cross-cultural data visualisation

project 3: city & transport & people

with James Boekbinder & Marieke de Beurs

2021 - 2022

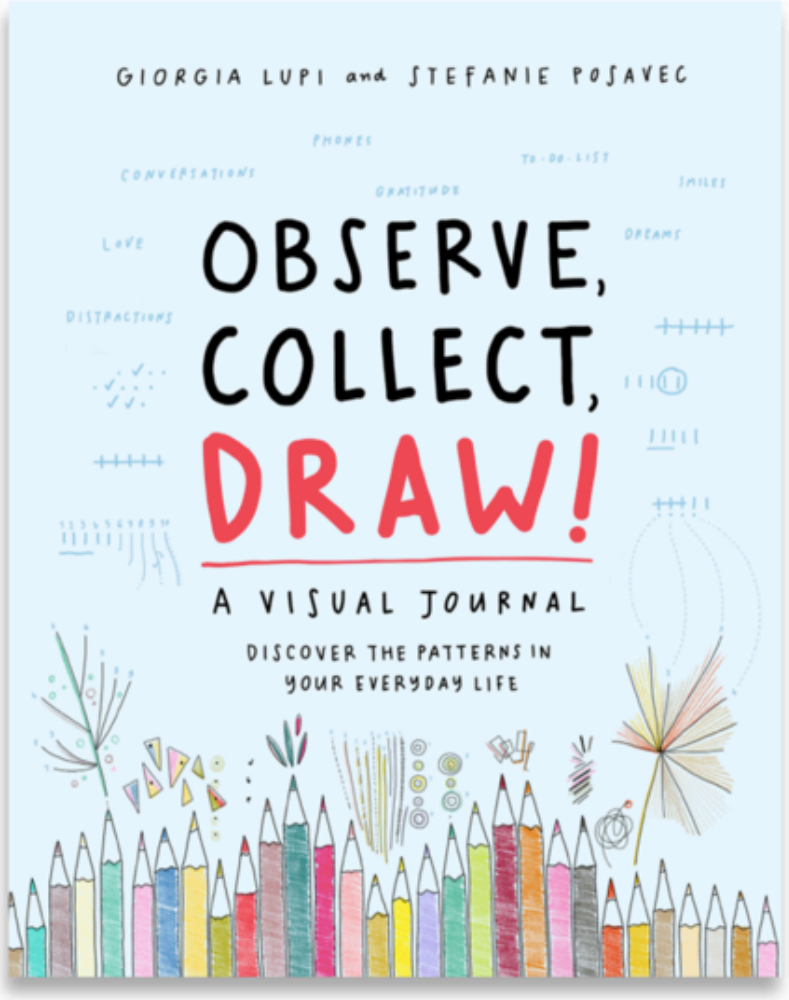
project 3

Resources

project 3 - resources

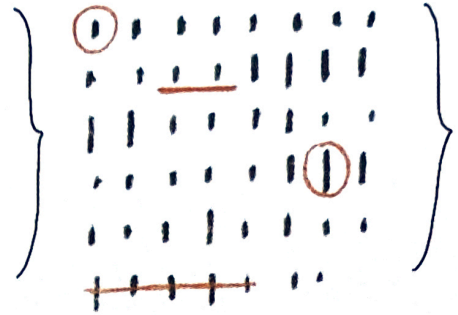
Books

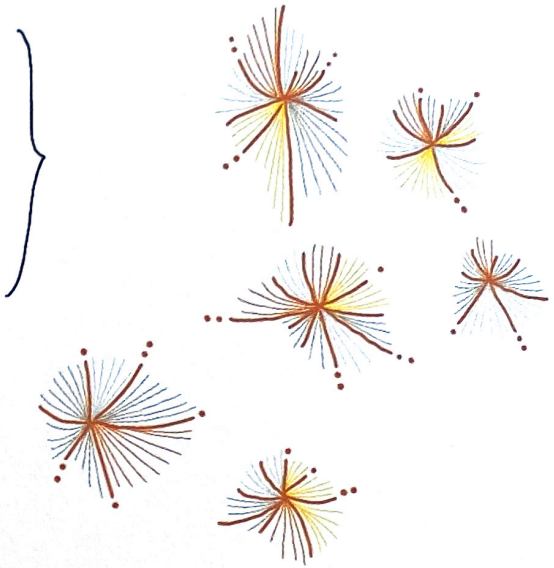
Process



Source:
Observe, Collect, Draw!: A Visual Journal
Georgia Lupi & Stefanie Posavec

SEE THE WORLD AS A DATA COLLECTOR





DATA PERMEATES OUR DAYS AND OUR LIVES,
IT'S JUST A MATTER OF LEARNING HOW TO
RECOGNIZE IT

...MY SMILES...

...MY INTERACTIONS...

...MY SURROUNDINGS...

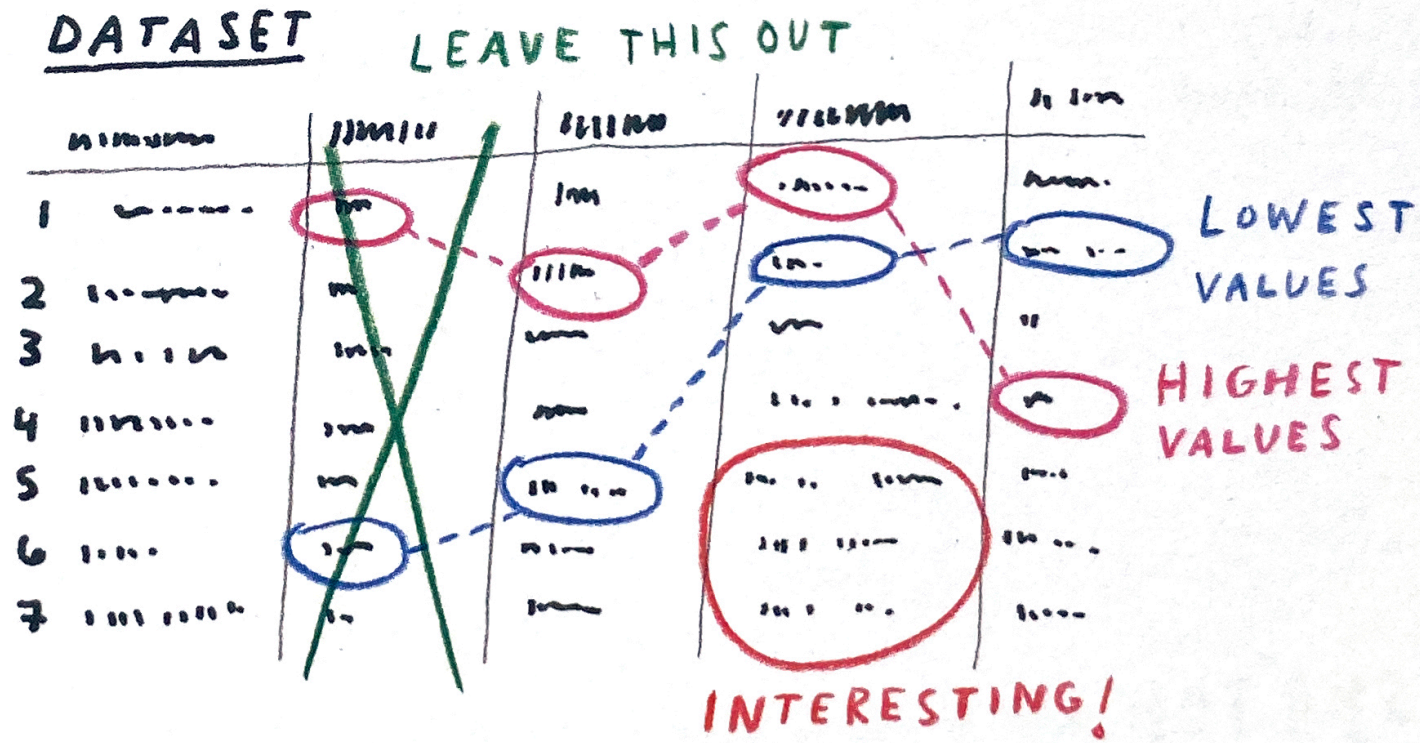
...MY COMPLAINTS...

BEGIN WITH A QUESTION

BEGIN WITH A PRIMARY QUESTION:
WHAT DO YOU WANT TO KNOW AND EXPLORE?
THEN ENRICH THE DATA (AND GIVE THE DRAWINGS DEPTH) BY ASKING ADDITIONAL SMALLER, CONTEXTUAL QUESTIONS.

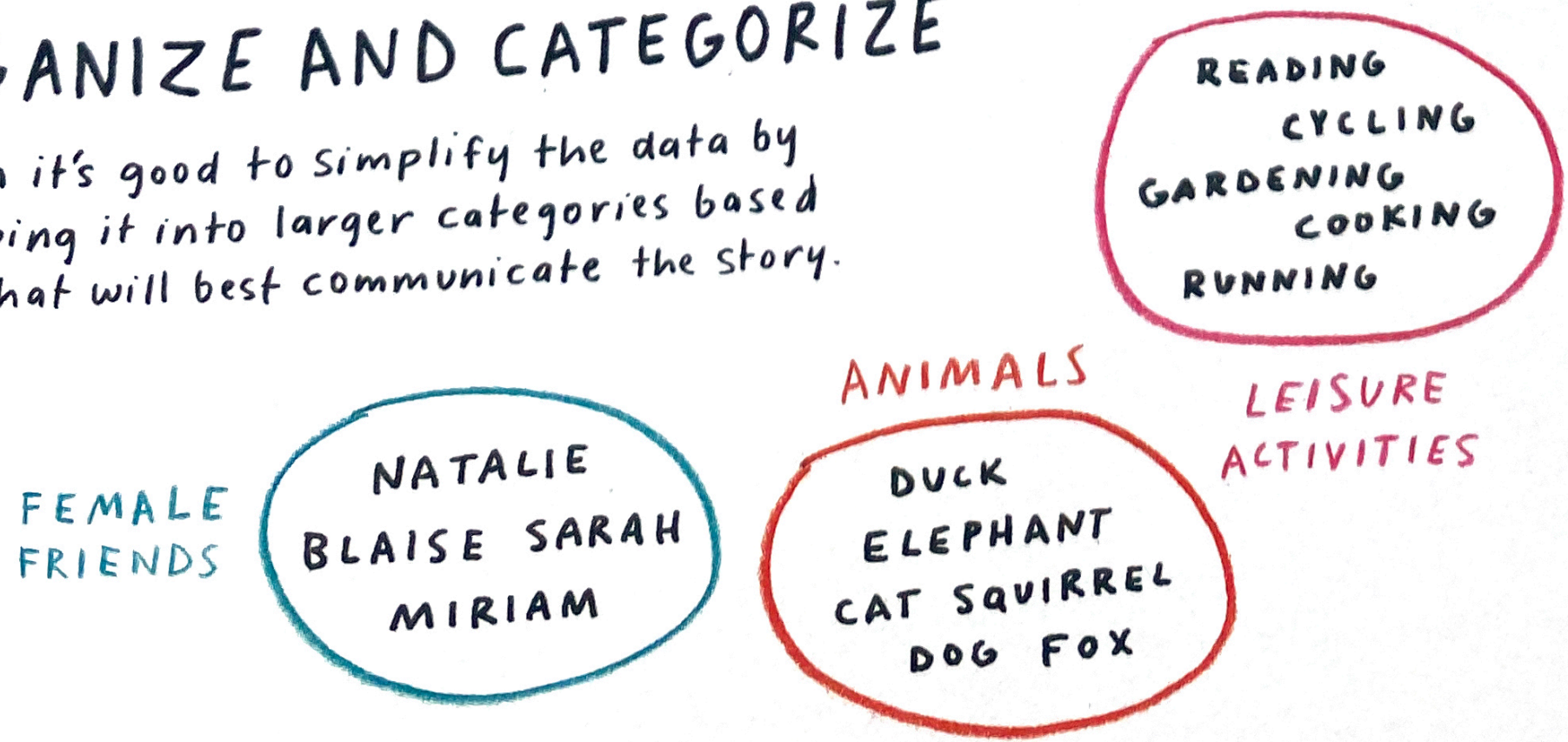
SPEND TIME WITH DATA

Before starting to visualize, always analyze and spend time with your data, searching for patterns and trying to understand it at a deeper level.



