Influencing With Data
Presented by KPMG x General Assembly

WELCOME TO GENERAL ASSEMBLY

We empower people to do work they love through education in technology, business, data, and design.

Thanks to our partner

Today's Instructor

James Orton

Data Science Consultant,
Distil Data

GA was founded on the principle of empowering people to pursue the work they love. Since we opened our first campus in 2011, we have had the privilege of working with students, governments, and the world's largest companies to create opportunities to radically transform careers and economic prospects.

Jake Schwartz
Co-Founder and CEO
General Assembly

General Assembly at a glance

- **2019** **Fast Company's** 10 Most Innovative in Education
- **2018** GA joins **The Adecco Group** in Transforming the World of Work
- **100,000+** global alumni
- **5,000** expert instructors
- **500+** enterprise clients
- **22** campuses in **9** states and **7** countries
- **7,000+** hiring partners
- **50,000+** assessment-takers
- **2** Standards Boards
- **50+** NPS
- **94.1%** of full-time students who find jobs within **180** days of graduation*

100,000+
students have taken full- and part-time courses at General Assembly.

94.1%
of students who participated in our Career Services program got a job in their field of study within 180 days of graduating.

What we do

Educating Individuals

- ➔ Build vital skills at all professional levels
- ➔ Collaborate and connect with an elite network
- ➔ Change and boost your career and portfolio

Hiring Opportunities

We are bridging the gap between job seekers and companies needing talent with relevant skills.

Educating Companies

- ➔ Partnerships with Fortune 1000 companies
- ➔ Customized staff training to advance employees
- ➔ Dedicated hiring pipeline to acquire GA alumni

What we do

UX Design Immersive

10 WEEKS FULL TIME

Software Engineering Immersive

12 WEEKS FULL TIME

Data Science Immersive

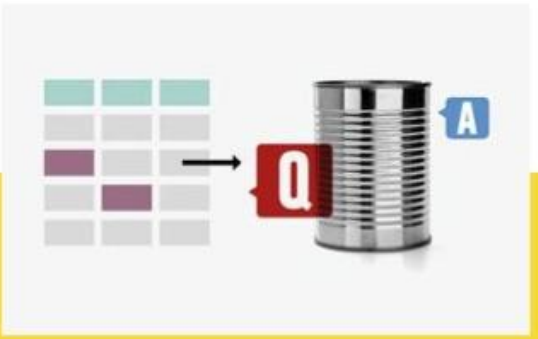
12 WEEKS FULL TIME

Coming up on Campus

Free Class: Get Started With Python

Monday 25 November
6-7.30pm
Free class

SQL for Beginners



Wednesday 20 November
6.30-8.30pm
Ticketed

Intro to Data Science With Python: Beginner's Bootcamp

Wednesday 20 November
10am - 3pm
Ticketed

Data Analytics Part-Time

3 December - 20 February
10 Weeks
Tuesday + Thursday
6.30-8.30pm

To learn more, visit ga.co

GENERAL ASSEMBLY

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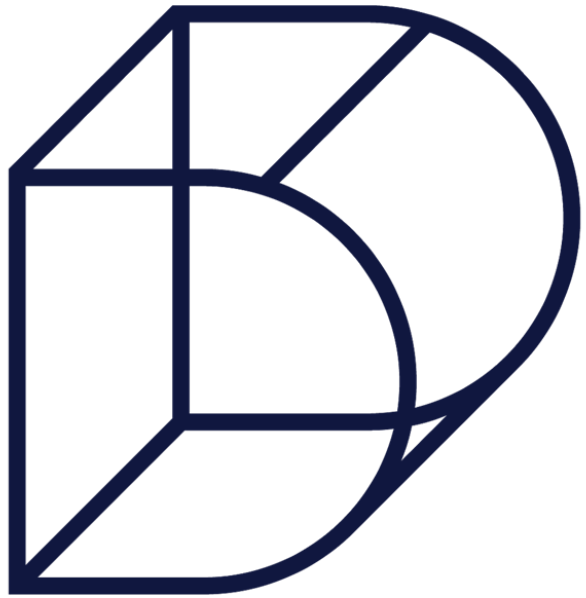
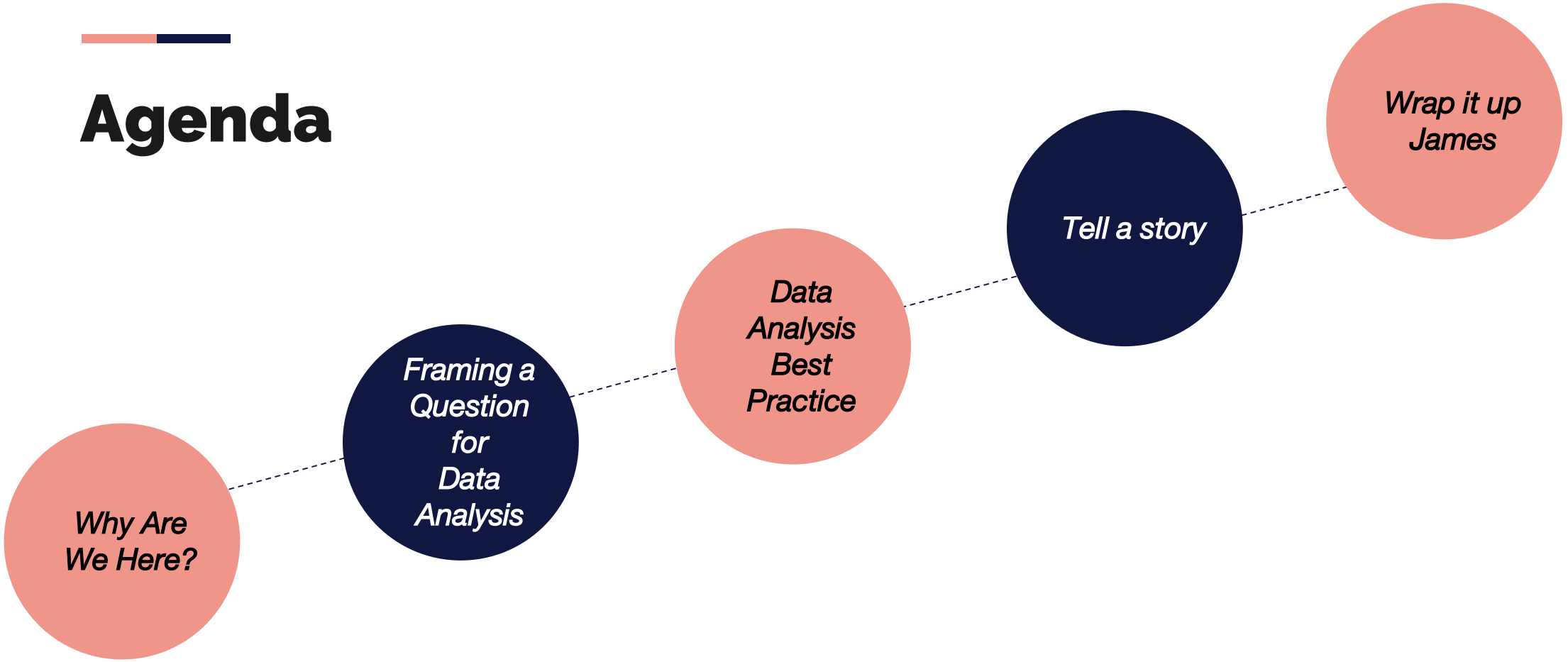


Distil Data

Agenda


Why Are We Here?
Framing a Question for Data Analysis
Data Analysis Best Practice
Tell a story
Wrap it up James

Distil Data

Why Are We Here?

Learning Objectives

Understand why effective data analysis always starts with a question

Best practice tips for data collection and analysis

How to tell a story your audience actually wants to hear

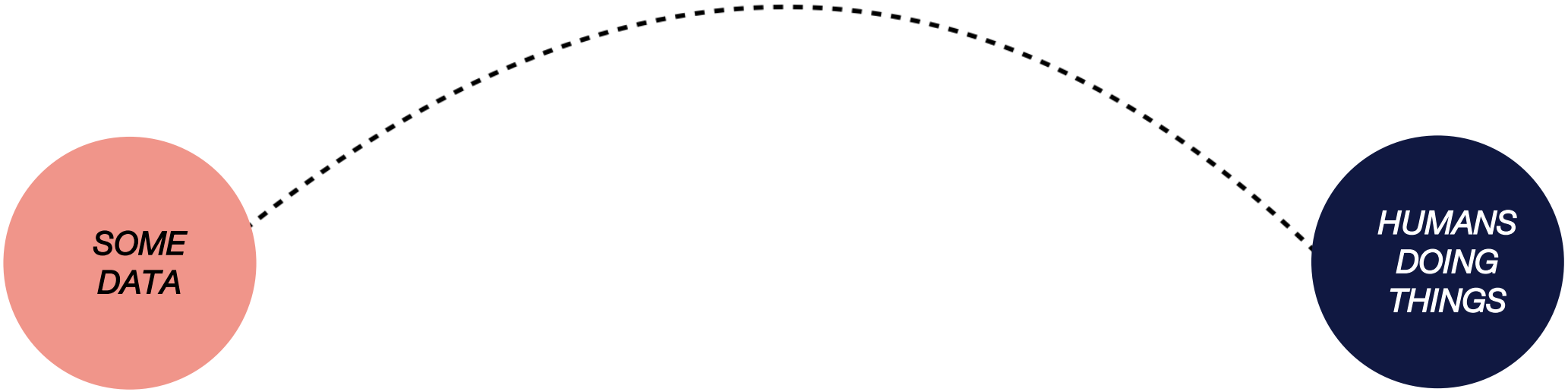
Why Are We Here?

“In God we trust, all others bring data.”
- W. Edwards Deming

Why Are We Here?

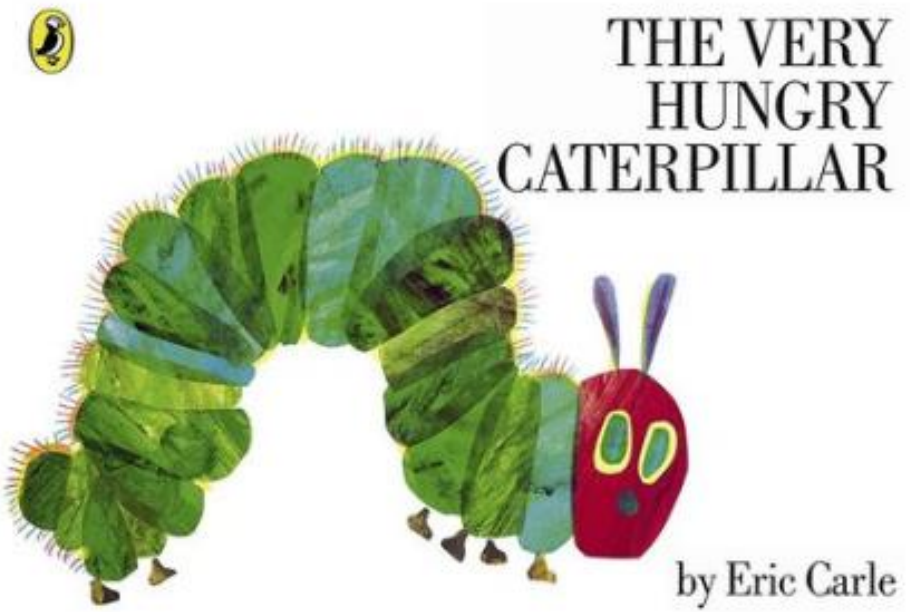
DATA ALLOWS US TO MAKE
MORE EFFECTIVE DECISIONS

Why Are We Here?

