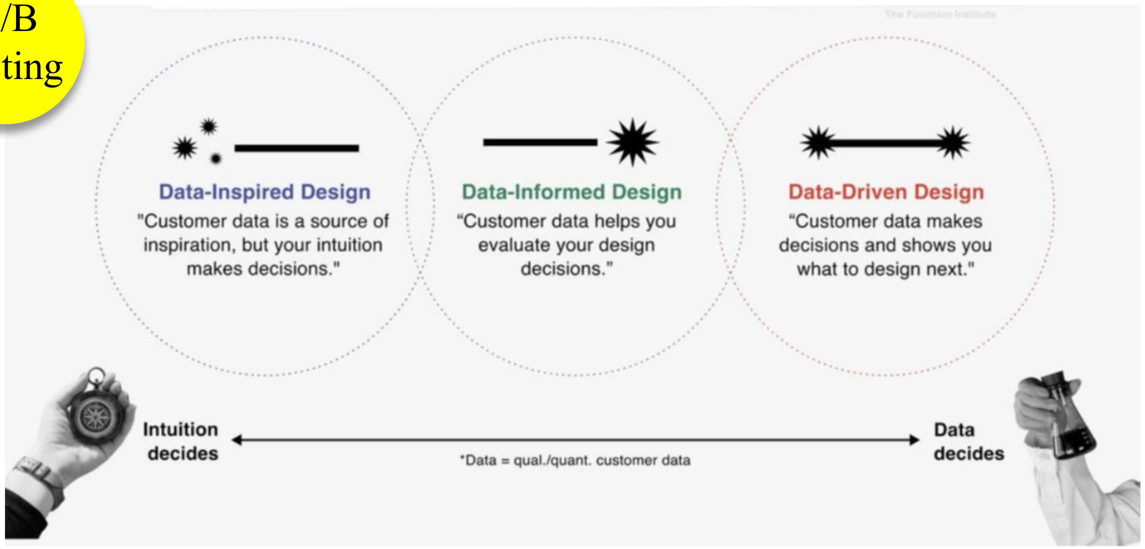


Null hypothesis is ...	True	False
Rejected	Type I error False positive Probability = α	Correct decision True positive Probability = 1 - β
Not rejected	Correct decision True negative Probability = 1 - α	Type II error False negative Probability = β

Scribbr



A/B Testing



Data-Inspired Design
"Customer data is a source of inspiration, but your intuition makes decisions."

Data-Informed Design
"Customer data helps you evaluate your design decisions."

Data-Driven Design
"Customer data makes decisions and shows you what to design next."

Intuition decides ← → Data decides

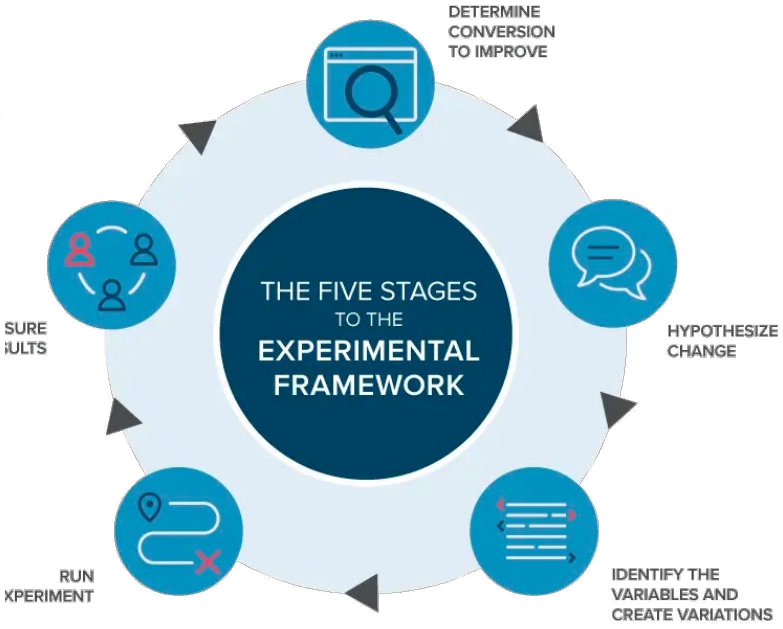
*Data = qual./quant. customer data

√ A
✕ B
VS.
25%
Conversion
5%
Conversion

- **A/B testing is a special kind of quantitative experiments**
  - where "A" representing the old control, and "B" representing a single / multiple experimental changes
  - where the goal is to maximize single/multiple measurements of user behavior
  - A/B testing is most useful when combined with qualitative methods (e.g. observation, survey, interview)

- **A/B testing has multiple goals as listed below**
  - Finding a winner among many design variations
  - Testing hypotheses of cause (design) and effect (user behavior)
  - Gaining generalizable understanding of the task and the user population
  - Developing a reusable platform for continuously running a series of A/B tests

- **A/B testing consists of five big steps**
  1. Choose a single (or couple) quantifiable measure(s) of user behavior
  2. Construct hypotheses
  3. Create design variations
  4. Run the experiment
  5. Analyze the results



THE FIVE STAGES TO THE EXPERIMENTAL FRAMEWORK

DETERMINE CONVERSION TO IMPROVE

HYPOTHESIZE CHANGE

IDENTIFY THE VARIABLES AND CREATE VARIATIONS

RUN XPERIMENT

SURE ULTS

A/B Testing

1. Equally allocate users to design variations (if possible)

Don’t assign majority of users to specific conditions. It will slow down the experiment by increasing the minimum sample sizes to get statistical significance.

