

Datavisualisaties en infographics

*Het gaat niet om waar je naar kijkt,
maar om wat je ziet.*

Het Taalcongres, De Redactie

Amsterdam, 6 oktober 2022

Irene van den Broek, PhD

 @IrenevdBroek

 @JeBentWatJeMeet

 @IreneVDB

Hoi, ik ben Irene!

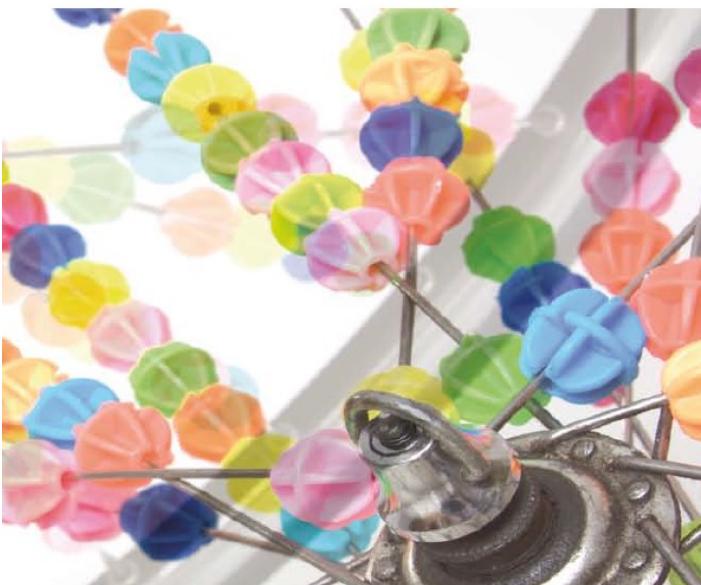


Irene van den Broek

irenevandenbroek@gmail.com

Ik heb een achtergrond in *biomedisch* onderzoek...

Liquid chromatography coupled to tandem mass spectrometry for the quantitative bioanalysis of bioactive and potential biomarker peptides



Irene van den Broek 2010



2005-2010
Universiteit Utrecht

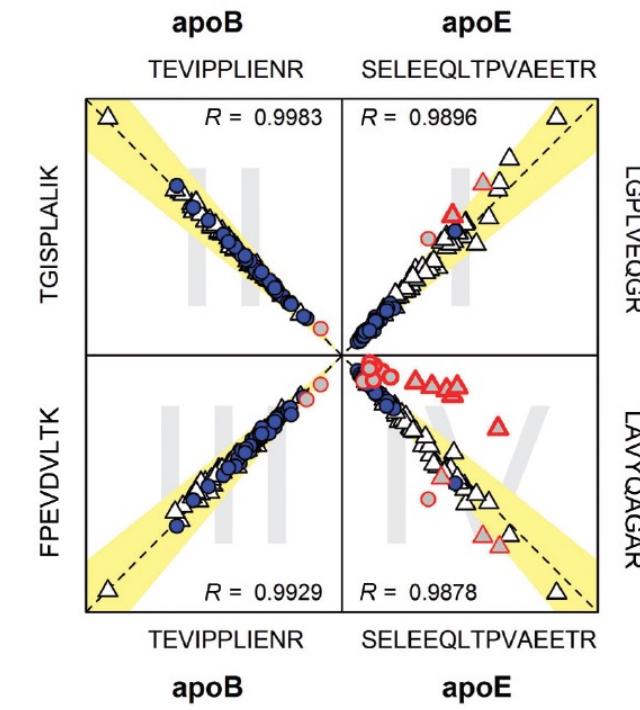
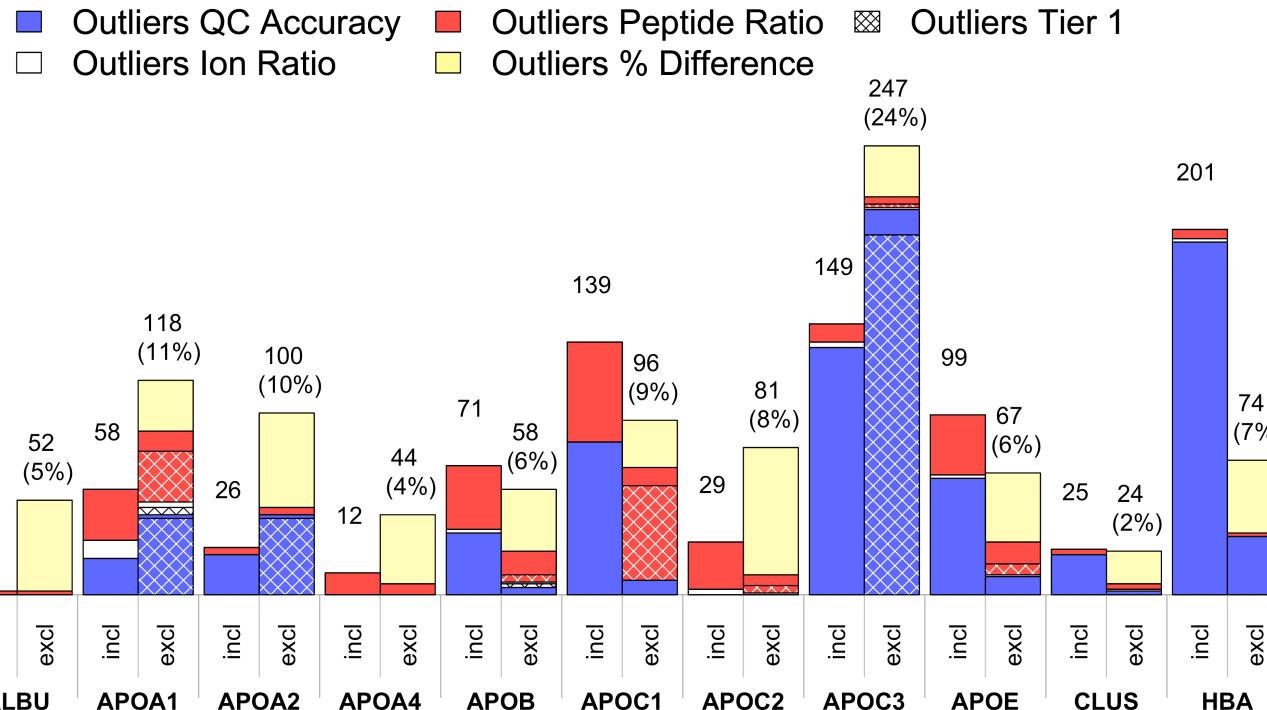


2013-2015
Leids Universitair
Medisch Centrum

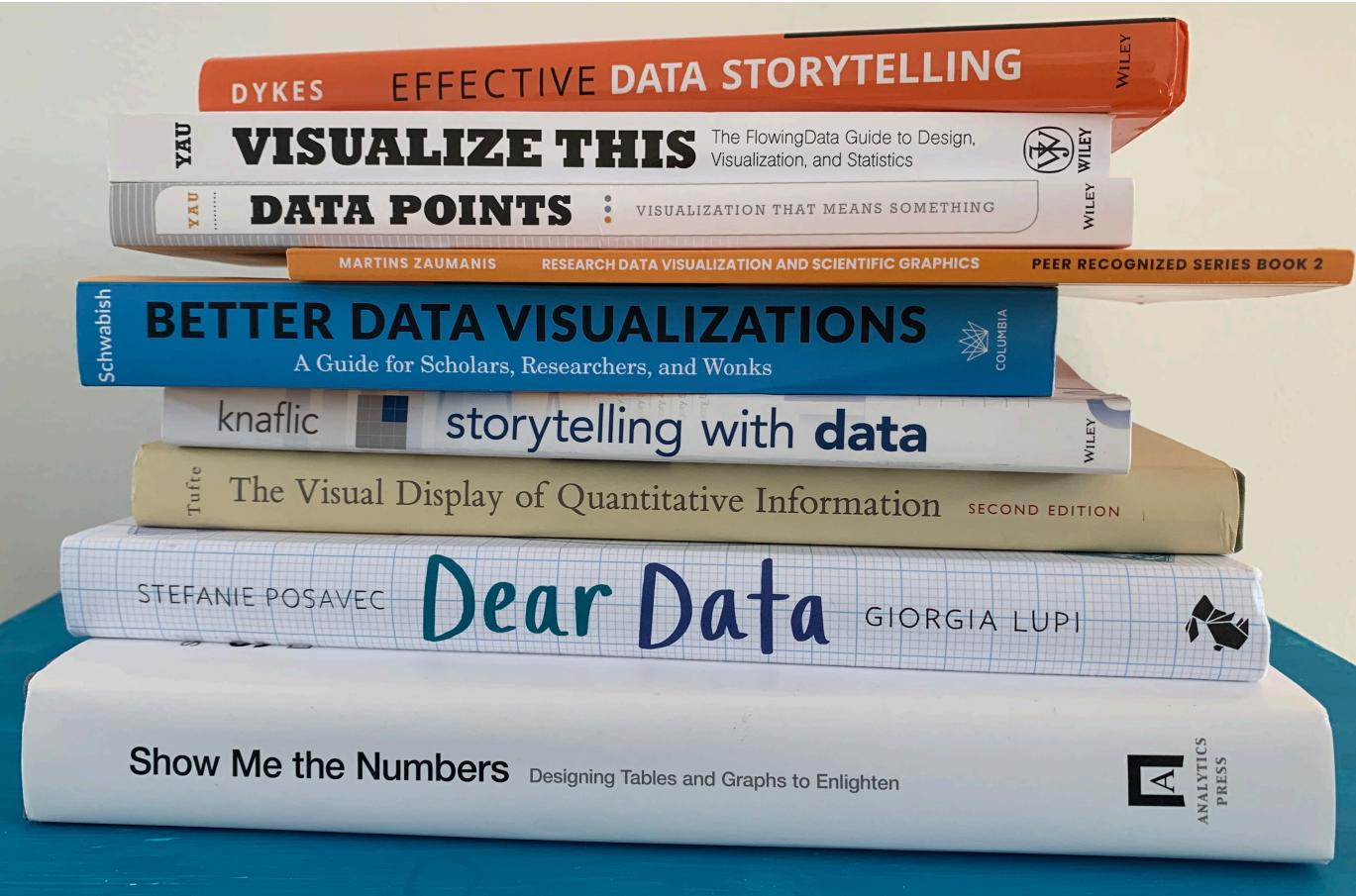


2015-2019
Cedars-Sinai
Medical Center

Ik was gek op het maken van figuren, het liefst zo *complex* mogelijk!

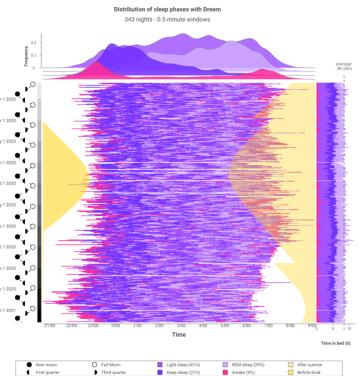


Toen ontdekte ik dat het visualiseren van data *een vak apart* is: Ik was verkocht!

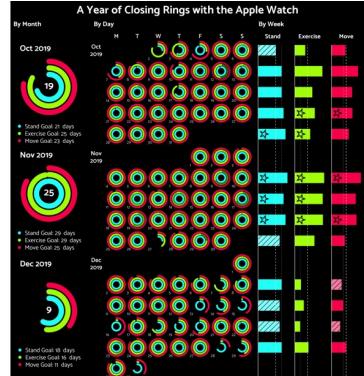


Ik begon mijn *Lijf* en *Leven* te visualiseren...

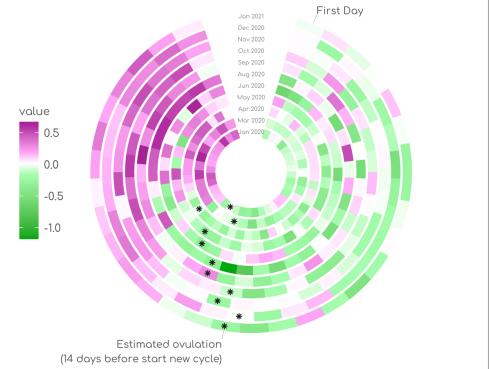
Slaap



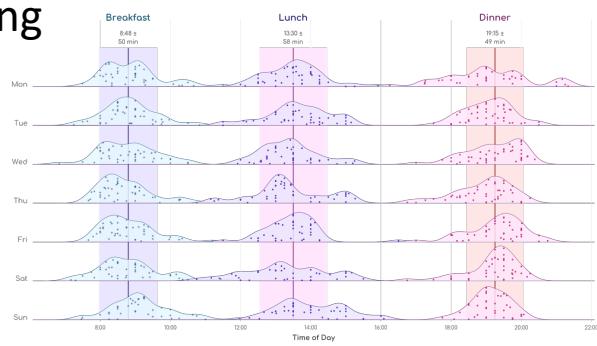
Beweging



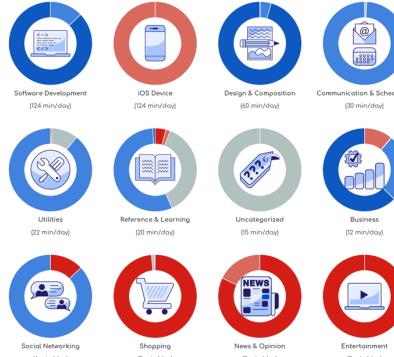
Lichaam



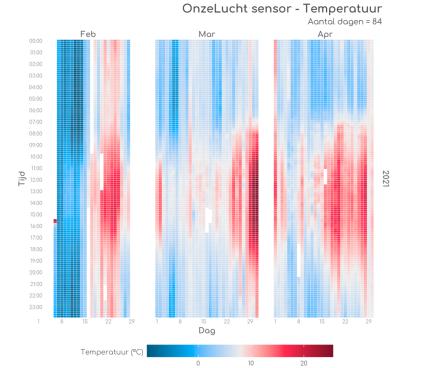
Voeding



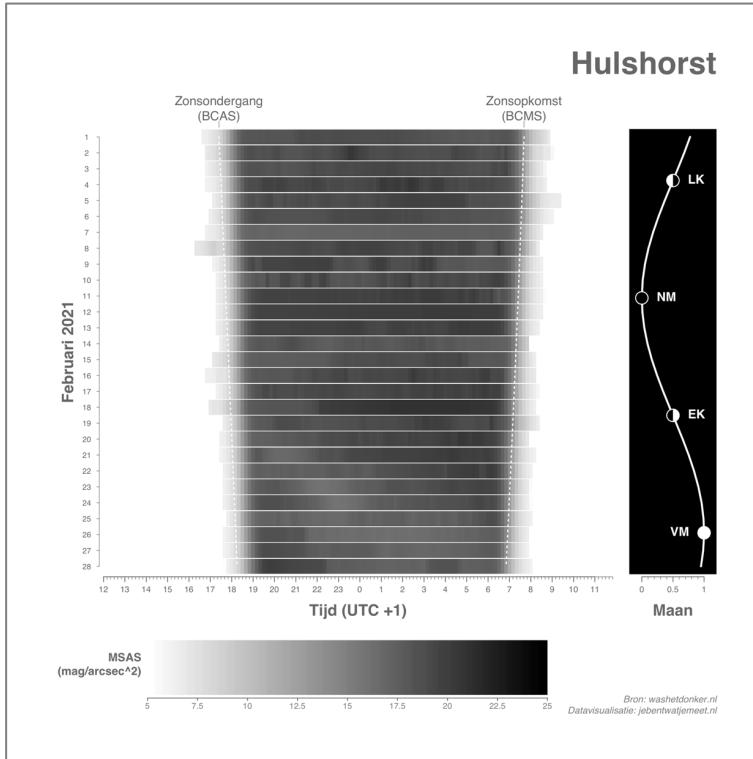
Gewoontes



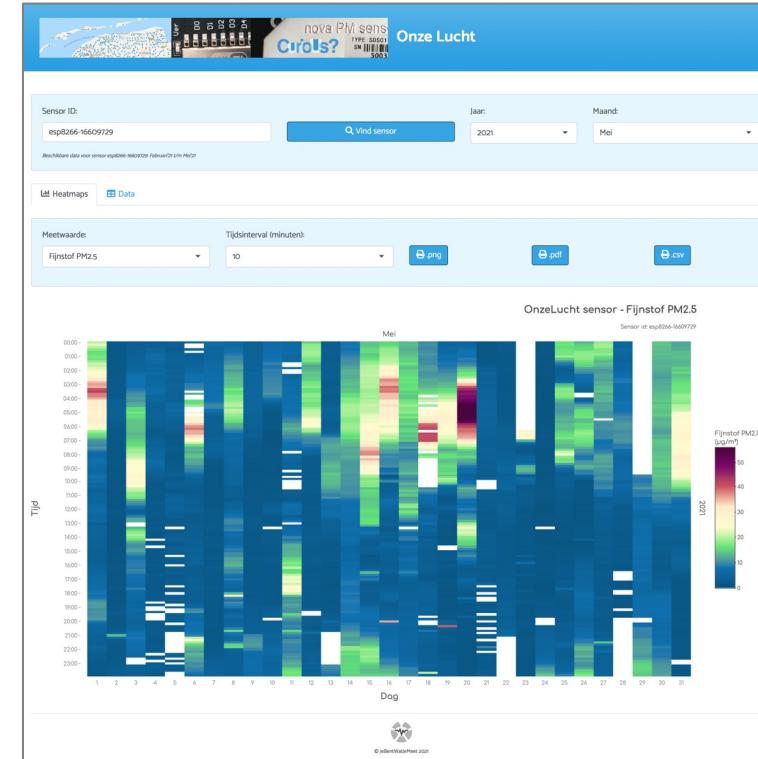
Omgeving



En maak datavisualisaties voor o.a. burgerwetenschapsprojecten...



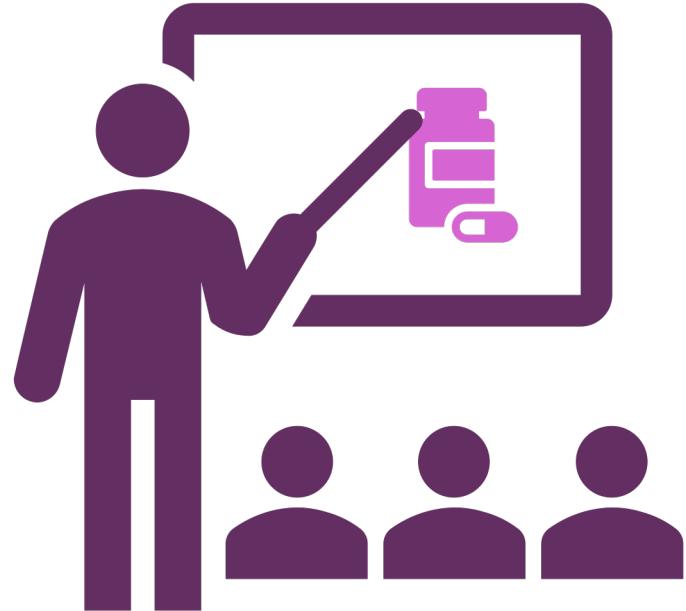
www.washetdonker.nl



www.onzelucht.nl

Het liefst combineer ik mijn beide passies...

voor onderwijs en...



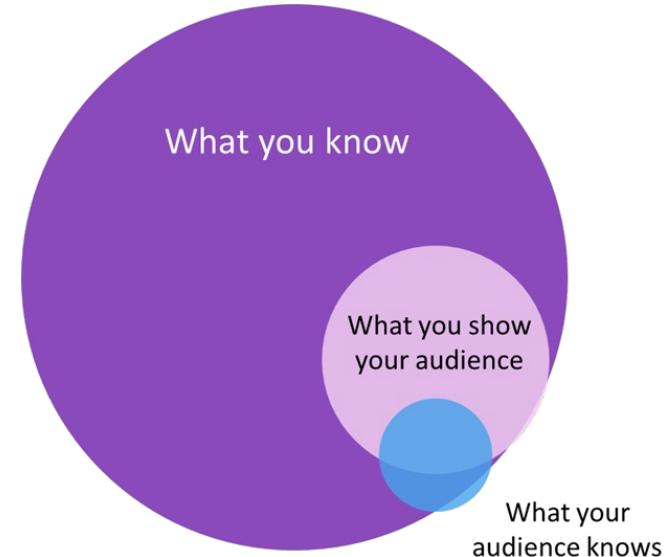
...data visualisatie!



...en deel ik wat ik zelf graag eerder had willen weten!



The curse of knowledge



Een overzicht van vandaag:

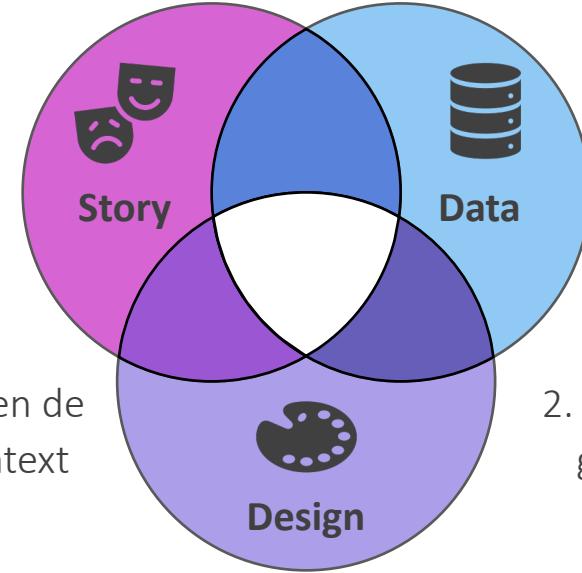
1

Waarom

Wat is visuele communicatie?

Hoe

2



1. Ken de context

2. Kies een grafiek

3. Optimaliseer visuele perceptie

Warming up!

En een beetje beweging ...

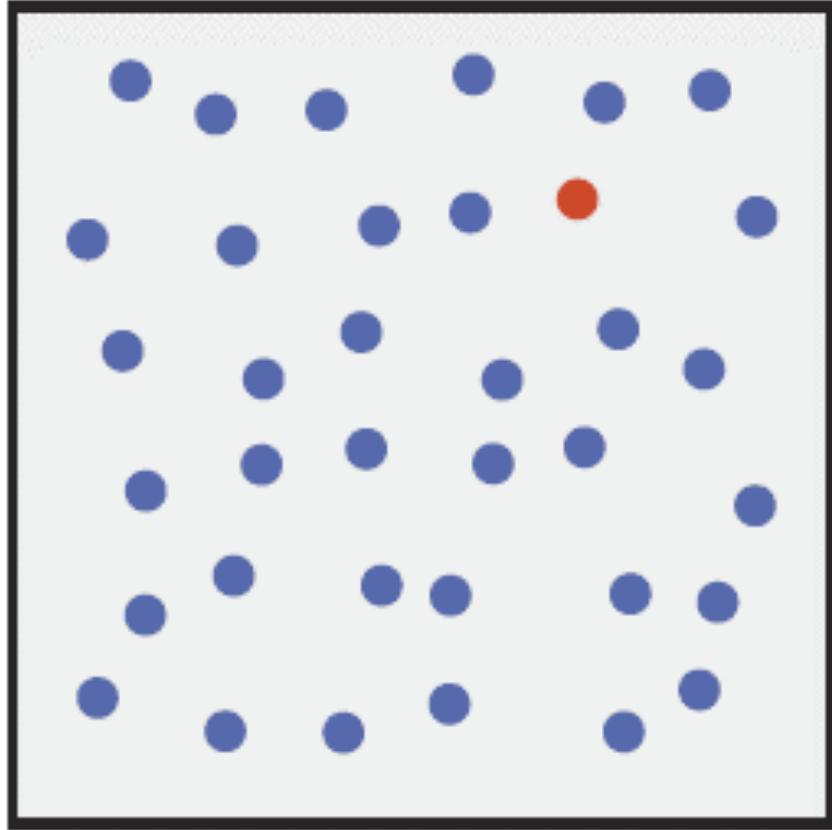
LINKS?