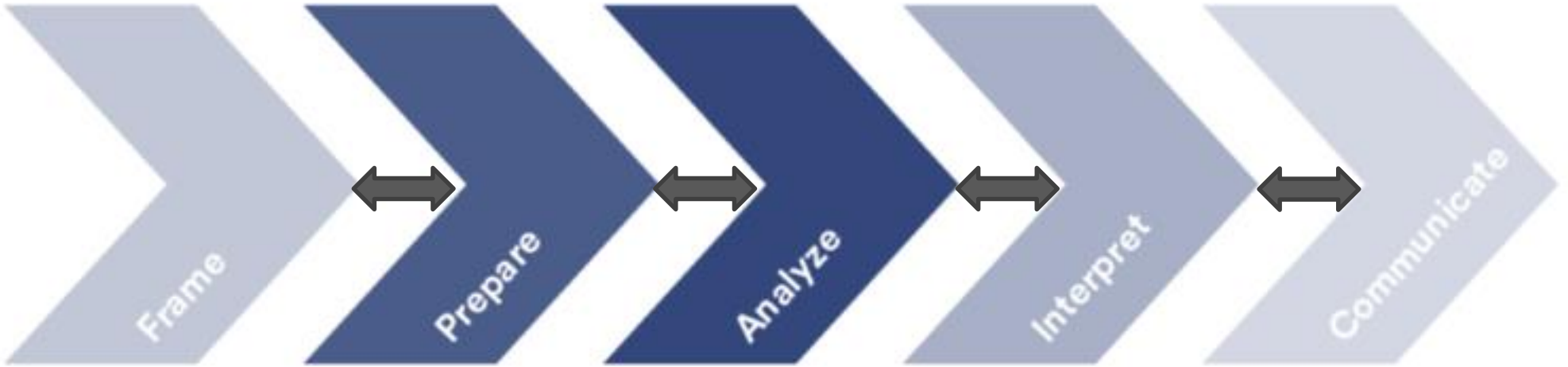


Why Are We Here?

DATA IS USELESS UNLESS
EFFECTIVELY COMMUNICATED



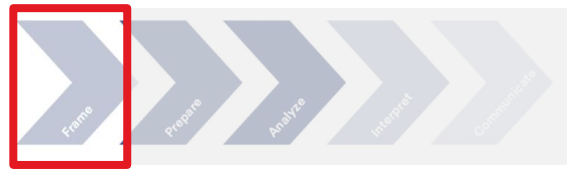
Why Are We Here?



Distil Data

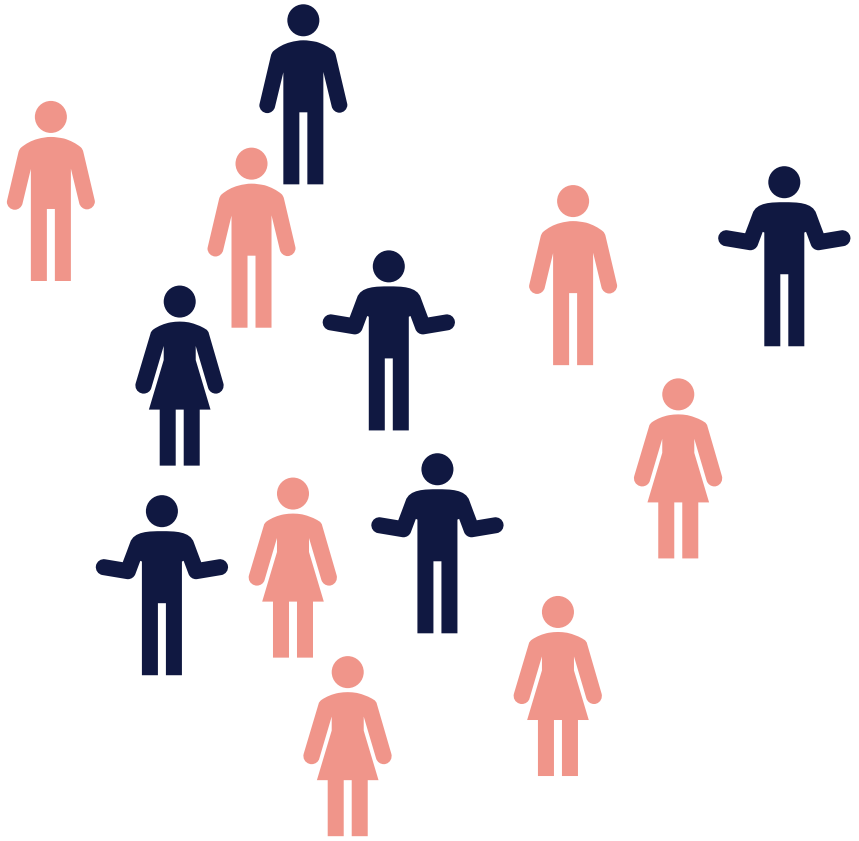
Framing A Question For Data Analysis

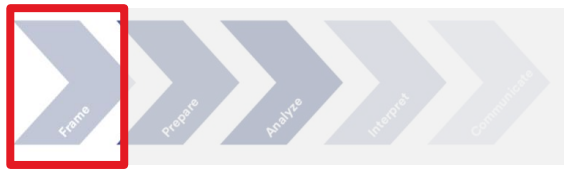
Where are we?



Good stakeholder management

Create a shared understanding or the problem

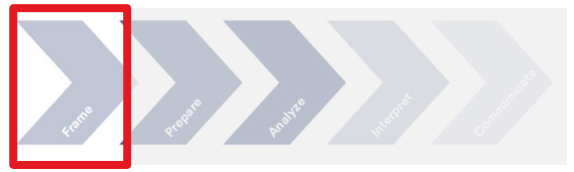




The Five Whys Technique

Well known by six sigma practitioners and parents of toddlers alike.

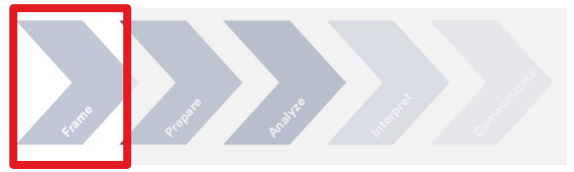
Find the root cause of a problem and identify the full picture.



Know your data

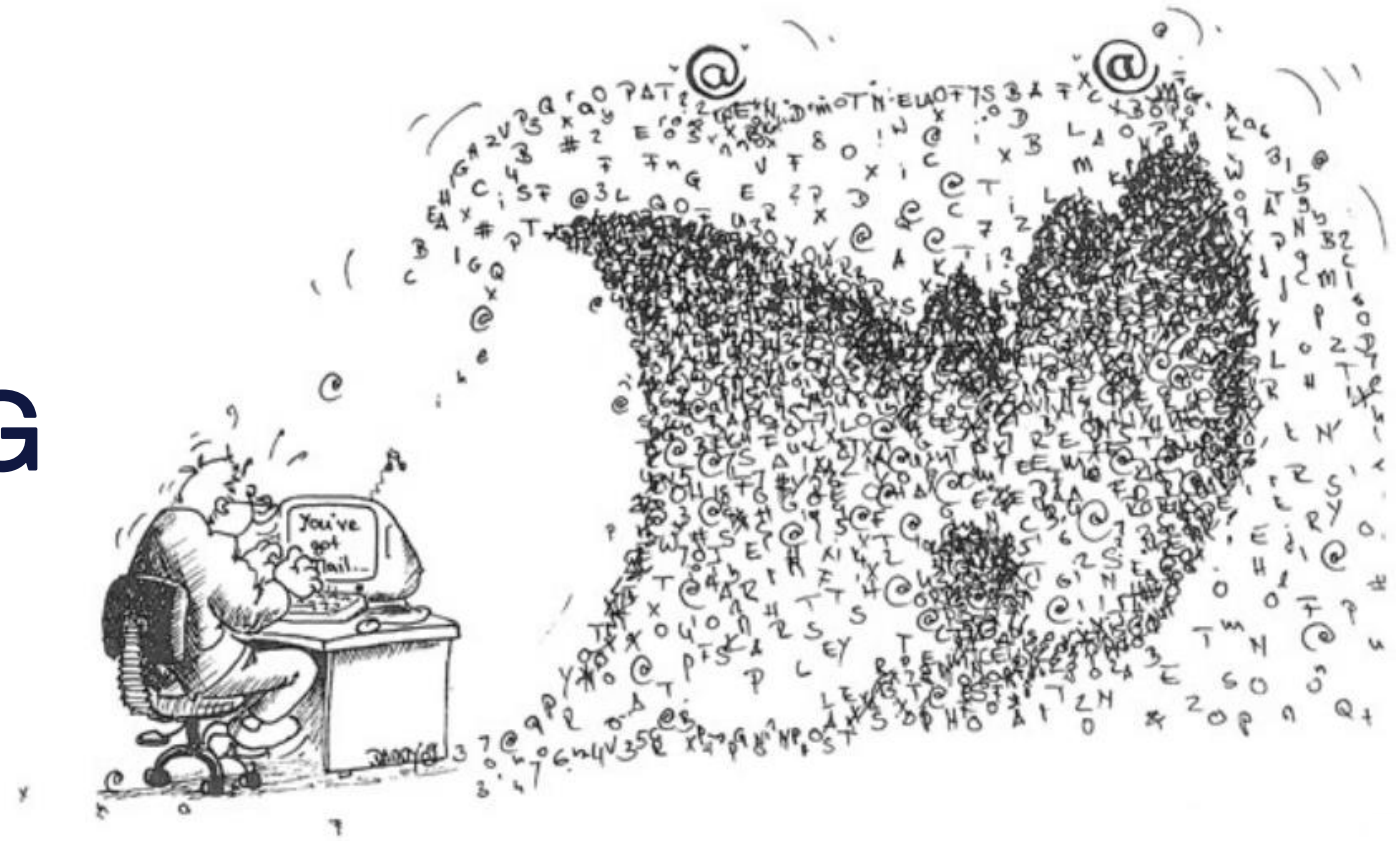
Conduct a basic data audit

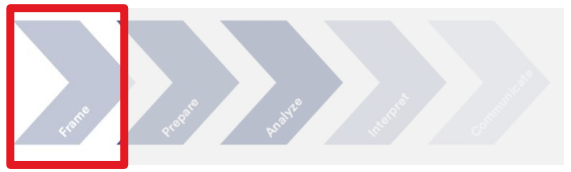
Have some understanding of what is possible



Don’t get lost in data

KNOW WHAT YOU’RE LOOKING FOR.





Avoid: “So what?”

Are your questions actionable? And what is the business benefit?

⬇

Understand upfront how this project will benefit the business

⬇

Estimate Benefit in dollar terms

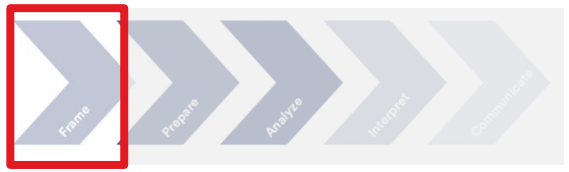
⬇

Estimate the complexity

⬇

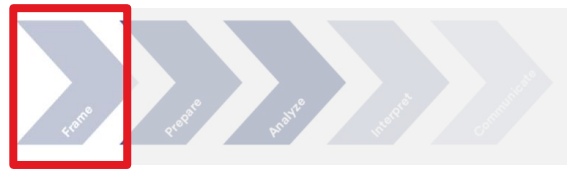
Prioritise projects by those with the greatest impact

	Impact	Complexity	Priority
Question 1	$$$	!!	2
Question 2	$	!!!	3
Question 3	$$	!	1



An approximate answer to the right question is worth a good deal more than an exact answer to an approximate problem.

- John Tukey



DIG DEEPER

Ask questions to define the objective of the analysis first and set yourself up for actionable decisions later.