2. Get sufficient samples to get statistical significance of at least 95% ($p<0.05$)

300-400 samples per variation is usually considered enough. If you cannot reach the 95% ($p=0.05$) with 300-400 samples * # variations, it is very unlikely that the variations have strong impact on the measured goal.

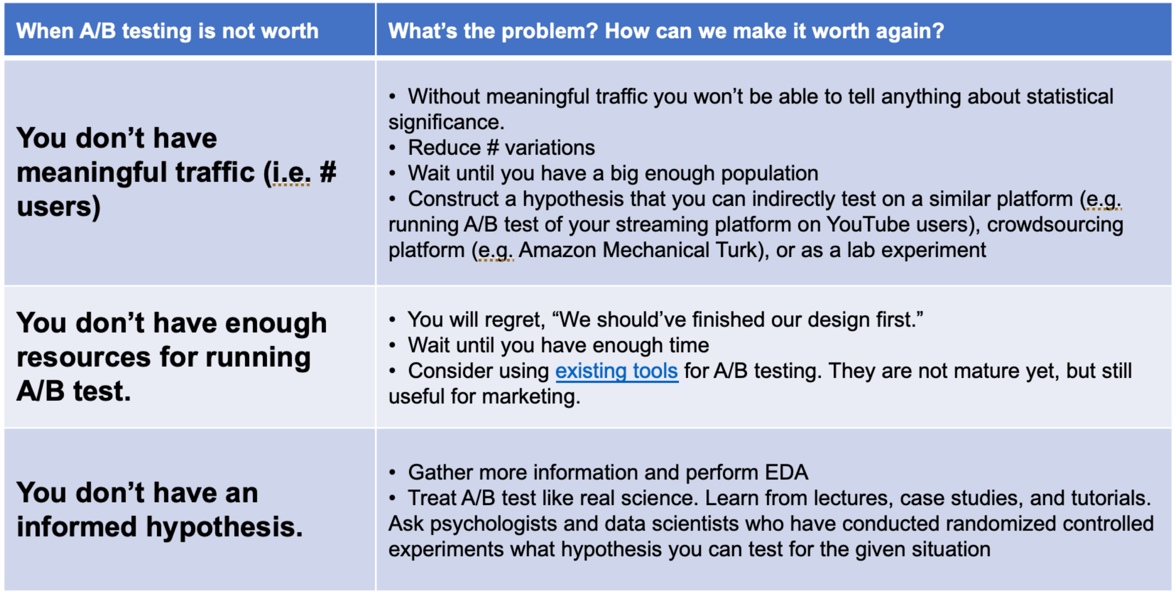
3. Run the experiment for multiple behavioral cycles

Lots of user behaviors tend to have weekly patterns (e.g. on Monday, people tend to be quite busy). To minimize the risk of weekly biases, run the experiment for at least one week (preferably two weeks or a month). However, it depends on what the task is and who the users are.

4. Pay attention to external factors

If it is Christmas or Valentine's day, an online marketing campaign might be highly affected by the external factor. While it’s impossible to get a perfectly clean environment, consider external factors in your interpretation.

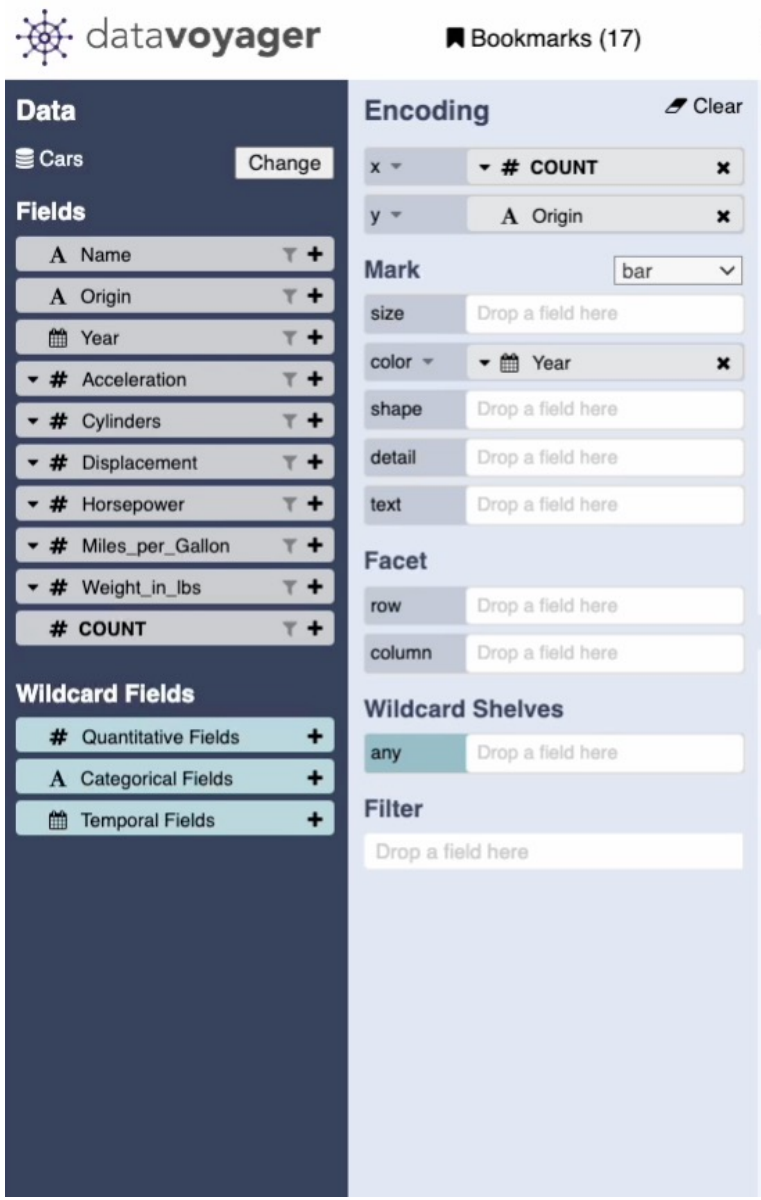
- A/B testing is not silver bullet. It has a lot of limitations and pitfalls.