JA?

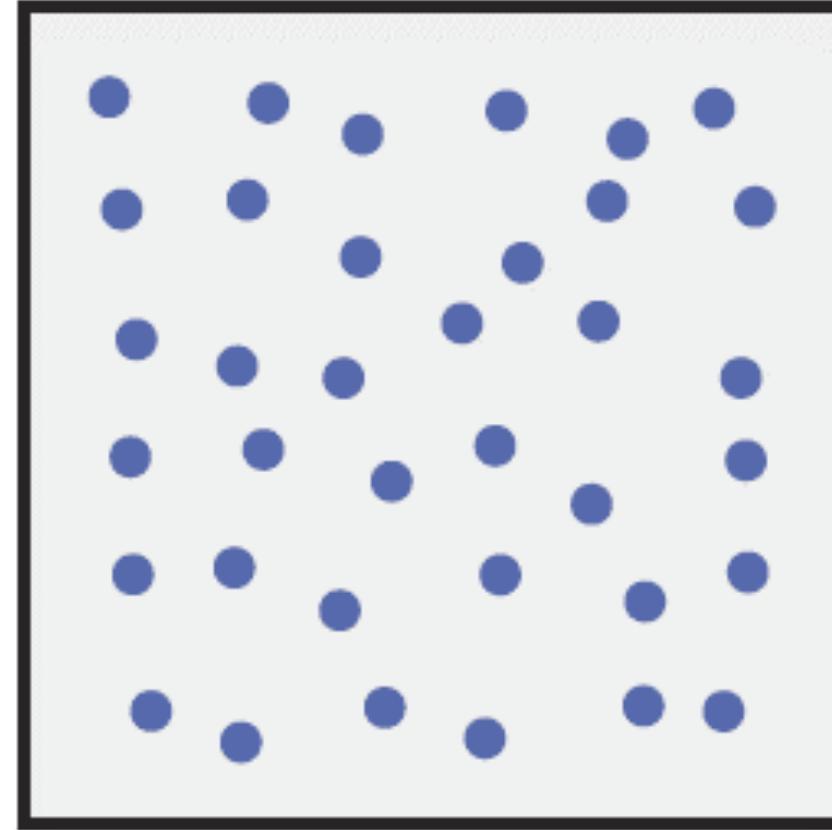


Waar zit een rode stip?

A



B



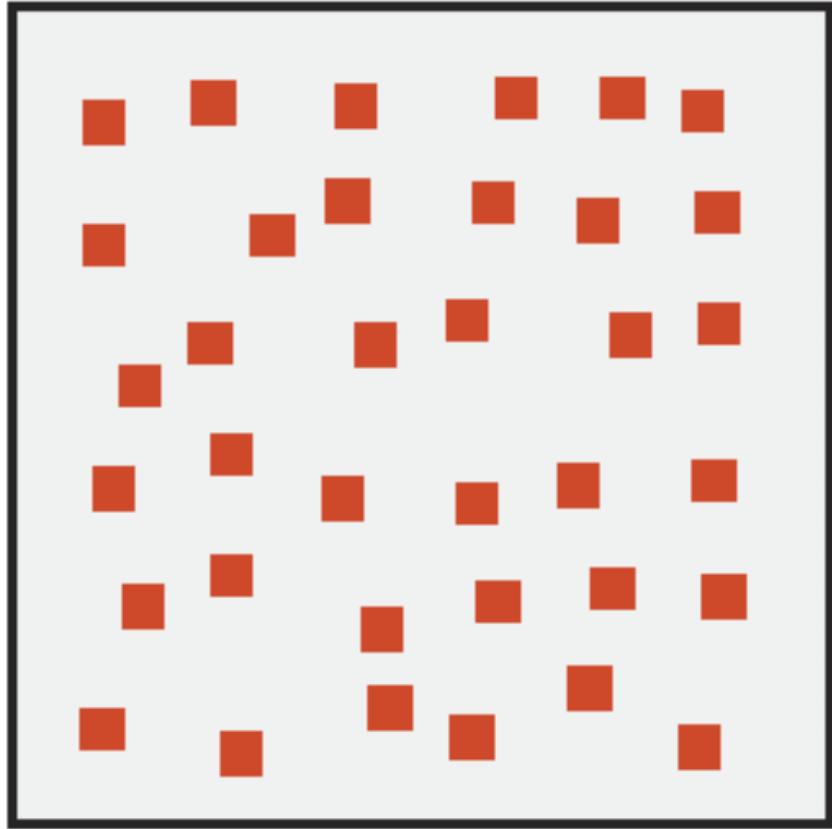
LINKS?

=

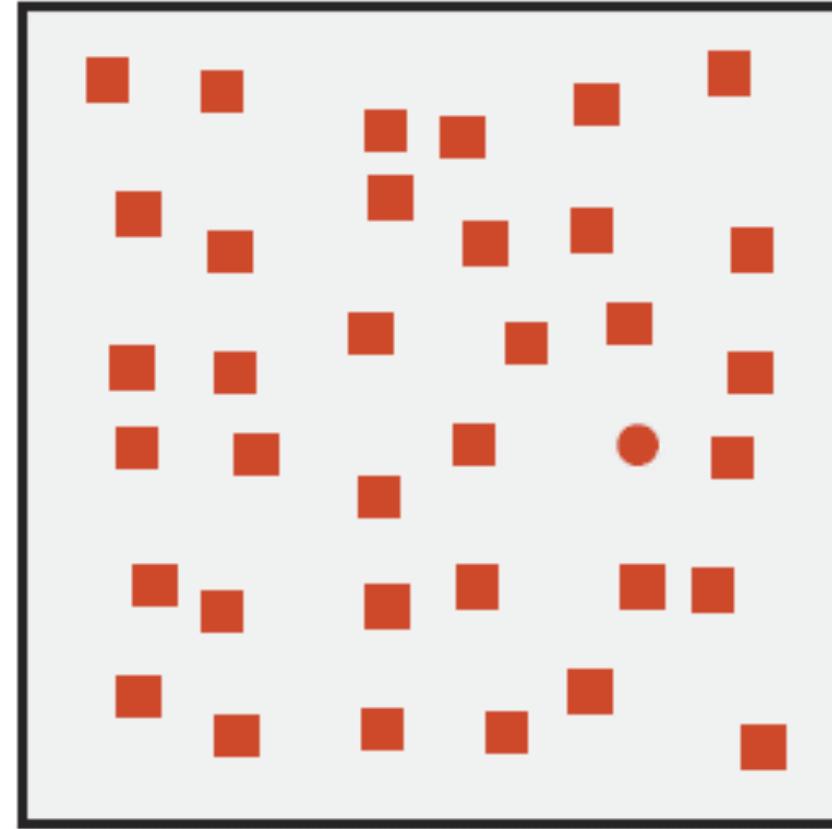
UP!

Waar zit een rode stip?

A



B



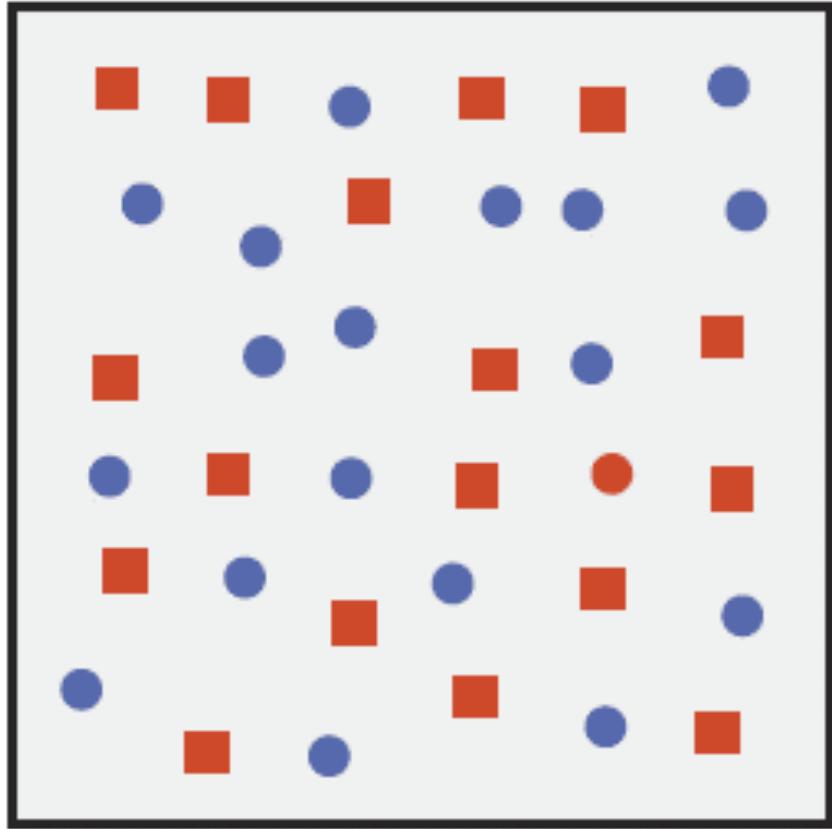
LINKS?

=

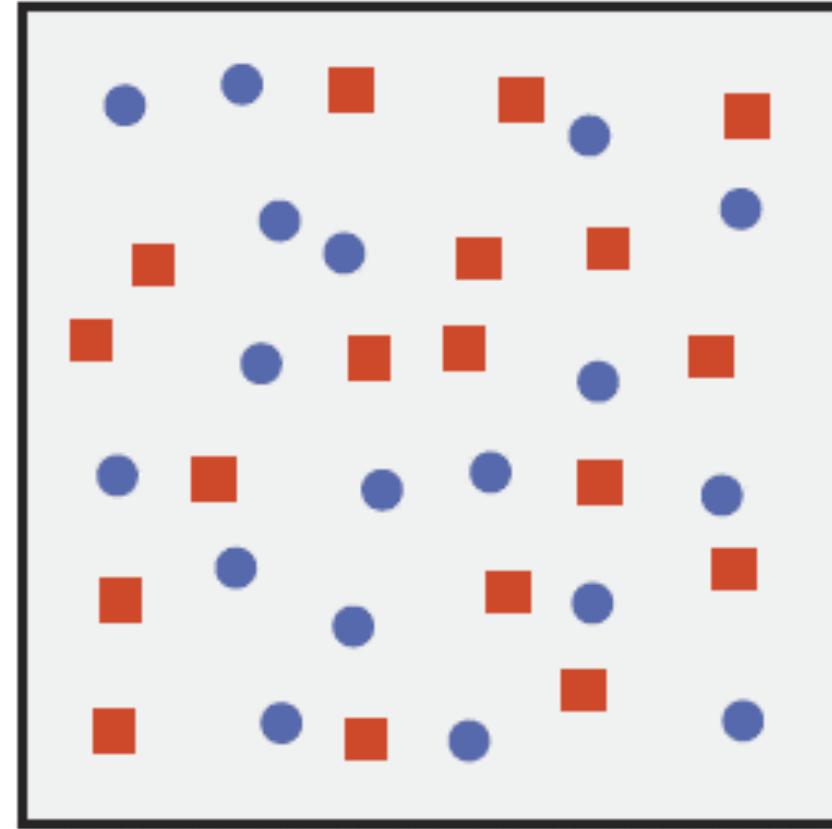
UP!

Waar zit een rode stip?

A



B

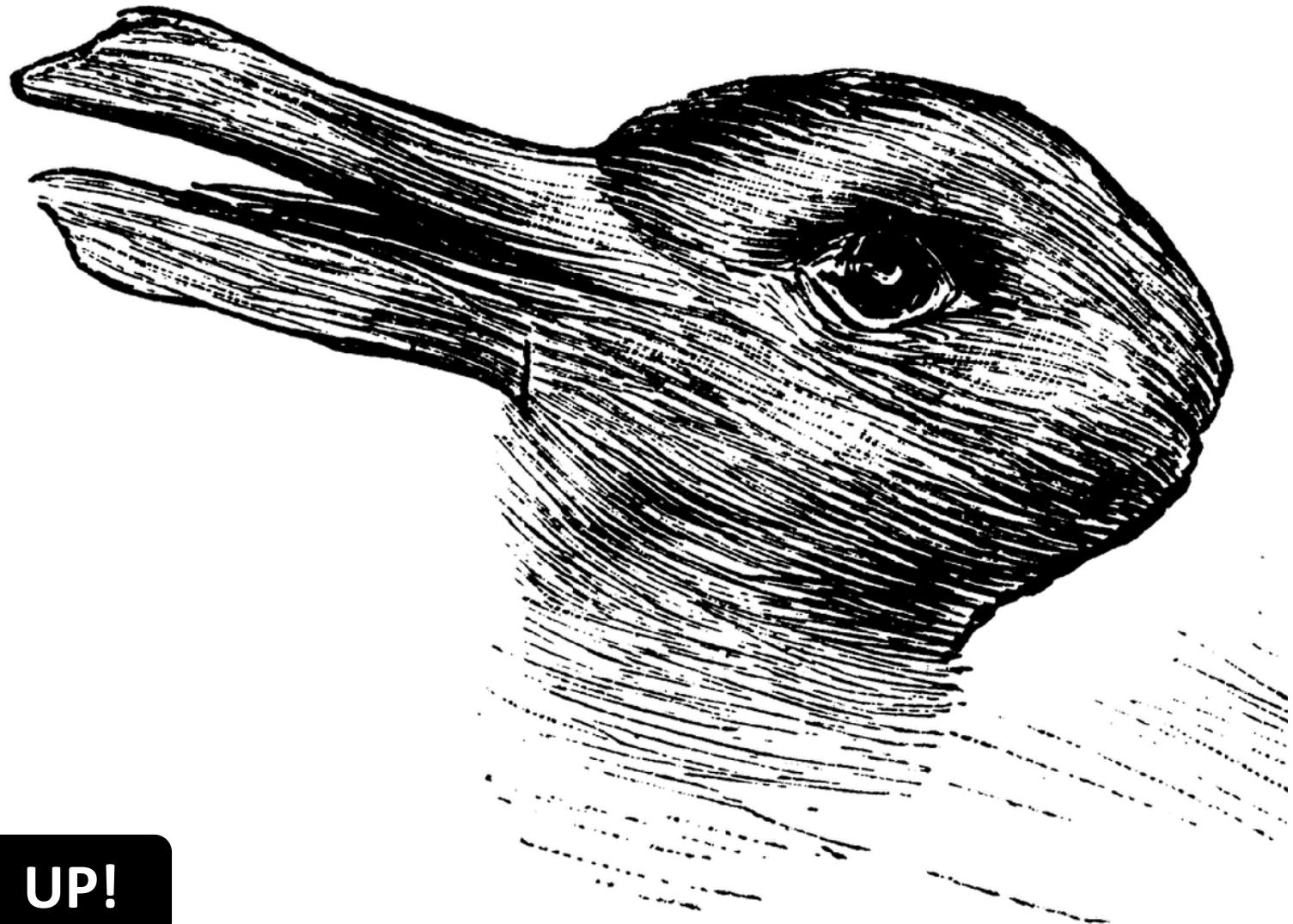


LINKS?

=

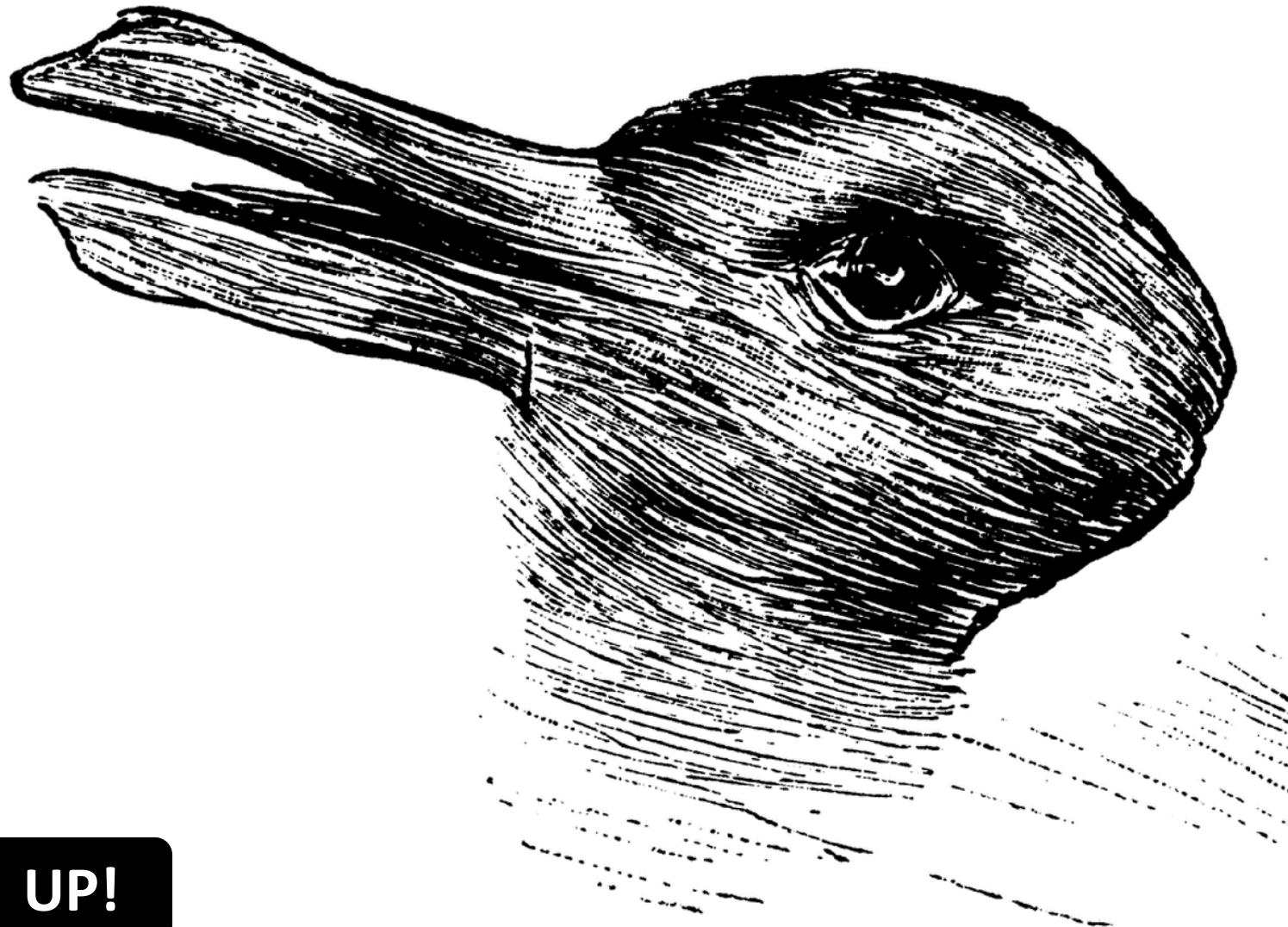
UP!

Zie jij een konijn?



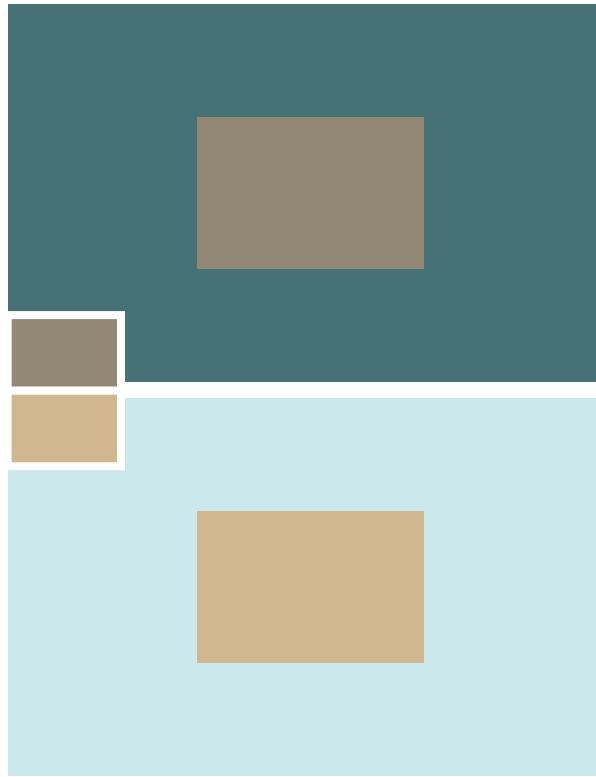
JA? = UP!

Zie jij een eend?



JA? = UP!