FOCUS

Focus your energy and time on the things that matter most to your team and business.

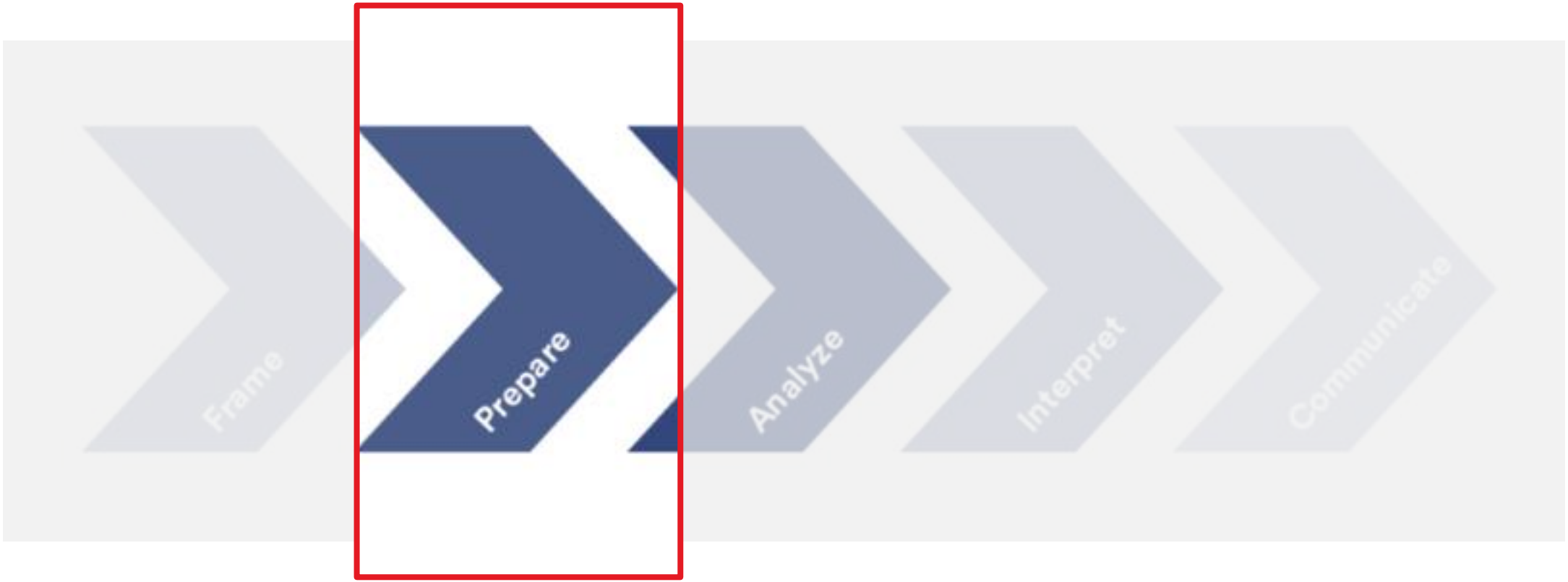
KNOW YOUR VARIABLES

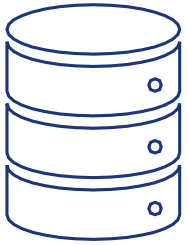
Consider what variables you can explore that might lead to actionable recommendations.

Distil Data

Where Does Your Data Come From?

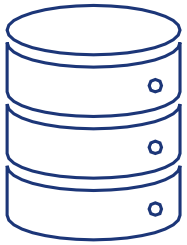
Where are we?





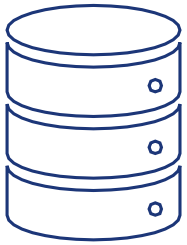
1ST PARTY DATA

You collect it, you own it.



2ND PARTY DATA

Data trade between non-competitive partners.



3RD PARTY DATA

Sold by data suppliers
Publicly available data
Not exclusive

The best insights more often come from new data rather than fancy methods.

- James Orton

Distil Data

Why we clean data

What That Means For Data Quality

Poor data quality = poor data analysis

Confidence in any conclusion is quickly eroded where there are data quality issues.

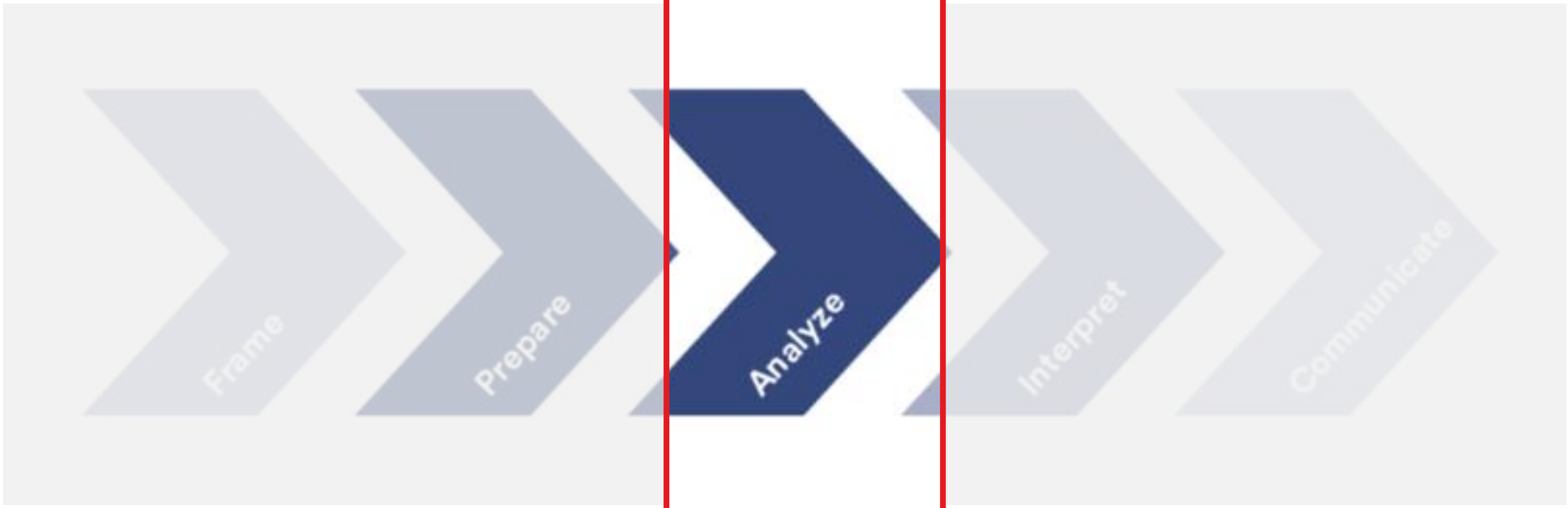
Cleaning data

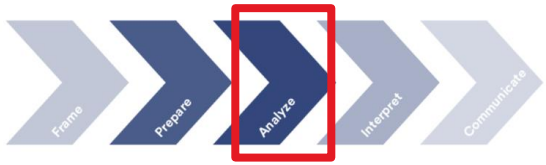
- Data recorded inaccurately
- Blank fields
- Inconsistent information
- Bad data not investigated, deleted, or miscategorized
- Fields not defined clearly
- Duplicate information

Distil Data

Types of data analysis

Where are we?





What analysis should we do?

Machine Learning

Prescriptive Analytics

Descriptive Analytics

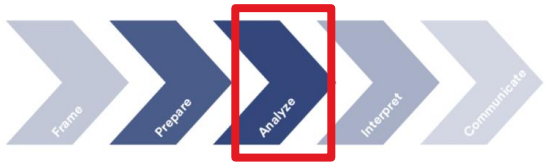
Causal Analysis

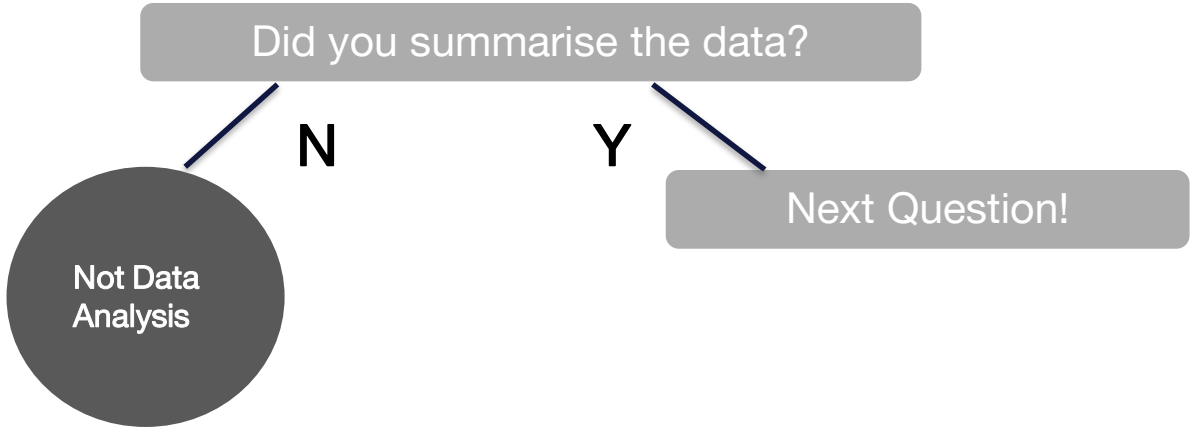
Predictive Analytics

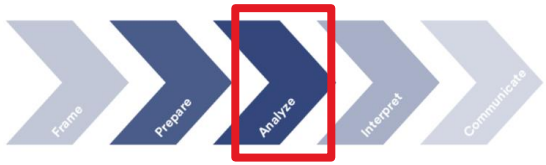
Deep Learning

Artificial Intelligence

Unsupervised Learning


Frame
Prepare
Analyze
Interpret
Communicate


Did you summarise the data?
N
Y
Not Data Analysis
Next Question!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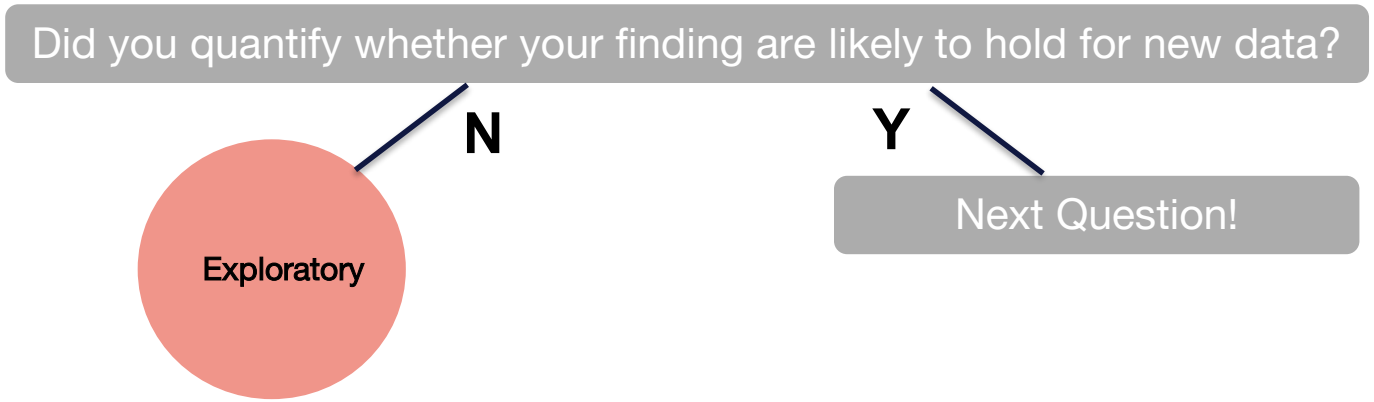
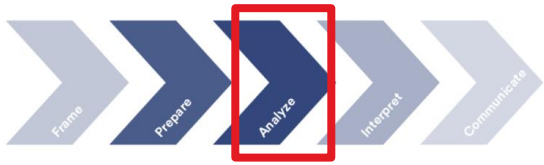

Did you quantify whether your finding are likely to hold for new data?
N
Y
Exploratory
Next Question!