When A/B testing is not worth	What’s the problem? How can we make it worth again?
You don’t have meaningful traffic (i.e. # users)	• Without meaningful traffic you won’t be able to tell anything about statistical significance. • Reduce # variations • Wait until you have a big enough population • Construct a hypothesis that you can indirectly test on a similar platform (e.g. running A/B test of your streaming platform on YouTube users), crowdsourcing platform (e.g. Amazon Mechanical Turk), or as a lab experiment
You don’t have enough resources for running A/B test.	• You will regret, “We should’ve finished our design first.” • Wait until you have enough time • Consider using existing tools for A/B testing. They are not mature yet, but still useful for marketing.
You don’t have an informed hypothesis.	• Gather more information and perform EDA • Treat A/B test like real science. Learn from lectures, case studies, and tutorials. Ask psychologists and data scientists who have conducted randomized controlled experiments what hypothesis you can test for the given situation

Visual Encoding Design

Visual Encoding Design



datavoyager

Bookmarks (17)

Data

Cars — Change

Fields

- A Name
- A Origin
- Year
- # Acceleration
- # Cylinders
- # Displacement
- # Horsepower
- # Miles_per_Gallon
- # Weight_in_lbs
- # COUNT

Wildcard Fields

- # Quantitative Fields
- A Categorical Fields
- Temporal Fields

Encoding — Clear

- x: # COUNT
- y: A Origin

Mark: bar

- size: Drop a field here
- color: Year
- shape: Drop a field here
- detail: Drop a field here
- text: Drop a field here

Facet

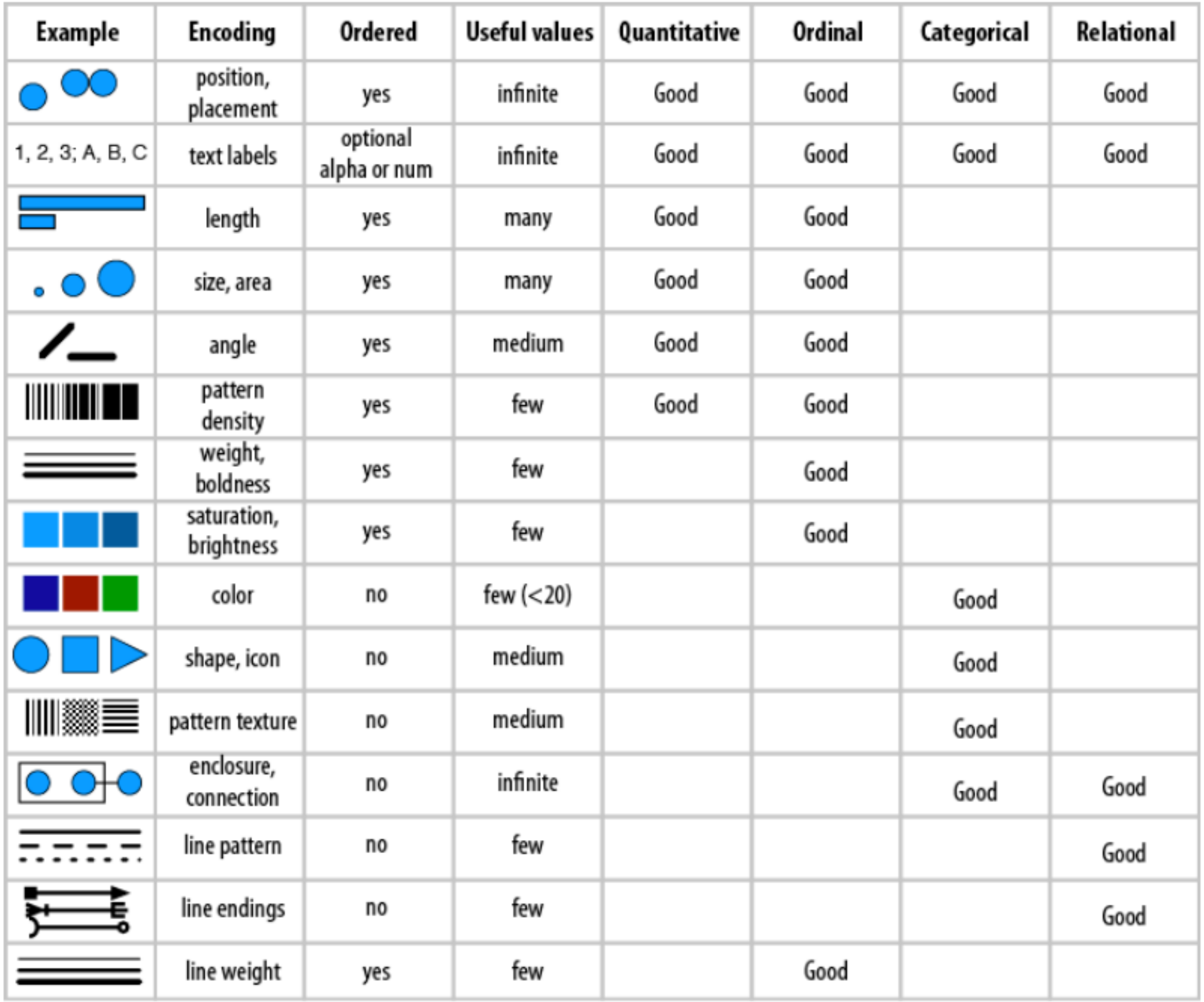
- row: Drop a field here
- column: Drop a field here