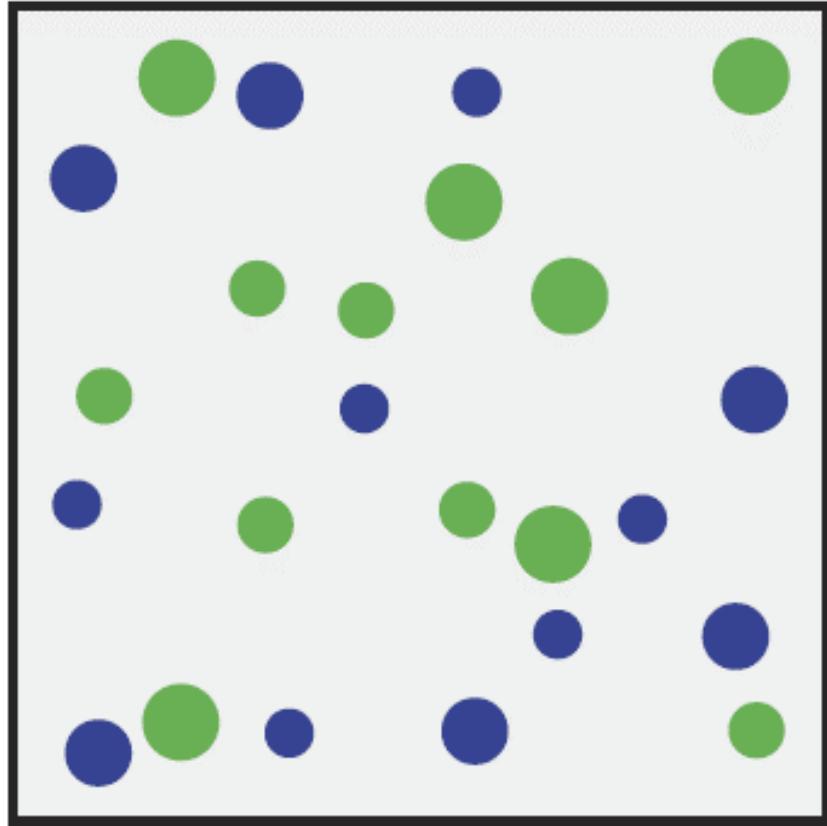
De bruine rechthoeken zijn dezelfde kleur



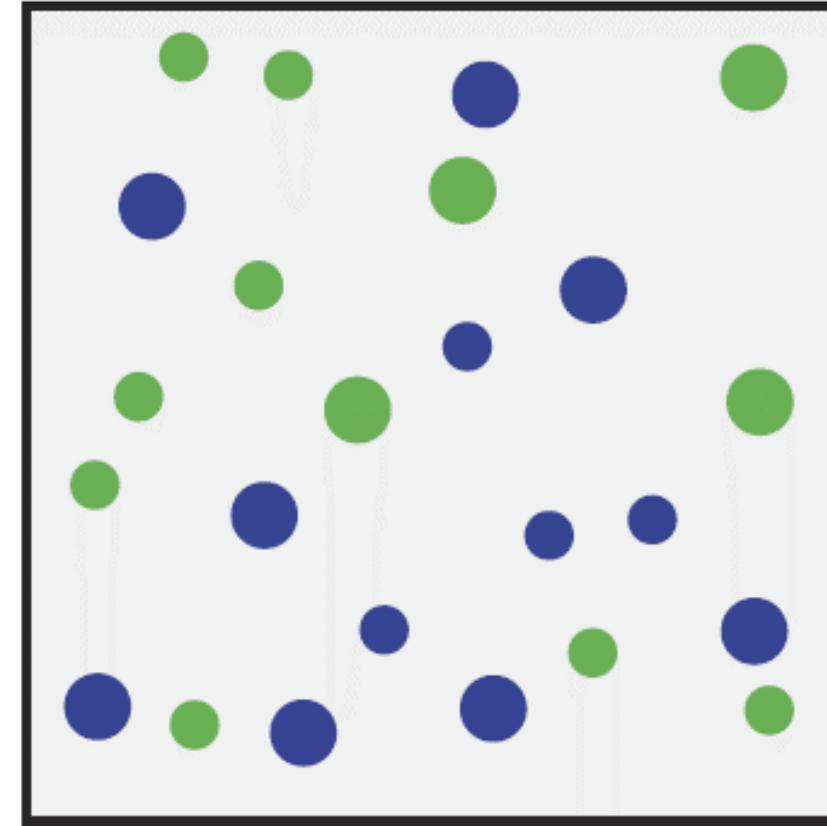
JA? = UP!

Waar zijn de **groene** stippen het grootst?

A



B

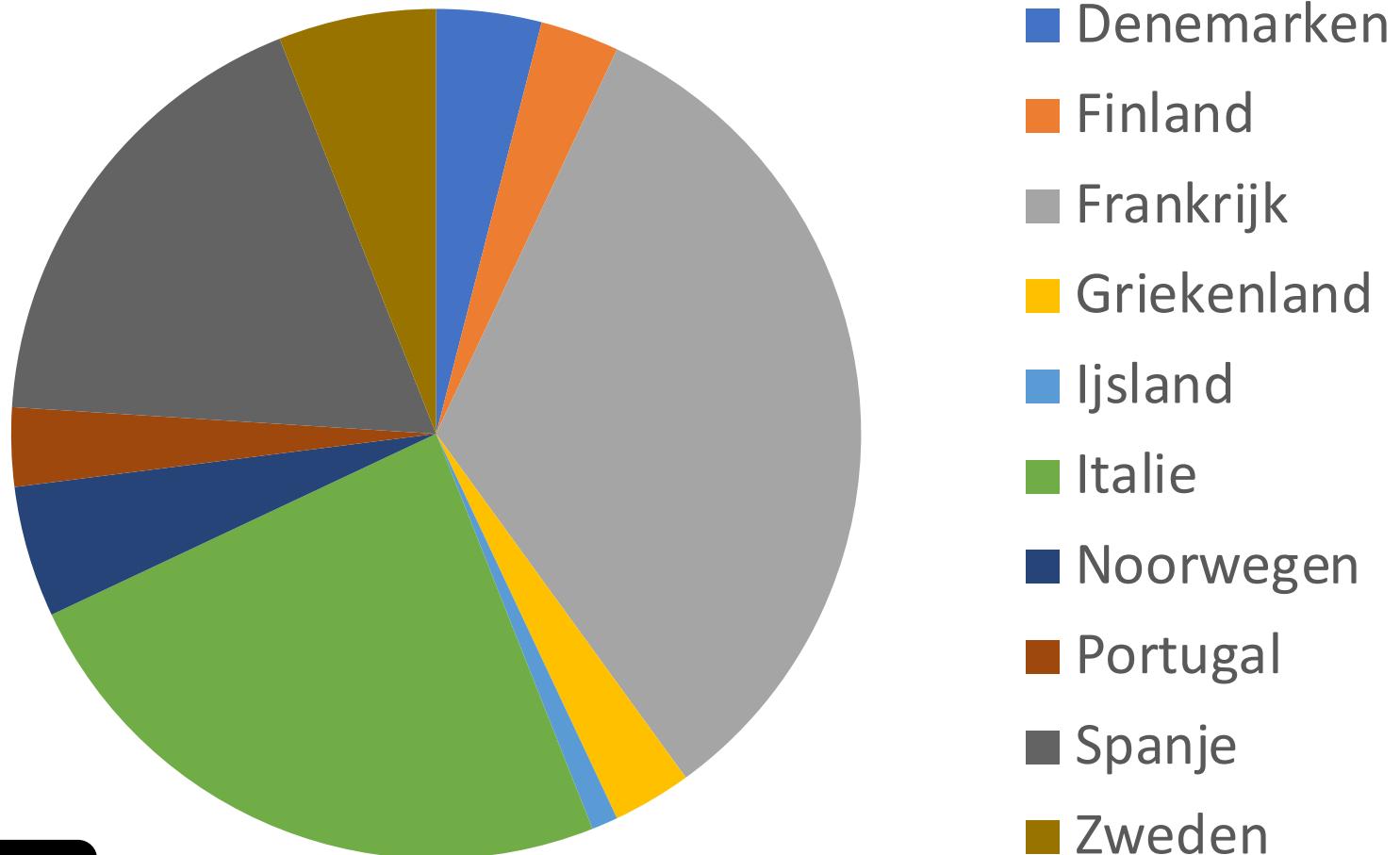


LINKS?

=

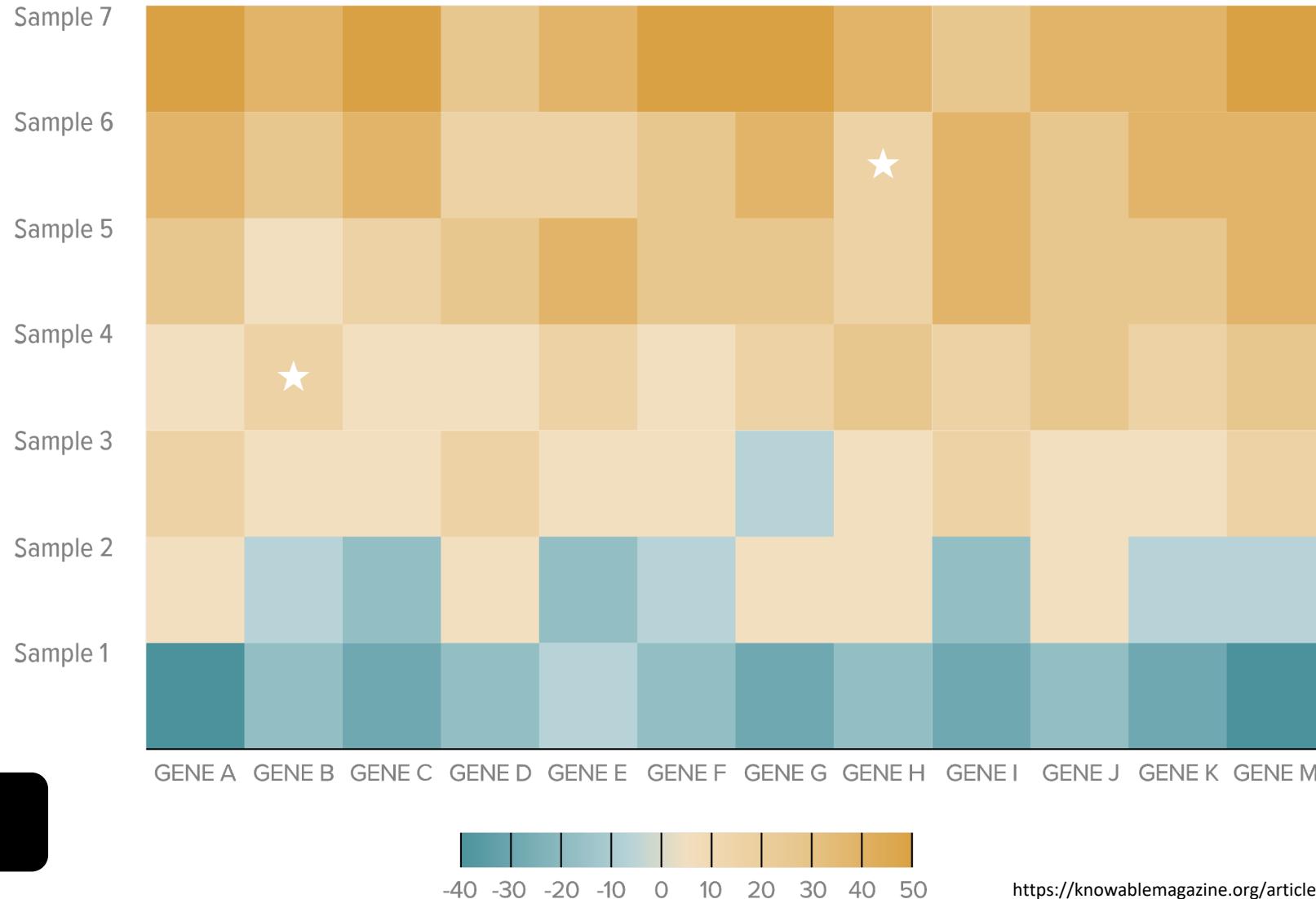
UP!

Het vlak voor Noorwegen is groter dan het vlak voor Finland

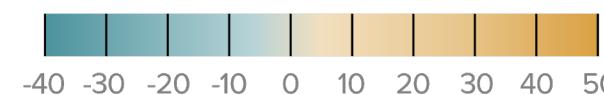


JA? = UP!

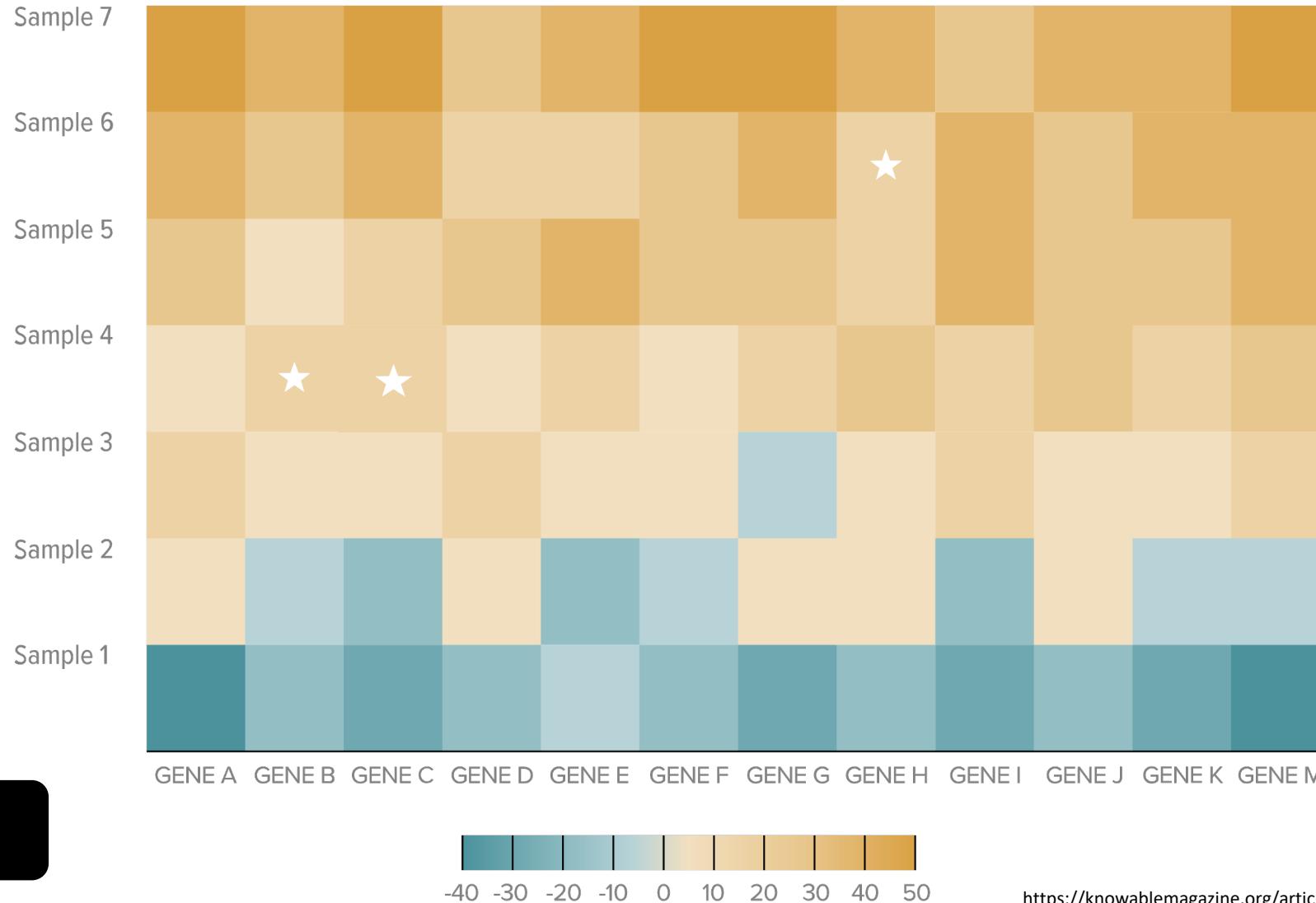
De achtergrond met ster heeft dezelfde kleur



JA? = UP!



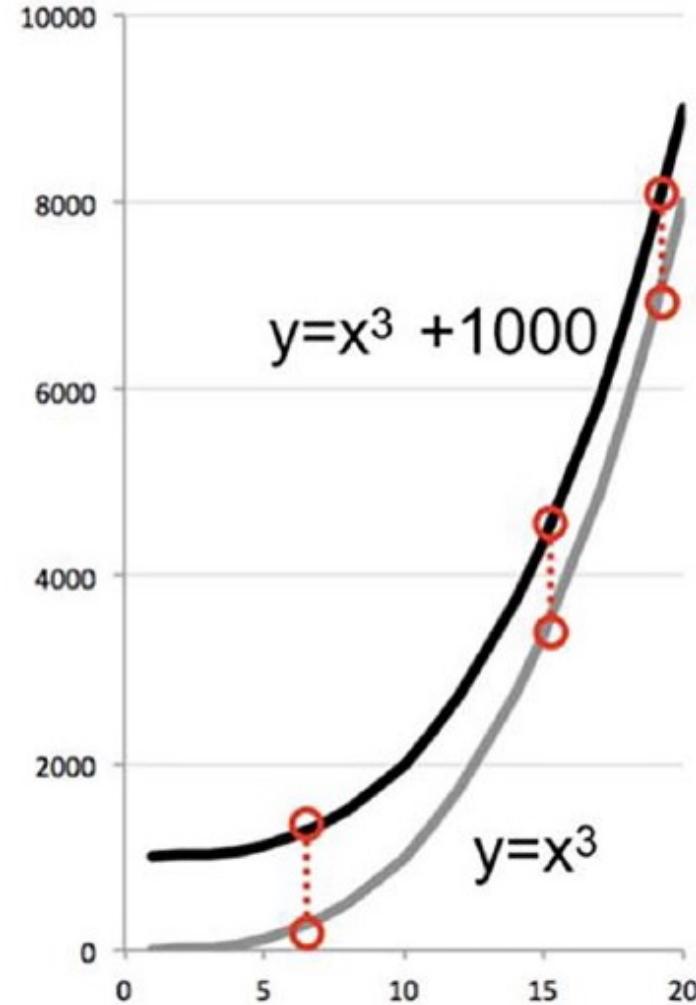
De achtergrond met ster heeft dezelfde kleur



JA? = UP!

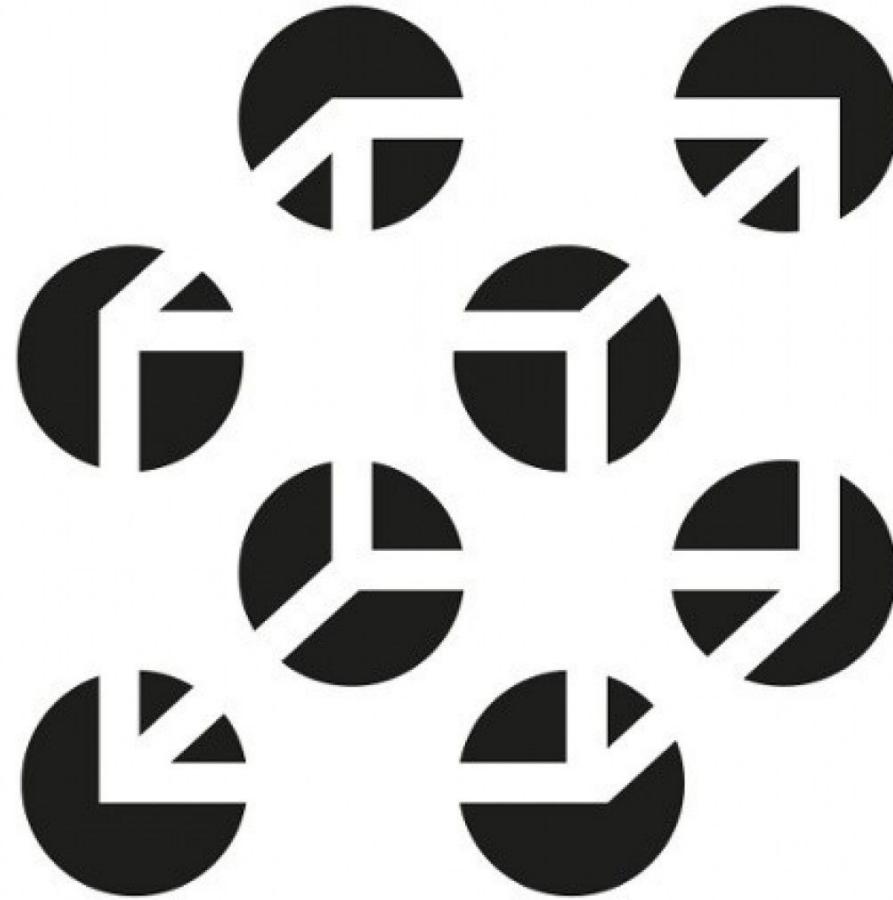


Waar is het verschil tussen de lijnen het grootst? Links of rechts?



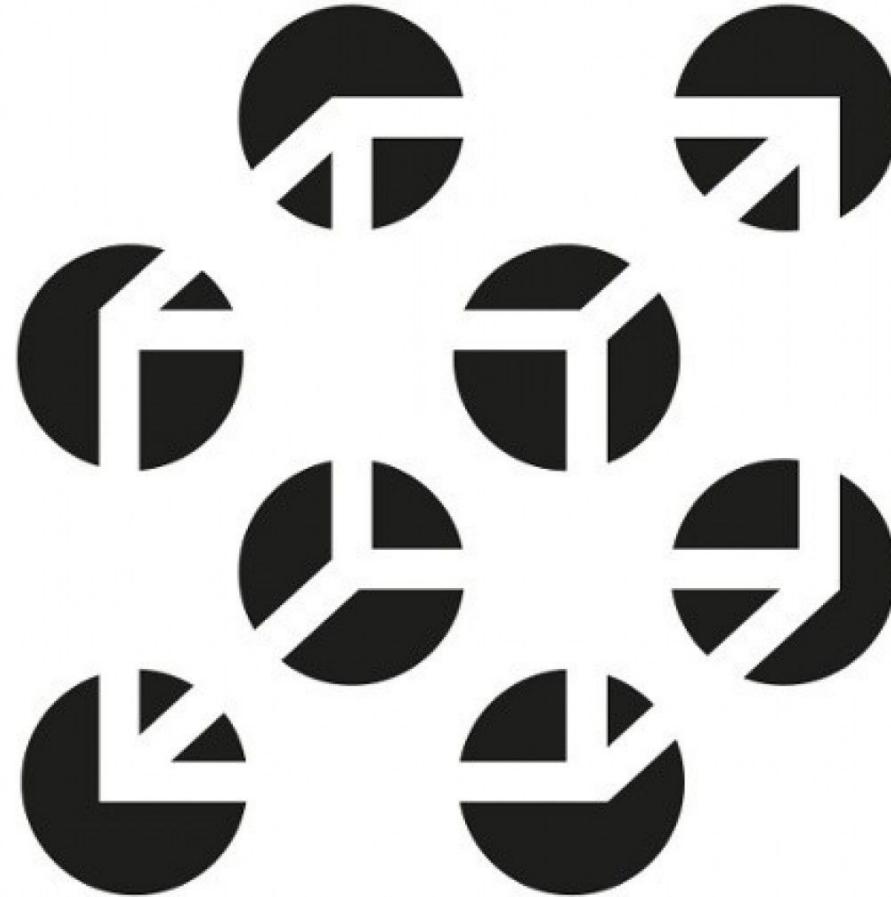
LINKS? = UP!

Zie je een kubus?