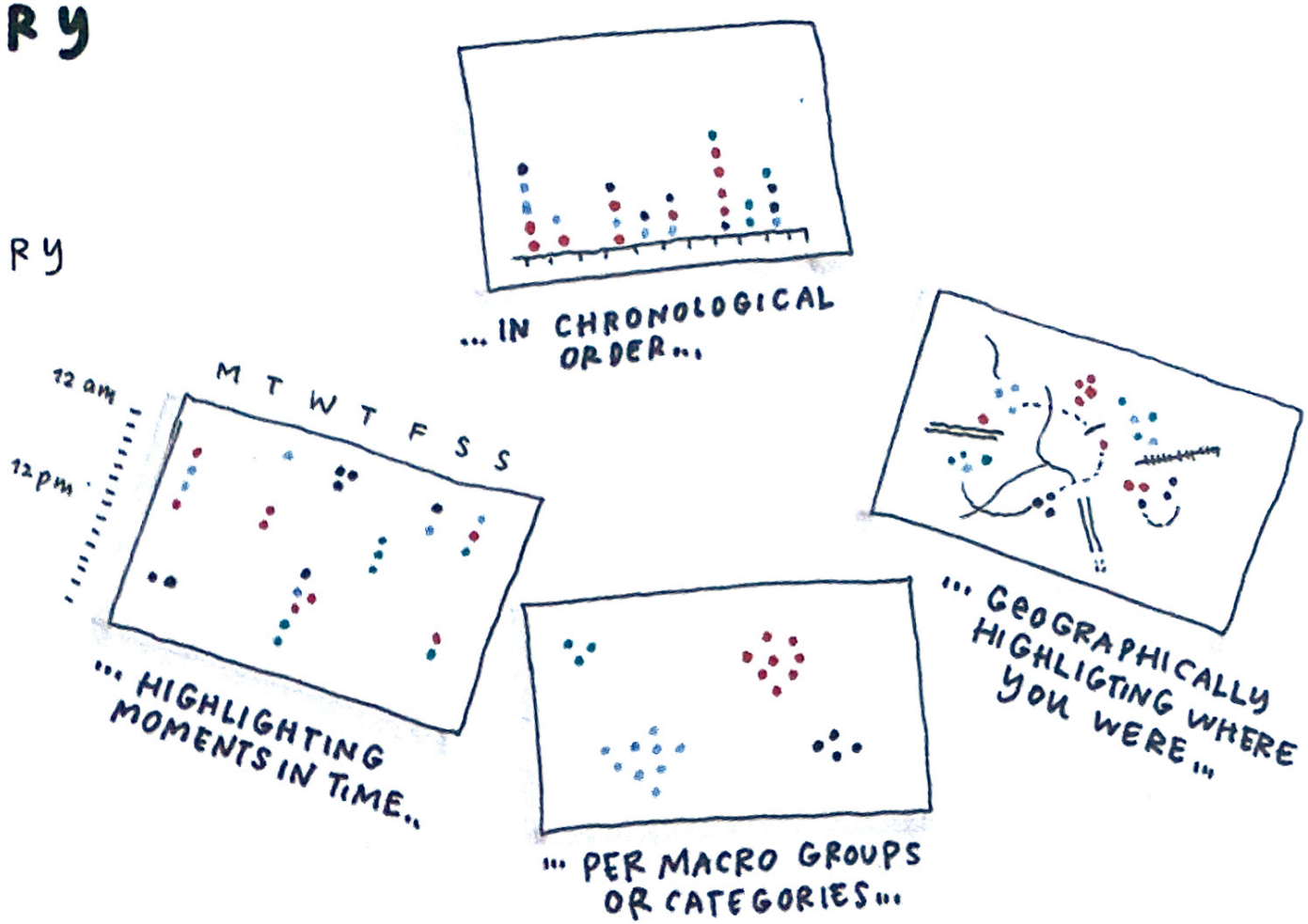
ORGANIZE AND CATEGORIZE

Often it's good to simplify the data by grouping it into larger categories based on what will best communicate the story.



FIND THE MAIN STORY

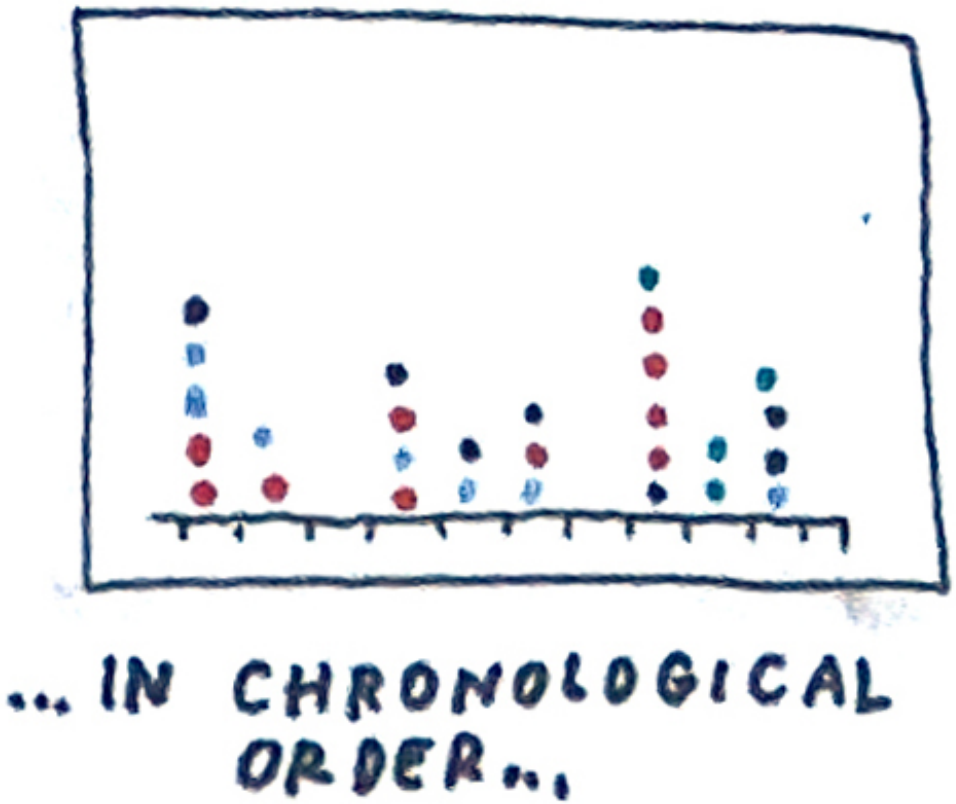
STARTING WITH PATTERNS
DISCOVERED IN THE DATA,
DECIDE WHAT THE MAIN STORY
IS FOR THE DRAWING.
FINDING THE DATA'S FOCUS
HELPS DECIDE THE LAYOUT
OF A DATA DRAWING.



Categorical show and compare categories

classify and **transform into categories**

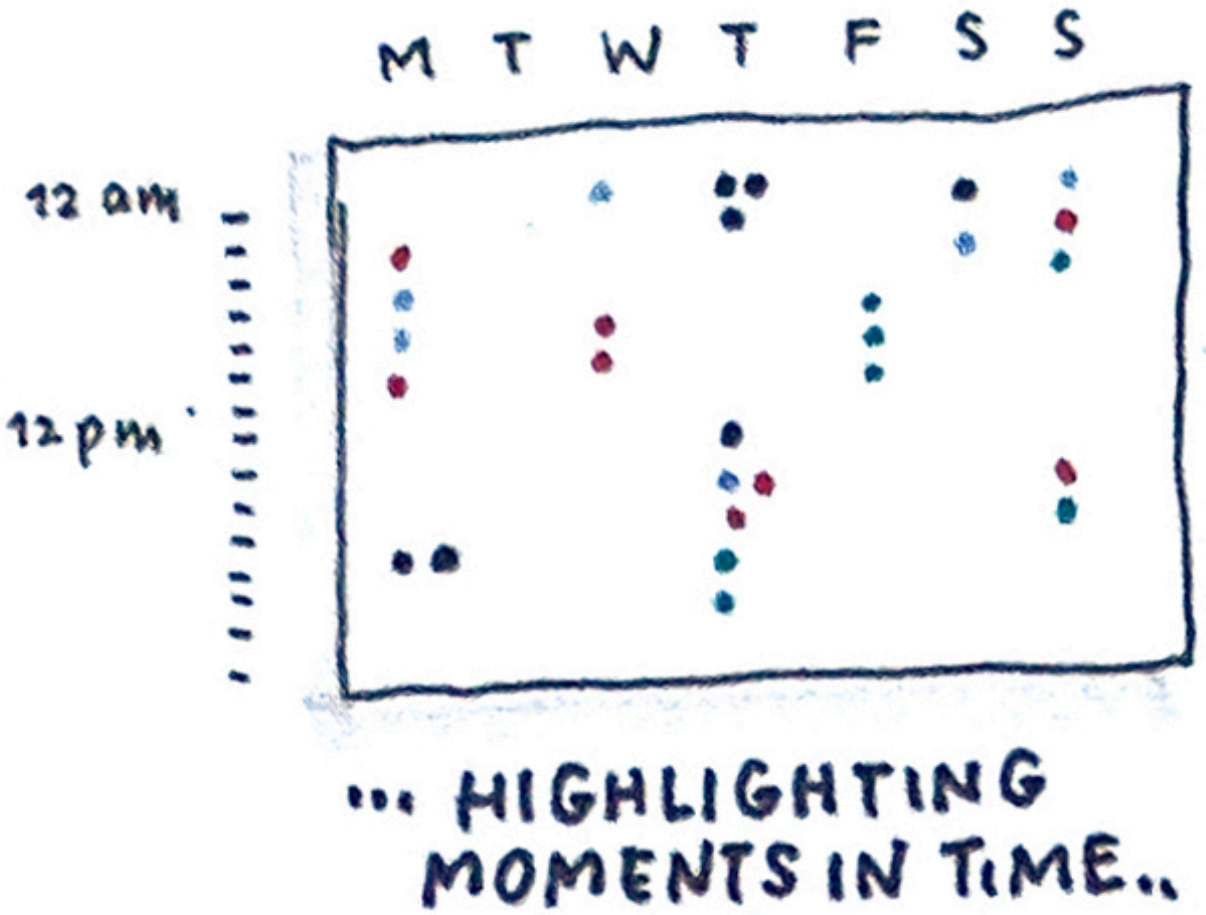
Relational comparing two or more variables



count quantities/*(frequenties)* of things

(which may stand for a quality or property; or the frequency of things)

Temporal relations or events over time



Measure the temporal position – **when** things happen

Spatial relations or events in space

Measure the spatial position – **where** things happen

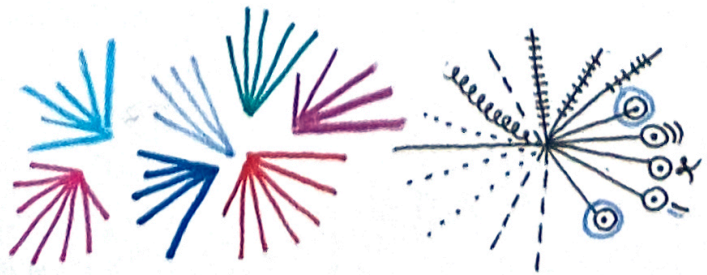
GET VISUALLY INSPIRED

LOSE YOURSELF IN IMAGES, USING THE AESTHETIC QUALITIES OF THE FEATURES YOU ARE ATTRACTED TO AS A VISUAL INSPIRATION FOR THE DRAWING.

SKETCH AND DRAFT IDEAS

EXPLORE IDEAS BY SKETCHING AND PLAYFULLY EXPERIMENTING WITH FORM, COLOR, AND MATERIALS IN A FREEHAND FASHION AS YOU DECIDE THE VISUAL ELEMENTS THAT WILL REPRESENT EVERY PART OF THE DATA.