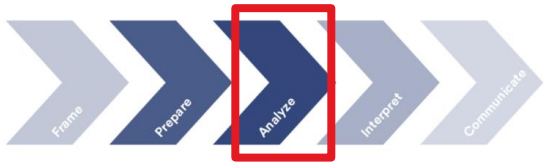
Are you interested in how changing one measurement affects another?

N

Next Question!

Y

Causal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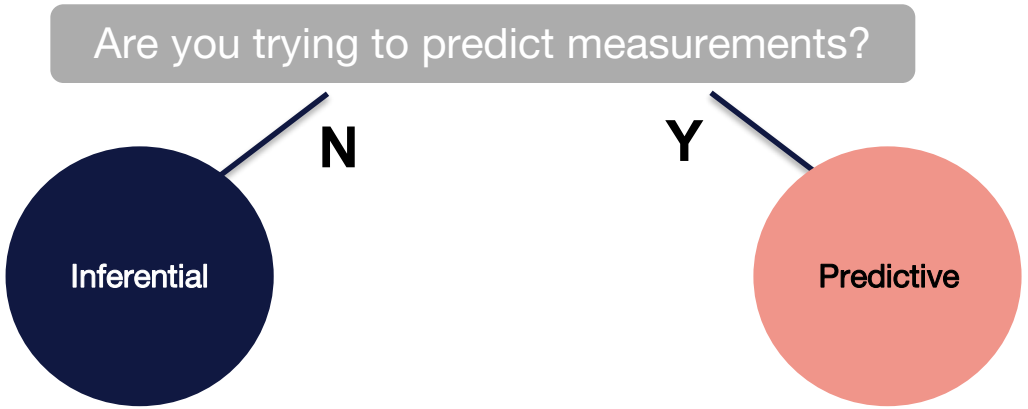
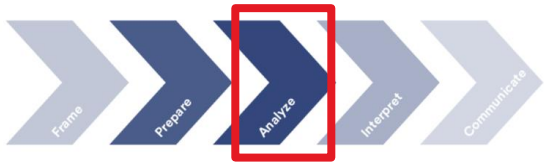

Are you trying to predict measurements?
N
Y
Inferential
Predictive



Did you summarise the data?

N

Not Data Analysis

Y

Did you quantify whether your finding are likely to hold for new data?

N

Exploratory

Y

Are you interested in how changing one measurement affects another?

N

Are you trying to predict measurements?

N

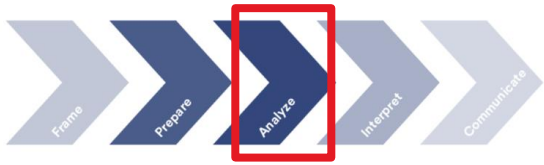
Inferential

Y

Predictive

Y

Causal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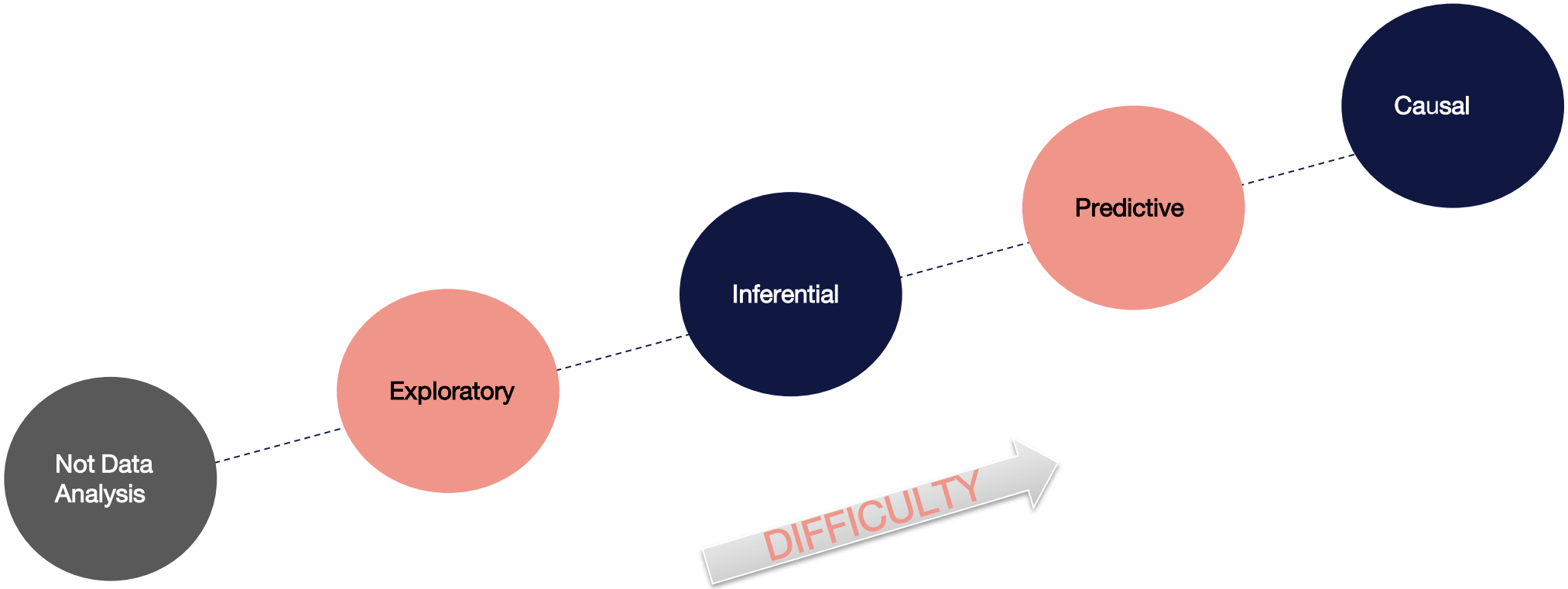
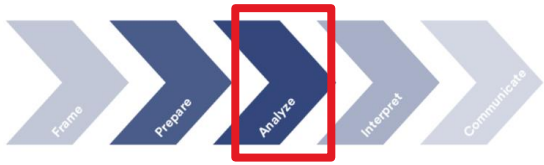
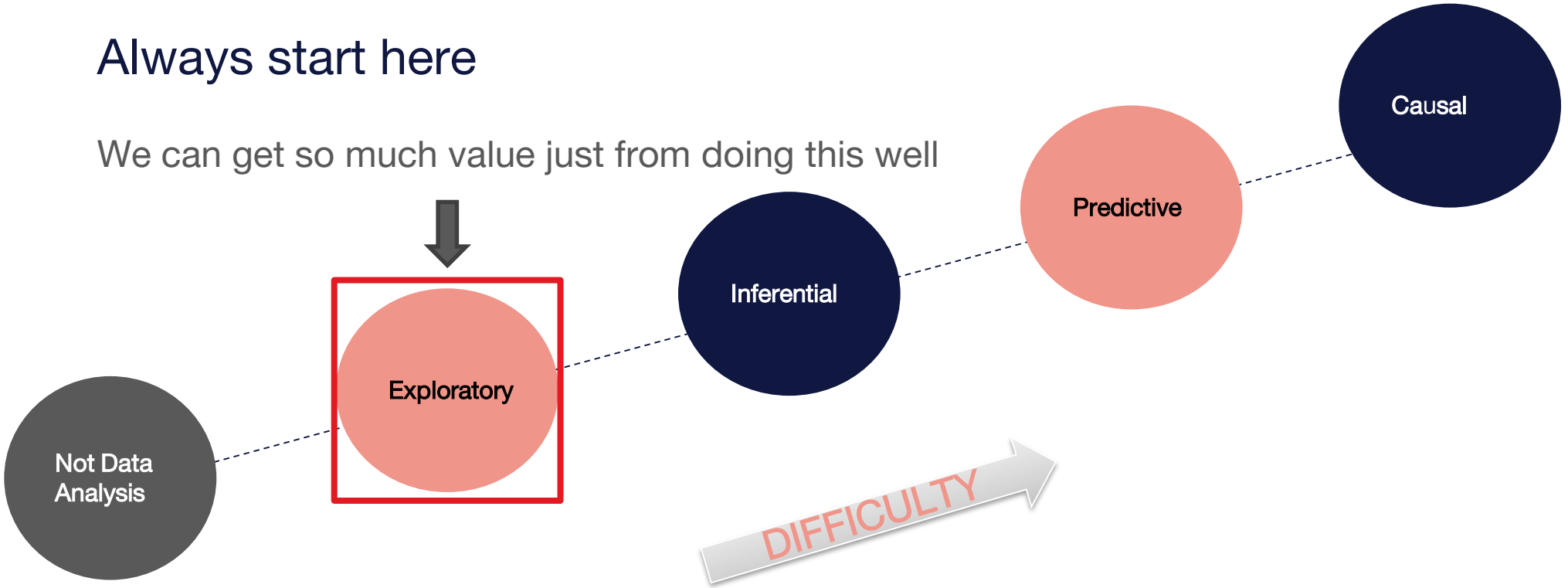
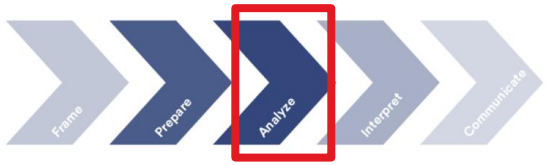

Not Data Analysis
Exploratory
Inferential
Predictive
Causal
DIFFICULTY



Always start here

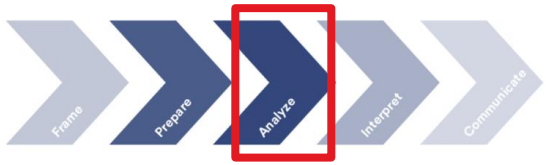
We can get so much value just from doing this well





Exploratory data analysis is an attitude, a state of flexibility, a willingness to look for those things that we believe are not there, as well as the things we believe might be there.