Wildcard Shelves

- any: Drop a field here

Filter

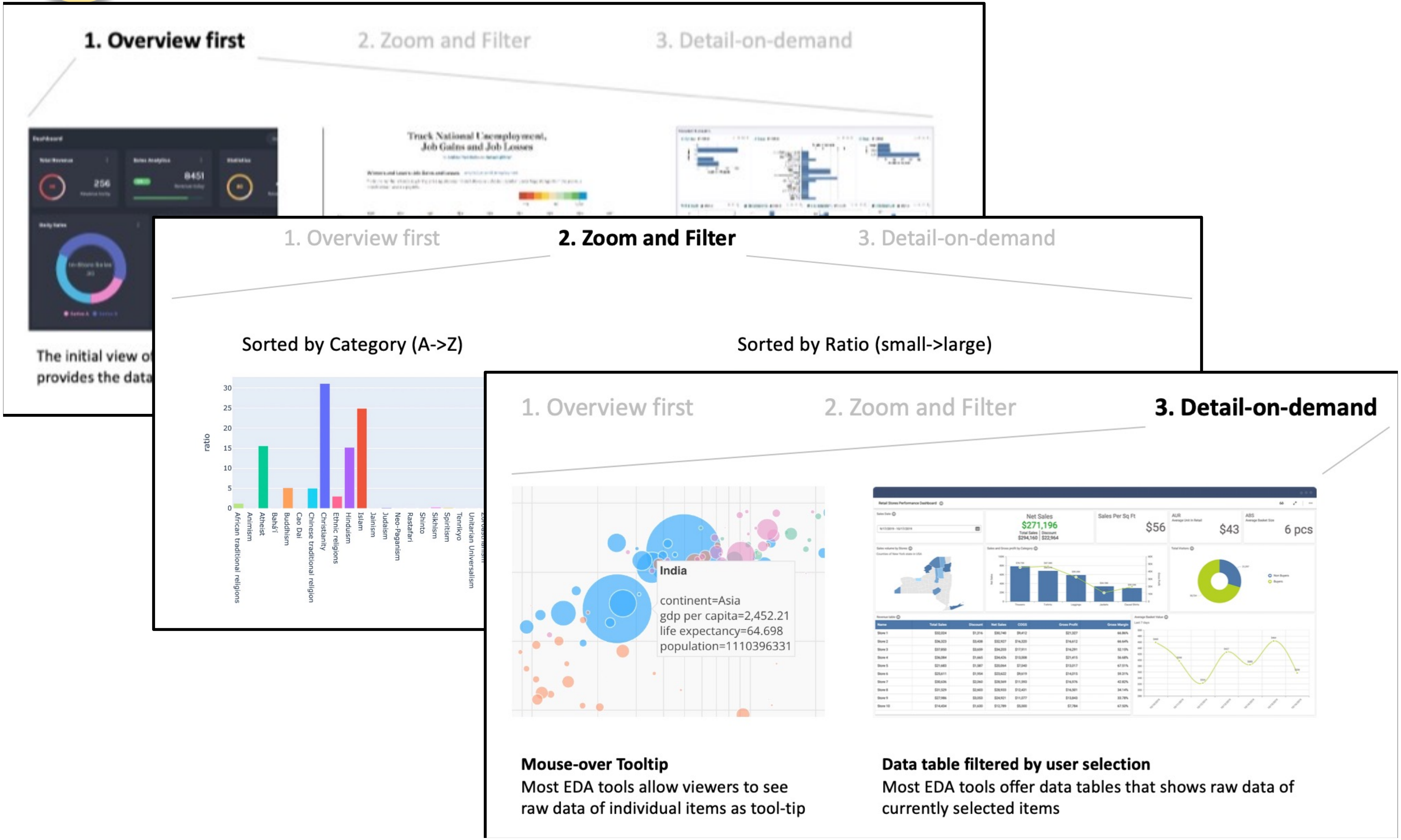
Drop a field here



Example	Encoding	Ordered	Useful values	Quantitative	Ordinal	Categorical	Relational
● ●●	position, placement	yes	infinite	Good	Good	Good	Good
1, 2, 3; A, B, C	text labels	optional alpha or num	infinite	Good	Good	Good	Good
▬ ▬	length	yes	many	Good	Good		
• ● ⬤	size, area	yes	many	Good	Good		
/ _	angle	yes	medium	Good	Good		
▥	pattern density	yes	few	Good	Good		
≡	weight, boldness	yes	few		Good		
🟦🟦🟦	saturation, brightness	yes	few		Good		
🟦🟥🟩	color	no	few (<20)			Good	
● ■ ▶	shape, icon	no	medium			Good	
▥ ▩ ☰	pattern texture	no	medium			Good	
○ ○–○	enclosure, connection	no	infinite			Good	Good
- - -	line pattern	no	few				Good
→	line endings	no	few				Good
≡	line weight	yes	few		Good		

Interaction

Ben Shneiderman’s information-seeking mantra



1. Overview first 2. Zoom and Filter 3. Detail-on-demand

The initial view of
provides the data

1. Overview first **2. Zoom and Filter** 3. Detail-on-demand