EXPLORING VARIATIONS



TESTING COLORS and TECHNIQUES

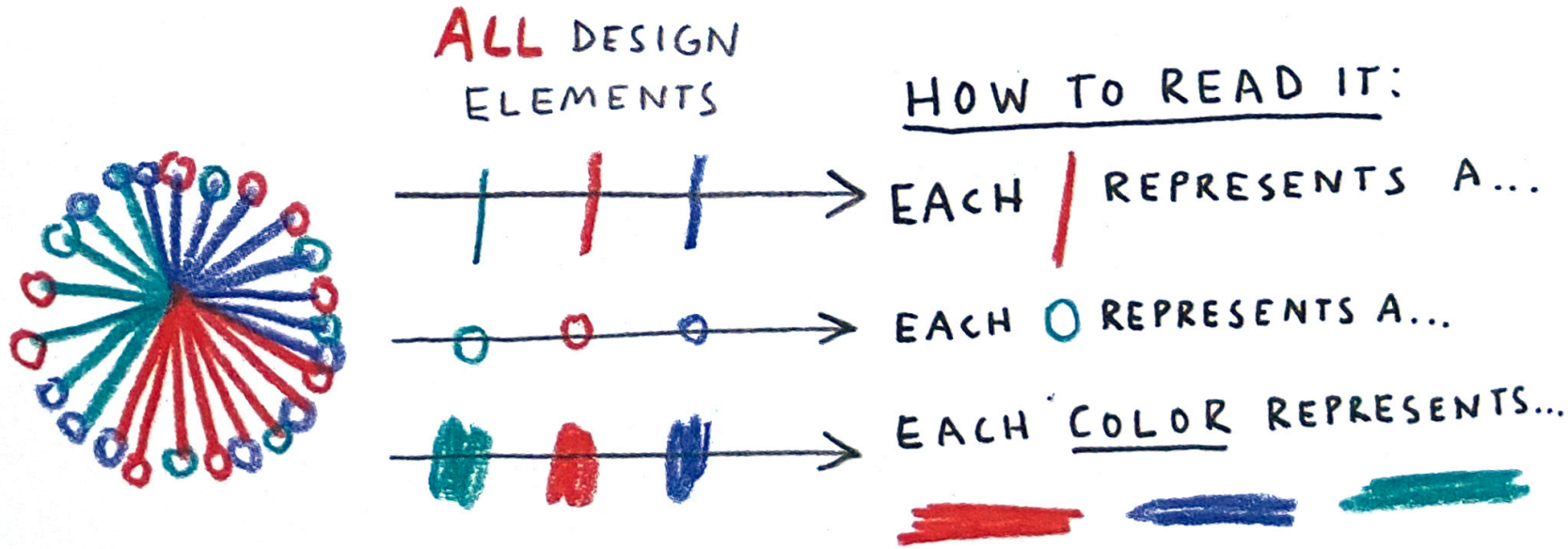
ADDING DETAILS and DEPTH TO EACH LOG

DRAW THE FINAL PICTURE

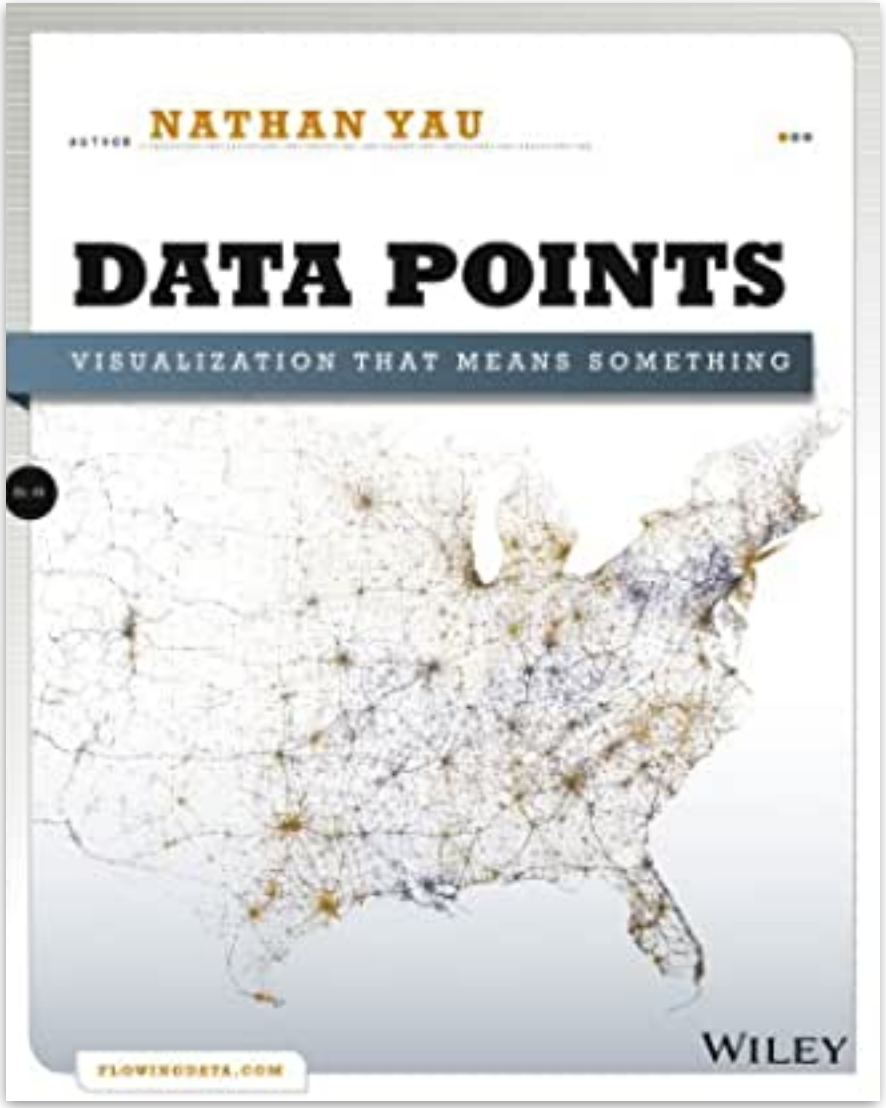
After sketching and testing ideas for a data-drawing, you'll find an approach that works. Then create your drawing, ensuring it includes all the tiny details, trying to make it as beautiful (and as understandable) as you can.

DRAW THE LEGEND

Creating a legend starts with a question: "What does someone need to read my data-drawing?" In the legend, every design element that represents data is listed so the reader understands what everything means.

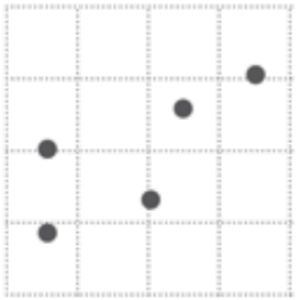


Components



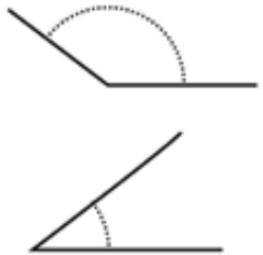
Four components of data visualization

Position
Where in space the data is

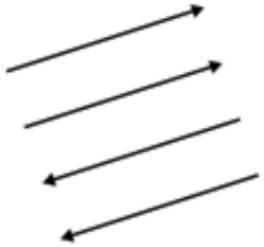


Length
How long the shapes are

Angle
Rotation between vectors



Direction
Slope of a vector in space



Shapes
Symbols as categories

Area
How much 2-D space

Volume
How much 3-D space

Color saturation
Intensity of a color hue

Color hue
Usually referred to as color

Visual cues

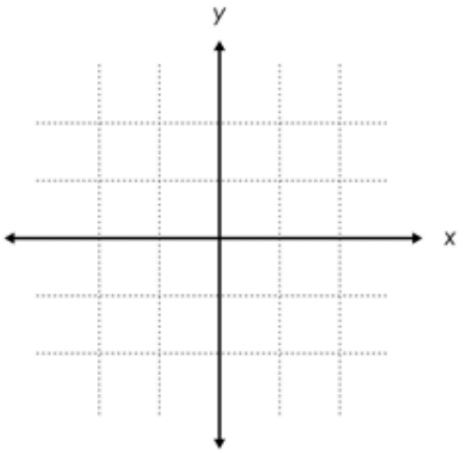
- position
- length
- angle
- direction
- shapes
- area
- volume
- color saturation
- color hue

Coordinate systems

There are a variety of them, from cylindrical to spherical, but these three will cover most of your bases.

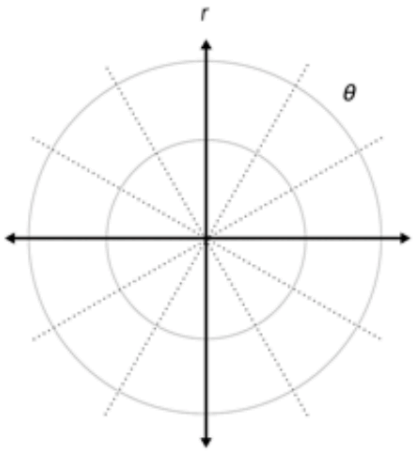
Cartesian

If you've ever made a graph, the x- and y-coordinate system will look familiar to you.



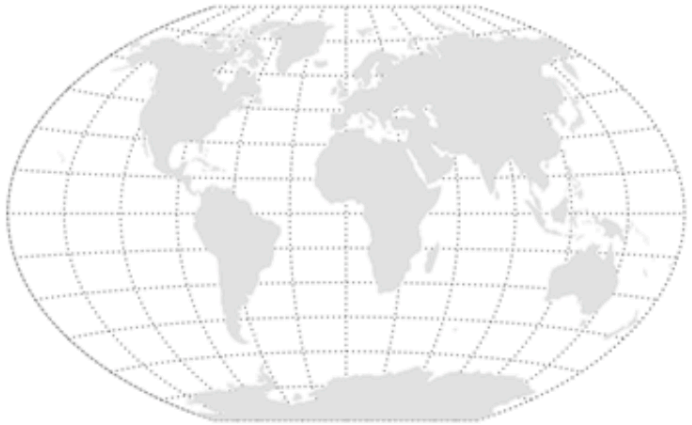
Polar

Pie charts use this system. Coordinates are placed based on radius *r* and angle *θ*.



Geographic

Latitude and longitude are used to identify locations in the world. Because the planet is round, there are multiple projections to display geographic data in two dimensions. This one is the Winkel tripel.

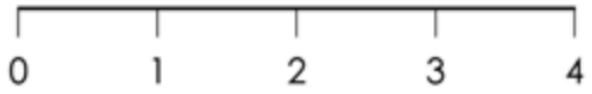


Coordinate systems

- Cartesian
- Polar
- Geographic

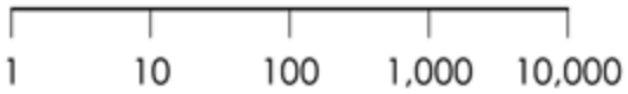
Linear

Values are evenly spaced



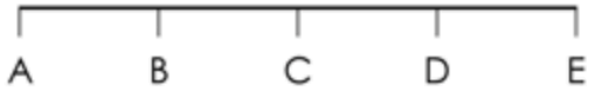
Logarithmic

Focus on percent change



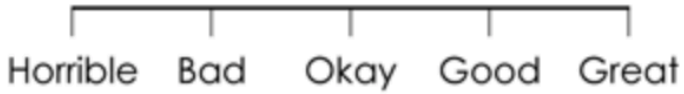
Categorical

Discrete placement in bins



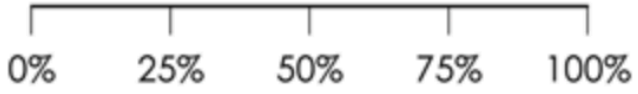
Ordinal

Categories where order matters



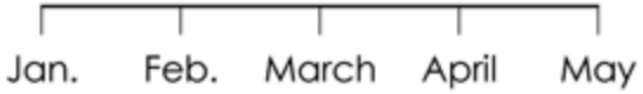
Percent

Representing parts of a whole



Time

Units of months, days, or hours

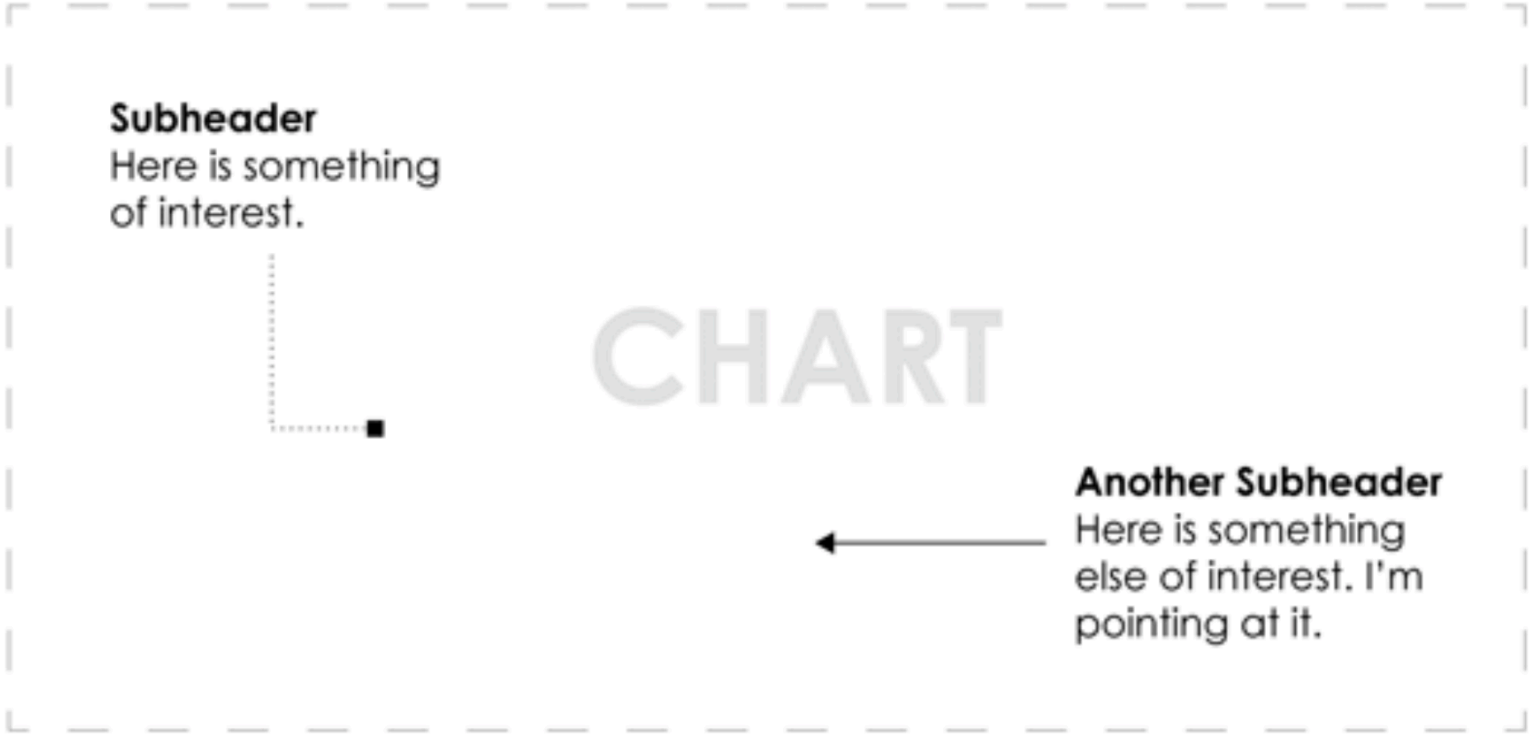


Scales

- Linear
- Categorical
- Percent
- Logarithmic
- Ordinal
- Time

Header title that describes findings

Lead-in text is your chance to provide more details on what the data is about, where it's from, and what the audience should see or look at.



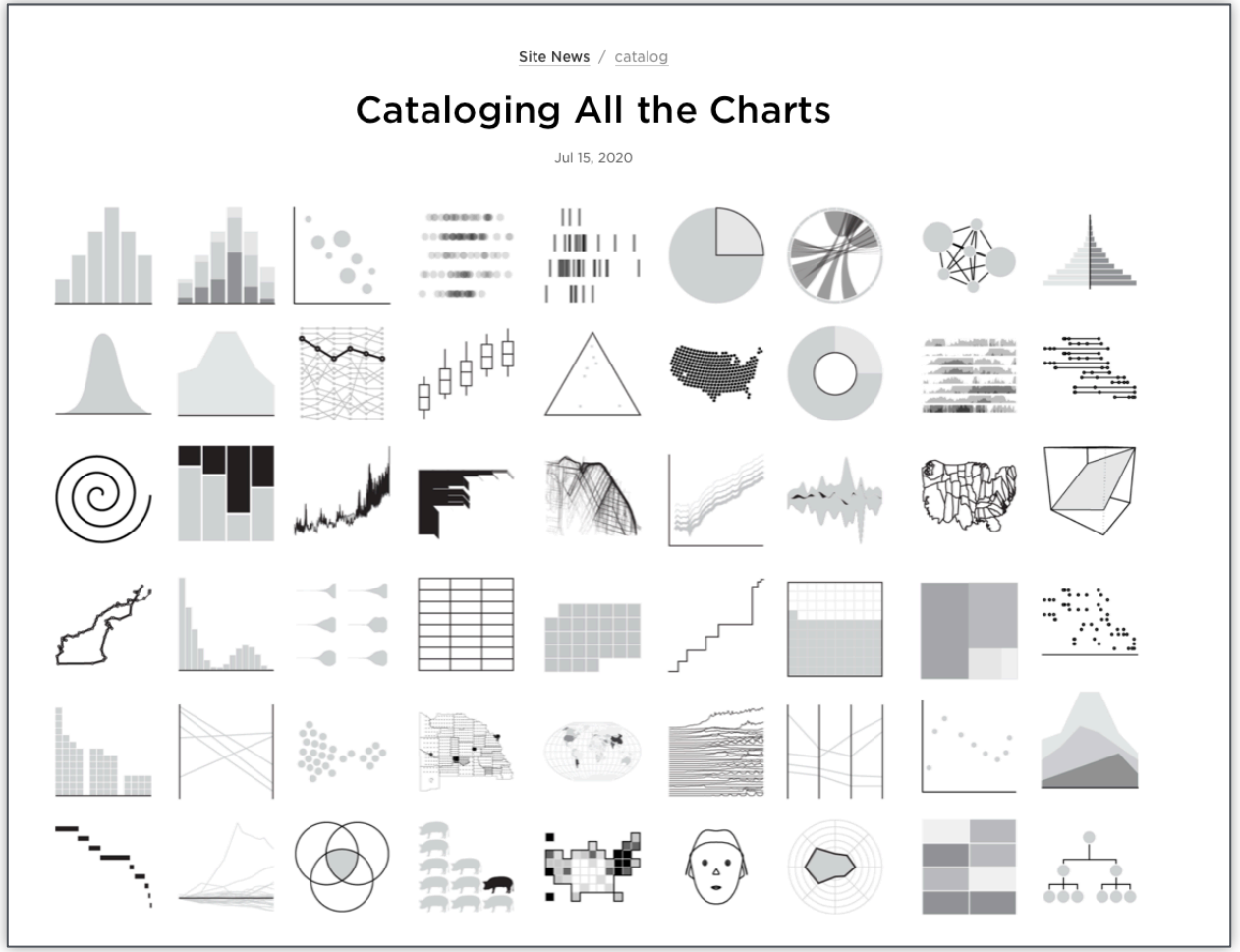
Source: This is where the data is from.