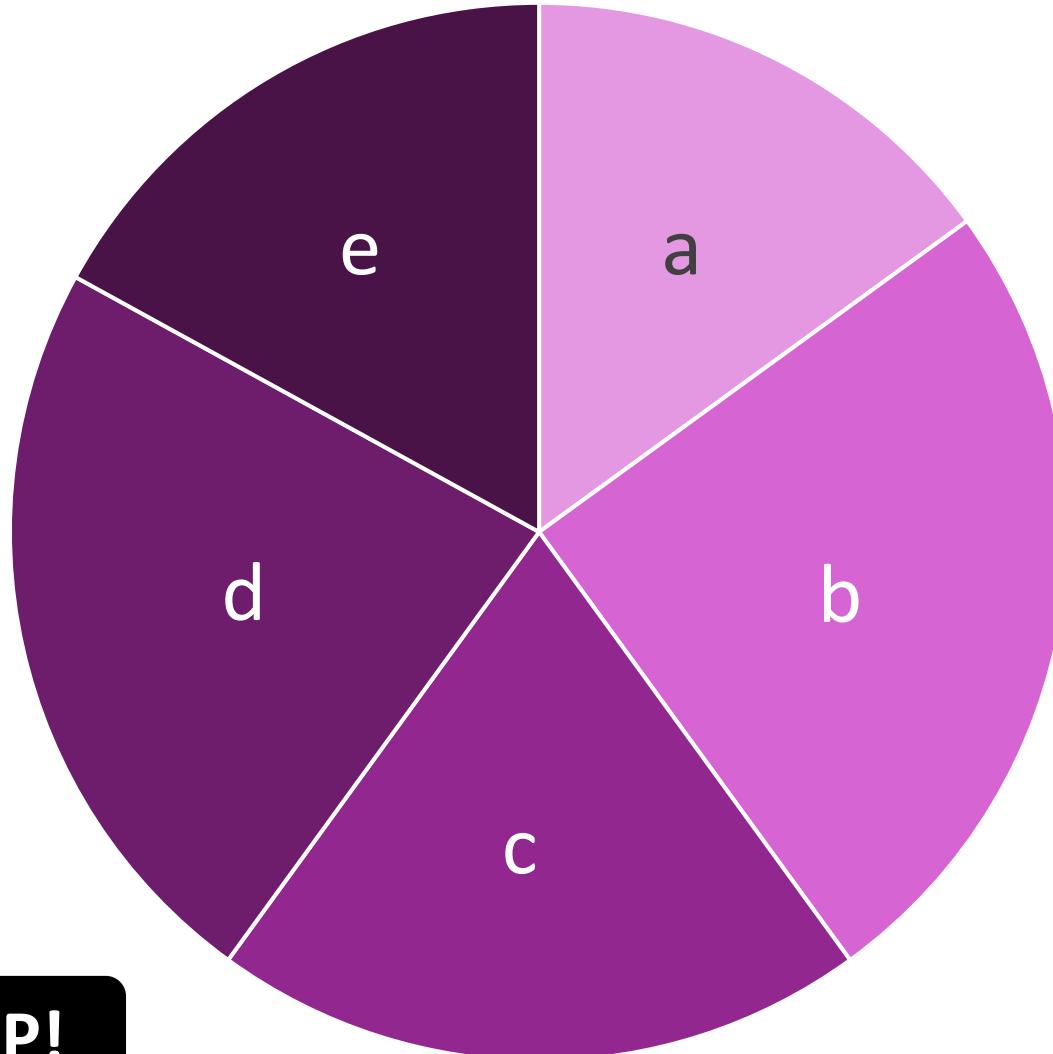
JA? = UP!

Is er een kubus?



JA? = UP!

Gaat hoog naar laag van b > d > c > e > a?



JA? = UP!

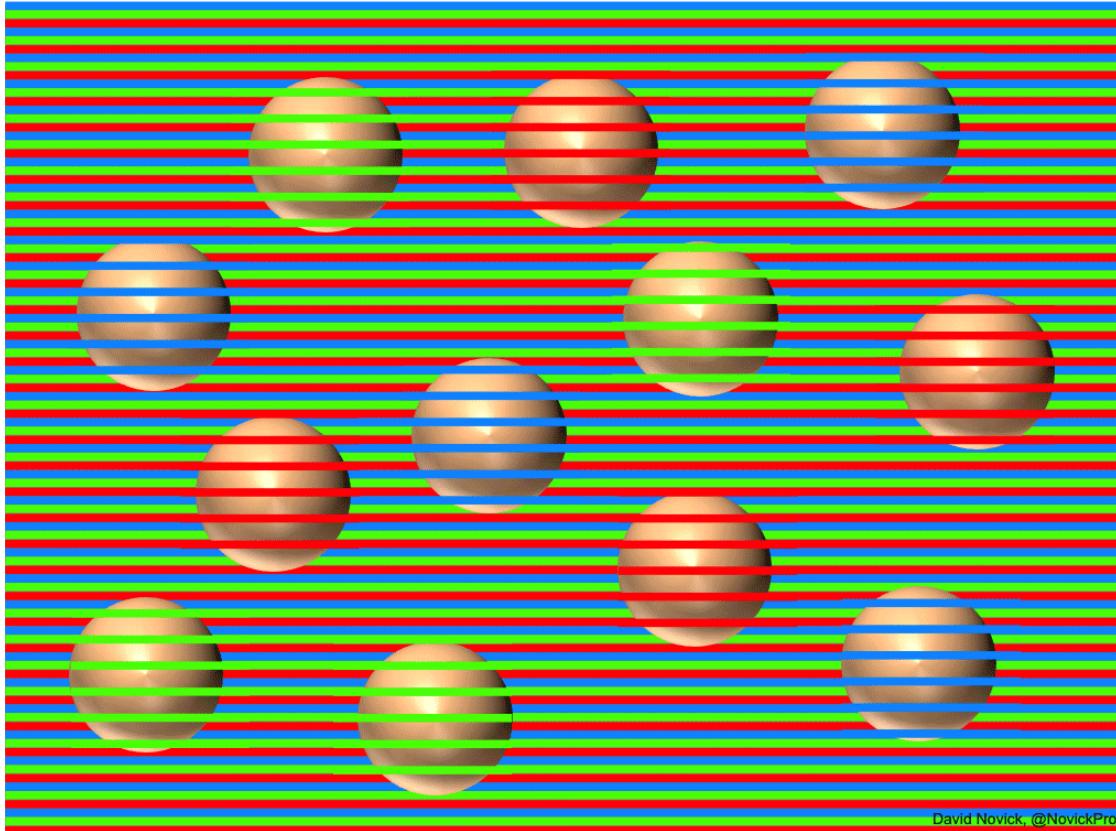
Alle bollen hebben dezelfde kleur



JA?

= UP!

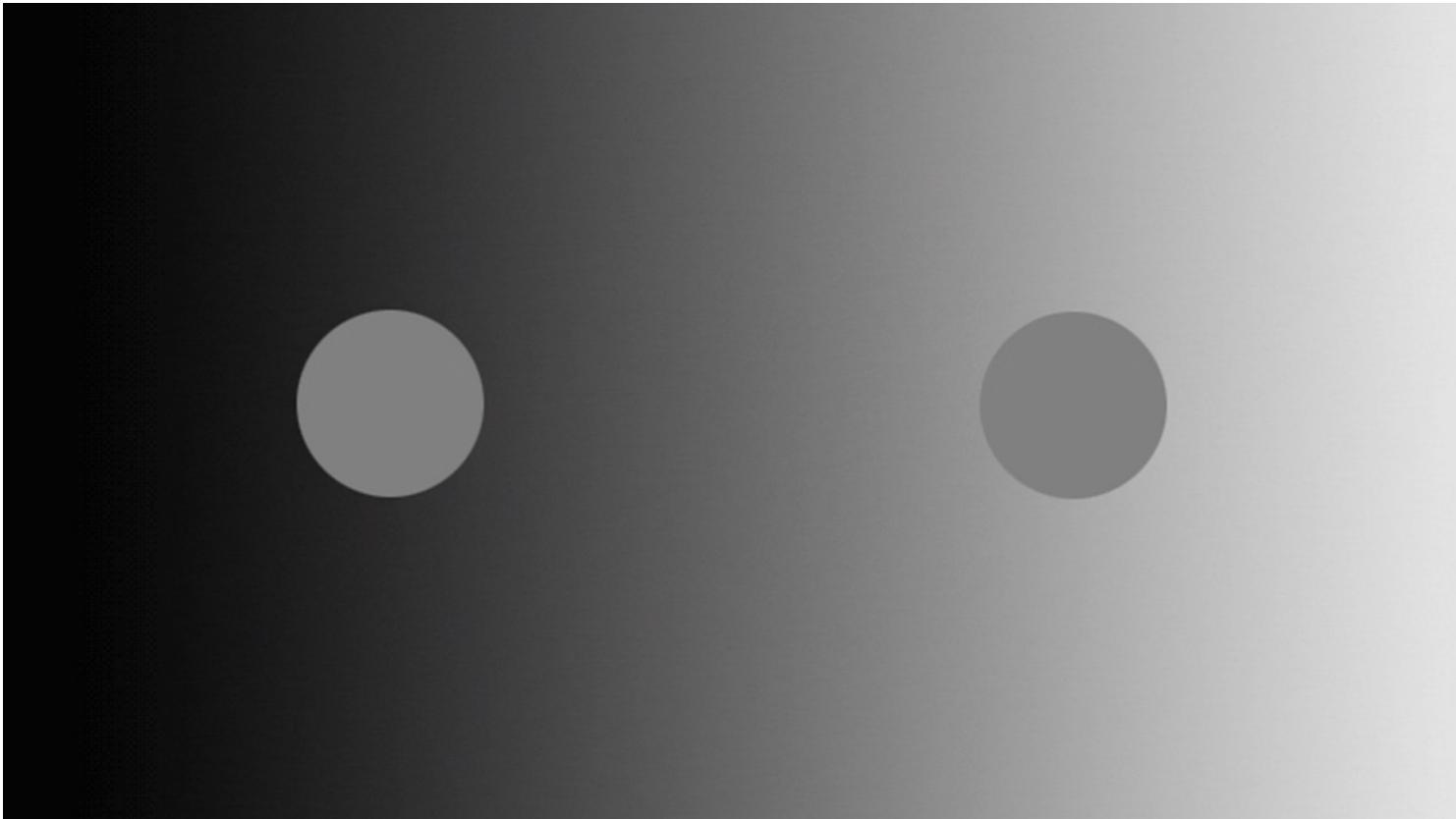
Alle bollen hebben dezelfde kleur



David Novick, @NovickProf

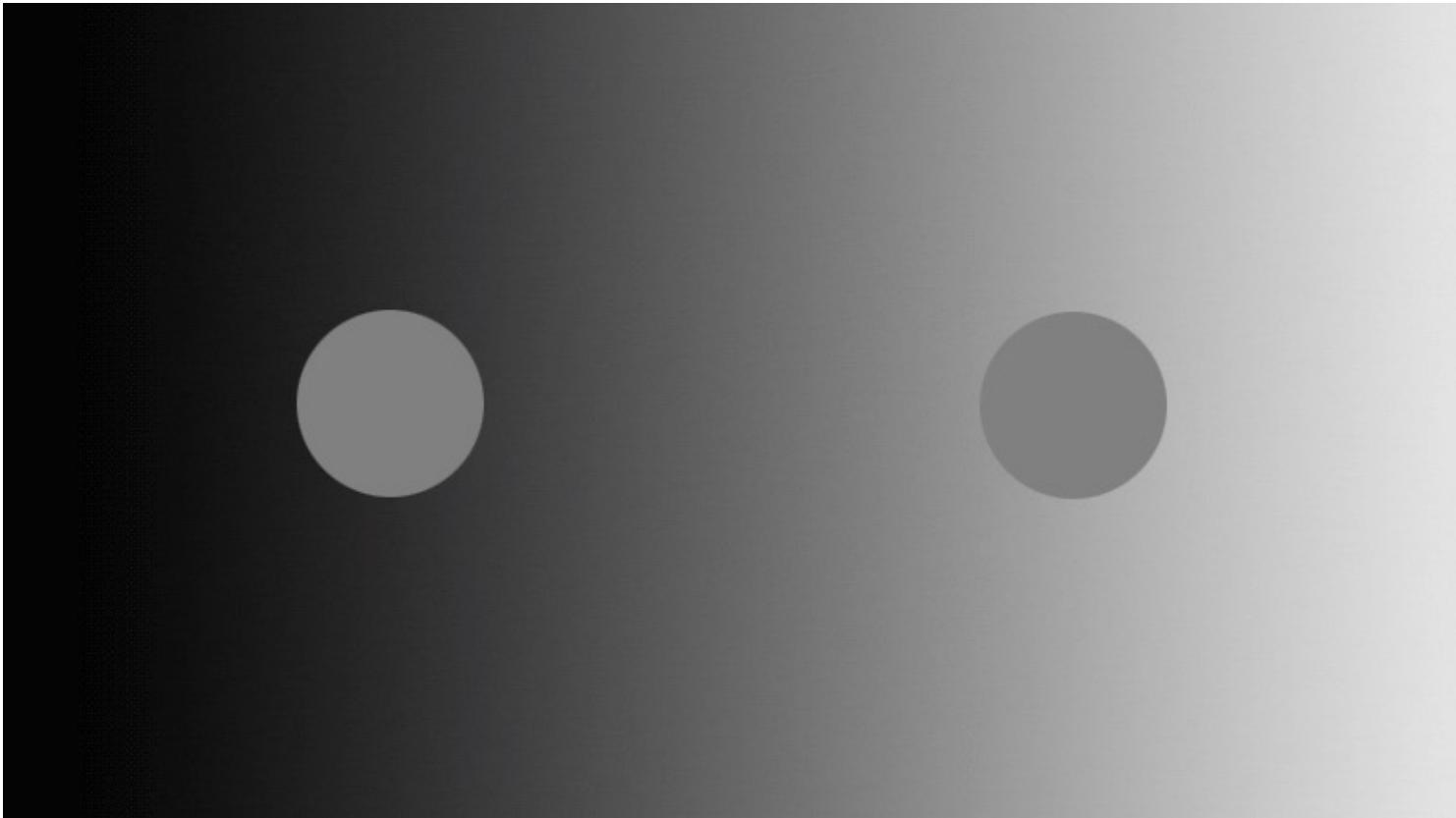
JA? = UP!

Welke cirkel is lichter van kleur?



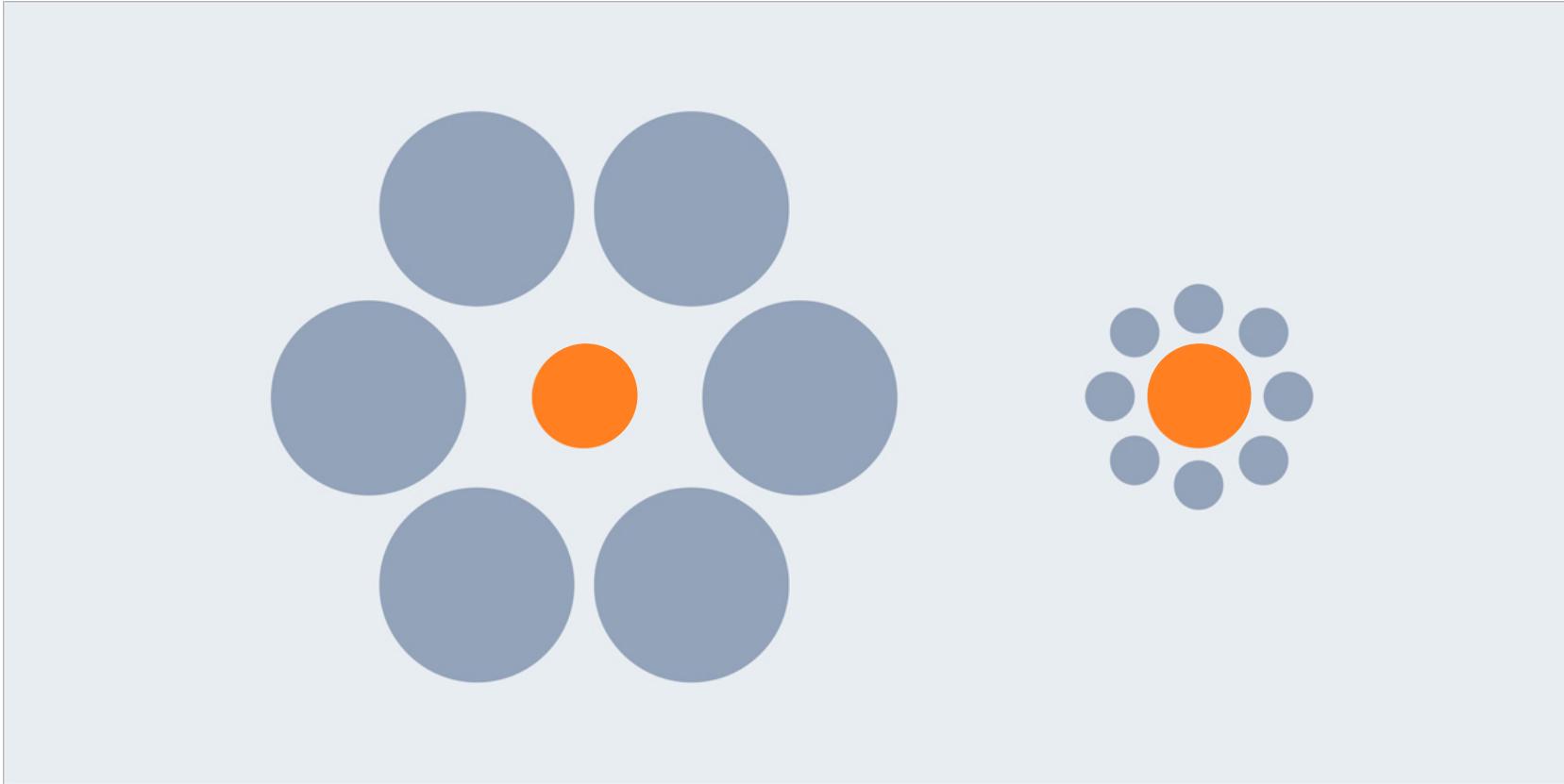
LINKS? = UP!

Weet je het zeker...?



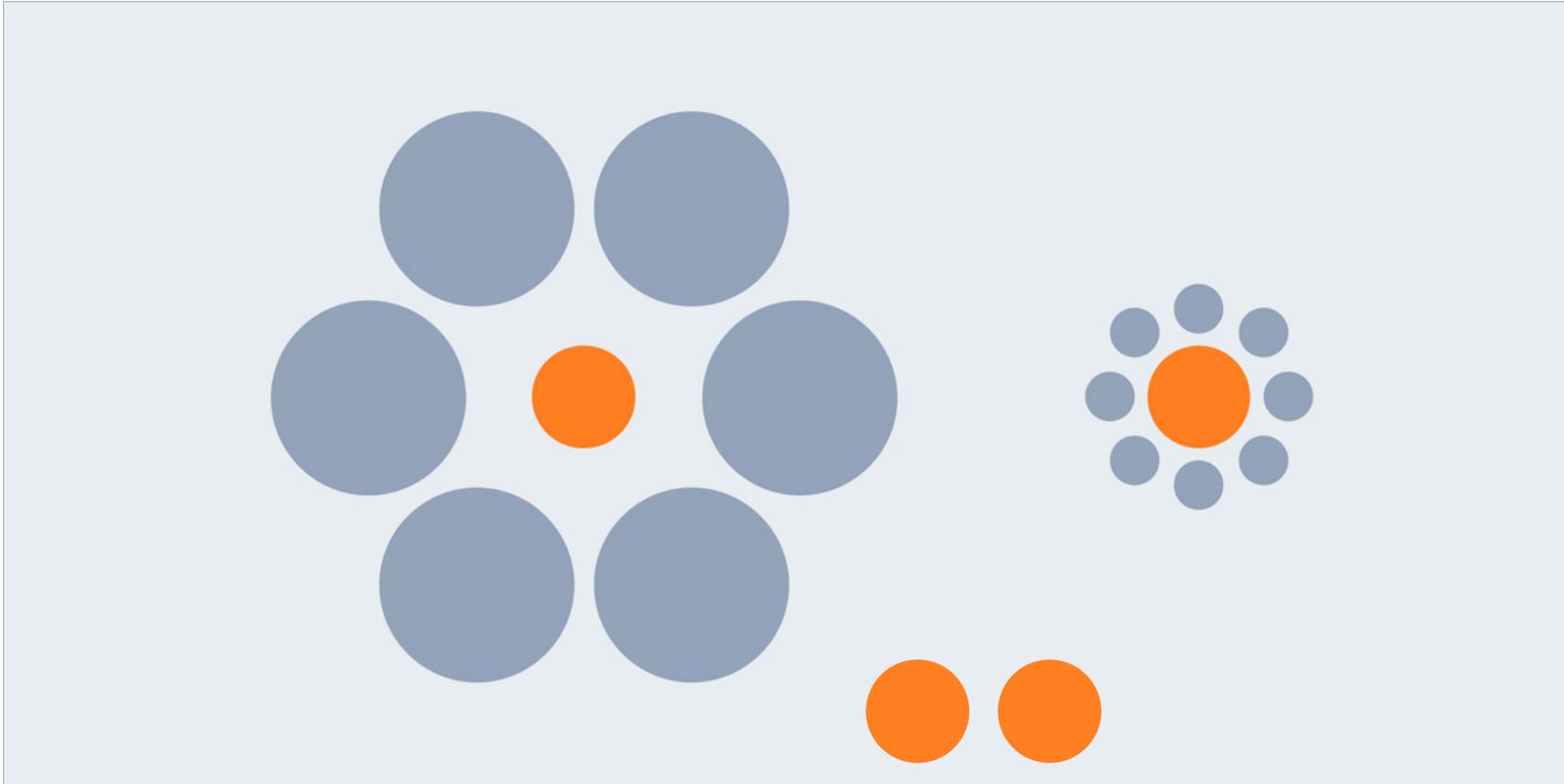
LINKS? = UP!

Welke oranje cirkel is kleiner?

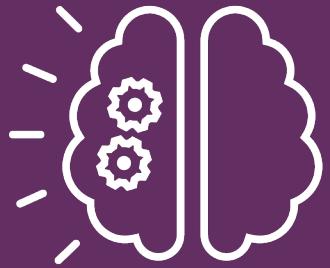


LINKS? = UP!

Welke oranje cirkel is kleiner?



LINKS? = UP!