- John Tukey



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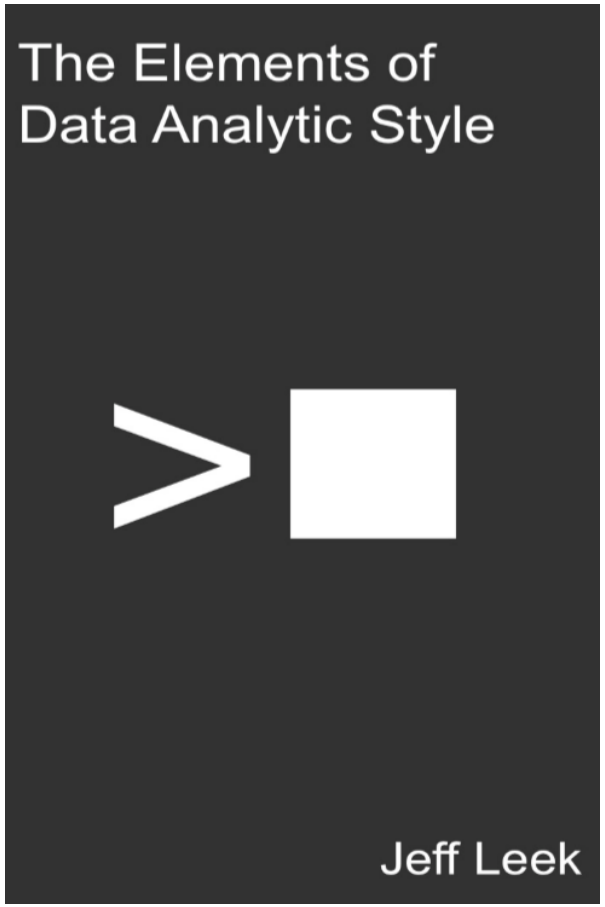
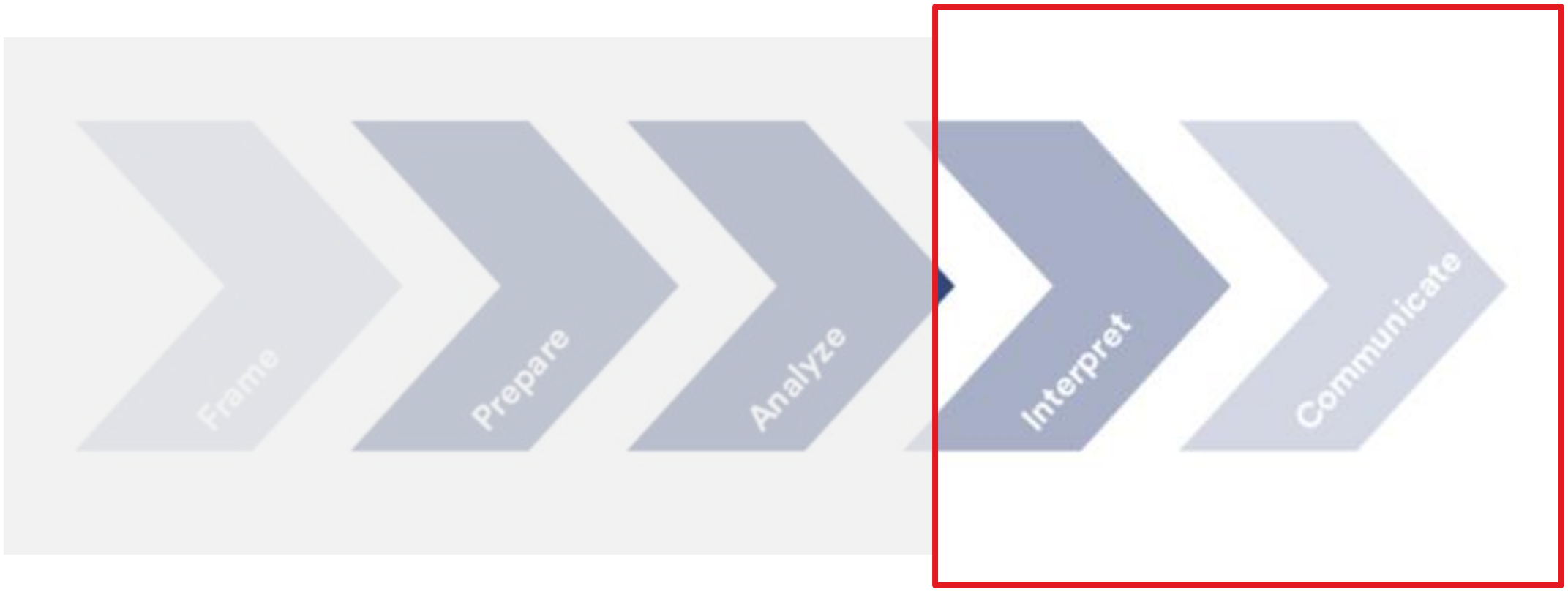


Distil Data

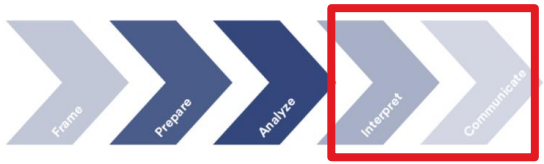
Communicating The Results

Where are we?



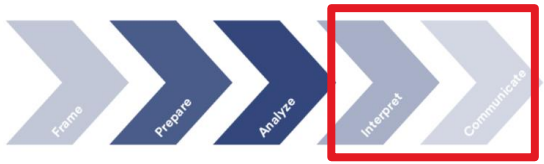
Distil Data

Tell A Story



Telling A Story

THIS COUNTRY HAS A LONG HISTORY OF STORY TELLING

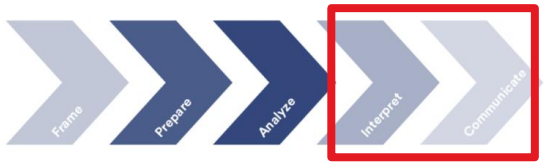


Telling A Story

and then we did this

and then we tried this

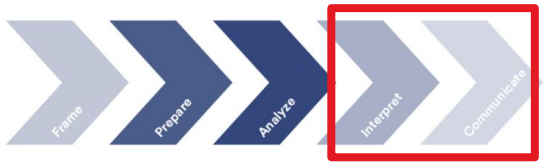
COOL STORY BRO



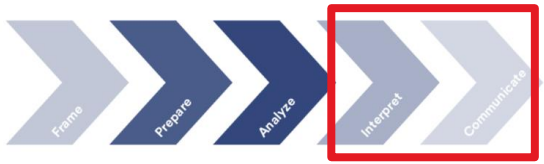
Telling A Story

FORGET THE PROCESS

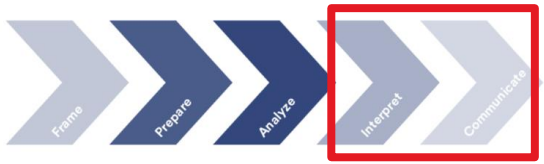
TELL THEM WHAT IS IMPORTANT TO THEM


Frame
Prepare
Analyze
Interpret
Communicate


YOUR RECOMMENDATION SHOULD CONSIDER THE AUDIENCE
What is this person going to think, feel, and do because of this information?

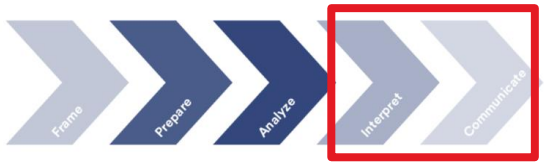


Know your audience

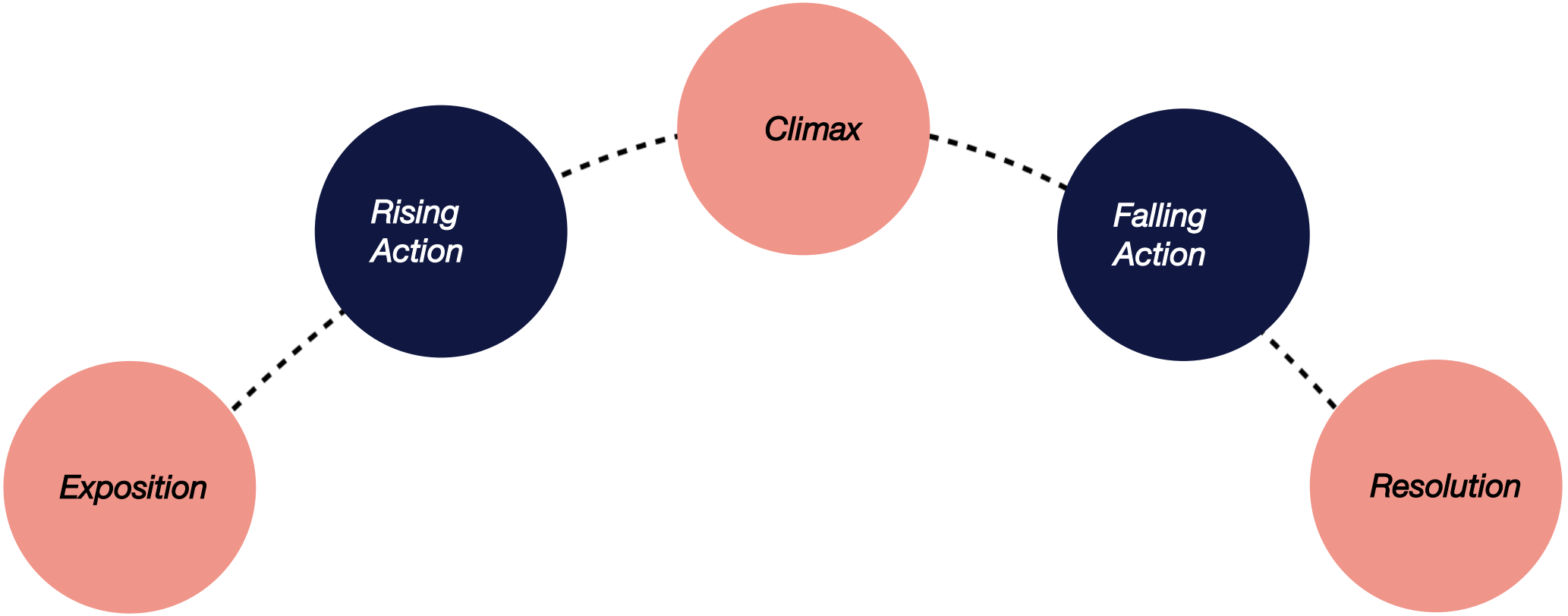


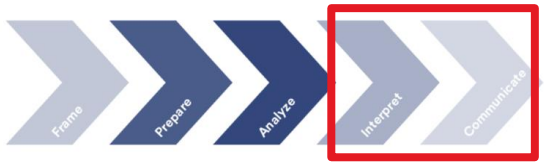
Tell an honest story

- Talk about any uncertainty in your findings.
- Use data analysis to uncover insight.
- Try to avoid using data analysis to prove a point or back up preconceived ideas.