Context

- Annotations
- Explanatory text

project 3 - resources

Websites


Site News / catalog
Cataloging All the Charts
Jul 15, 2020

1) Kies je grafiek

Wat wil je laten zien?

categorie · tijd · deel van geheel · distributie · geospatiaal · relatie · exacte waarde

staafgrafiek — een meetwaarde
gegroepeerde staaf — twee meetwaarden
divergerend gestapeld — tegenovergestelde waarden
afwijkings staaf — verschil tussen
zwevende staaf — verschil tussen
gestapelde staaf — enkele categorie tov geheel
paneel staafdiagram — meerdere categoriën
lollipop — net als staaf, maar dunner
halter grafiek — twee groepen
proportioneel — grootte
x/y coördinaten plot — meetwaarde combinatie
verticale waterval — visuele optelling
kogel grafiek — slecht/ok/goed
parallelle coördinaten — multi variate data
beeld diagram — met iconen
woorden wolk — niet aangeraden
ronde kolomgrafiek — niet aangeraden
ronde staafgrafiek — niet aangeraden
radar — niet aangeraden
meter — niet aangeraden

lijn grafiek — continu
punt-lijn grafiek — geaggregeerde tijd
vlak grafiek — een meetwaarde
kolom grafiek — een meetwaarde
gestapelde kolom — als kolom tov geheel
gestapelde vlak — als vlak tov geheel
afwijkings kolom — boven of onder doel
afwijkings lijn — tov cumulatief doel
waterval — verandering over tijd
tijdslijn — gebeurtenissen
sparklines — mini trend
helling grafiek — twee momenten
punten plot — voor en na
cyclus plot — repeterende cycli
horizon grafiek — hoog en laag

100% gestapelde staaf — één categorie tov 100%
100% gestapelde kolom — losse tijdstippen tov 100%
100% gestapelde vlak — continue tijd tov 100%
100% staaf grafiek — telt op tot 100%
100% gestapelde staaf — één categorie, alle tijd
100% gestapelde kolom — alle categoriën, één moment
Sankey diagram — opsplitsen
wafel grafiek — 100 blokjes
boom diagram — geneste delen
100% waterval — losse delen
parallelle set — deel van meerdere gehelen
Marimekko grafiek — met extra variabele
geneste vlak grafiek — delen in andere delen
Pareto grafiek — 80 / 20 analyse
taart grafiek — niet aangeraden
donut grafiek — niet aangeraden

stippen matrix — frequentie telling
bevolkingspiramide — twee categoriën
histogram — aantal per groep
frequentiepolygoon — normale verdeling
foutbalken — onzekerheid
doosdiagram — vijf-getallensamenvatting
viool — doosdiagram en distributie
noklijn plot — distributies over tijd
cijfer — enkel groot cijfer
tabel — meerdere cijfers
afwijkings doos — focus op verschil
grafiek labels — meer nauwkeurigheid

route kaart — richting
symbolen kaart — klassen
stroom kaart — beweging
chloropeth kaart — waarde per regio
contourkaart — waarde per gebied
puntkaart — verdeling
zeshoek kaart — waarde per zeshoek
bellen kaart — niet aangeraden
grafiek op kaart — niet aangeraden

trechter grafiek — conversie
Venn diagram — overlap
stroom diagram — stap voor stap
Gantt grafiek — planning
organigram — organisatie hiërarchie
boog diagram — relaties in tijd
ranglijst grafiek — rang over tijd
gesorteerde stroom — rang en grootte over tijd
warmte kaart — kleur als waarde
netwerk diagram — relaties + hiërarchie
risico grafiek — risico weergeven
spreidingsdiagram — correlatie
dendrogram — clusters
zonnestraal — geneste subgroepen
koorde diagram — relaties en aantal
bellen diagram — niet aangeraden

Gebruik deze grafiek om te: onderzoeken · communiceren · monitoren · verwarren

2) Ontwerp je grafiek

Laat de data spreken!

wel doen

Laat de context zien
Sorteer je data in een betekenisvolle volgorde
betekenisvolle sortering

Verrijk je grafiek met een doel of een criterium, zodat de waardes meer betekenis krijgen
doel of criterium

Makkelijk vergelijken
Zijn er meer dan 4 reeksen, zet je grafiek dan om in meerdere kleine grafieken.
meerdere kleine grafieken

Rasterlijnen maken het makkelijker om de lengte de balken te vergelijken en helpen de steilheid van lijnen te zien.
rasterlijnen

Visuele hiërarchie
Maak de assen, aslabels, gridlijnen e.d. grijs, zodat de data het meeste opvalt in de grafiek.
minder is meer

Benadruk de belangrijkste balk of lijn, zodat deze opvalt.
benadruk

Laat zien en leg uit
Benoem in de titel wat de grafiek laat zien.
beschrijvende titel

Gebruik labels en commentaar in je grafiek om je data een verhaal te laten vertellen.
commentaar

niet doen

Misleidend ontwerp
Een afgekapte Y-as in een staaf- of kolomgrafiek vervormt de relatieve lengte van de balken
afgekapte Y as

Meerdere Y-assen geven een valse betekenis aan lijnen die kruisen of aan de ruimte tussen lijnen.
meerdere Y assen

Schoonheid boven accuratesse
Gebruik geen 3D om een grafiek mooier te maken. Het aflezen wordt er moeilijker en verwarrender door.
3D effect

Hoewel vloeiende lijnen er mooier uitzien, geven ze de gegevens niet correct weer.
vloeiende lijnen

Veel te veel
Het menselijk brein kan maximaal vier series in een grafiek verwerken.
meer dan 4 series

Geef dingen die hetzelfde zijn, ook dezelfde kleur. Onnodig kleurgebruik leidt af.
te veel of onnodig kleurgebruik

Moeilijk te lezen
Toon zo min mogelijk decimalen en toon altijd hetzelfde aantal decimalen.
te veel details

Tekst en getallen die niet horizontaal zijn uitgelijnd, zijn moeilijk te lezen.
niet horizontaal uitgelijnde tekst

Deze gratis mini poster is als PDF te downloaden op www.Chart.Guide/poster
Copyright, poster en grafiekontwerp: www.Chart.Guide - Poster versie 4.0.2

1) Choose your chart

What would you like to show?

categories | time | part to whole | distribution | geospatial | relationship | exact value

barchart — one measure
grouped bar — two variables
diverging stacked bar — opposing variables
deviation bar — delta between
floating bar — delta between
stacked bar — one category + total
panel bar — multiple categories
lollipop — like bar but thinner
dumbbell — two groups
proportional — sizing
x/y coordinate plot — measure combination
vertical waterfall — visual calculation
bullet graph — bad/ok/good
parallel coordinate — multivariate data
pictograph — using icons
wordcloud — not recommended
radial column — not recommended
radial bar — not recommended
radar chart — not recommended
gauge — not recommended

line chart — continuous time
dot-line chart — aggregated in time
area chart — one measure
column chart — one measure
stacked column — like column + total
stacked area — like area + total
deviation column — above or below target
deviation line — versus cumulative target
waterfall — change in time
timeline — order of events
sparklines — mini trend
slopegraph — two time stamps
dot plot — before and after
cycle plot — repeating time series
horizon graph — high and low

100% stacked bar — one categorie = 100%
100% stacked column — one timestamp = 100%
100% stacked area — continuous time = 100%
100% bar chart — adding up to 100%
100% stacked bar — category in time
100% stacked column — multiple categories
Sankey diagram — flow
waffle chart — 100 blocks filled
tree map — nested part to whole
100% waterfall — breakdown
parallel set — part to multiple whole
Marimekko chart — plus extra variable
nested area — parts inside other parts
Pareto chart — 80 / 20 analysis
pie chart — not recommended
donut chart — not recommended

funnel chart — conversion
Venn diagram — overlapping
flow chart — step by step
Gantt chart — planning
organization chart — hierarchical
arc diagram — relations
bump chart — rank over time
sorted stream graph — rank + size over time
heatmap — use color to show
network diagram — relations + hierarchie
risk map — visualizing risk
scatterplot — correlation
dendrogram — clustering
sunburst — nested groups
chord diagram — relations
bubble — not recommended

dot matrix — frequency count
age distribution — two categories
histogram — per interval
frequency polygon — distribution
error bars — uncertainty
box plot — with median
violin — box plot + density
ridgeplot — distributions over time

route map — direction
symbol map — classes
flow map — movement
chloropeth map — value by region
isopleth map — value by area
dot map — distribution
hexbin map — value by hex
bubble map — not recommended
chart on map — not recommended

number — single big number
table — multiple numbers
deviation box — focus on delta
in bar labeling — more accuracy

Use this chart for: analysing | communicating | monitoring | confusing

2) Design your chart

Let your data speak

do's

Show in context
Rank your data in a relevant way so patterns and outliers became visible.
relevant ranking

Enrich you chart with target or benchmarks, to give the values more meaning.
target or benchmark

Support easy comparison
When you have more than 4 series, change you chart to small multiples.
small multiple

Gridlines make it easier to compare length of columns and bars and help to see the steepness of lines.
gridlines

Visual hierarchy
De-emphasize all non-data elements like axis and legend. The data is more important.
less is more

Highlight the most important element, to make it stand out.
emphasize

Show and tell
Create a title to name the insight in the chart.
descriptive title

Labels and annotation help your data to tell a story.
annotation

don'ts

Misleading design
A truncated axis in a column or bar-chart distorts the relative size of the columns
cutting of Y axis

Multiple Y-axis give a false meaning to lines crossing or to the space between lines.
multiple Y axis

Beauty over accuracy
Do not use 3D to make a chart prettier, it will make it harder and more confusing to read.
3D effect

Although fluid lines might look nicer, they are not representing the data properly.
fluid lines

Too much
The human brain can only process a maximum of 4 series in a chart.
more than 4 series

Things that are the same, should have the same color
too much or meaningless color

Hard to read
Show as little decimals as possible.
Always show the same number of decimals.
too much details

Text and numbers that are not horizontal aligned are harder to read.
align text other than horizontally

Free miniposter as PDF available at www.chart.guide/post
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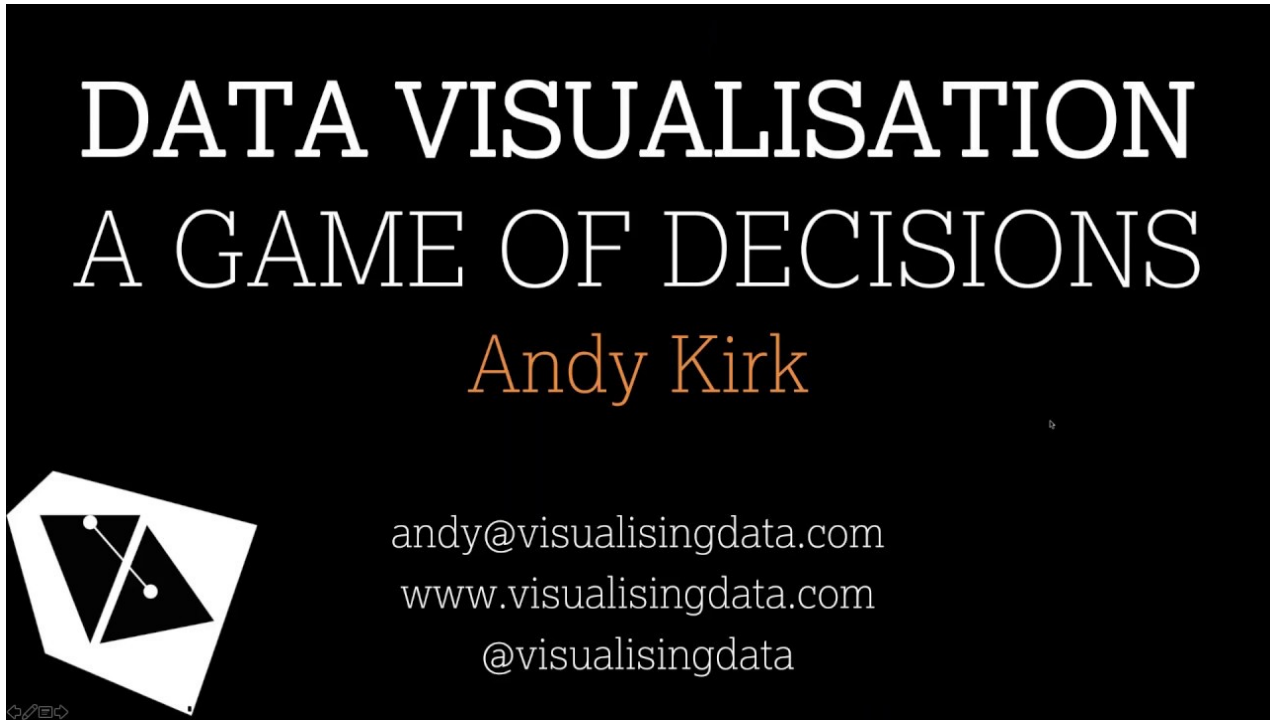
project 3 - resources