Sorted by Category (A->Z)

Sorted by Ratio (small->large)

1. Overview first 2. Zoom and Filter **3. Detail-on-demand**

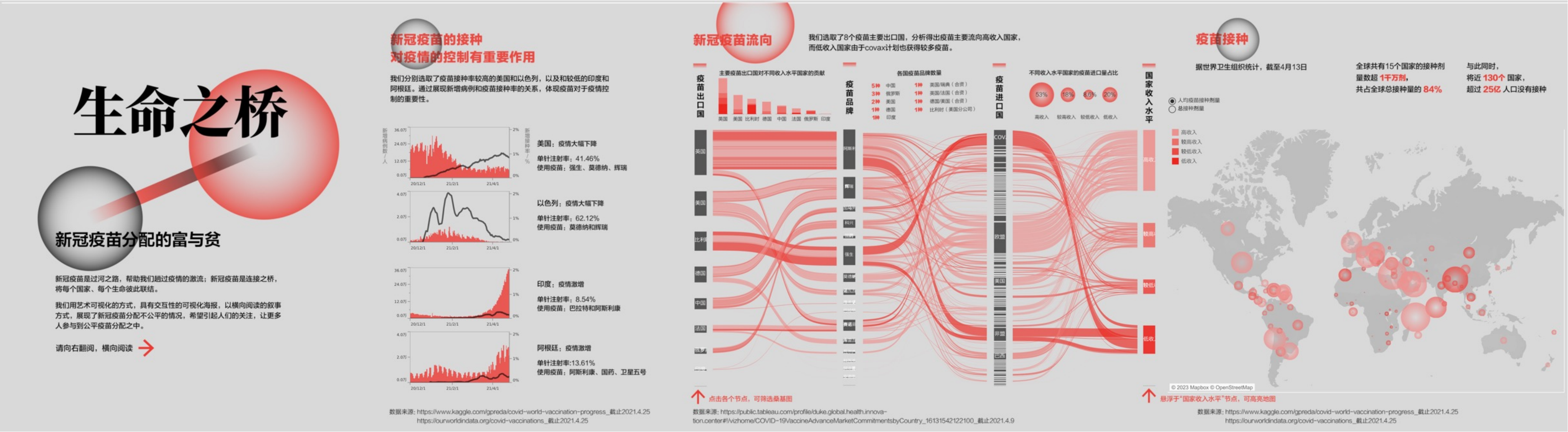
India

continent=Asia
gdp per capita=2,452.21
life expectancy=64.698
population=1110396331

Mouse-over Tooltip
Most EDA tools allow viewers to see raw data of individual items as tool-tip

Data table filtered by user selection
Most EDA tools offer data tables that shows raw data of currently selected items

Tableau



生命之桥

新冠疫苗分配的富与贫

新冠疫苗是过河之路，帮助我们趟过疫情的激流；新冠疫苗是连接之桥，将每个国家、每个生命彼此联结。

我们用艺术可视化的方式，具有交互性的可视化海报，以横向阅读的叙事方式，展现了新冠疫苗分配不公平的情况，希望引起人们的关注，让更多人参与到公平疫苗分配之中。

请向右翻阅，横向阅读 →

新冠疫苗的接种 对疫情的控制有重要作用

我们分别选取了疫苗接种率较高的美国和以色列，以及和较低的印度和阿根廷。通过展现新增病例和疫苗接种率的关系，体现疫苗对于疫情控制的重要性。

美国：疫情大幅下降

单针注射率：41.46%
使用疫苗：强生、莫德纳、辉瑞

以色列：疫情大幅下降

单针注射率：62.12%
使用疫苗：莫德纳和辉瑞

印度：疫情激增

单针注射率：8.54%
使用疫苗：巴拉特和阿斯利康

阿根廷：疫情激增

单针注射率:13.61%
使用疫苗：阿斯利康、国药、卫星五号

数据来源: https://www.kaggle.com/gpreda/covid-world-vaccination-progress_截止2021.4.25
https://ourworldindata.org/covid-vaccinations_截止2021.4.25