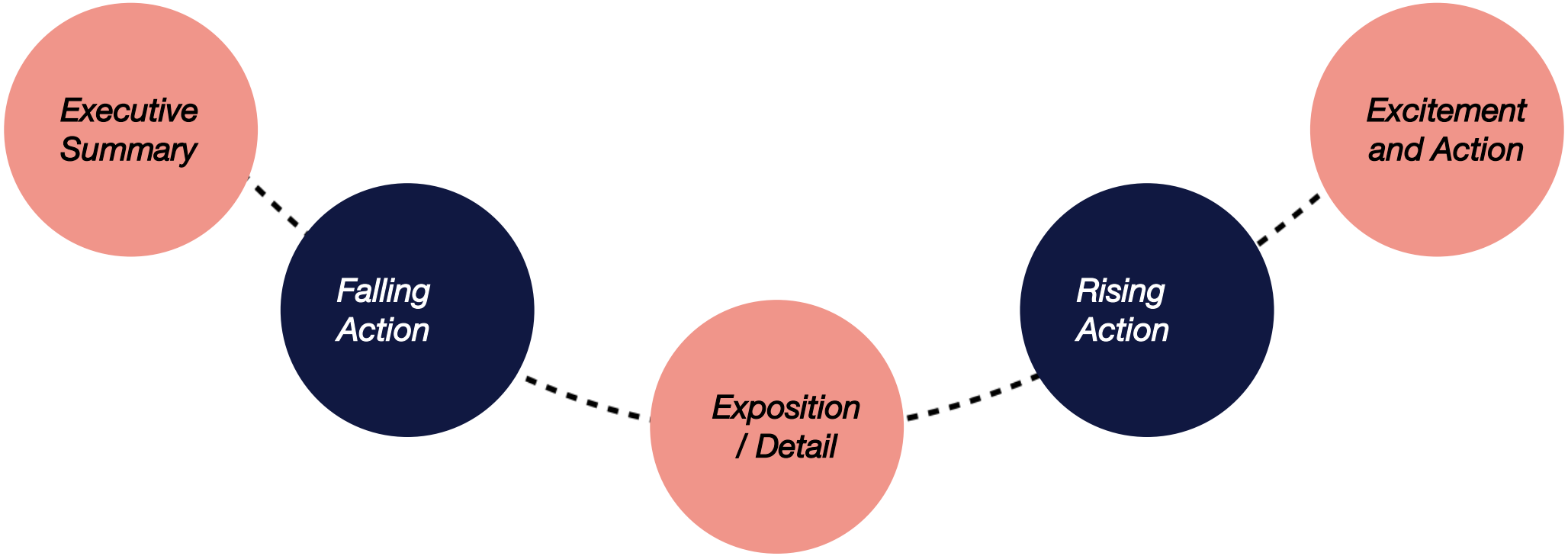


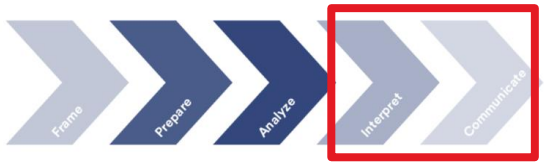
Narrative Arc





Narrative Arc – for data stories





Top tips

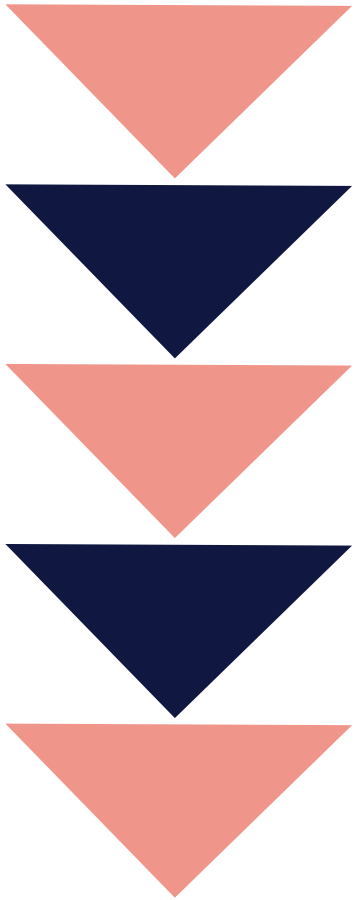
START HIGH LEVEL

AND THEN DIG IN

BE INTERACTIVE

BE PREPARED TO DEVIATE

BE PREPARED TO GUIDE INFLUENCE AND FOCUS



Telling A Story

What are the key messages for your audience?

What detail do they need to know?

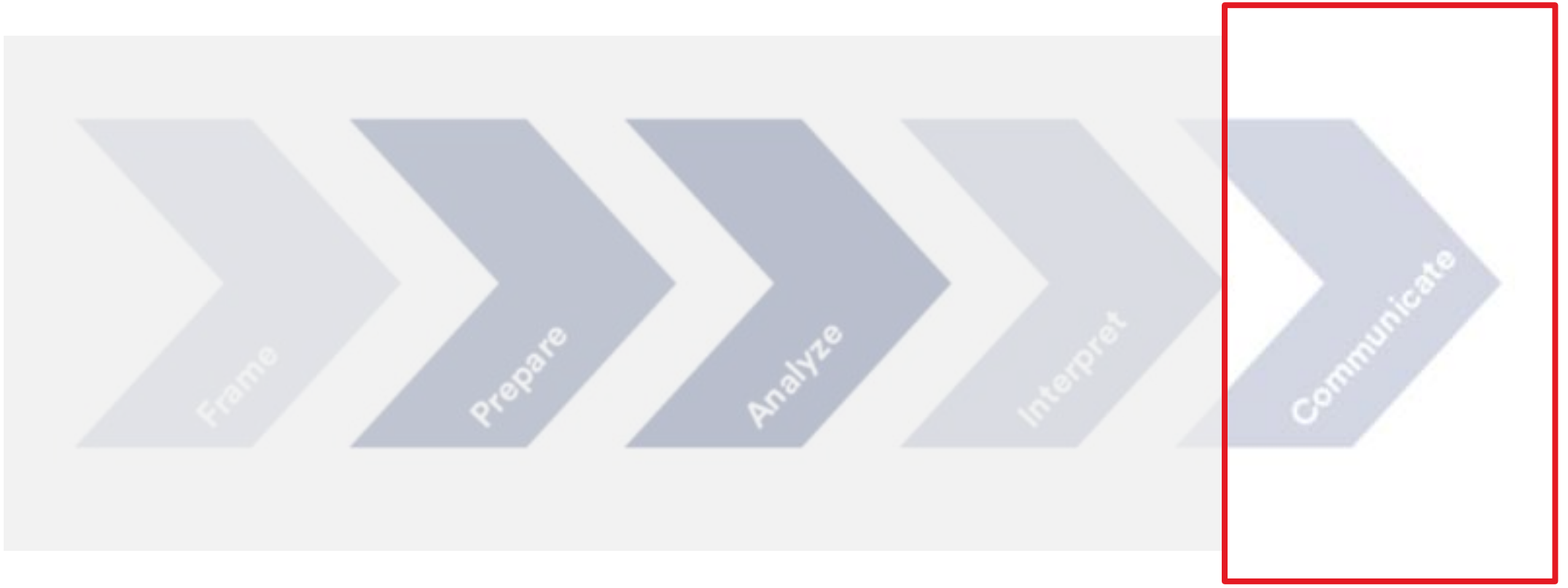
Why should they care?

What action should they take?

Distil Data

Visualise the story

Where are we?



Surprise and visualise

Anscombe's quartet

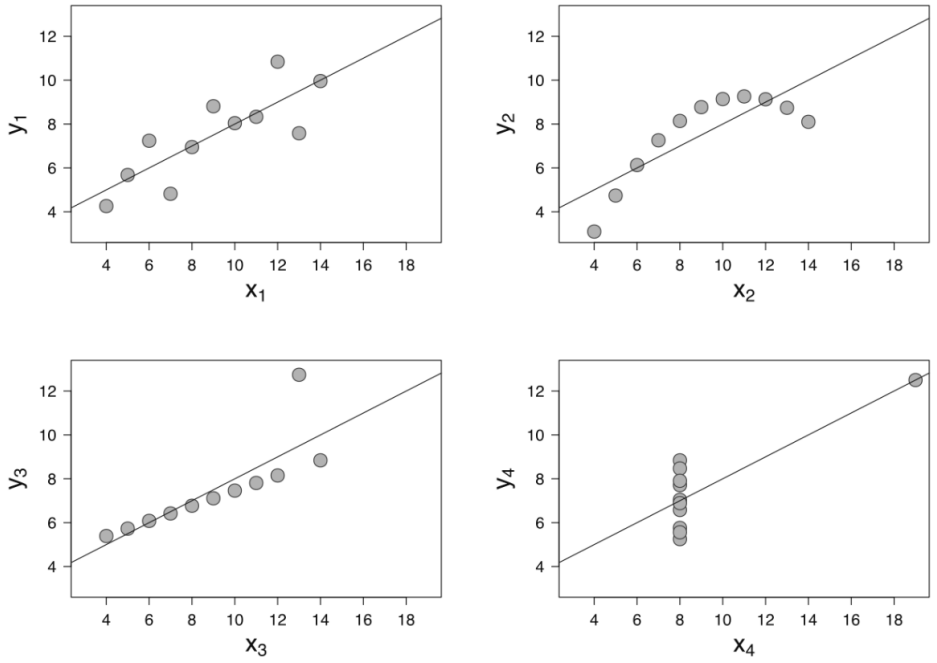
I		II		III		IV	
x	y	x	y	x	y	x	y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

4 Different Sets of data with X, Y values

With the same summary statistics

Plot	sum X	sum Y	avg X	avg Y	stdev X	stdev Y
I	99.0	82.5	9.00	7.50	3.32	2.03
II	99.0	82.5	9.00	7.50	3.32	2.03
III	99.0	82.5	9.00	7.50	3.32	2.03
IV	99.0	82.5	9.00	7.50	3.32	2.03

Anscombe Quartet



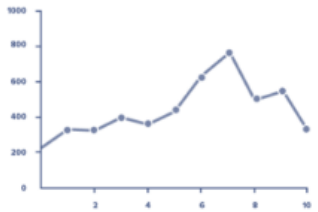
Visually they are very different!

The greatest value of a picture is when it forces use to notice what we never expected to see.

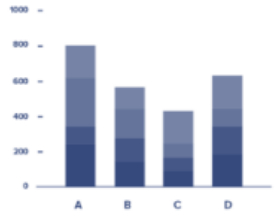
- John Tukey

Plenty of options

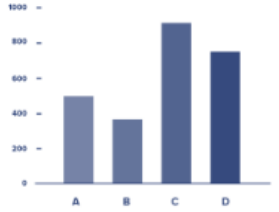
Line Graph



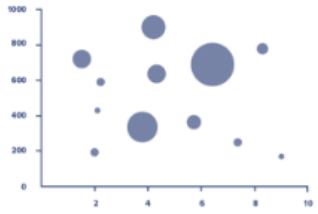
Stacked Bar Chart



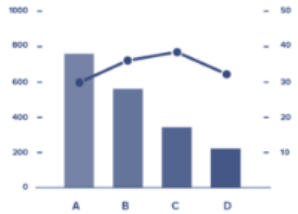
Bar Chart (vertical)