Video’s

Video's

Andy Kirk about understanding properties and Qualities

https://www.youtube.com/watch?v=GVkXbQOzKNs



Video

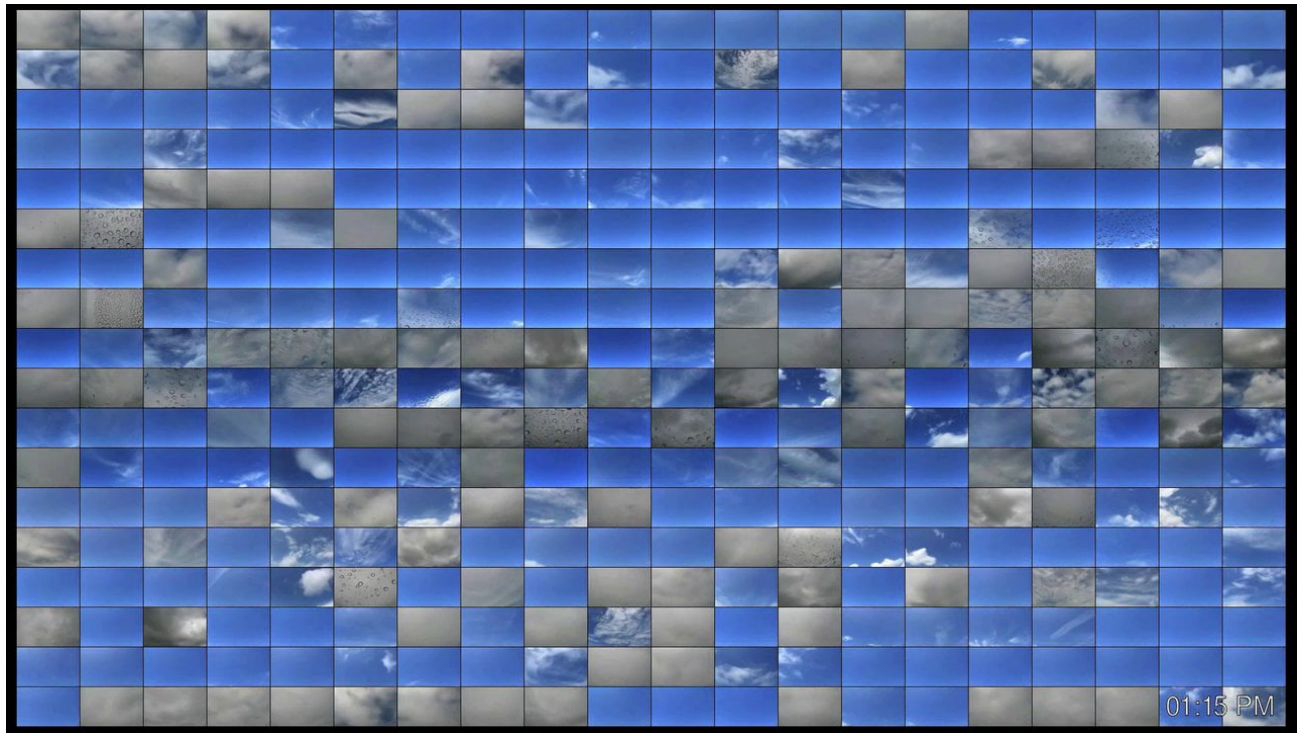
Nicholas Felton - Transforming data into meaningful stories - Photovis

https://www.youtube.com/watch?v=bVEIMtpARPI

Video's

Example: photographs of the sky from a specific location and time.
These have also been combined into a video:

https://vimeo.com/32095756



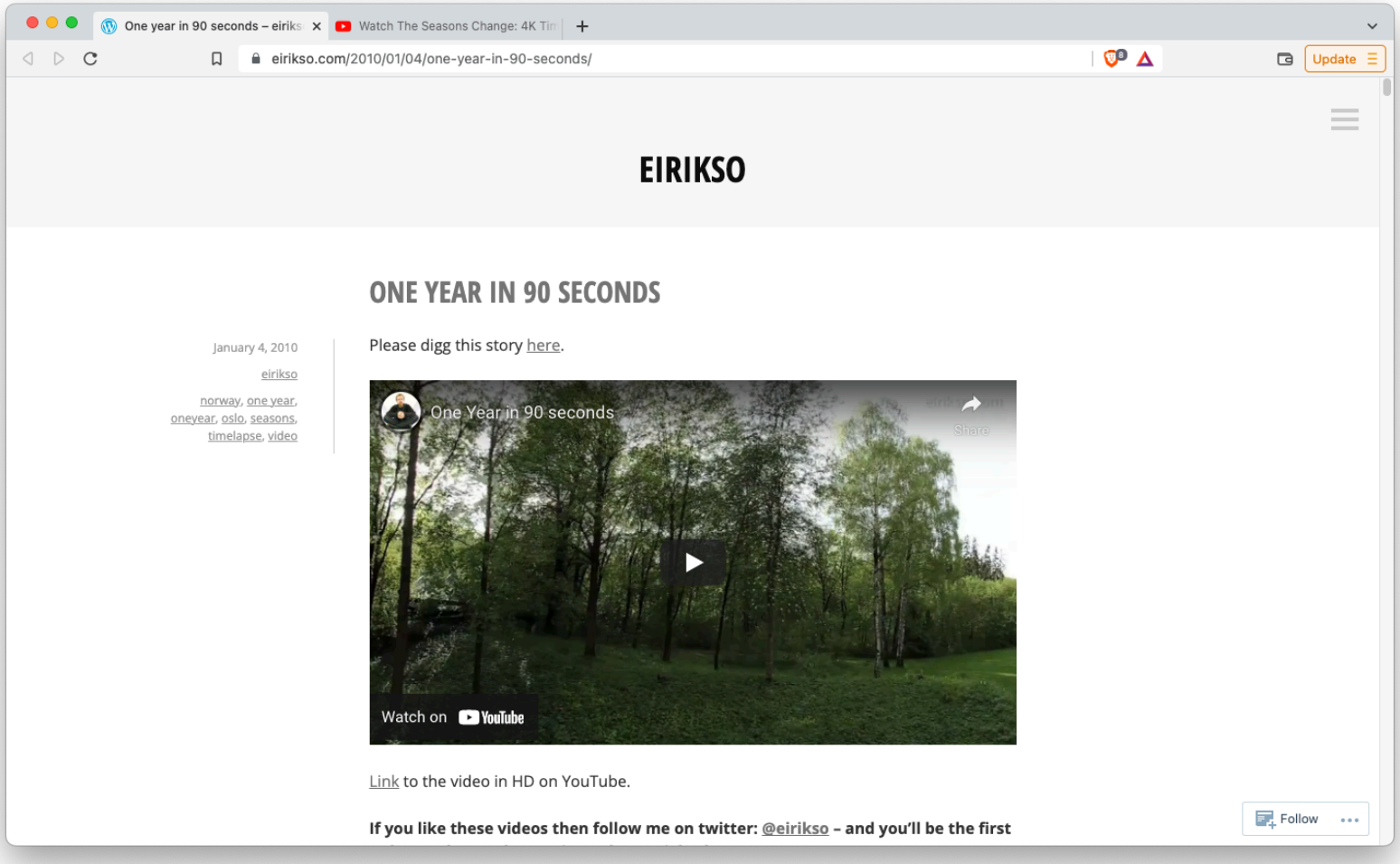
Video

One year in 90 seconds - Eirik Solheim

https://www.youtube.com/watch?v=KBtdGalL-QE

Website

https://eirikso.com/2010/01/04/one-year-in-90-seconds/



project 3 - resources

Theory

About measurement & data tables

What do we mean by measurement?

‘Measurement is the representation of relations between objects, persons or groups on a certain property by using relations between numbers.'

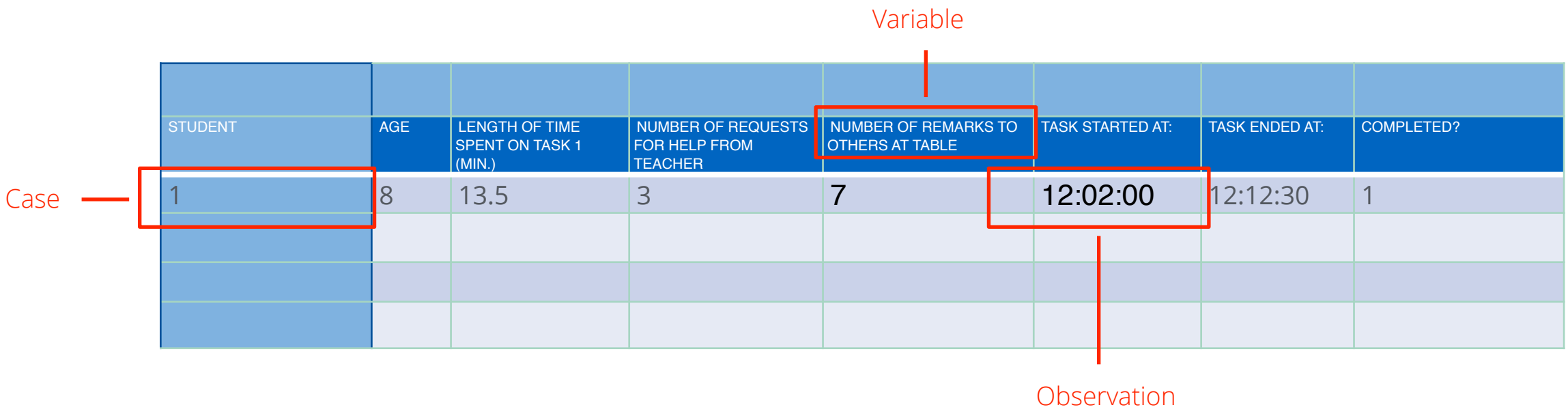
- Source: Solid Science: Research Methods by Annemarie Zand Scholten, UvA

Look at real-life situations and ask: what can be measured here?

Constructing a data table

Children working on school assignment

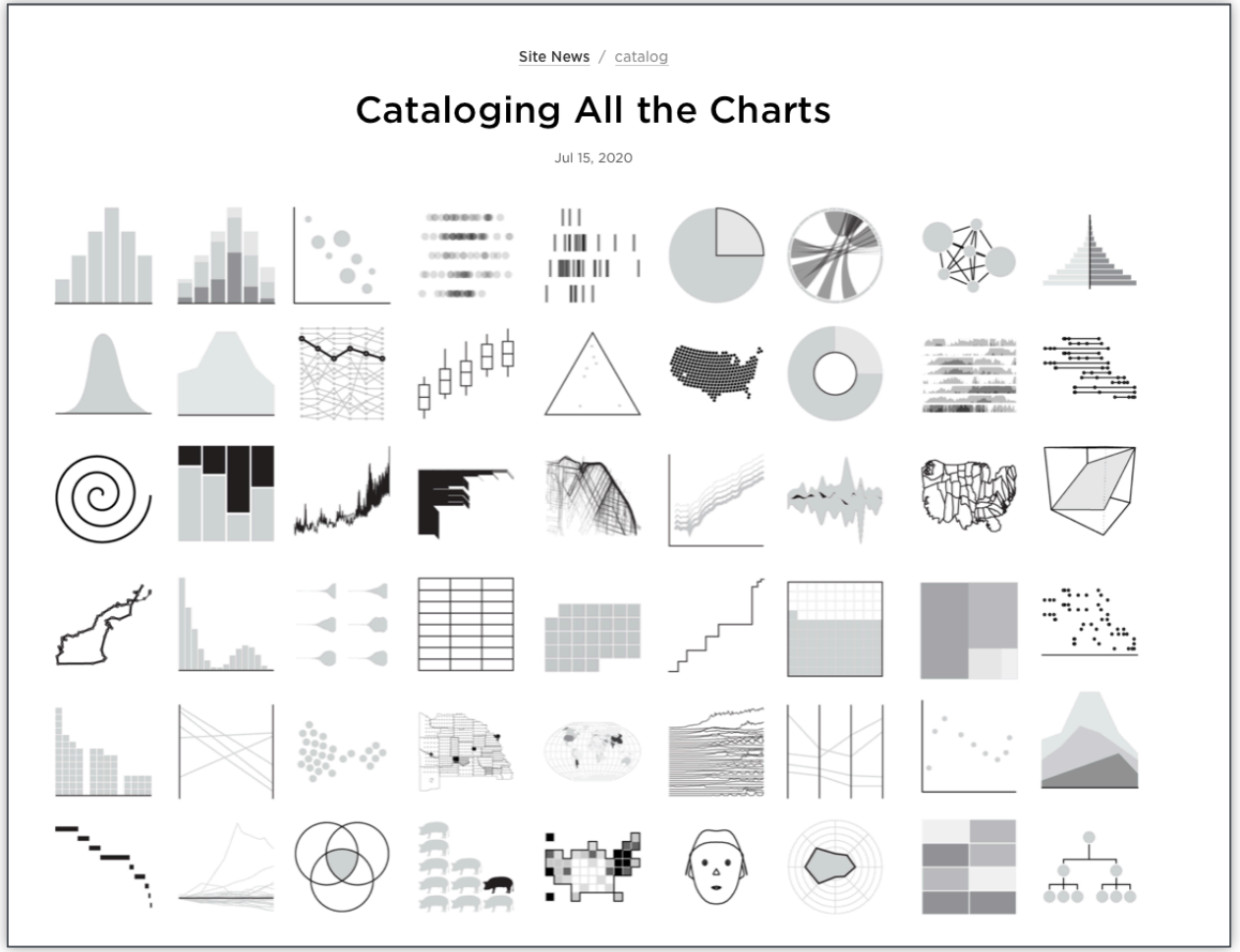
Metadata: which class, school, etc.