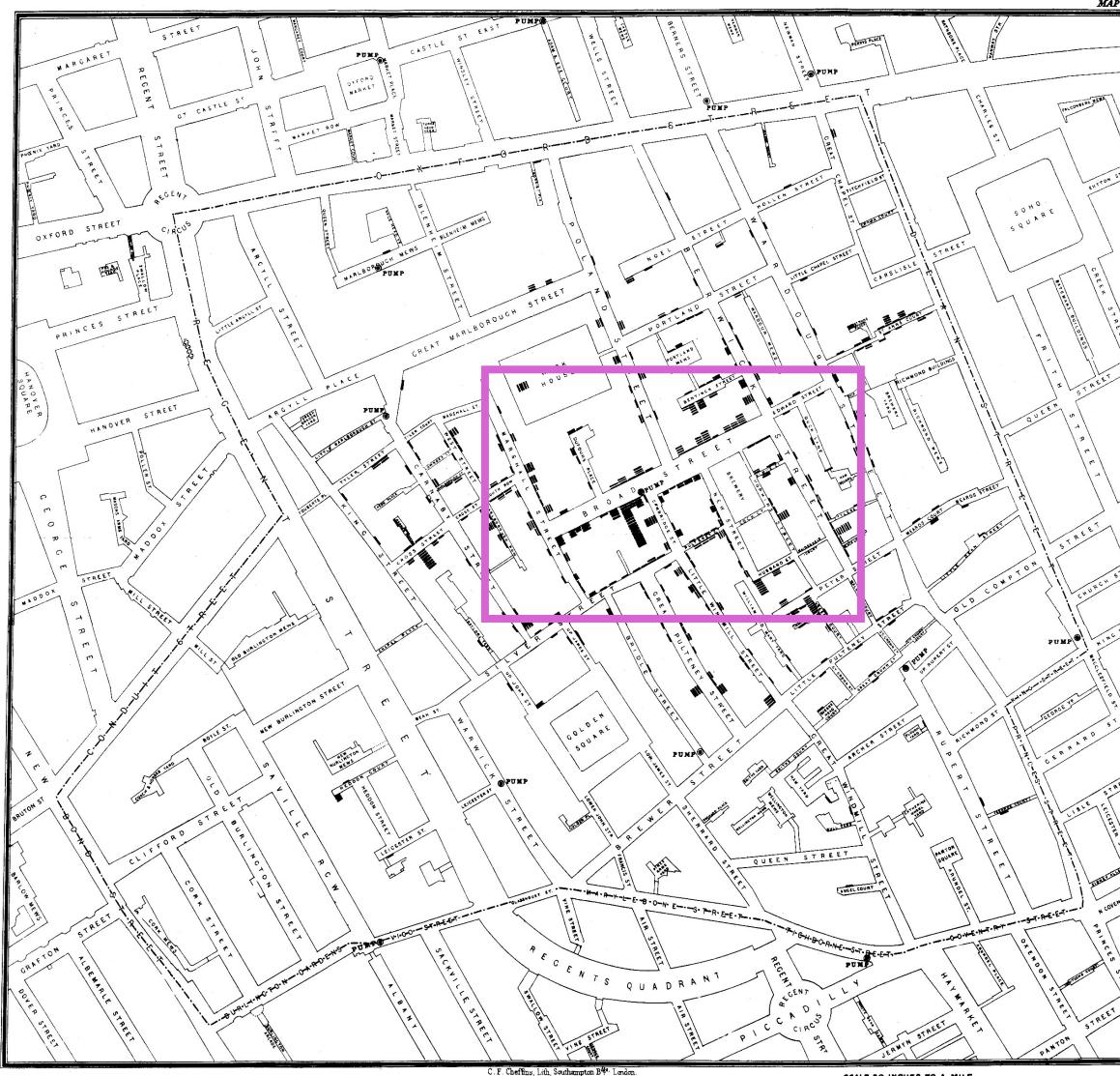
*“It’s not what you look at that
matters, it’s what you see”*

Henry David Thoreau

Waarom visuele communicatie ?

“Eén beeld zegt meer dan duizend woorden”

1854: De cholera kaart van John Snow



1854: De cholera kaart van John Snow



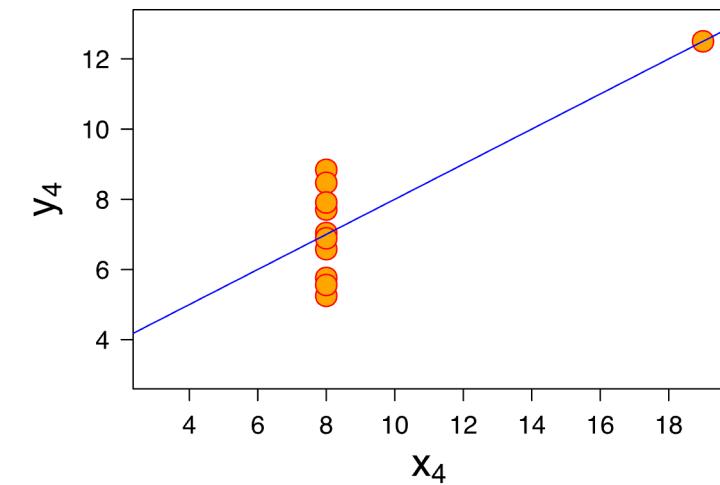
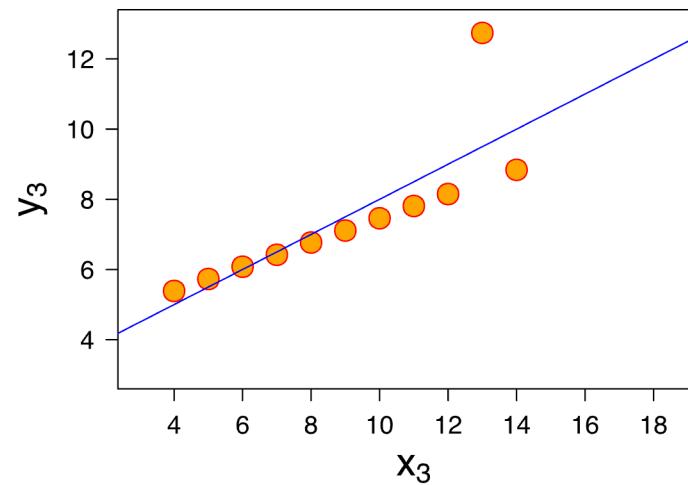
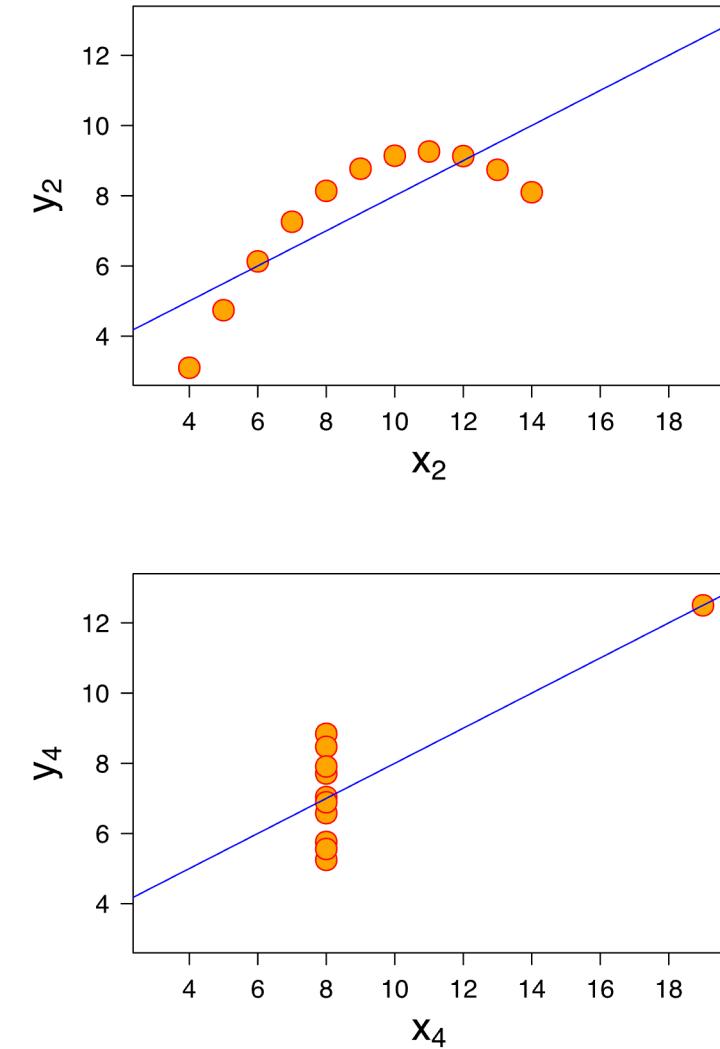
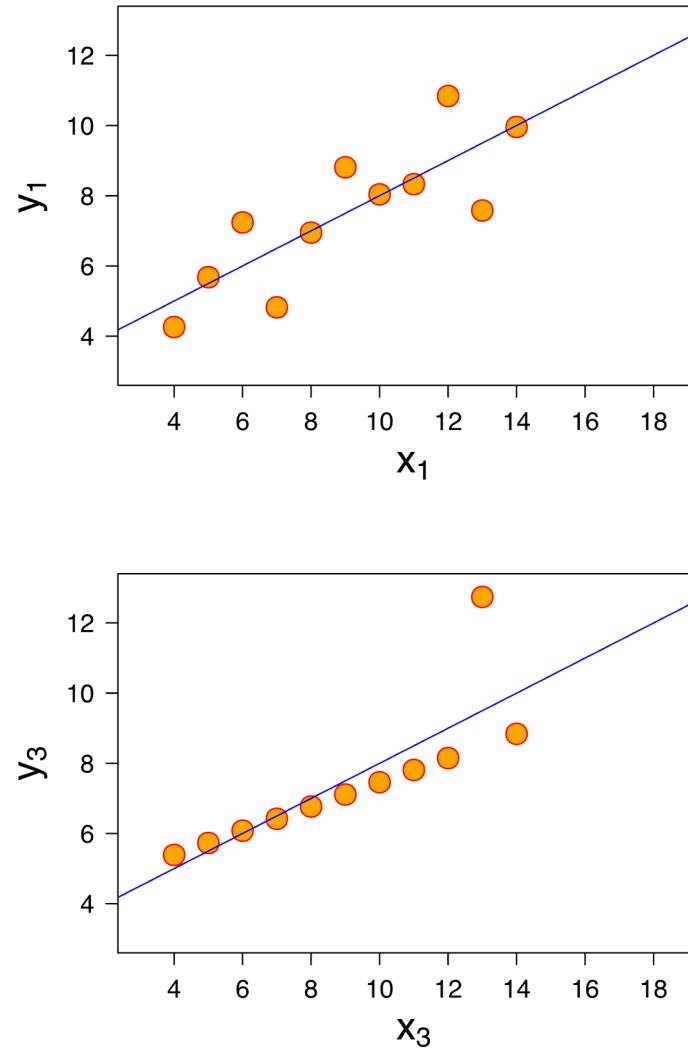
Vier datasets. Zie je iets bijzonders?

I		II		III		IV		
x	y	x	y	x	y	x	y	
10	8,04	10	9,14	10	7,46	8	6,58	
8	6,95	8	8,14	8	6,77	8	5,76	
13	7,58	13	8,74	13	12,74	8	7,71	
9	8,81	9	8,77	9	7,11	8	8,84	
11	8,33	11	9,26	11	7,81	8	8,47	
14	9,96	14	8,1	14	8,84	8	7,04	
6	7,24	6	6,13	6	6,08	8	5,25	
4	4,26	4	3,1	4	5,39	19	12,5	
12	10,84	12	9,13	12	8,15	8	5,56	
7	4,82	7	7,26	7	6,42	8	7,91	
5	5,68	5	4,74	5	5,73	8	6,89	
SUM	99,00	82,51	99,00	82,51	99,00	82,50	99,00	82,51
AVG	9,00	7,50	9,00	7,50	9,00	7,50	9,00	7,50
STDEV	3,32	2,03	3,32	2,03	3,32	2,03	3,32	2,03

Een figuur laat zien wat data alleen niet kan!

Het kwartet van Anscombe:

4 datasets
11 x-waarden
11 y-waarden
Dezelfde som
Hetzelfde gemiddelde
Dezelfde standaard deviatie



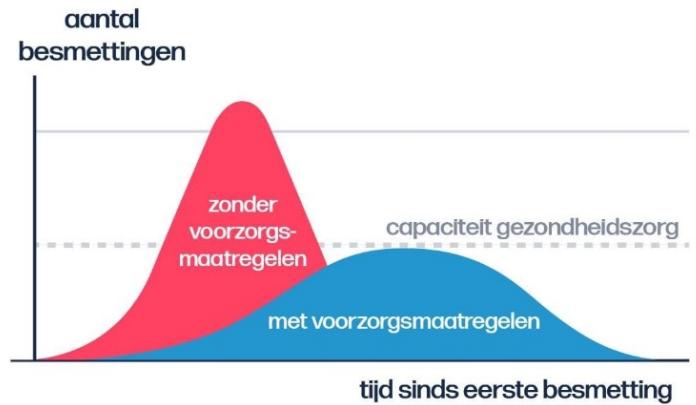
Klimaatdata voor een groot publiek!



Wat is visuele (data-)
communicatie ?

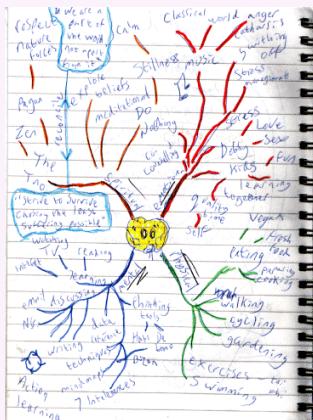
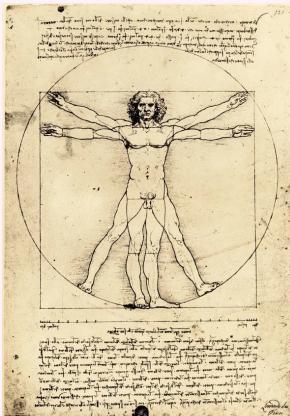
Er zijn vier soorten visualisaties

COMMUNICEREN

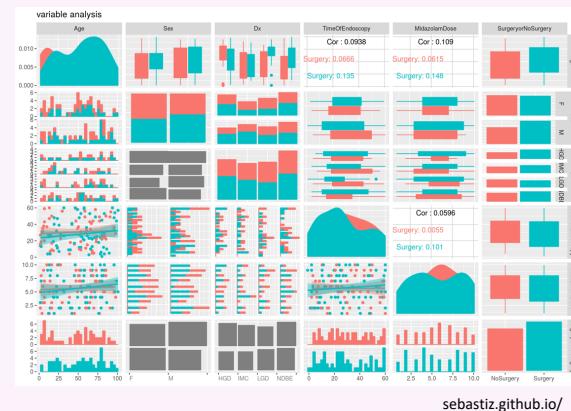


Voor anderen

CONCEPTUEEL



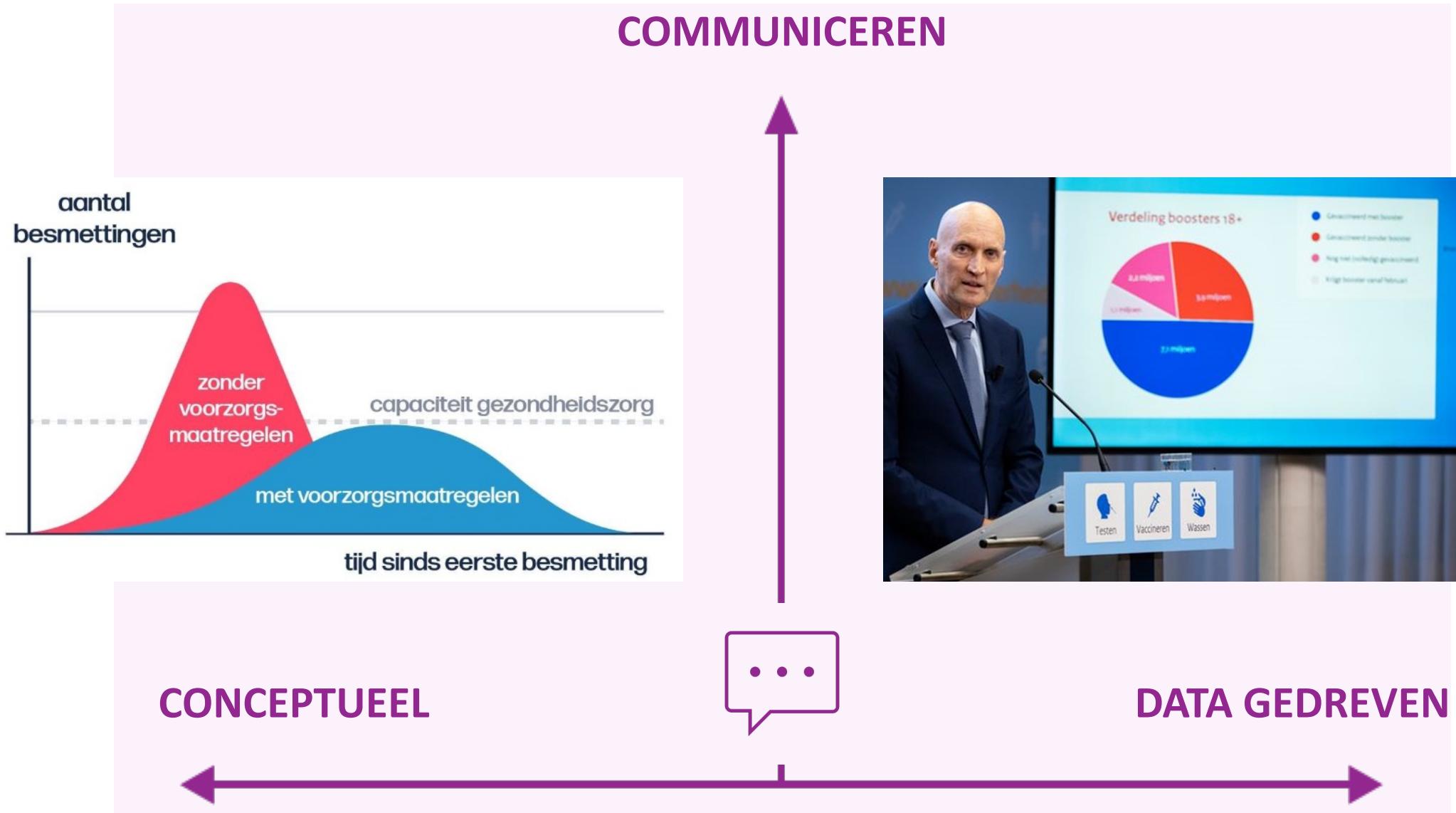
DATA GEDREVEN



Voor jezelf

ONTDEKKEN

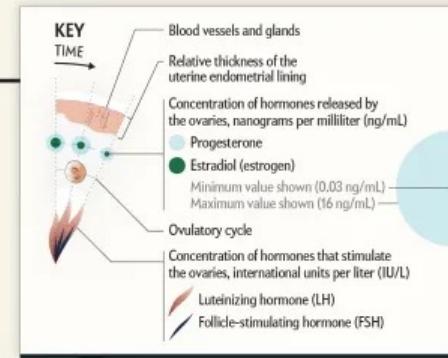
...en twee soorten visuele communicatie



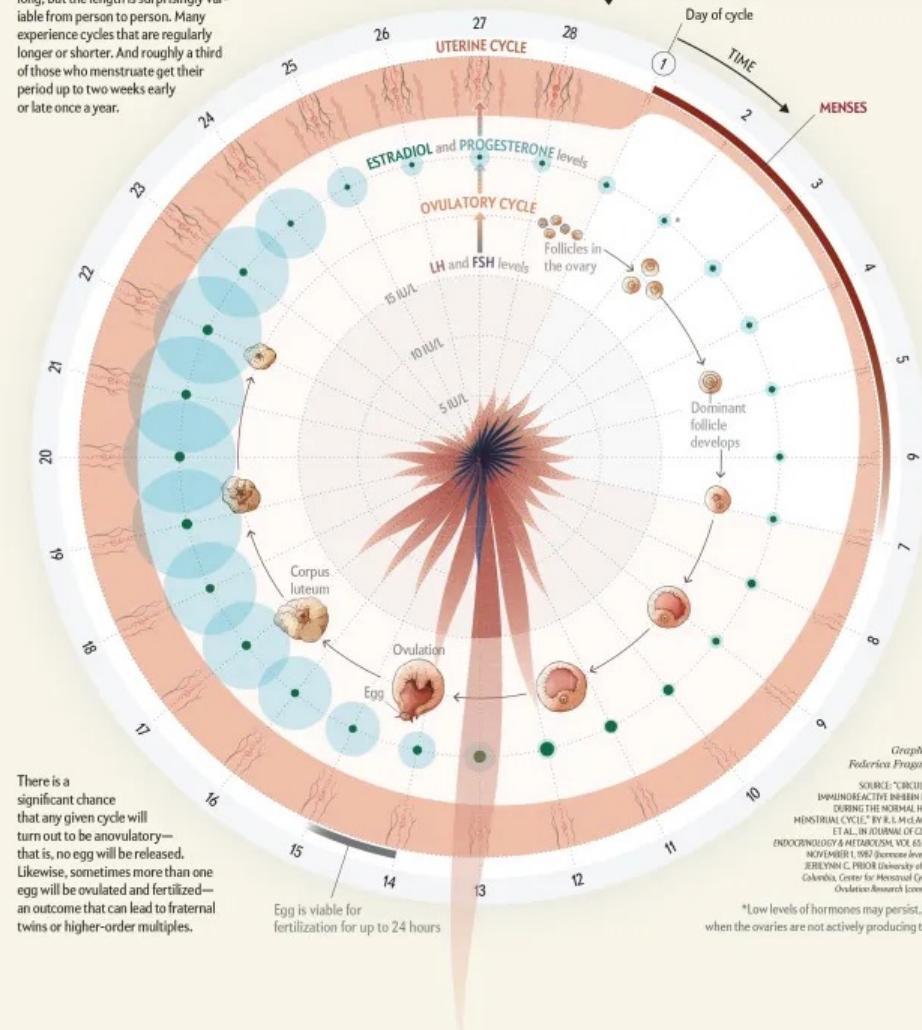
Conceptueel en data-gedreven

The Menstrual Cycle

Humans are among the very few species to experience a period. The menstrual cycle starts in the brain, which sends signals to the pituitary gland (not shown) to produce hormones that stimulate the ovaries. The ovaries house egg-containing follicles that release an egg during ovulation. The ovaries also secrete hormones to help prepare the uterus to host an embryo, which results if the egg is fertilized by a sperm. If no embryo implants, the uterus disposes of its lining, and the cycle begins again.