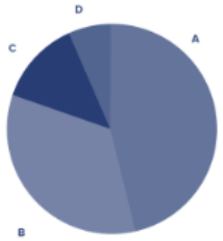
Bubble Chart



Pareto Chart

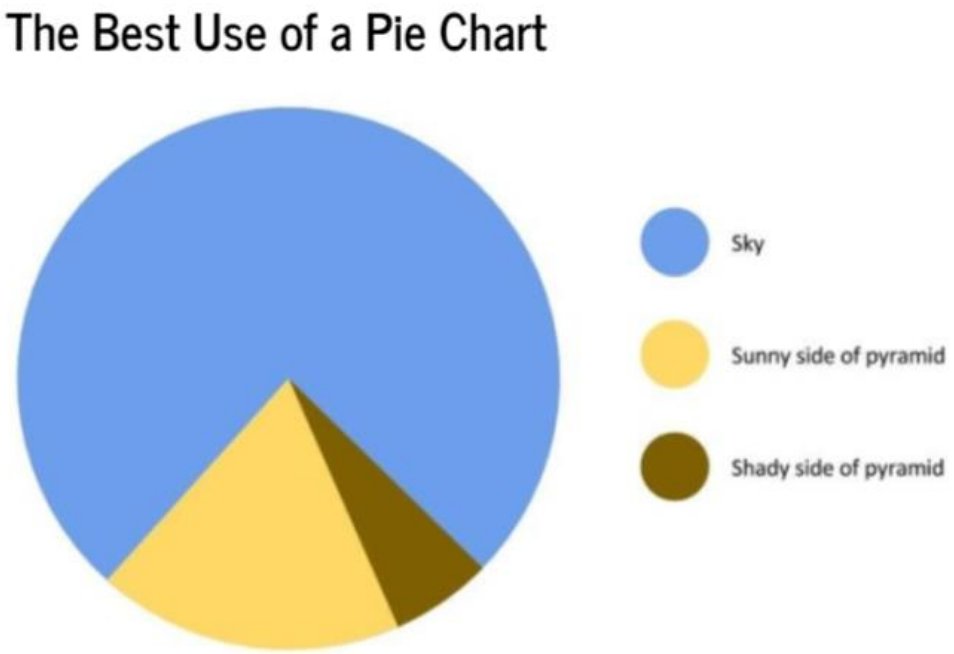


Pie Chart



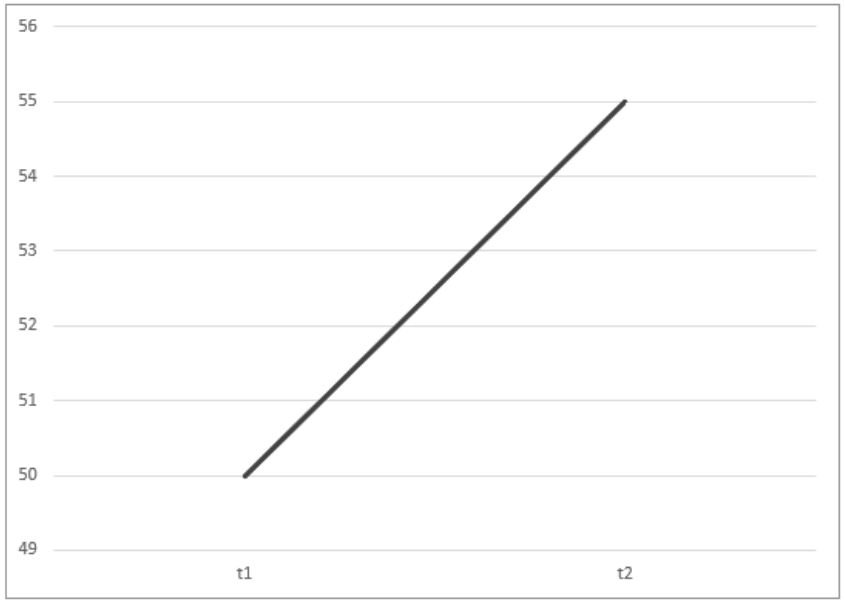
https://datavizproject.com/

Be mindful of how we use data visualisation

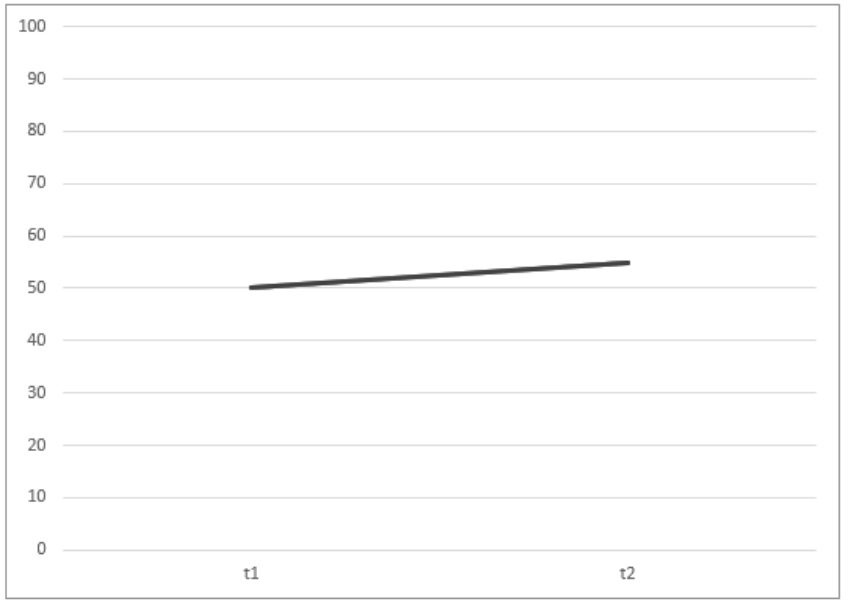


Be mindful of how we use data visualisation

HUGE GROWTH IN SALES!



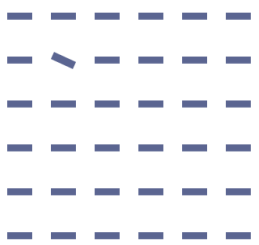
ALMOST NO GROWTH IN SALES!



More choices

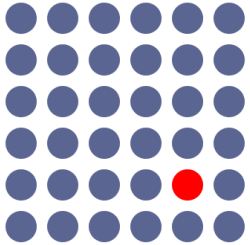
SHAPE

ORIENTATION

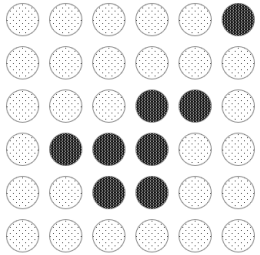


POSITION

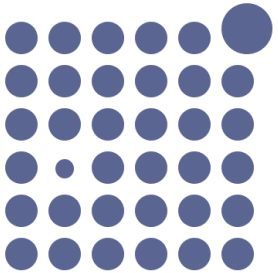
COLOUR



TEXTURE



SIZE



How many sevens?

5	2	8	3	6	1	9	3	6	2	5	3	7	4	3	8	3
8	5	8	9	6	2	1	4	4	3	9	3	6	5	2	4	9
1	0	2	7	5	2	8	3	6	1	6	2	9	3	8	3	8
5	8	4	7	2	0	3	7	3	5	4	7	1	8	2	0	1
2	5	3	6	4	3	9	1	0	8	9	5	7	3	4	5	3
2	7	5	2	8	3	6	1	6	2	9	3	8	3	8	5	8
4	7	2	0	3	7	3	5	4	7	1	8	2	0	1	9	6
2	1	4	4	3	9	3	6	5	2	4	9	1	0	2	7	5
2	8	3	6	1	6	2	9	3	8	3	8	5	8	4	7	2
0	3	7	3	5	4	7	1	8	2	0	1	2	5	3	6	4
3	9	1	0	8	9	5	7	3	4	5	3	2	7	5	2	8
3	6	1	6	2	4	6	2	7	5	9	1	5	2	6	3	6

How many sevens?

5	2	8	3	6	1	9	3	6	2	5	3	7	4	3	8	3
8	5	8	9	6	2	1	4	4	3	9	3	6	5	2	4	9
1	0	2	7	5	2	8	3	6	1	6	2	9	3	8	3	8
5	8	4	7	2	0	3	7	3	5	4	7	1	8	2	0	1
2	5	3	6	4	3	9	1	0	8	9	5	7	3	4	5	3
2	7	5	2	8	3	6	1	6	2	9	3	8	3	8	5	8
4	7	2	0	3	7	3	5	4	7	1	8	2	0	1	9	6
2	1	4	4	3	9	3	6	5	2	4	9	1	0	2	7	5
2	8	3	6	1	6	2	9	3	8	3	8	5	8	4	7	2
0	3	7	3	5	4	7	1	8	2	0	1	2	5	3	6	4
3	9	1	0	8	9	5	7	3	4	5	3	2	7	5	2	8
3	6	1	6	2	4	6	2	7	5	9	1	5	2	6	3	6

How many sevens?

5	2	8	3	6	1	9	3	6	2	5	3	7	4	3	8	3
8	5	8	9	6	2	1	4	4	3	9	3	6	5	2	4	9
1	0	2	7	5	2	8	3	6	1	6	2	9	3	8	3	8
5	8	4	7	2	0	3	7	3	5	4	7	1	8	2	0	1
2	5	3	6	4	3	9	1	0	8	9	5	7	3	4	5	3
2	7	5	2	8	3	6	1	6	2	9	3	8	3	8	5	8
4	7	2	0	3	7	3	5	4	7	1	8	2	0	1	9	6
2	1	4	4	3	9	3	6	5	2	4	9	1	0	2	7	5
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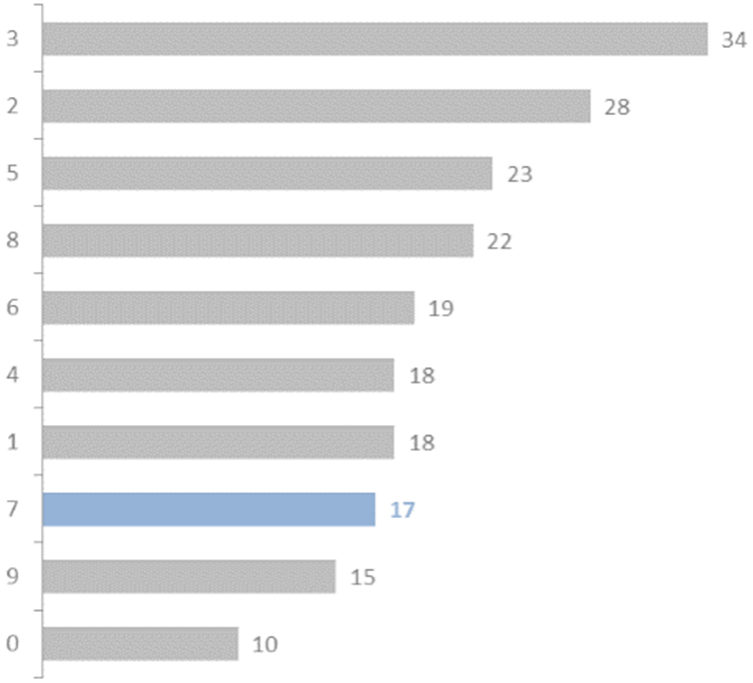
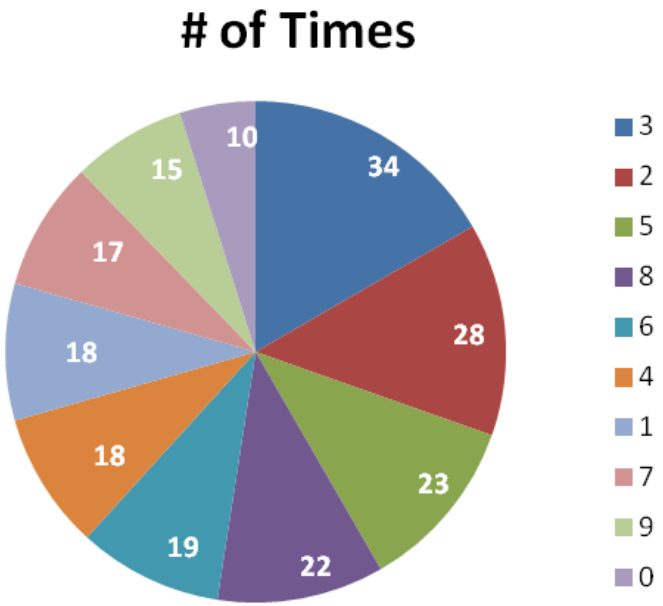
3	9	1	0	8	9	5	7	3	4	5	3	2	7	5	2	8
3	6	1	6	2	4	6	2	7	5	9	1	5	2	6	3	6

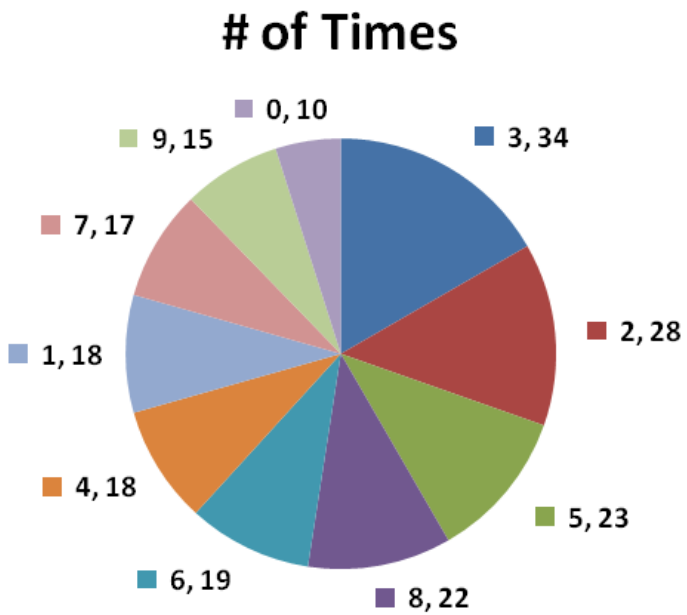
How many sevens?