STUDENT	AGE	LENGTH OF TIME SPENT ON TASK 1 (MIN.)	NUMBER OF REQUESTS FOR HELP FROM TEACHER	NUMBER OF REMARKS TO OTHERS AT TABLE	TASK STARTED AT:	TASK ENDED AT:	COMPLETED?
1	8	13.5	3	7	12:02:00	12:12:30	1

Type fiets: 1 = krat; 2 = race; etc.

About chart types

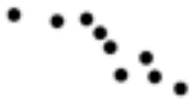

Site News / catalog
Cataloging All the Charts
Jul 15, 2020

Hogeschool van Amsterdam

The perfect graphic

deperfectegrafiek.nl

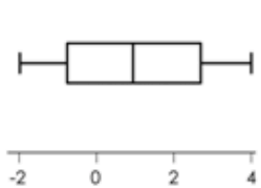
Visual Cues

Patterns	Position	Length	Angle	Direction	Area or Volume	Color
Increase						
Decrease						
Combination						
Outlier						
Noise						

Distribution Summary

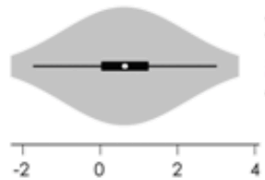
You can visualize data at different granularities with the charts above. These show key values for a less specific view of distributions.

Box plot



Shows range, median and quartiles

Violin plot

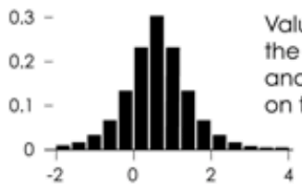


A combination of a box plot and density plot

Distribution of one variable

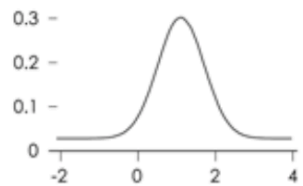
You can see where data is clustered and see any outliers by keeping track of where they sit on a value axis.

Histogram



Value axis on the horizontal and density on the vertical

Density plot

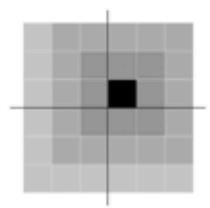


Like histogram but continuous instead of bins

Distribution of multiple variables

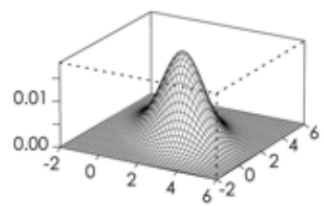
Sometimes values come as pairs, and it makes sense to show both values at the same time.

Heat map



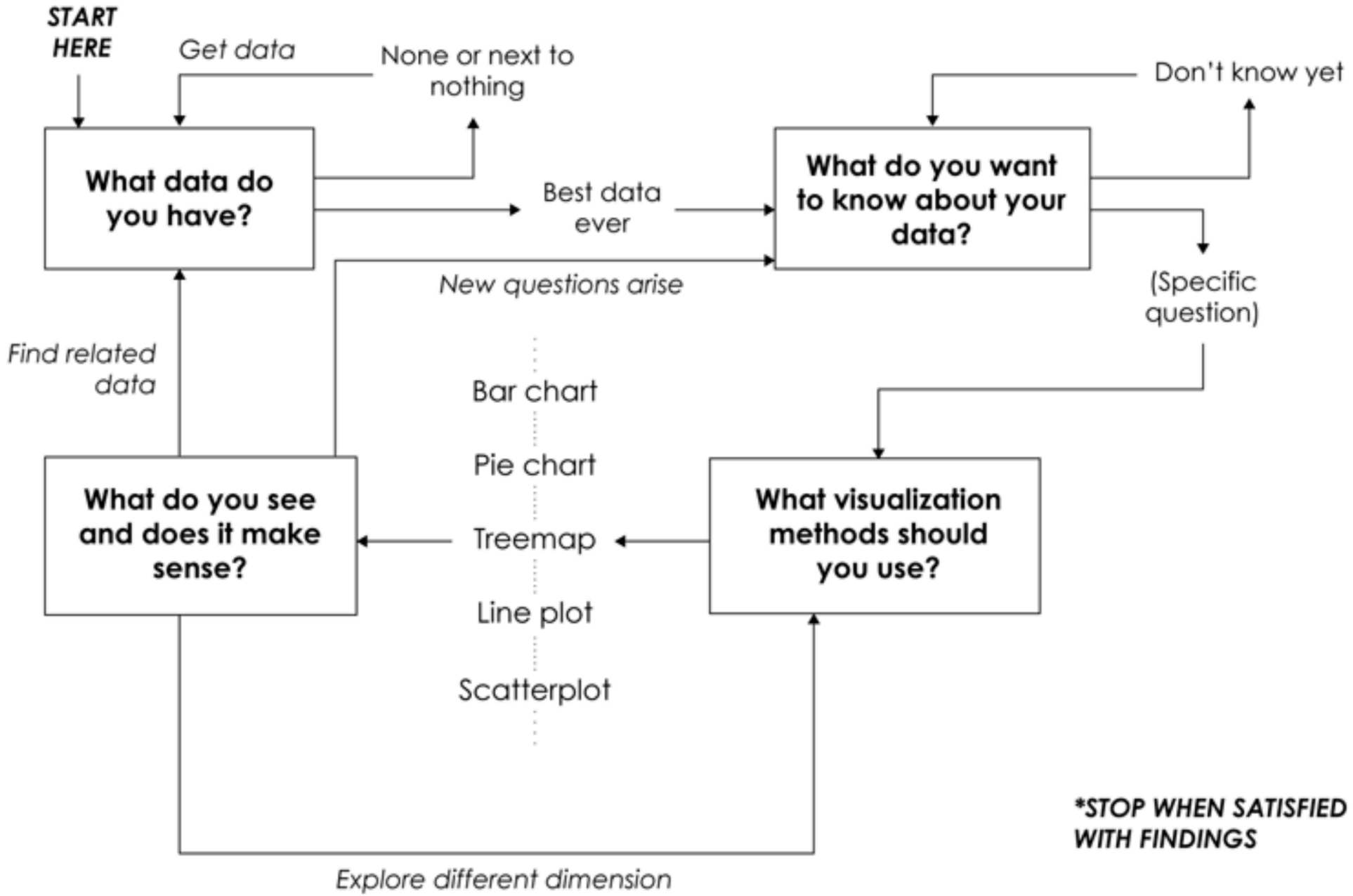
Density on a a 2-D plane, using color as visual cue

Surface plot



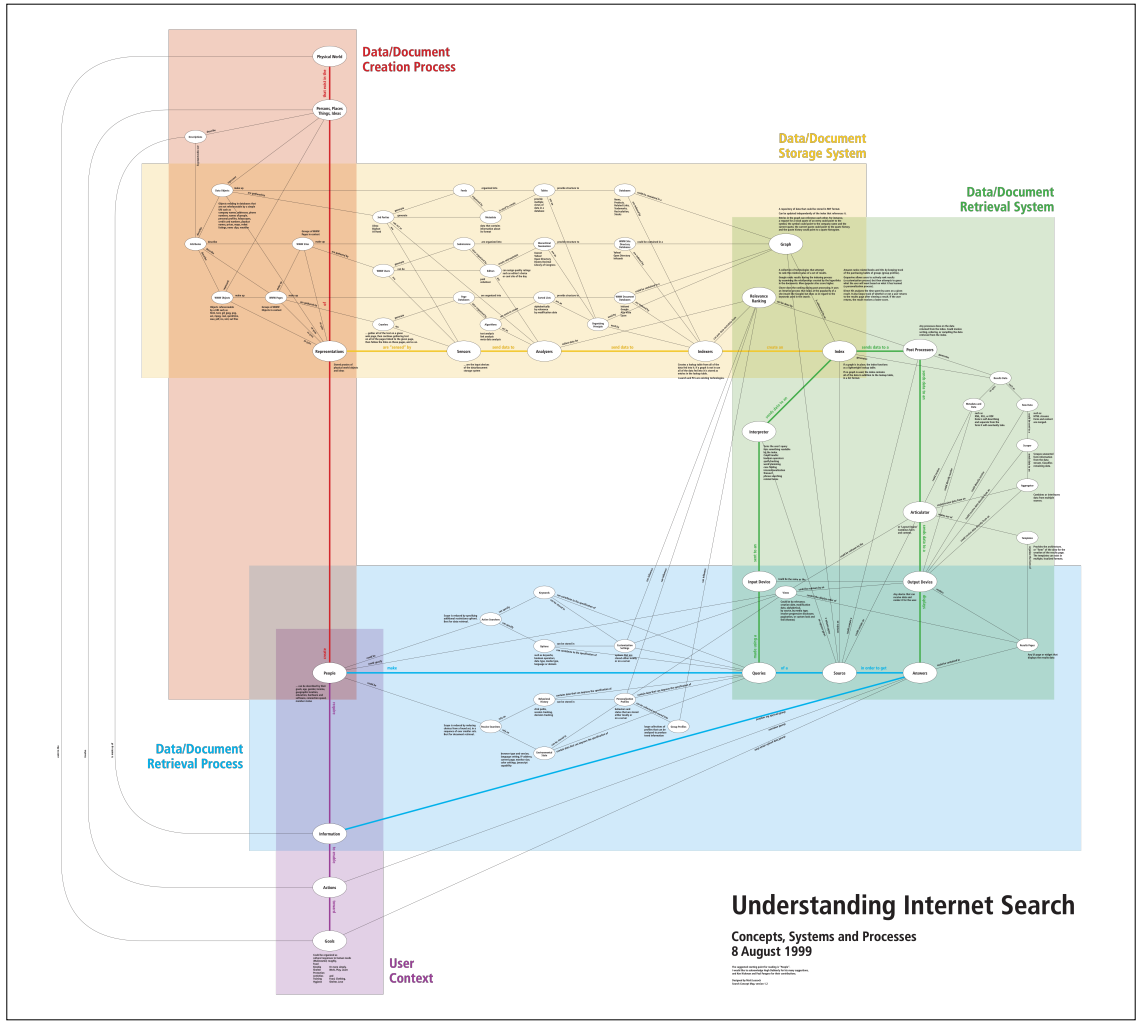
Shows same patterns as heat map, but uses height instead of color

About process


START HERE
Get data
None or next to nothing
What data do you have?
Best data ever
What do you want to know about your data?
Don't know yet
(Specific question)
New questions arise
Find related data
Bar chart
Pie chart
Treemap
Line plot
Scatterplot
What do you see and does it make sense?
What visualization methods should you use?
Explore different dimension
*STOP WHEN SATISFIED WITH FINDINGS

Examples

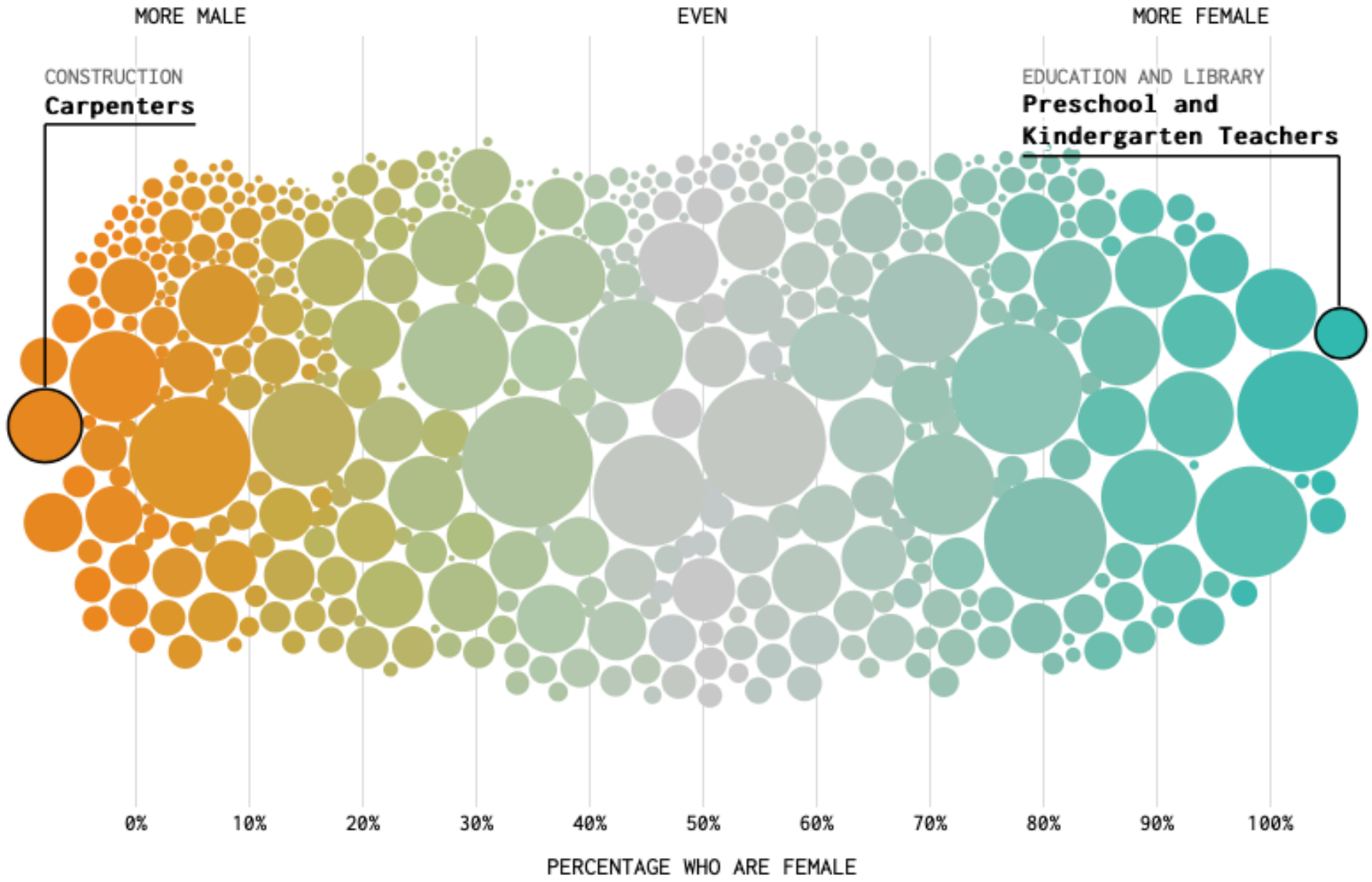
Hogeschool van Amsterdam



Dubberly Design Office: concept map

MALE AND FEMALE OCCUPATIONS IN 2015

Larger circles represent more common jobs.