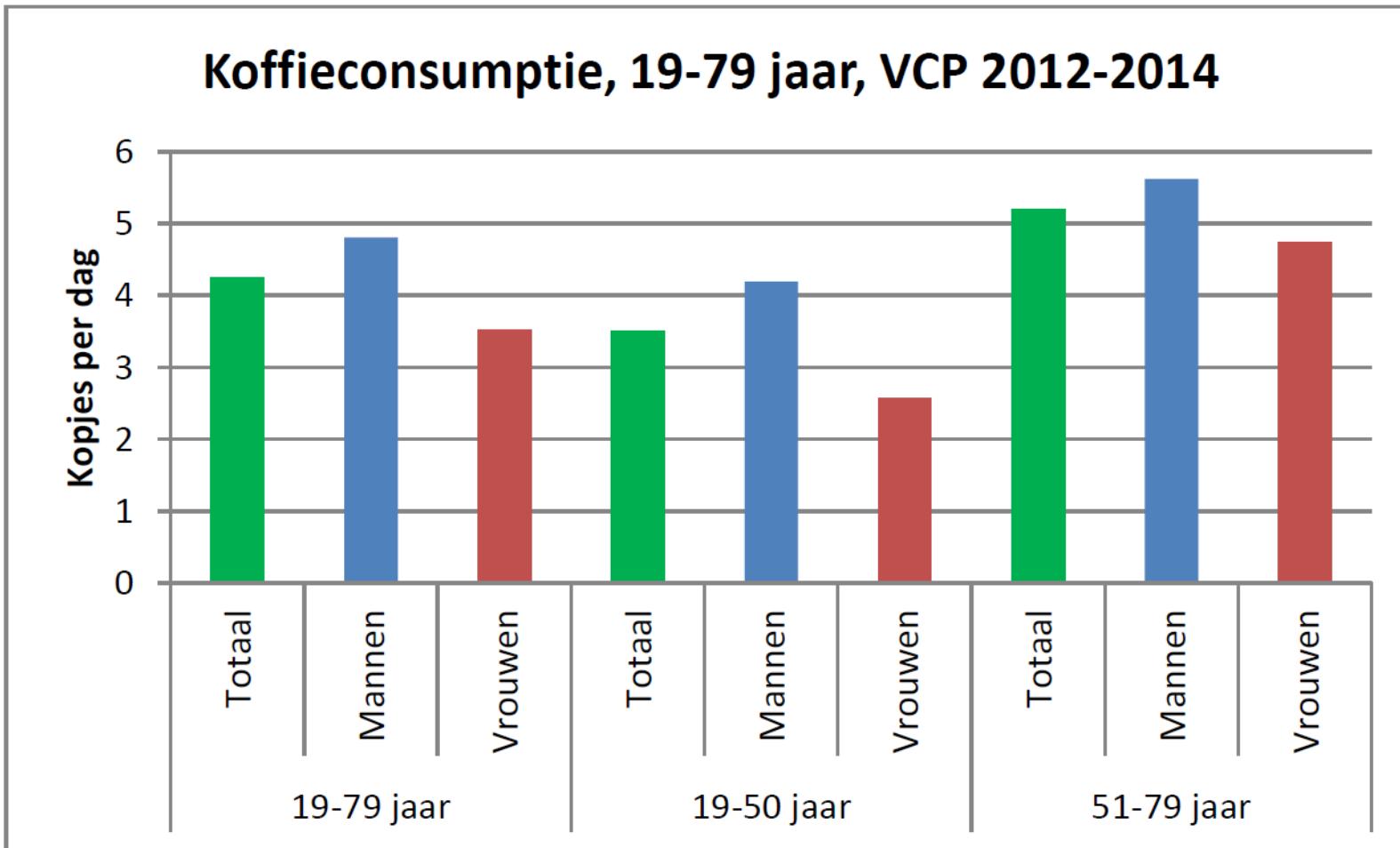


The average menstrual cycle is 28 days long, but the length is surprisingly variable from person to person. Many experience cycles that are regularly longer or shorter. And roughly a third of those who menstruate get their period up to two weeks early or late once a year.

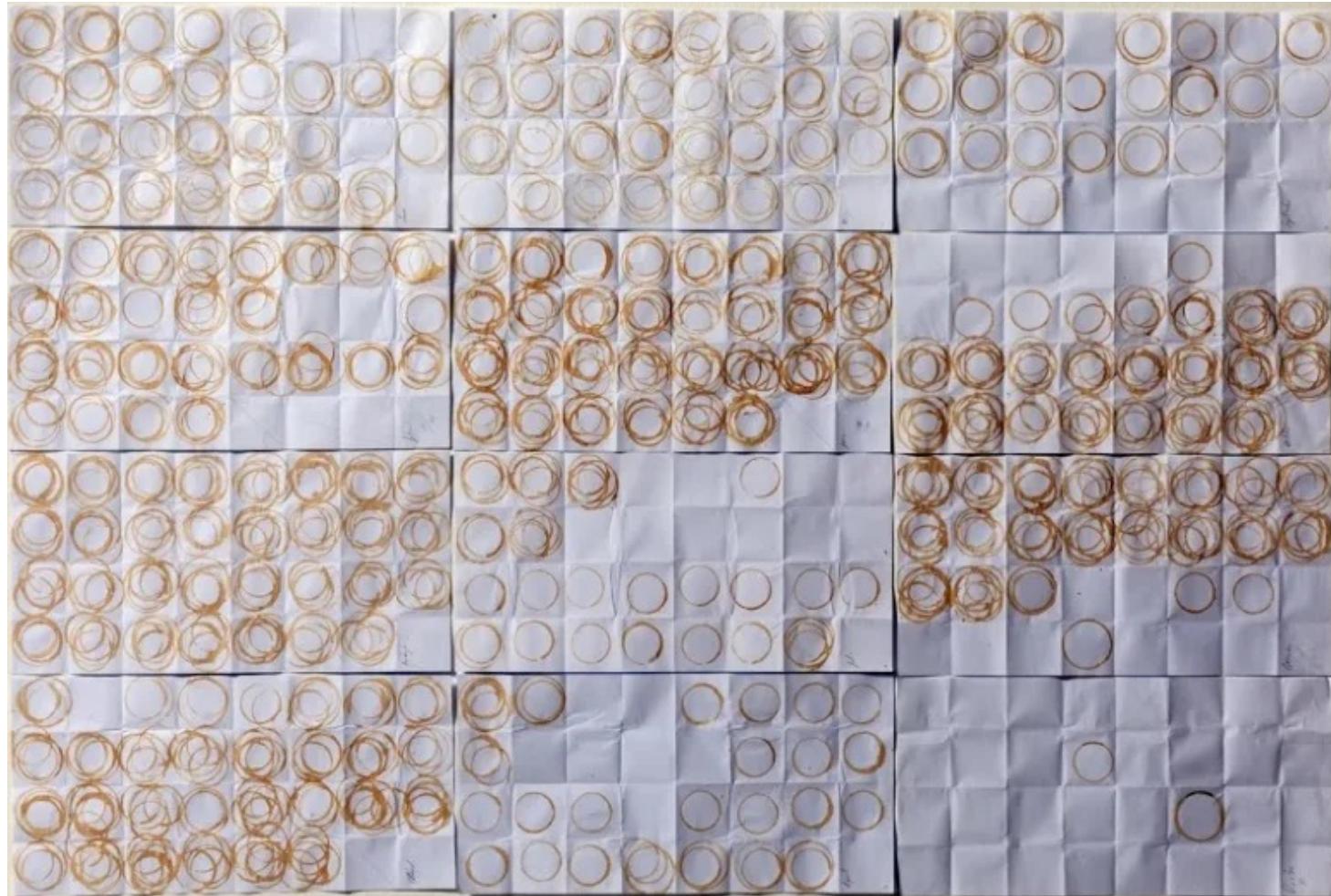


Frederica Fragapane,
The Scientific American

Koffieconsumptie in beeld...



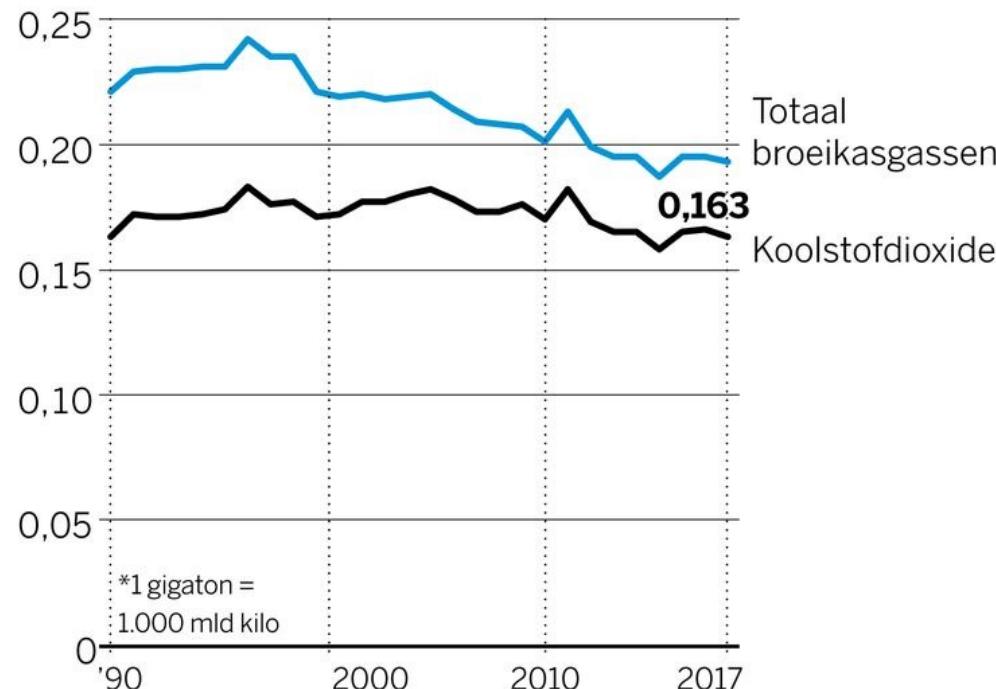
Koffieconsumptie in beeld...



CO₂ uitstoot in beeld...

CO₂ NEDERLAND DAALT

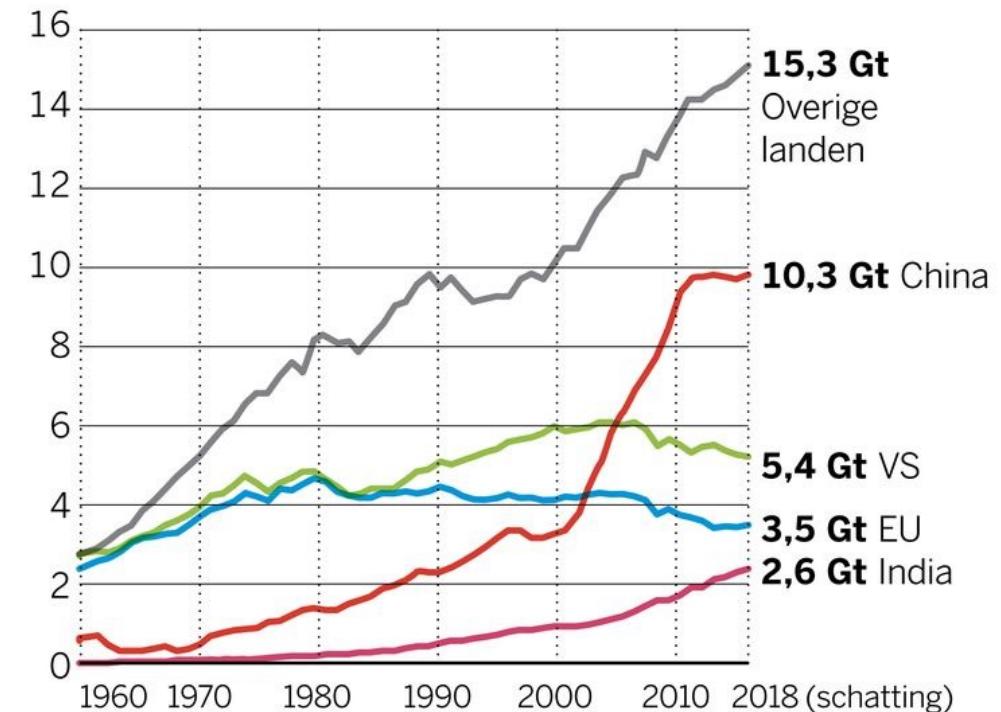
Uitstoot in gigaton* CO₂-equivalenten



051218 © VK. Bron: CBS, RIVM/Emissieregistratie

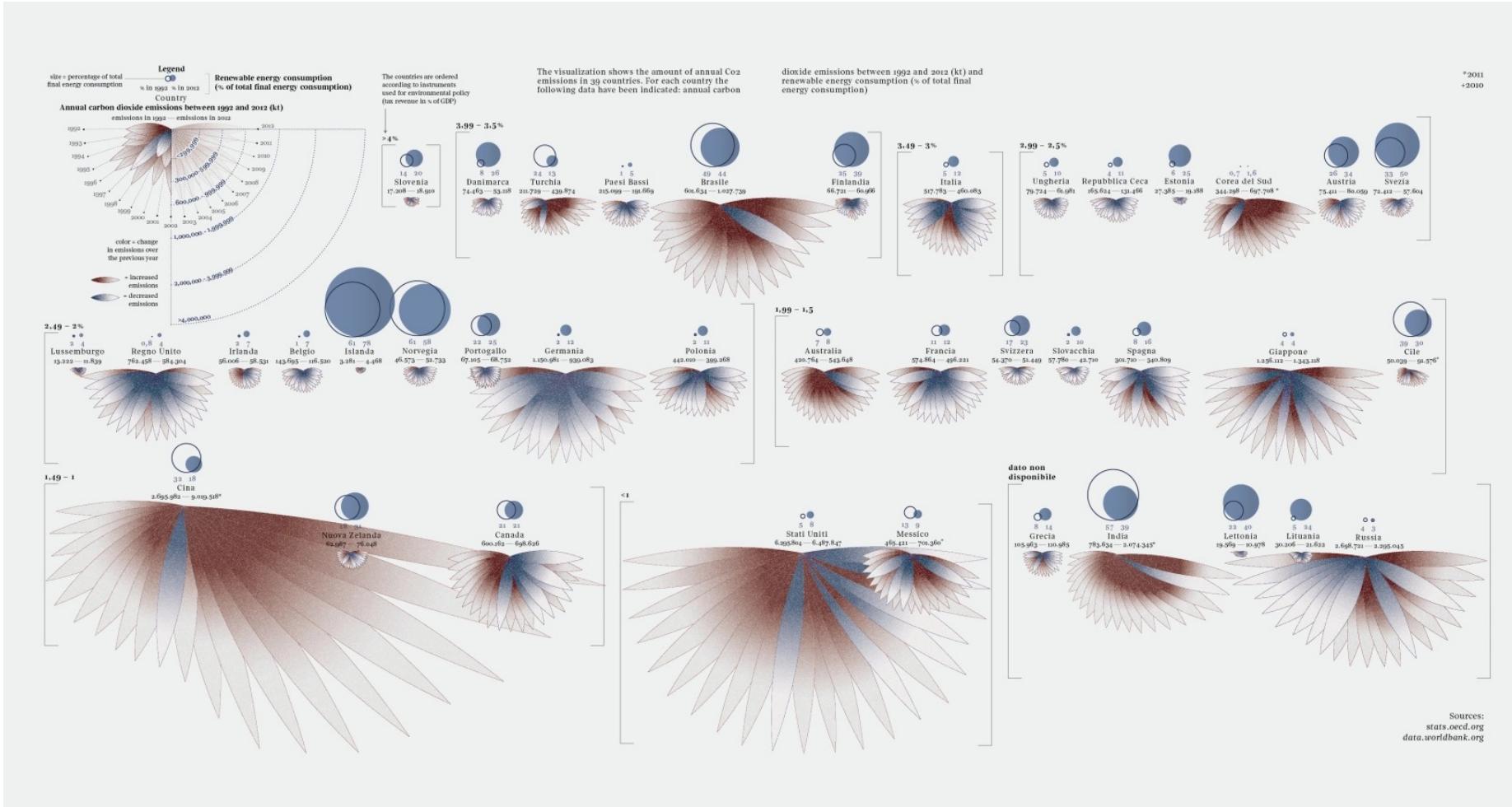
CHINA KOPLOPER UITSTOOT

CO₂-uitstoot uit fossiele brandstoffen in gigaton



051218 © de Volkskrant . Bron: Global Carbon Project

CO₂ uitstoot in beeld...

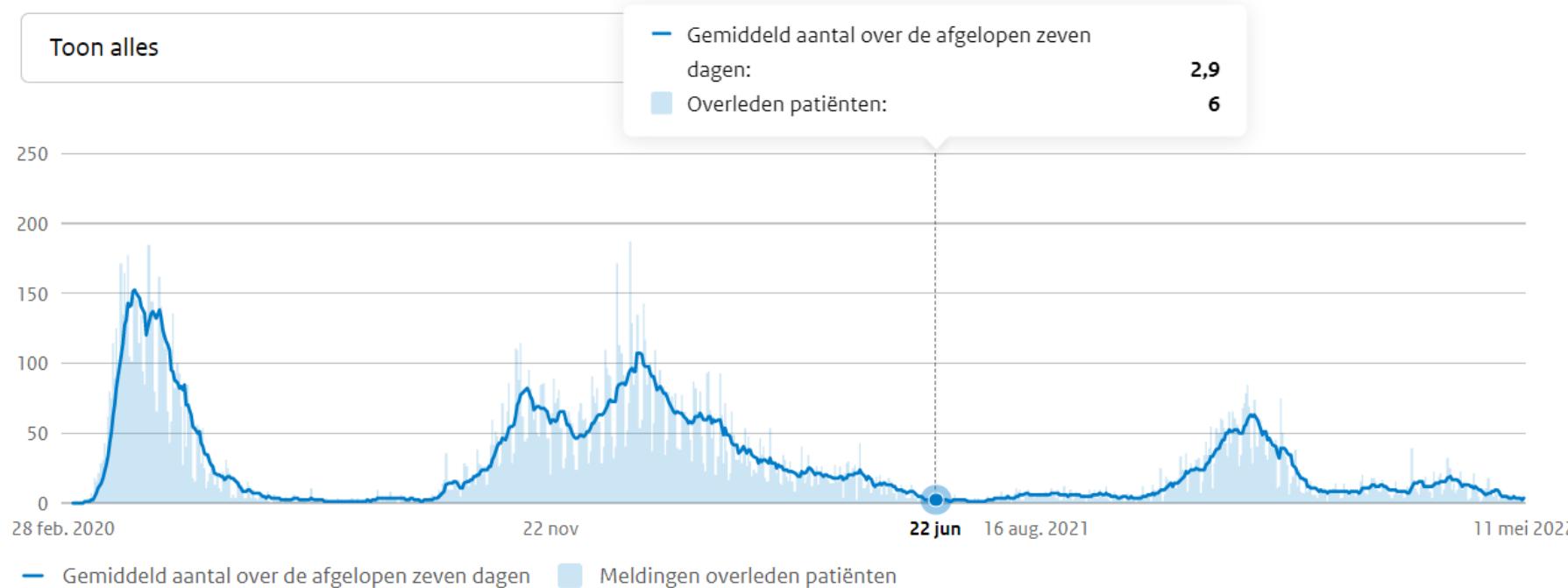


Covid-19 sterfte in beeld

Meldingen van aan COVID-19 overleden patiënten door de tijd heen



Deze grafiek laat zien van hoeveel COVID-19-patiënten gemeld is dat ze zijn overleden. In de grafiek tonen we ook gemiddelden over de afgelopen zeven dagen.



Bron: RIVM

Covid-19 sterfte in beeld: zo kan het ook...



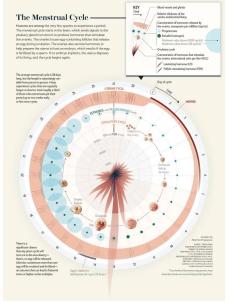
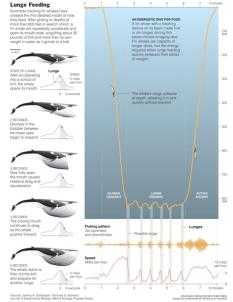
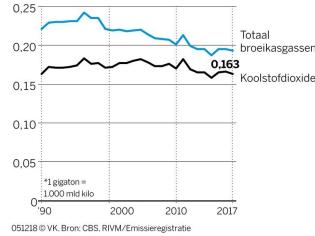
Kristin Briney,
<https://nightingaledvs.com/crafting-a-covid-visualization/>



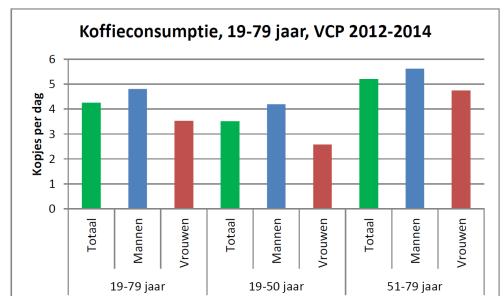
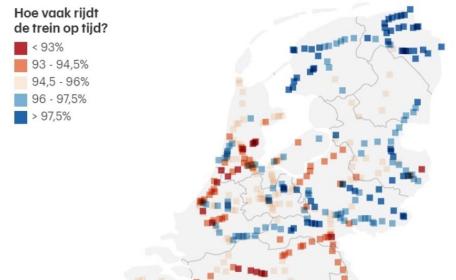
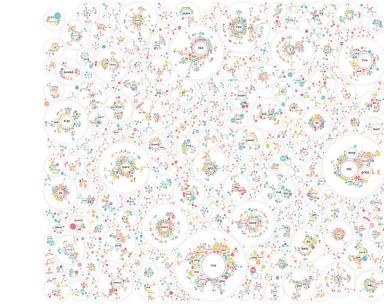
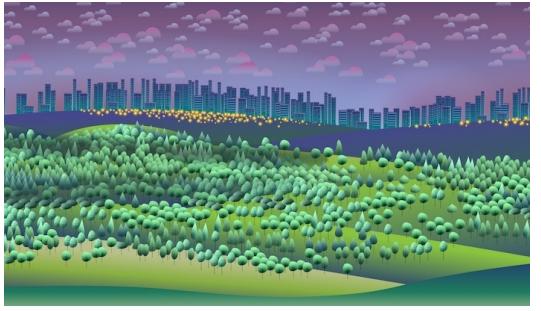
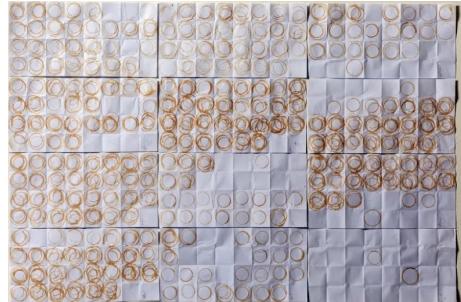
Suzanne Firstenberg,
<https://suzannefirstenberg.com/in-america-covid-19-white-flags-in-dc-suzanne-firstenberg/>

CO₂ NEDERLAND DAALT

Uitstoot in gigaton* CO₂-equivalente

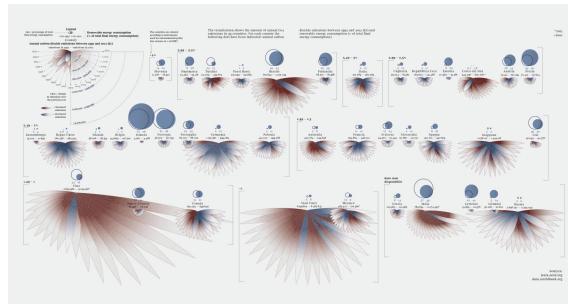
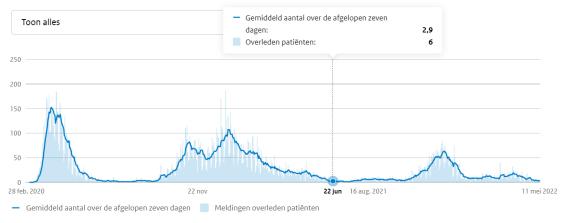


Voldoedingsopgave	Aantal meldingen per 100.000 gediplomeerde duopleinen / daggen
Amsterdam-Amstelland	408
Rotterdam-Rijnmond	362
Hollandse Kust-Zuid	334
Zuid-Holland-Zuid	314
Utrecht	313
Zaanstreek-Waterland	305
Midden-Holland	300
Brabant-Zuidoost	261
Gooi en Vechtstreek	260
Twente	257
Overijssel	244
Midden- en West-Brabant	242
Gelderland Zuid	224
Gelderland Midden	220
Brabant-Noord	215
Drenthe	196
Limburg-Noord	173
Limburg-Zuid	172
Flevoland	167
Fryslân	166
IJsselland	154
Noord-Holland-Oost	150
Noord-Holland-Noord	122
Limburg-Zuid	107
Zeeland	89
Nederland-totaal	252



Meldingen van aan COVID-19 overleden patiënten door de tijd heen

Dit grafiek laat zien van hoeveel COVID-19-patiënten gemeld is dat ze zijn overleden. In de grafiek tonen we ook gemiddelden over de afgelopen zeven dagen.