新冠疫苗流向

我们选取了8个疫苗主要出口国，分析得出疫苗主要流向高收入国家，而低收入国家由于covax计划也获得较多疫苗。

↑ 点击各个节点，可筛选桑基图

数据来源: https://public.tableau.com/profile/duke.global.health.innovation.center#!/vizhome/COVID-19VaccineAdvanceMarketCommitmentsbyCountry_16131542122100_截止2021.4.9

疫苗接种

据世界卫生组织统计，截至4月13日

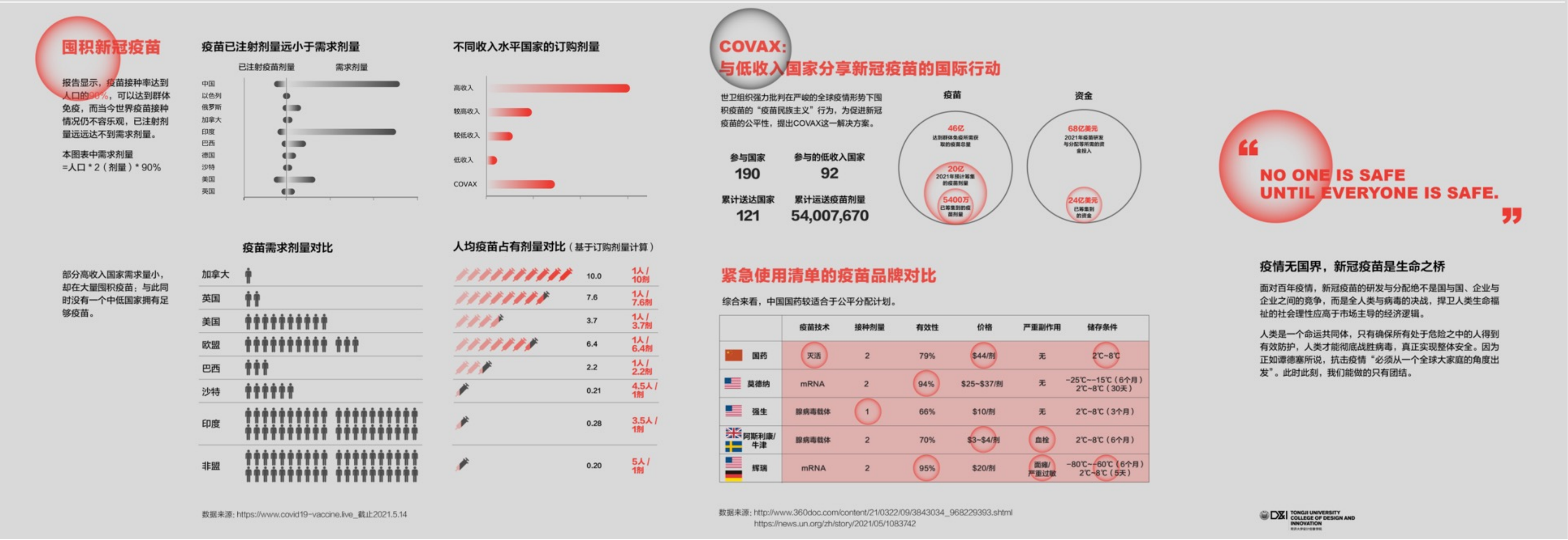
全球共有15个国家的接种剂量数超 1千万剂，
共占全球总接种量的 84%

与此同时，
将近 130个 国家，
超过 25亿 人口没有接种

◉ 人均疫苗接种剂量
○ 总接种剂量

↑ 悬浮于"国家收入水平"节点，可高亮地图

数据来源: https://www.kaggle.com/gpreda/covid-world-vaccination-progress_截止2021.4.25
https://ourworldindata.org/covid-vaccinations_截止2021.4.25



囤积新冠疫苗

报告显示，疫苗接种率达到人口的90%，可以达到群体免疫，而当今世界疫苗接种情况仍不容乐观，已注射剂量远远达不到需求剂量。

本图表中需求剂量
=人口 * 2（剂量）* 90%

疫苗已注射剂量远小于需求剂量

不同收入水平国家的订购剂量

部分高收入国家需求量小，却在大量囤积疫苗；与此同时没有一个中低国家拥有足够疫苗。

疫苗需求剂量对比

人均疫苗占有剂量对比（基于订购剂量计算）

10.0	1人/10剂
7.6	1人/7.6剂
3.7	1人/3.7剂
6.4	1人/6.4剂
2.2	1人/2.2剂
0.21	4.5人/1剂
0.28	3.5人/1剂
0.20	5人/1剂