INCOME AND EXPENDITURE OF 150 NEGRO FAMILIES IN ATLANTA, GA., U.S.A.

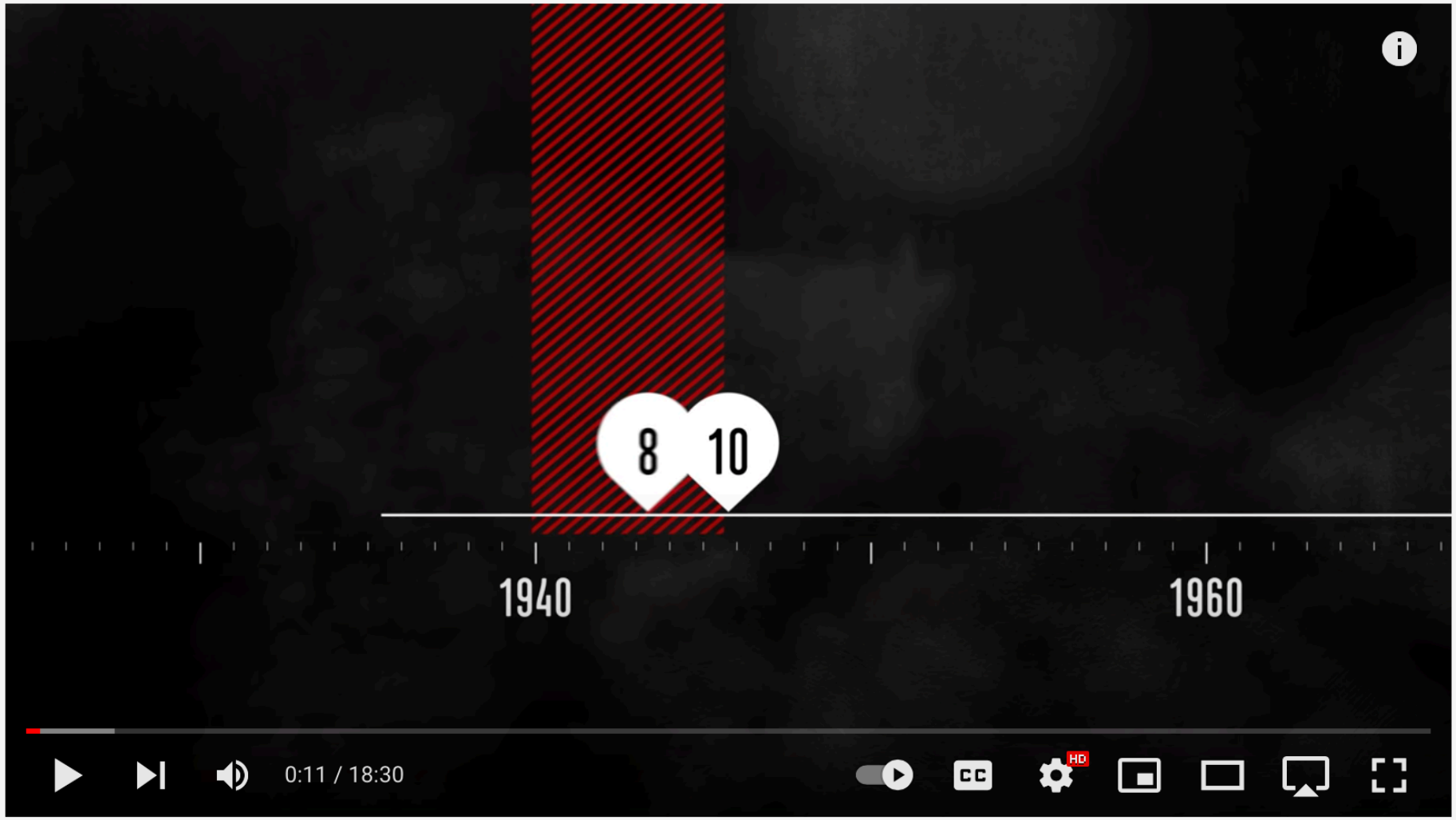
ANNUAL INCOME.

ANNUAL EXPENDITURE FOR

RENT.	FOOD.	CLOTHES.	DIRECT TAXES.	OTHER EXPENSES AND SAVINGS.
	DIETARY OF WELL-TO-DO NEGRO FAMILY FROM BULLETIN U.S. DEPARTMENT OF AGRICULTURE NO 71.		THE STATE TAX RATE IS: 1880 – $3.50 PER $1,000 1895 – $3.50 .. .. 1890 – $3.98 .. .. 1895 $4.56 .. .. 1899 $5.38 .. .. STATE AND COUNTY TAXES RAISE THIS TO $21 PER $1,000 IN ATLANTA.	THE HIGHER LIFE. RELIGION. ART. EDUCATION. SICKNESS. SAVINGS. AMUSEMENTS. BOOKS AND PAPERS. TRAVEL.

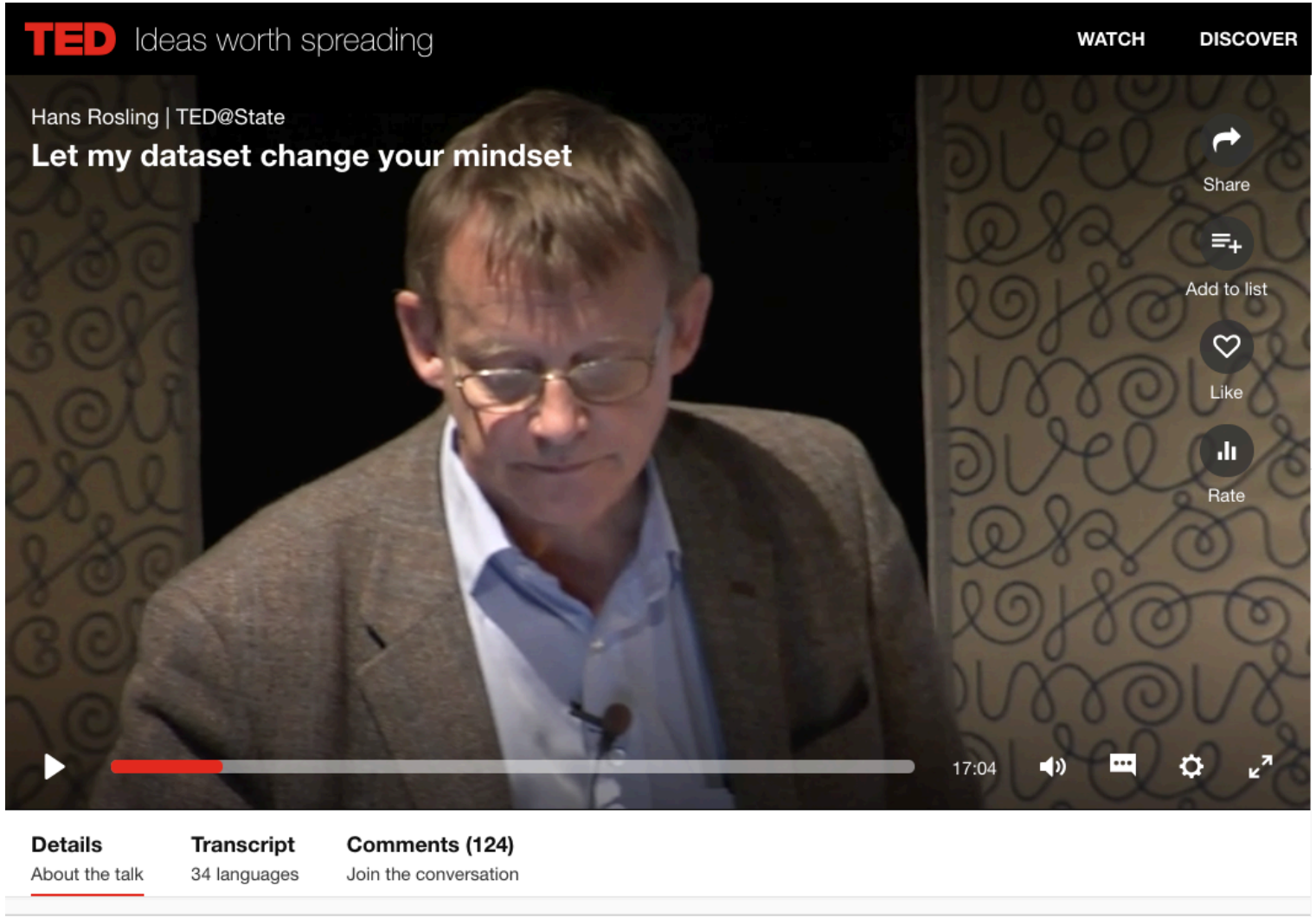
CLASS.	ACTUAL AVERAGE.						
$ 100-200	$ 138.10	19%	43%	28%	9.9%		
$ 200-300	$ 248.45	22%	47%	23%	4%	4%	POOR.
$ 300-400	$ 335.66	23%	43%	18%	4.5%	11.5%	FAIR.
$ 400-500	$ 433.82	18%	37%	15%	5.5%	24.5%	
$ 500-750	$ 547	13%	31%	17%	5%	34%	COMFORTABLE.
$ 750-1000	$ 880	37%	19%	8%	36%		
1,000 AND OVER	$ 1125	29%	16%	4.5%	50.5%		WELL-TO-DO

FOR FURTHER STATISTICS RAISE THIS FRAME.

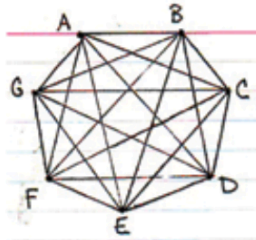


The Fallen of World War II

Watch on youtube: https://www.youtube.com/watch?v=DwKPFT-RioU

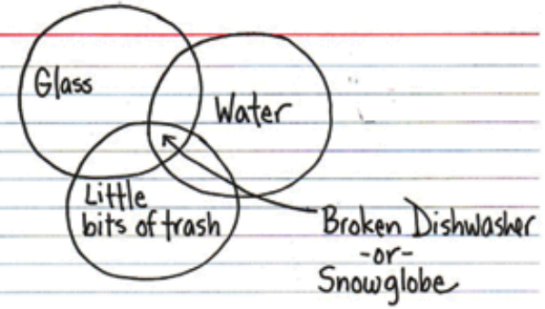


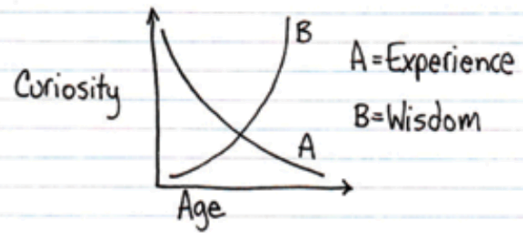
[Watch on TED: https://www.ted.com/talks/hans_rosling_at_state#t-153592](https://www.ted.com/talks/hans_rosling_at_state#t-153592)

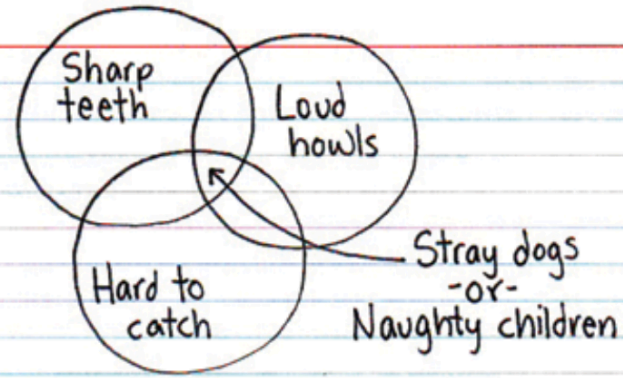


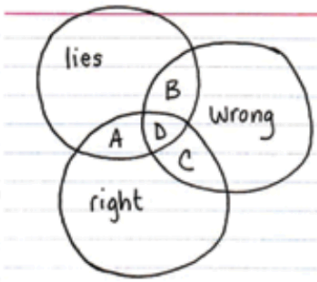
A = Lust
B = Gluttony
C = Greed
D = Sloth
E = Wrath
F = Envy
G = Pride

$\overline{AB}$ = Edible Undies
$\overline{AC}$ = Prostitution
$\overline{AD}$ = Quickie
$\overline{AE}$ = Domestic Abuse
$\overline{AF}$ = Adultery
$\overline{AG}$ = Trophy Wife
$\overline{BC}$ = Last Donut
$\overline{BD}$ = Saturday
$\overline{BE}$ = Bulimia
$\overline{BF}$ = High Metabolism
$\overline{BG}$ = Fat men in Speedos
$\overline{CD}$ = Get Rich Quick Scams
$\overline{CE}$ = Muggings
$\overline{CF}$ = Advertising
$\overline{CG}$ = Status Symbols
$\overline{DE}$ = Passive Aggression
$\overline{DF}$ = Welfare
$\overline{DG}$ = Slackers
$\overline{EF}$ = Cattiness
$\overline{EG}$ = Boxing
$\overline{GF}$ = 2nd Place