39

users



CHINA KOPLOPER UITSTOOT

CO₂-uitstoot uit fossiele brandstoffen in gigaton



Hoe visuele (data-)
communicatie ?

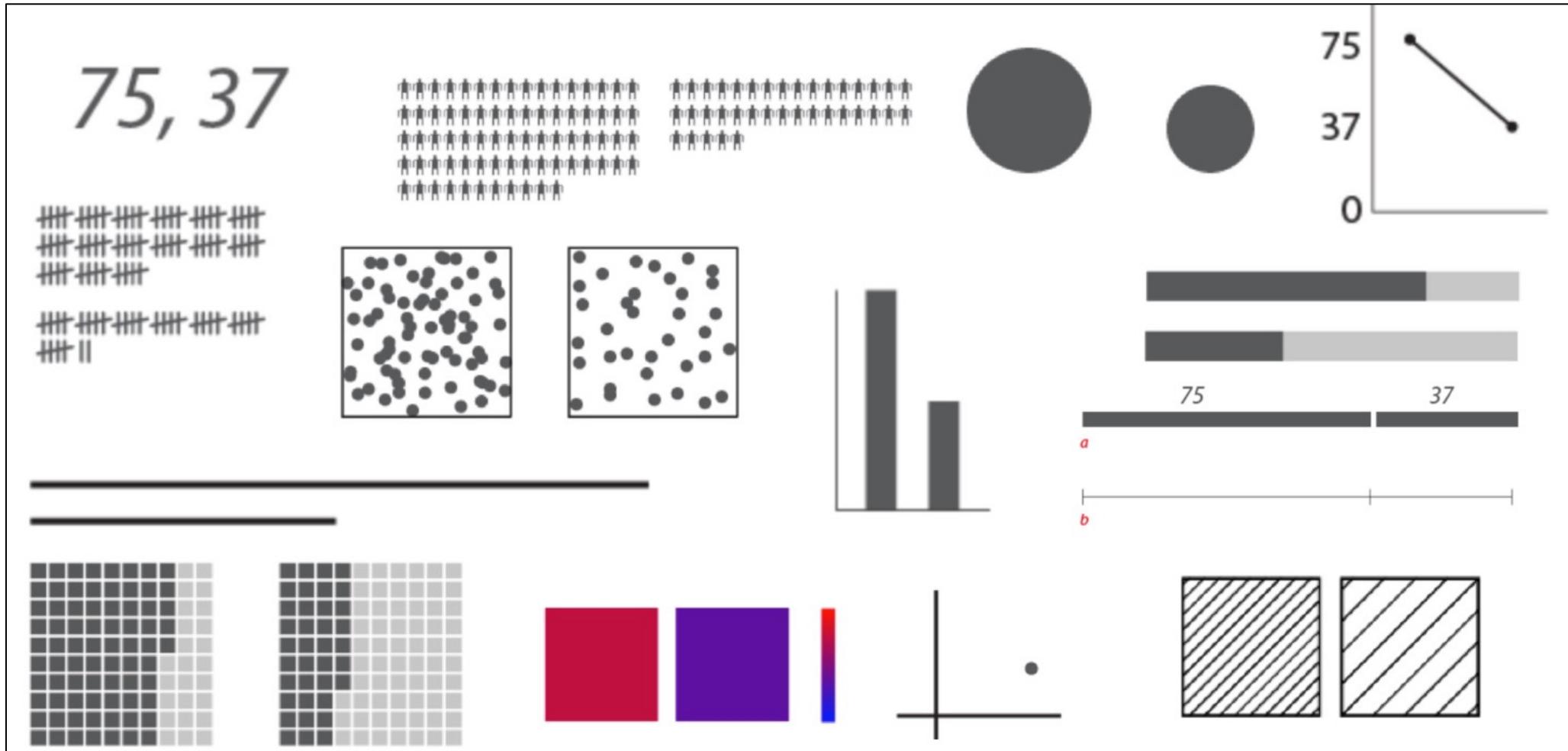
Twee getallen:

75 en 37



5 min

Een paar van de 45...



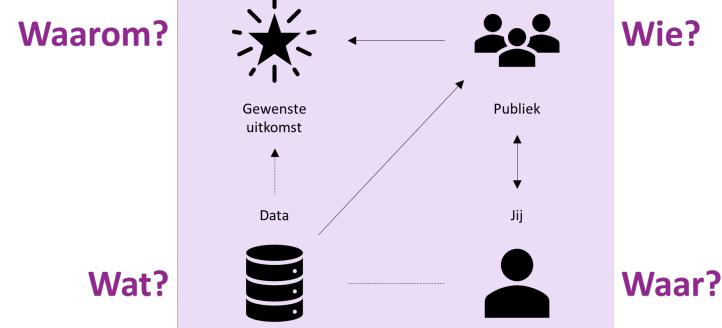
Zoveel mogelijkheden, hoe kies je?



Zoveel mogelijkheden, hoe kies je?

1.

Wat is de context?



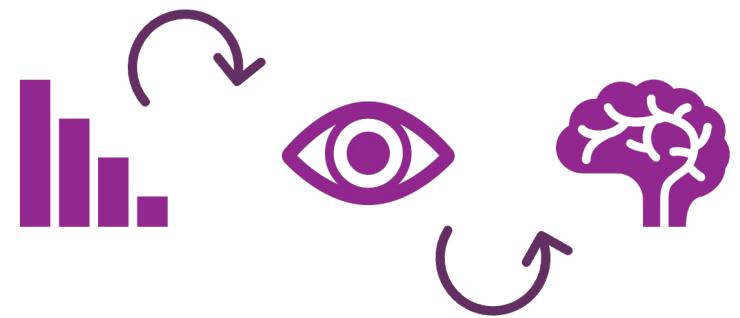
2.

Wat wil je laten zien?



3.

Hoe verwerkt ons brein visuele informatie?



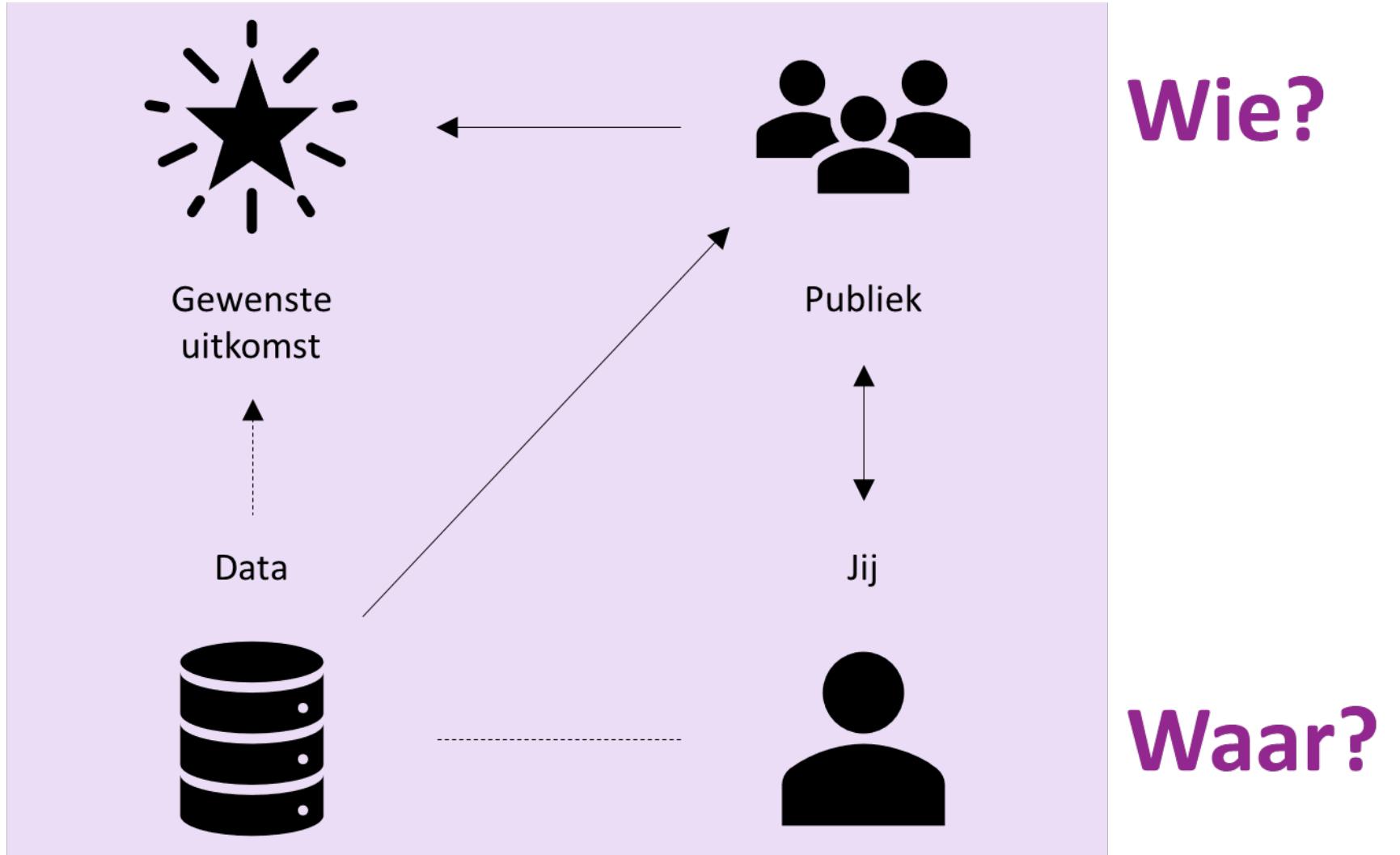
STORY

DATA

DESIGN

1. Ken de context

Waarom?



Wat?

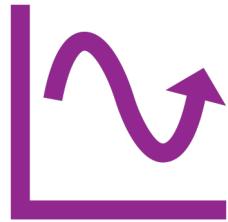
Wie?

Waar?

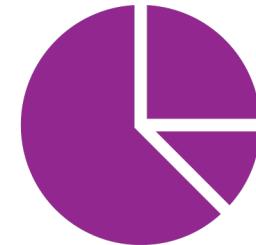
2. Kies een grafiek: wat wil je laten zien?



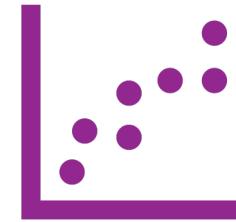
Vergelijking



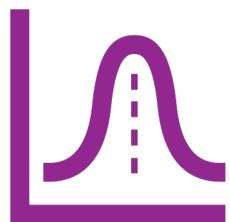
Trend



Deel van een
geheel



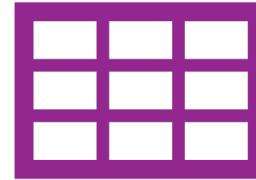
Relatie



Verdeling



Lokatie



Exacte waarden

1) Kies je grafiek

Wat wil je laten zien?



categorie



tijd



deel van geheel



distributie



geospatiaal



relatie



exacte waarde

6



Gebruik deze grafiek om te

onderzoeken

communiceren

monitoren

verwarmen

Meer tips over grafiek keuze en grafiek ontwerp kun je vinden op

Zoveel mogelijkheden, hoe kies je?



Eén dataset, meerdere verhalen

Aantal besmettingen	Stad
250	Amsterdam
110	Rotterdam
125	Den Haag
23	Utrecht
125	Eindhoven
55	Groningen
155	Leeuwarden
85	Enschede
120	Maastricht
15	Bilthoven

5 min



5 Scenarios:

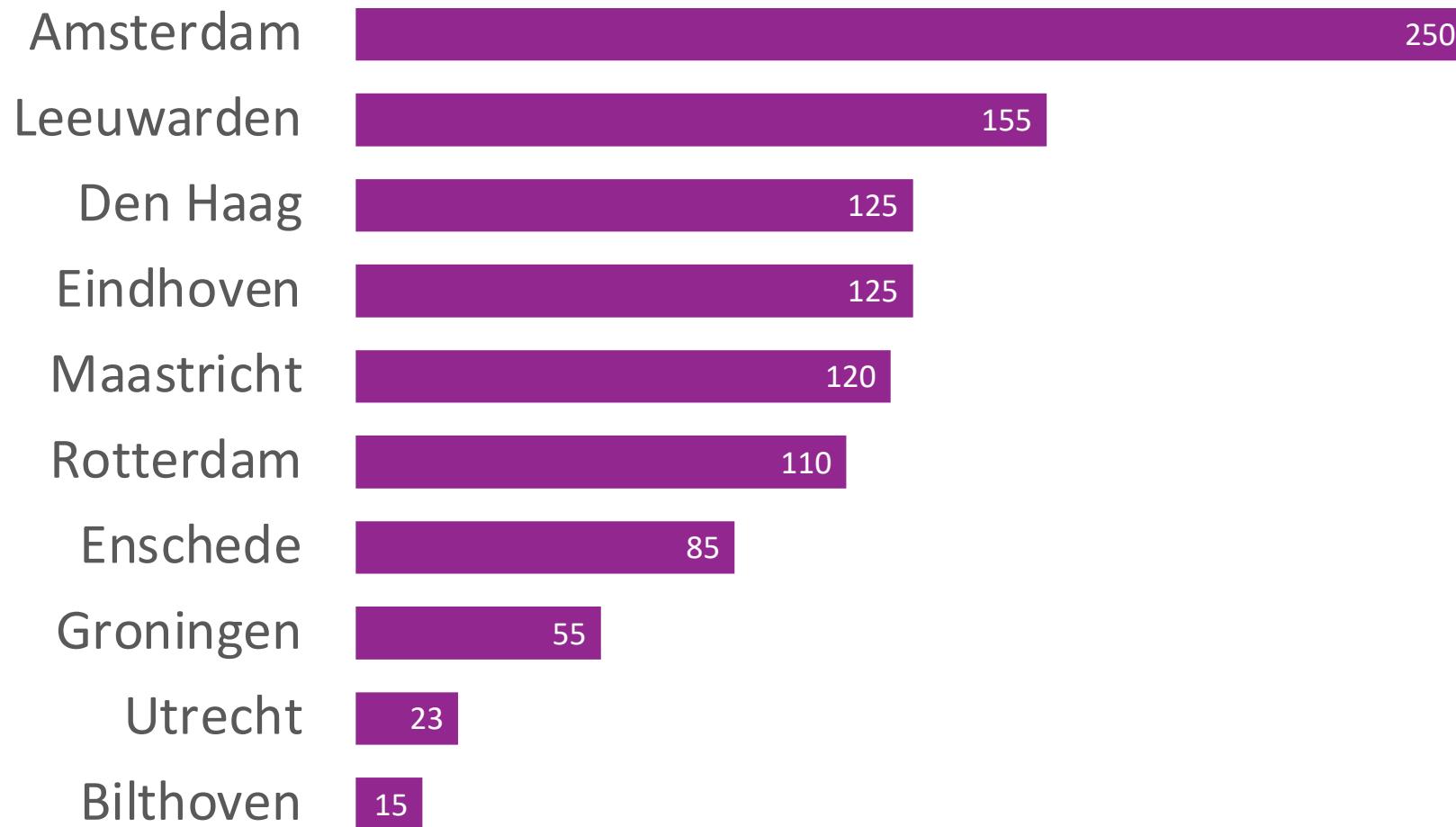
Lezer wil weten:

1. Hoeveel besmette personen zijn er per stad?
2. Op welke plaats staat Maastricht?
3. Hoe verhoudt het aantal in Amsterdam zich tot de andere steden?
4. Welke steden hebben meer dan 100 besmettingen?
5. Heeft de afstand tussen de steden invloed op het aantal besmettingen?

Hoeveel besmette personen zijn er per stad?

Stad	Aantal besmettingen	Stad	Aantal besmettingen
Amsterdam	250	Amsterdam	250
Leeuwarden	155	Bilthoven	15
Den Haag	125	Den Haag	125
Eindhoven	125	Eindhoven	125
Maastricht	120	Enschede	85
Rotterdam	110	Groningen	55
Enschede	85	Leeuwarden	155
Groningen	55	Maastricht	55
Utrecht	23	Rotterdam	110
Bilthoven	15	Utrecht	23

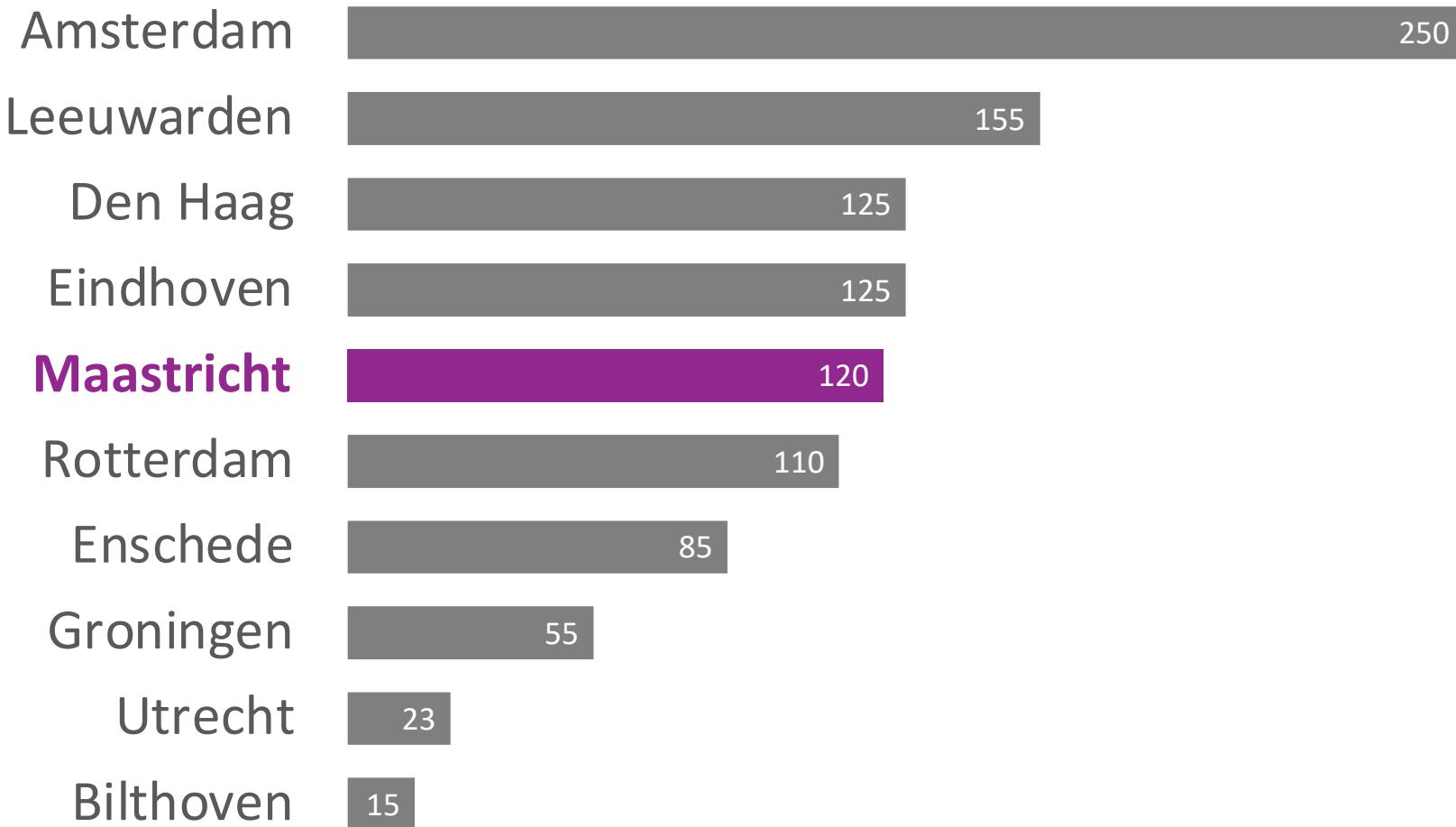
Hoeveel besmette personen zijn er per stad?