7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
5	2	8	3	6	1	9	3	6	2	5	3	4	3	8	3	8
5	8	9	6	2	1	4	4	3	9	3	6	5	2	4	9	1
0	2	5	2	8	3	6	1	6	2	9	3	8	3	8	5	8
4	2	0	3	3	5	4	1	8	2	0	1	2	5	3	6	4
3	9	1	0	8	9	5	3	4	5	3	2	5	2	8	3	6
1	6	2	9	3	8	3	8	5	8	4	2	0	3	3	5	4
1	8	2	0	1	9	6	2	1	4	4	3	9	3	6	5	2
4	9	1	0	2	5	2	8	3	6	1	6	2	9	3	8	3
8	5	4	8	2	0	3	3	5	4	1	8	2	0	1	2	5
3	6	4	3	9	1	0	8	9	5	3	4	5	3	2	5	2
8	3	6	1	6	2	4	6	2	5	9	1	5	2	6	3	6

How many sevens?



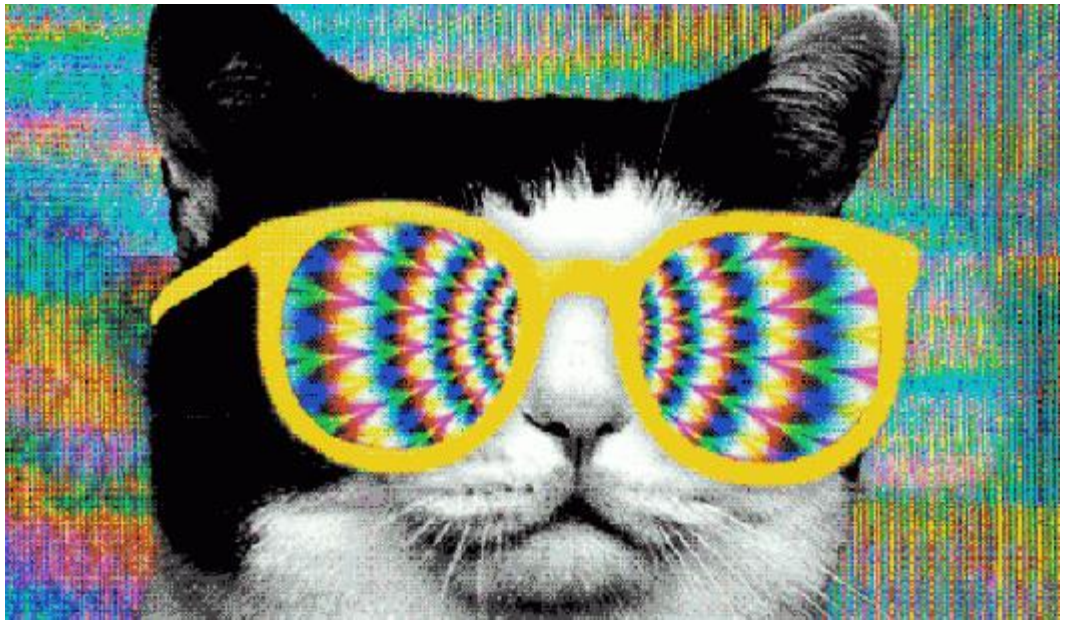


There is no data that can be displayed in a pie chart, that cannot be displayed BETTER in some other type of chart.

- John Tukey

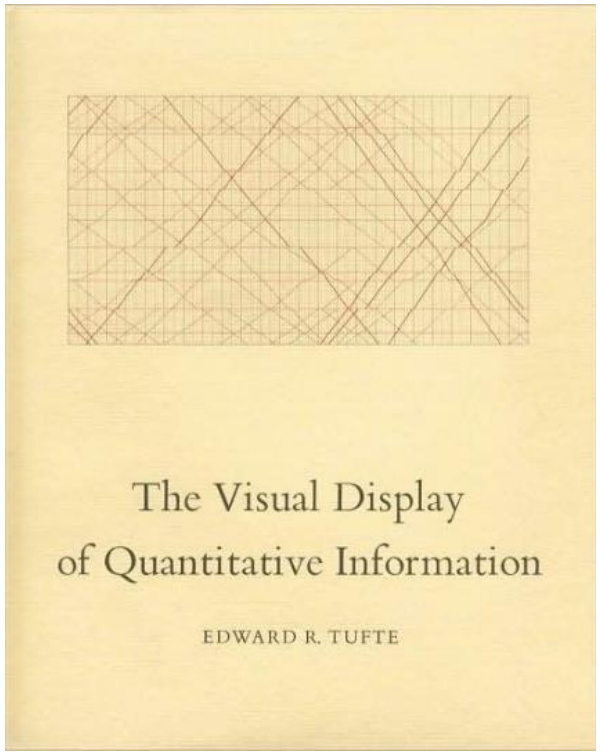
Tips

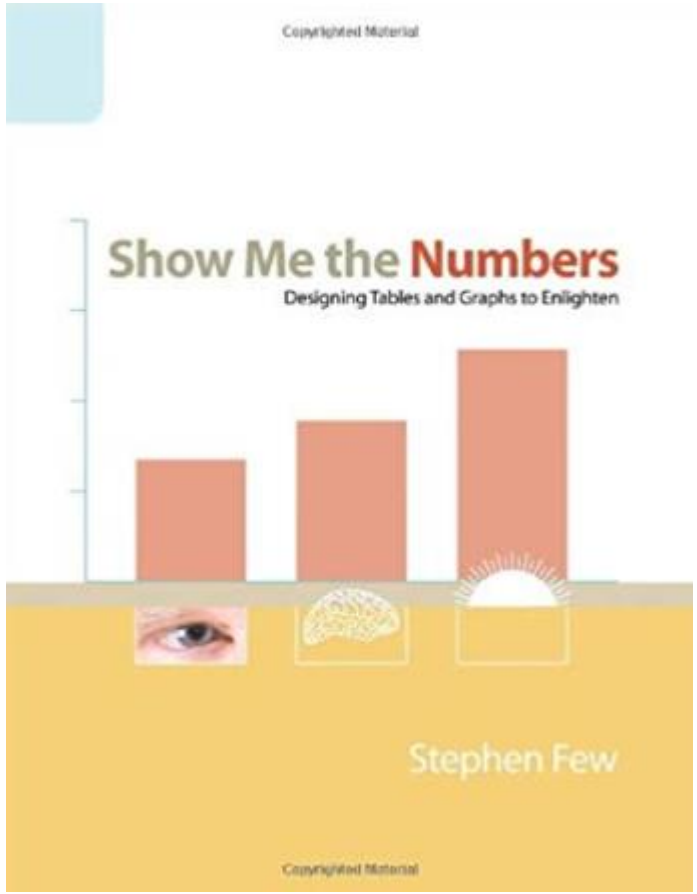
- Less is more <=>
- Draw attention to what is important
- Remove all noise
- “If everything yells for your viewers attention, nothing is heard” Aarron Walter, “Design for Emotion”




Frame
Prepare
Analyze
Interpret
Communicate

More books!


The Visual Display
of Quantitative Information
EDWARD R. TUFTE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Show Me the Numbers
Designing Tables and Graphs to Enlighten
Stephen Few
Copyrighted Material

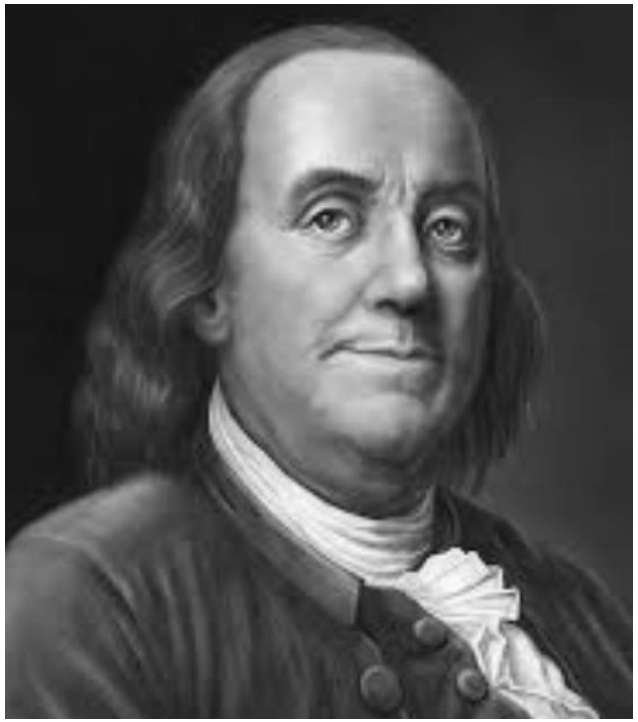
Distil Data

Get to the point

Value peoples time

Time is money

- Benjamin Franklin



Do you need a meeting with a powerpoint deck?

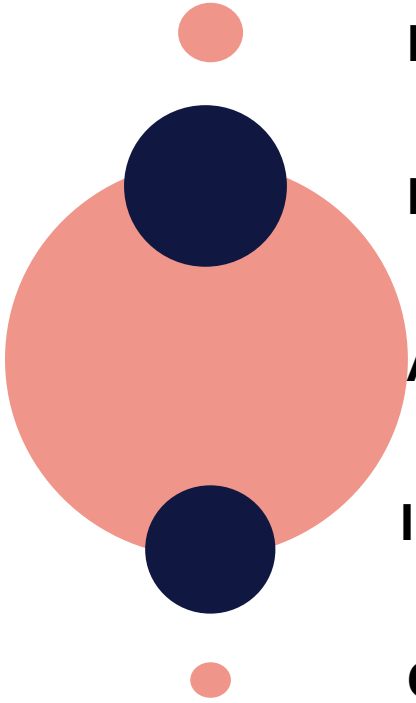
Distil Data

Wrapping it up

Framework

- **Frame:** carefully work out the best questions to answer
- **Prepare:** clean that data good
- **Analyze:** understand your data
- **Interpret:** translate your findings
- **Communicate:** tell your story

Framework – Typical approach



Frame

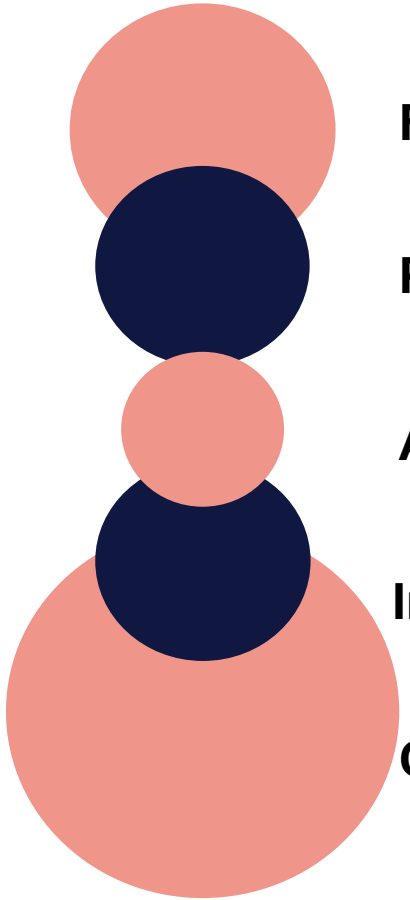
Prepare

Analyze!

Interpret

Communicate

Framework – Best practice



Frame

Prepare

Analyze!

Interpret

Communicate

Learning Objectives

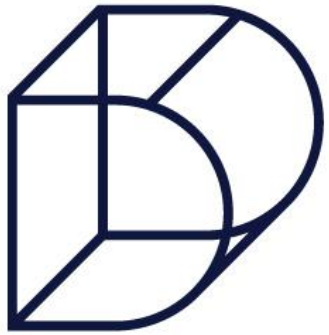
Understand why effective data analysis always starts with a question

Best practice tips for data collection and analysis

How to tell a story your audience actually wants to hear

Thank You!

Your Instructor today was



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Q & A