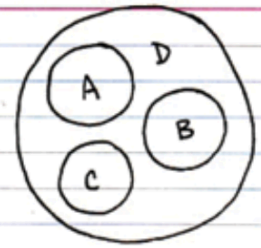




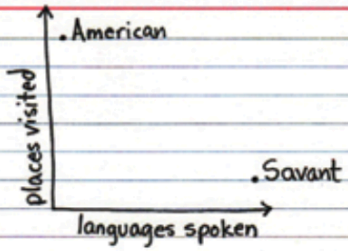


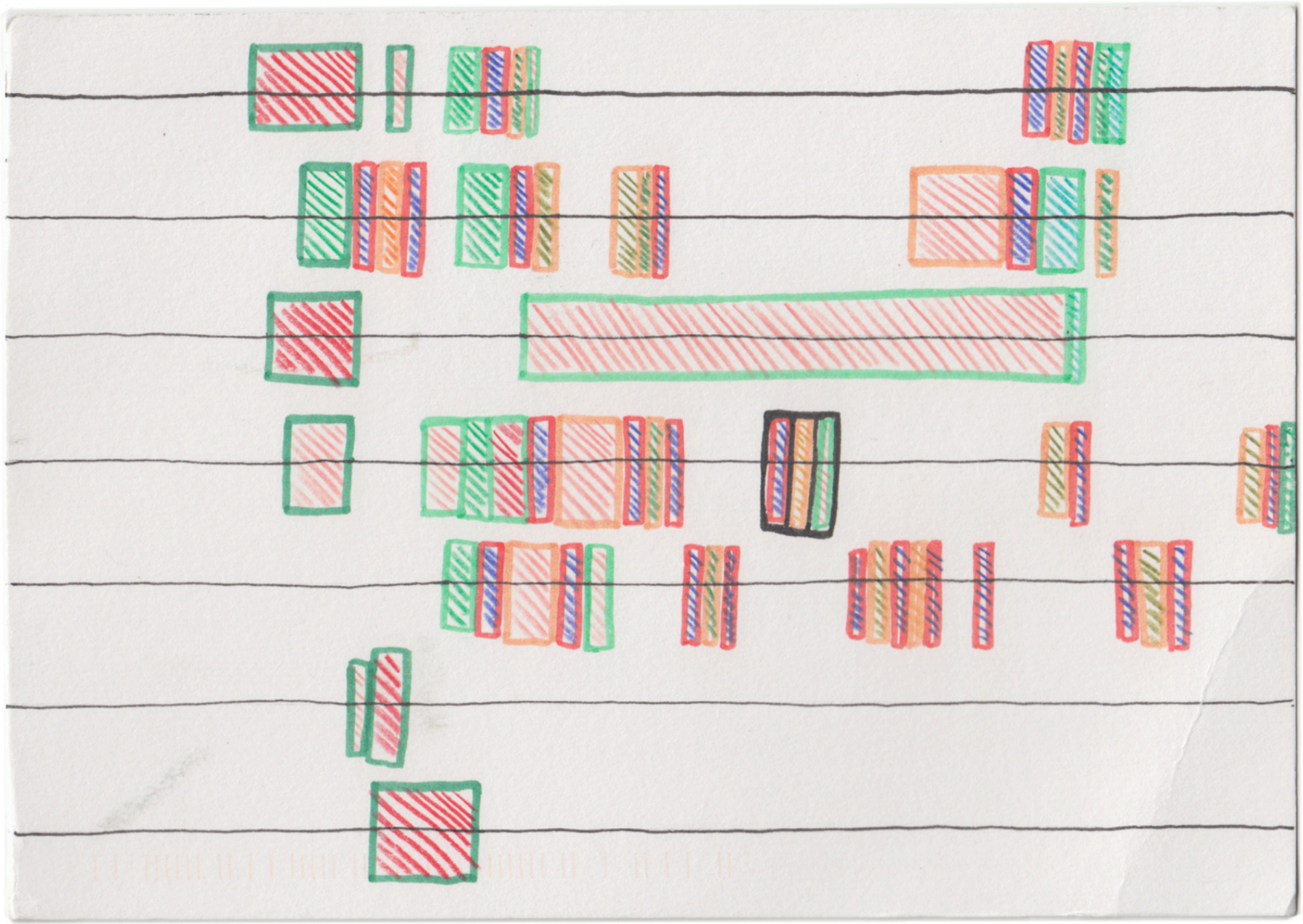


A = "You don't look fat at all"
B = "I'm not drunk, ocifers"
C = turning on red in London
D = "We're winning in Iraq"



A = Striptease
B = Limbo
C = Polka
D = Dances involving Poles



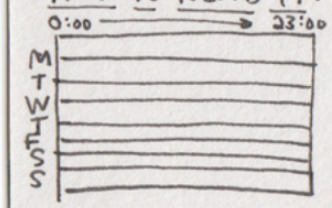


DEAR DATA - WEEK 30

A WEEK OF BEING ALONE

THE DATA: I COUNTED MOMENTS WHEN I WAS ALONE, ALONE BEING THAT I WAS IN A PLACE FILLED WITH STRANGERS OR IN A PLACE WHERE I WAS PHYSICALLY ALONE. I'VE ALSO DIFFERENTIATED BETWEEN BEING ALONE AND FEELING ALONE.

HOW TO READ IT:



EACH REPRESENTS A TIME I WAS ALONE.

THE WIDTH OF THE BAR INDICATES THE LENGTH OF TIME I WAS ALONE IN THIS PARTICULAR SITUATION, SCALED TO THE WIDTH OF THE CARD (= 24 HOURS.)

WAYS I WAS ALONE:

- IN HOUSE WITH HUSBAND ASLEEP
- PHYSICALLY ALONE IN A SPACE
- ALONE IN A SPACE FILLED W/ STRANGERS
- ALONE IN A CITY OF STRANGERS (OUTSIDE)
- THE ONLY TIMES I FELT EMOTIONALLY ALONE

WHAT I WAS DOING WHEN I WAS ALONE:

- EXERCISING
- SHOPPING
- WORKING
- DEAR DATA!
- WASTING TIME ON INTERNET
- MORNING/ EVENING ROUTINES
- WALKING
- TRAVELLING (PUBLIC TRANSPORT)
- BUYING/ PREPARING FOOD, GETTING COFFEE

TOP 3 ACTIVITIES I DID WHILE ALONE THIS WEEK:

1. WORK - 17:11 (I WORK FROM HOME WHEN I'M LAZY)
2. DEAR DATA - 6:56 (I GET UP EARLY TO DRAW)
3. WALKING - 5:46 (I WALK TO/FROM MY STUDIO)

FROM:
S POSAVEC

[redacted]
UK

Royal Mail
Mount Pleasant
Mail Centre
07-04-2015
44016000

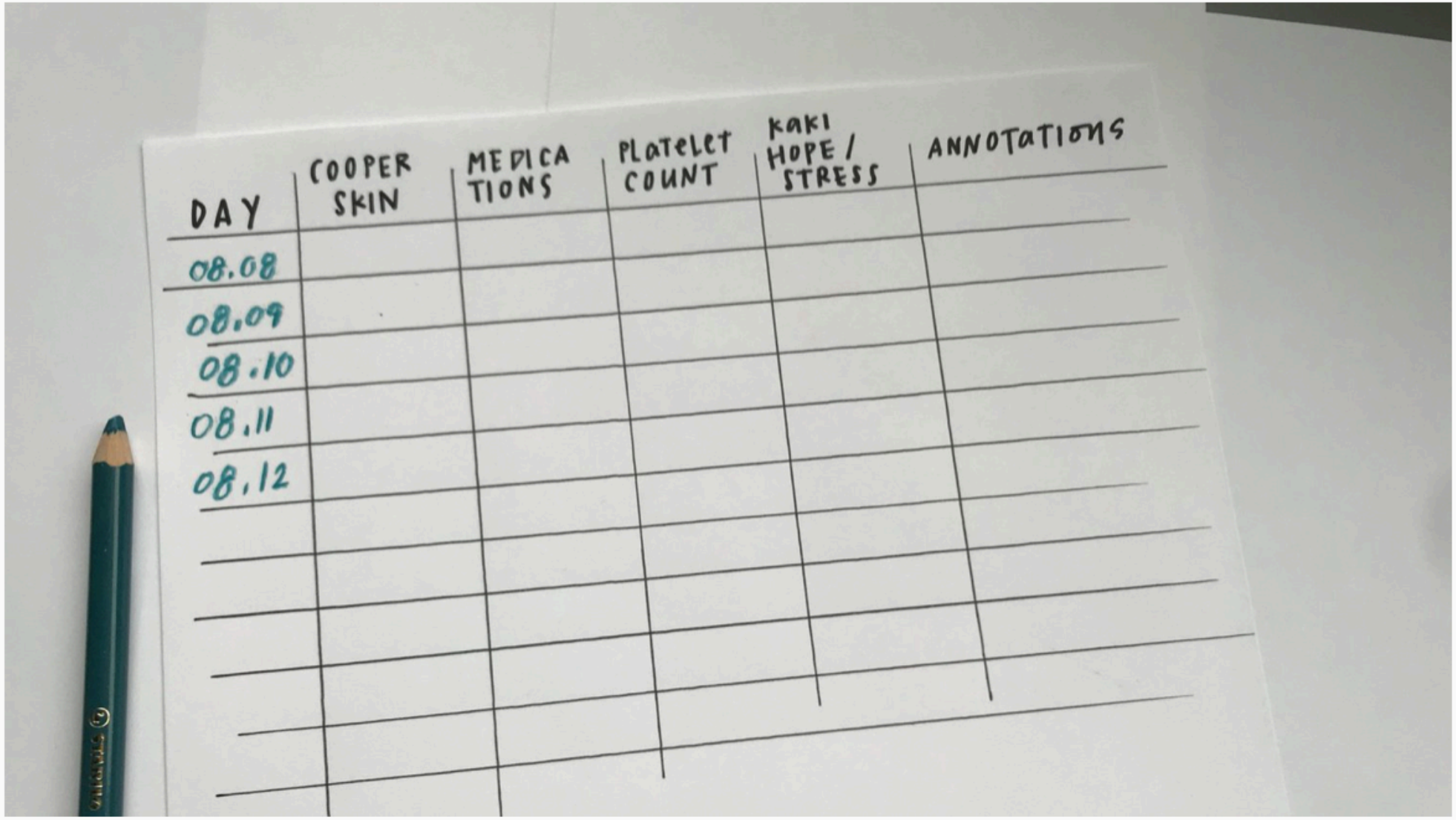
97p

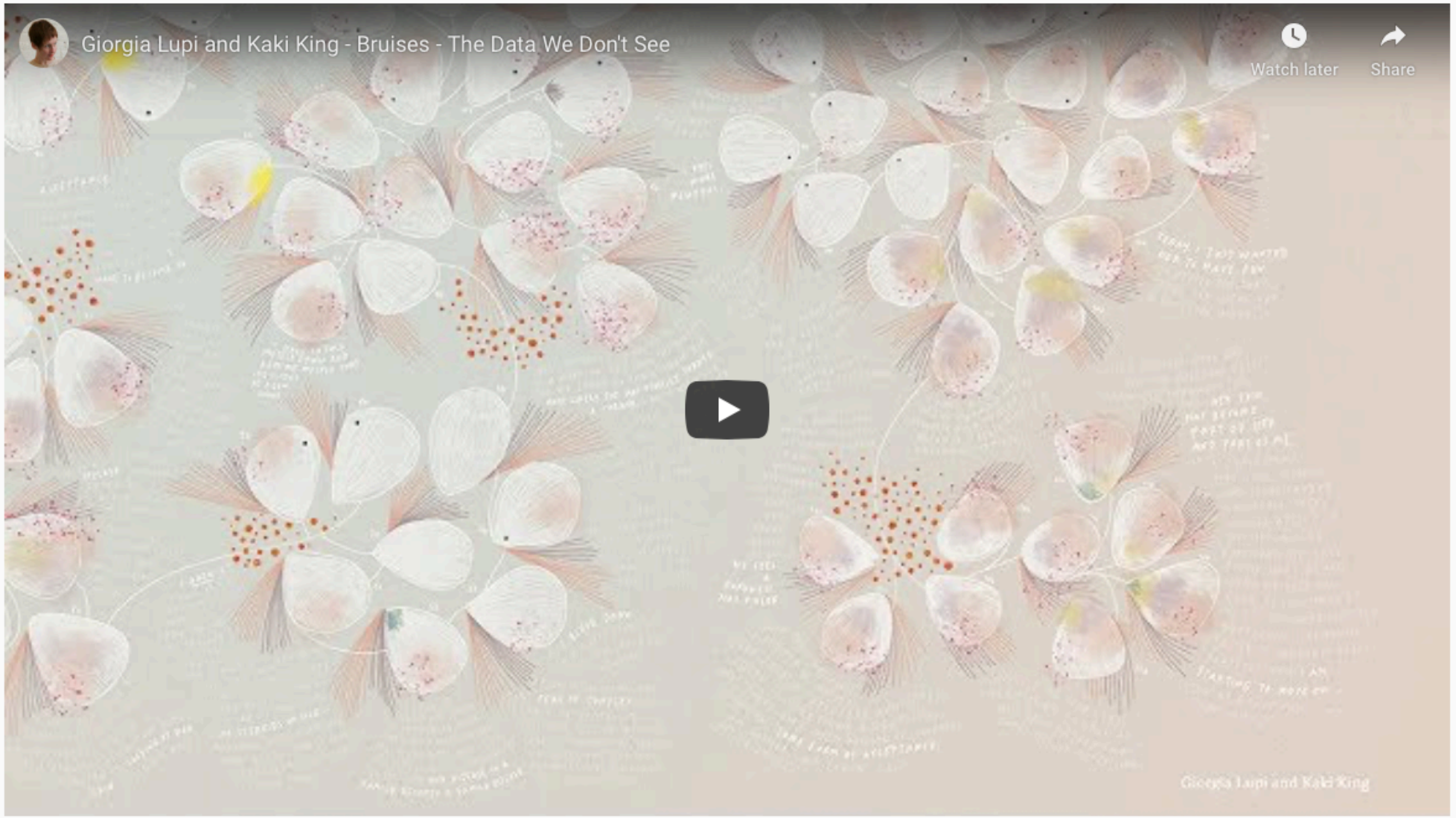
TO: GIORGIA LUPI

[redacted]
BROOKLYN, NY 11249
USA

BY AIR MAIL
par avion
Royal Mail®

"The doctor's directive to us was to watch her skin for any significant changes. Since I had been working with Giorgia I had learned to do personal data collection, so I began to write down what I was seeing on Cooper's skin, what activities we did that day, what treatments she had and what her reading were, as well as how I was feeling. My fear, stress, my hope. My thoughts and feelings."





Giorgia Lupi and Kaki King—**Bruises: The Data We Don't See**

Watch on youtube: https://www.youtube.com/watch?time_continue=205&v=QvxVWukROTw&feature=emb_title