数据来源: https://www.covid19-vaccine.live_截止2021.5.14

COVAX: 与低收入国家分享新冠疫苗的国际行动

世卫组织强力批判在严峻的全球疫情形势下囤积疫苗的"疫苗民族主义"行为，为促进新冠疫苗的公平性，提出COVAX这一解决方案。

参与国家	参与的低收入国家
190	92
累计送达国家	**累计运送疫苗剂量**
121	54,007,670

疫苗

46亿 达到群体免疫所需获取的疫苗总量

20亿 2021年预计筹集的疫苗剂量

5400万 已筹集到的疫苗剂量

资金

68亿美元 2021年疫苗研发与分配等所需的资金投入

24亿美元 已筹集到的资金

紧急使用清单的疫苗品牌对比

综合来看，中国国药较适合于公平分配计划。

	疫苗技术	接种剂量	有效性	价格	严重副作用	储存条件
国药	灭活	2	79%	$44/剂	无	2℃~8℃
莫德纳	mRNA	2	94%	$25~$37/剂	无	-25℃~-15℃（6个月） 2℃~8℃（30天）
强生	腺病毒载体	1	66%	$10/剂	无	2℃~8℃（3个月）
阿斯利康/牛津	腺病毒载体	2	70%	$3~$4/剂	血栓	2℃~8℃（6个月）
辉瑞	mRNA	2	95%	$20/剂	面瘫/严重过敏	-80℃~-60℃（6个月） 2℃~8℃（5天）

数据来源: http://www.360doc.com/content/21/0322/09/3843034_968229393.shtml
https://news.un.org/zh/story/2021/05/1083742

> "NO ONE IS SAFE
> UNTIL EVERYONE IS SAFE."

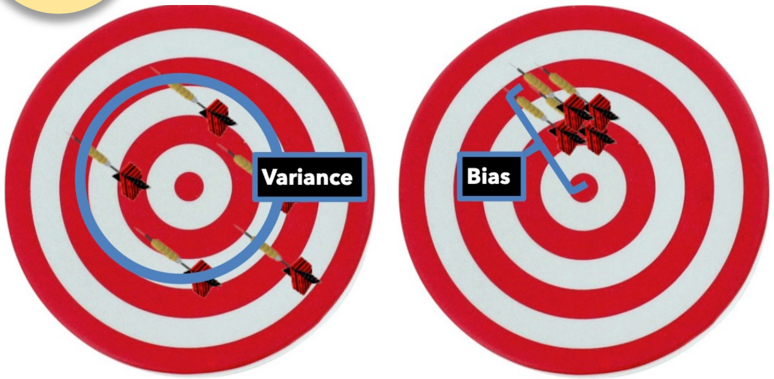
疫情无国界，新冠疫苗是生命之桥

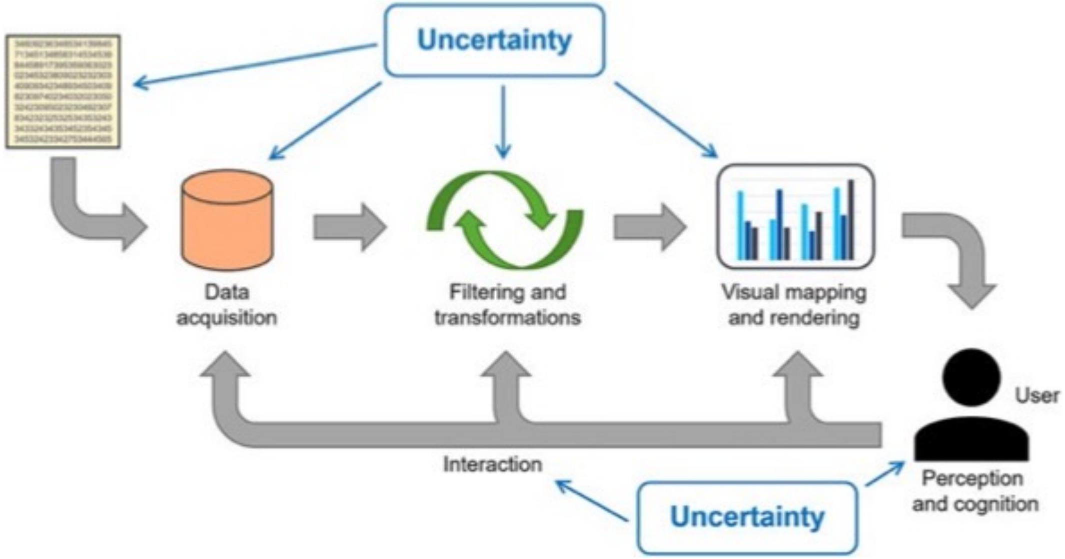
面对百年疫情，新冠疫苗的研发与分配绝不是国与国、企业与企业之间的竞争，而是全人类与病毒的决战，捍卫人类生命福祉的社会理性应高于市场主导的经济逻辑。

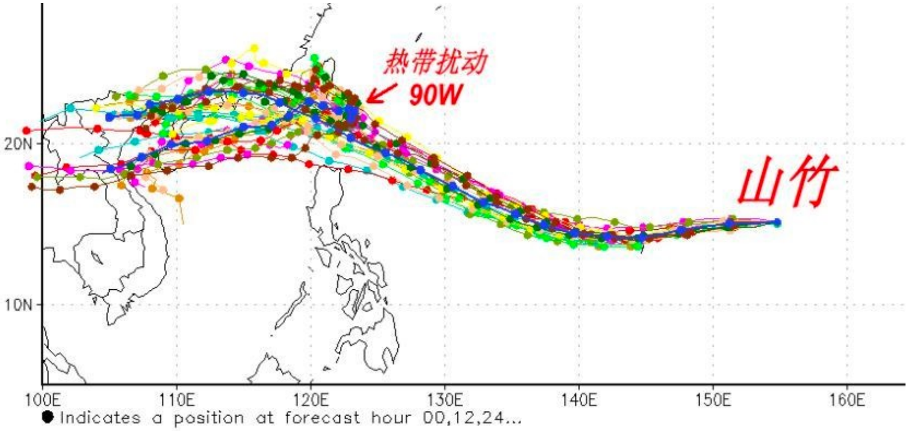
人类是一个命运共同体，只有确保所有处于危险之中的人得到有效防护，人类才能彻底战胜病毒，真正实现整体安全。因为正如谭德塞所说，抗击疫情"必须从一个全球大家庭的角度出发"。此时此刻，我们能做的只有团结。

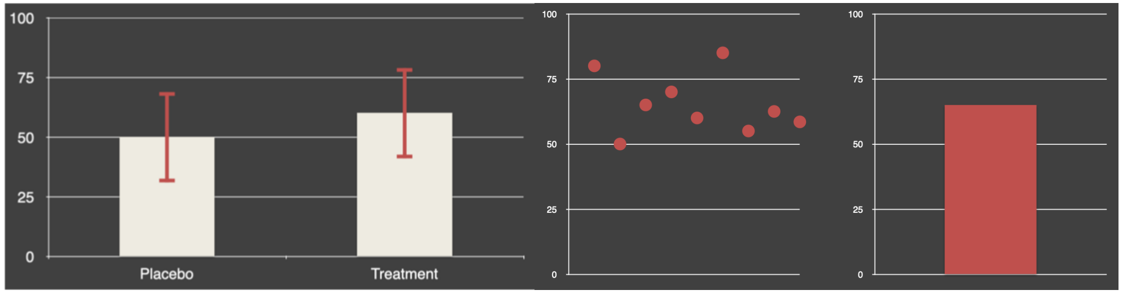
D&I TONGJI UNIVERSITY COLLEGE OF DESIGN AND INNOVATION
同济大学设计创意学院

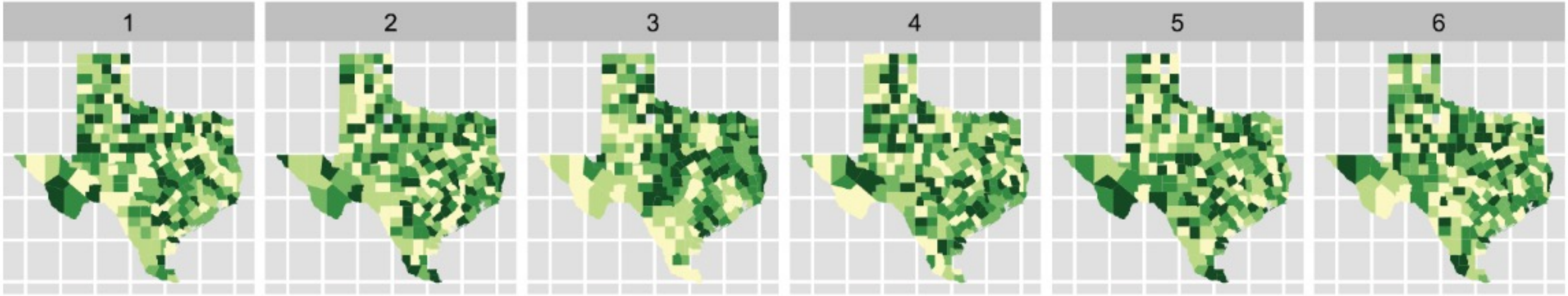
Uncertainty











The Takeaways

In our life, study, work

Understand the intrinsic nature of data

Make use of it for our purpose

Time for
Course Evaluation

Your participation is important!

Course Evaluation

方法及步骤

1.网页端：登录教务系统：https://tis.sustech.edu.cn/-业务办理-评教任务-2024春季学期学生评价任务。系统按课程类型设置评价任务（理论类、实验实践类、体育类、艺术类），如页面上有多个评价任务，请逐一进入并提交评价。

2.微信端：通过微信进入“南方科技大学”微信企业号--教学质量管理平台，在“我的任务-待评”中填写并提交本学期所选课程的所有听课评价。

Course Project | Final Showcase

- Final Project Showcase on **Data Storytelling**
  - **Submit** first draft before Fri Jun 07 @ 12:00 | **Present** on Fri Jun 07 in-class
  - **Submit** final version before Sunday Jun 09 @ 23:30

  - **<u>~ 8 mins presentation</u>** regarding your data-driven story
  - **<u>~ 2 mins Q&A</u>**

Thank you~

Wan Fang
Southern University of Science and Technology