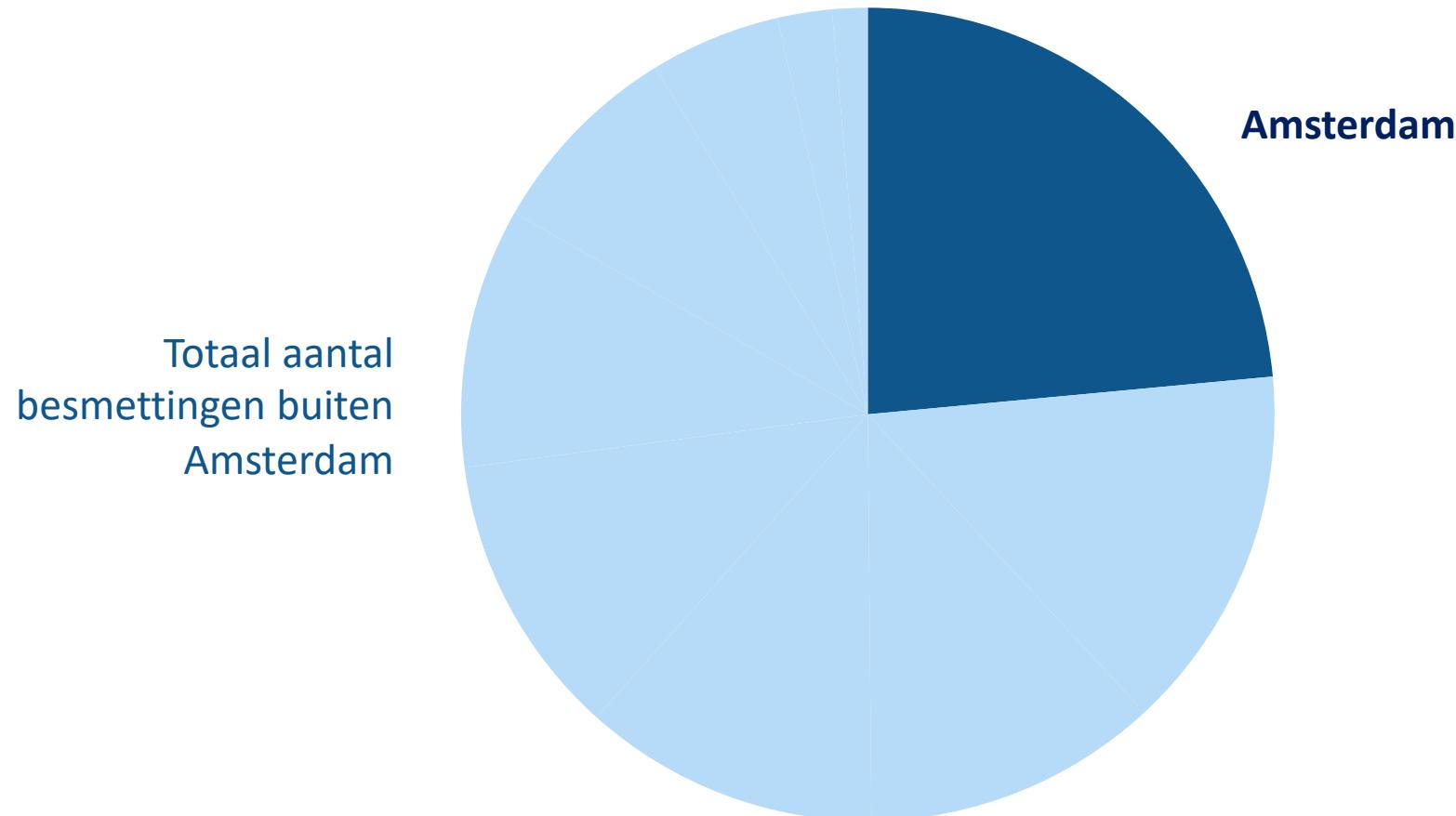
Op welke plaats staat Maastricht?

	Stad	Aantal besmettingen
1.	Amsterdam	250
2.	Leeuwarden	155
3.	Den Haag	125
4.	Eindhoven	125
5.	Maastricht	120
6.	Rotterdam	110
7.	Enschede	85
8.	Groningen	55
9.	Utrecht	23
10.	Bilthoven	15

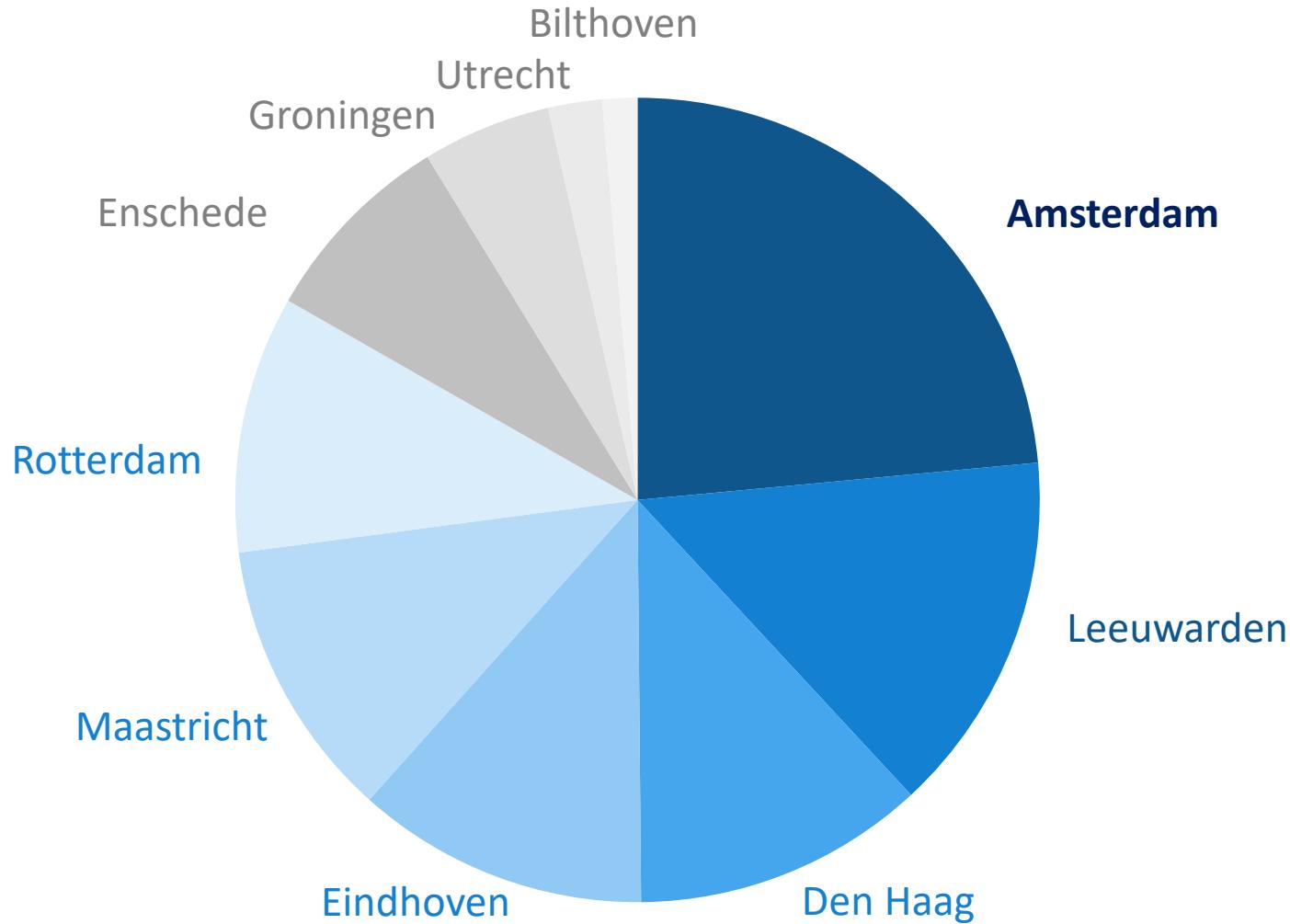
Op welke plaats staat Maastricht?



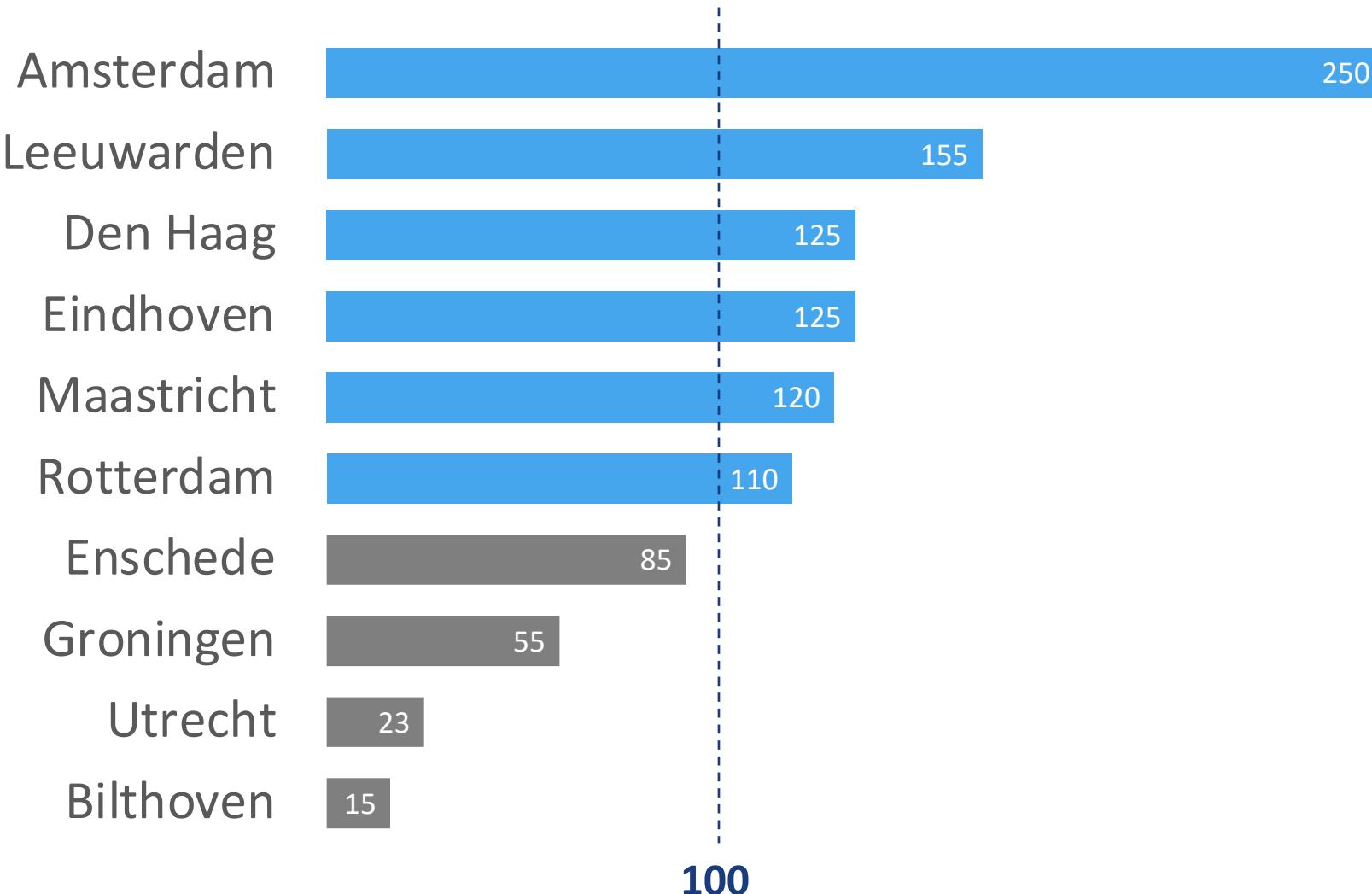
Hoe verhoudt het aantal besmettingen in Amsterdam zich tot de andere steden?



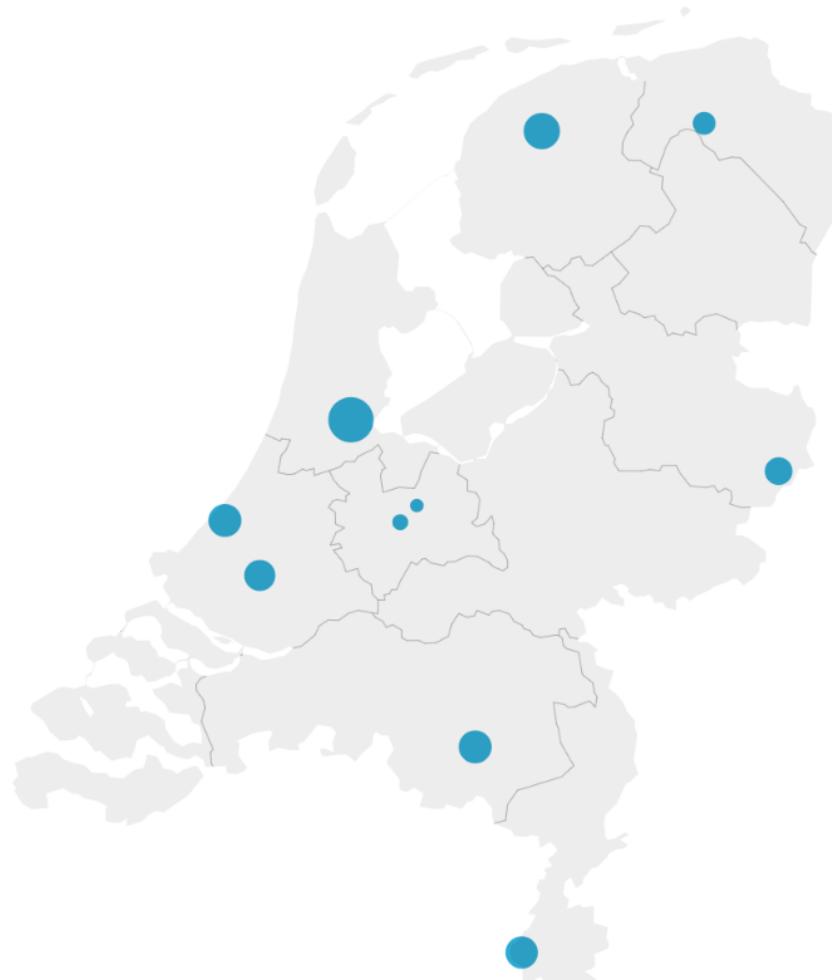
Hoe verhoudt het aantal besmettingen in Amsterdam zich tot de andere steden?



Welke steden hebben meer dan 100 besmettingen?



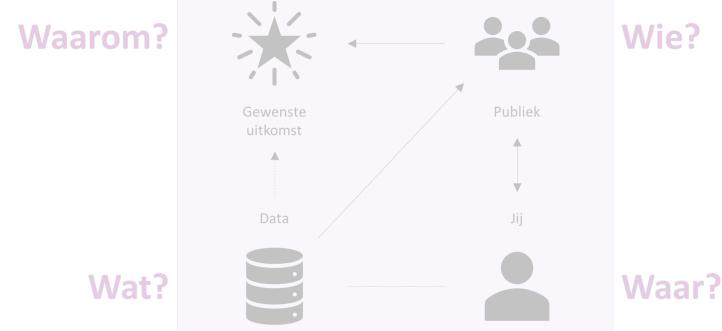
Heeft de afstand tussen de steden invloed op het aantal besmettingen?



Zoveel mogelijkheden, hoe kies je?

1.

Wat is de context?



STORY

2.

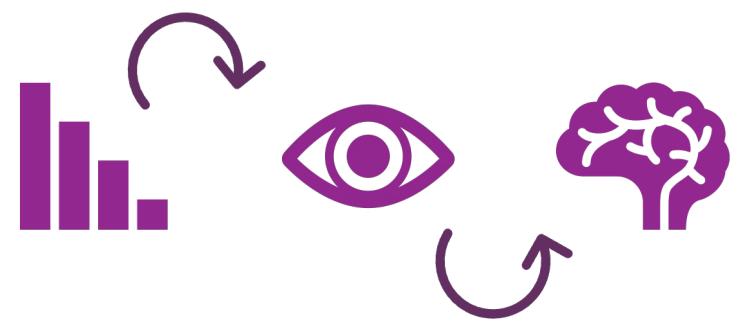
Wat wil je laten zien?



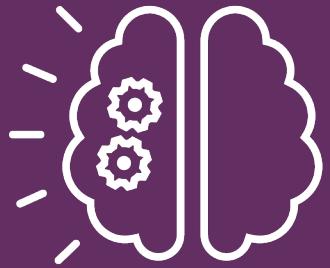
DATA

3.

Hoe verwerkt ons brein visuele informatie?



DESIGN



Visuele perceptie

Waar zijn we **goed** in?

“The eyes only see what the mind is prepared to comprehend.” – Henri Bergson.

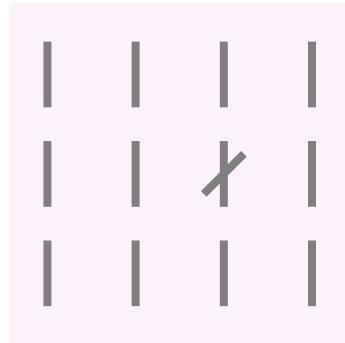
Hoeveel 5-en zie je?

321654643216465132168461321
646432136748651349687463123
668432616266984892536496874
651687964649843616984616957
465167412323161689312439873
421432875943869234987596387

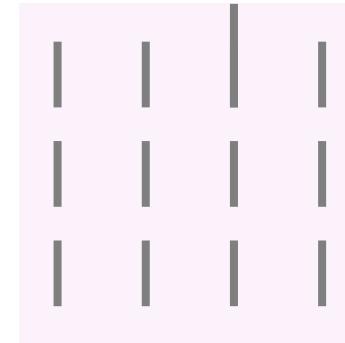
Hoeveel 5-en zie je?

321654643216465132168461321
646432136748651349687463123
668432616266984892536496874
651687964649843616984616957
465167412323161689312439873
421432875943869234987596387

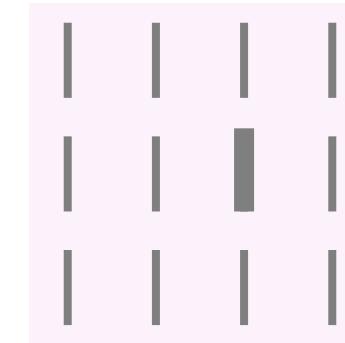
Pre-attentieve eigenschappen helpen de lezer te laten zien wat je wil dat ze zien!



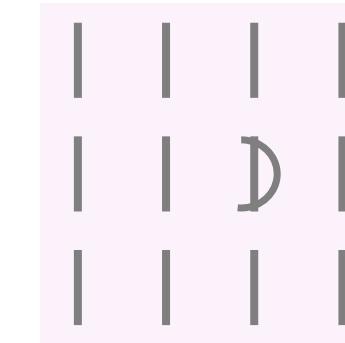
Orientering



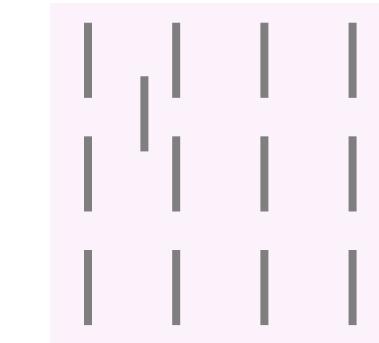
Lengte



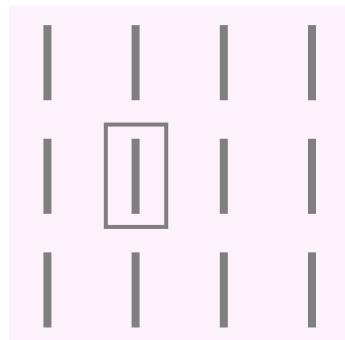
Breedte



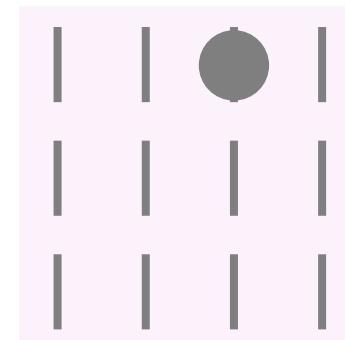
Kromming



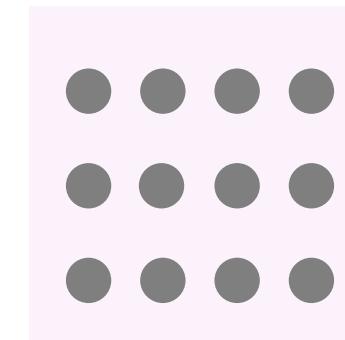
Positie



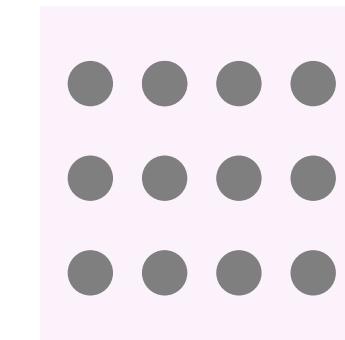
Omsluiting



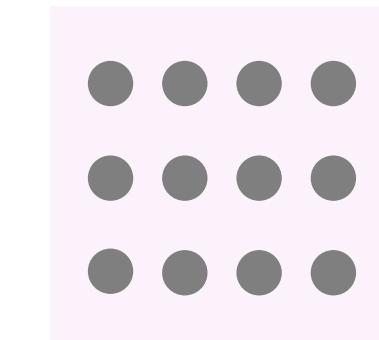
Vorm



Grootte



Kleur



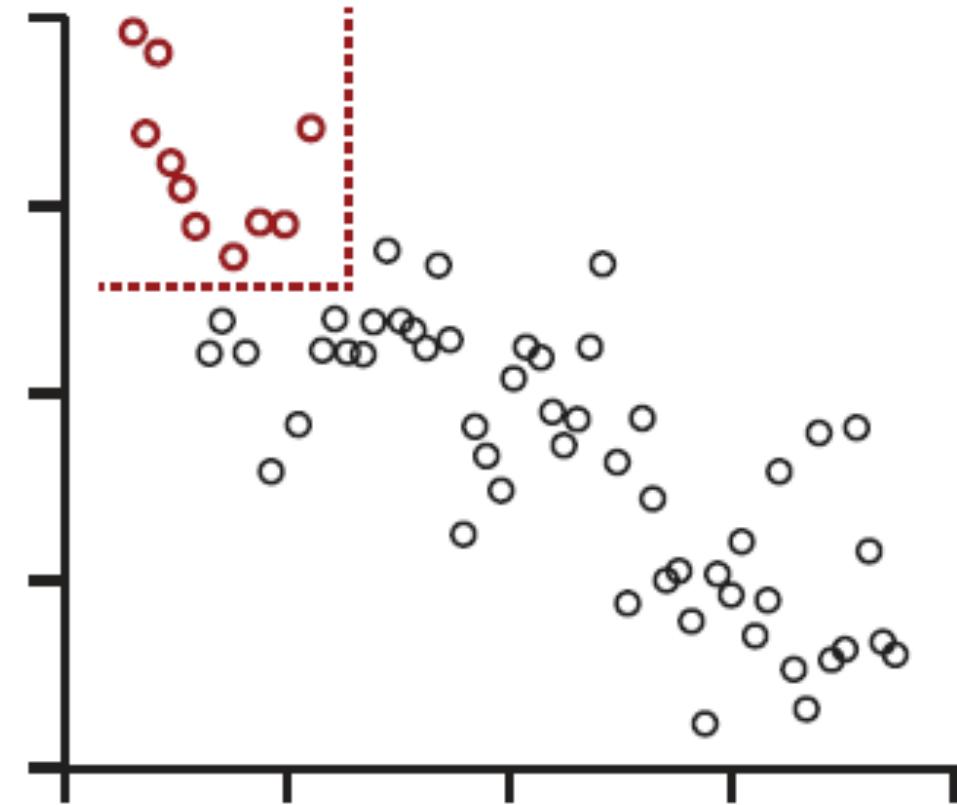
Beweging

Je kunt **pre-attentieve** visuele eigenschappen gebruiken in tabellen

Color name	RGB (1-255)
Black	0, 0, 0
Orange	230, 159, 0
Sky blue	86, 180, 233
Bluish green	0, 158, 115
Blue	0, 114, 178
Vermillion	213, 94, 0

Je kunt **pre-attentieve** visuele eigenschappen gebruiken in tabellen en grafieken

Color name	RGB (1-255)
Black	0, 0, 0
Orange	230, 159, 0
Sky blue	86, 180, 233
Bluish green	0, 158, 115
Blue	0, 114, 178
Vermillion	213, 94, 0



Maar ook in tekst

Hoe kun je pre-attentieve eigenschappen benutten in tekst?

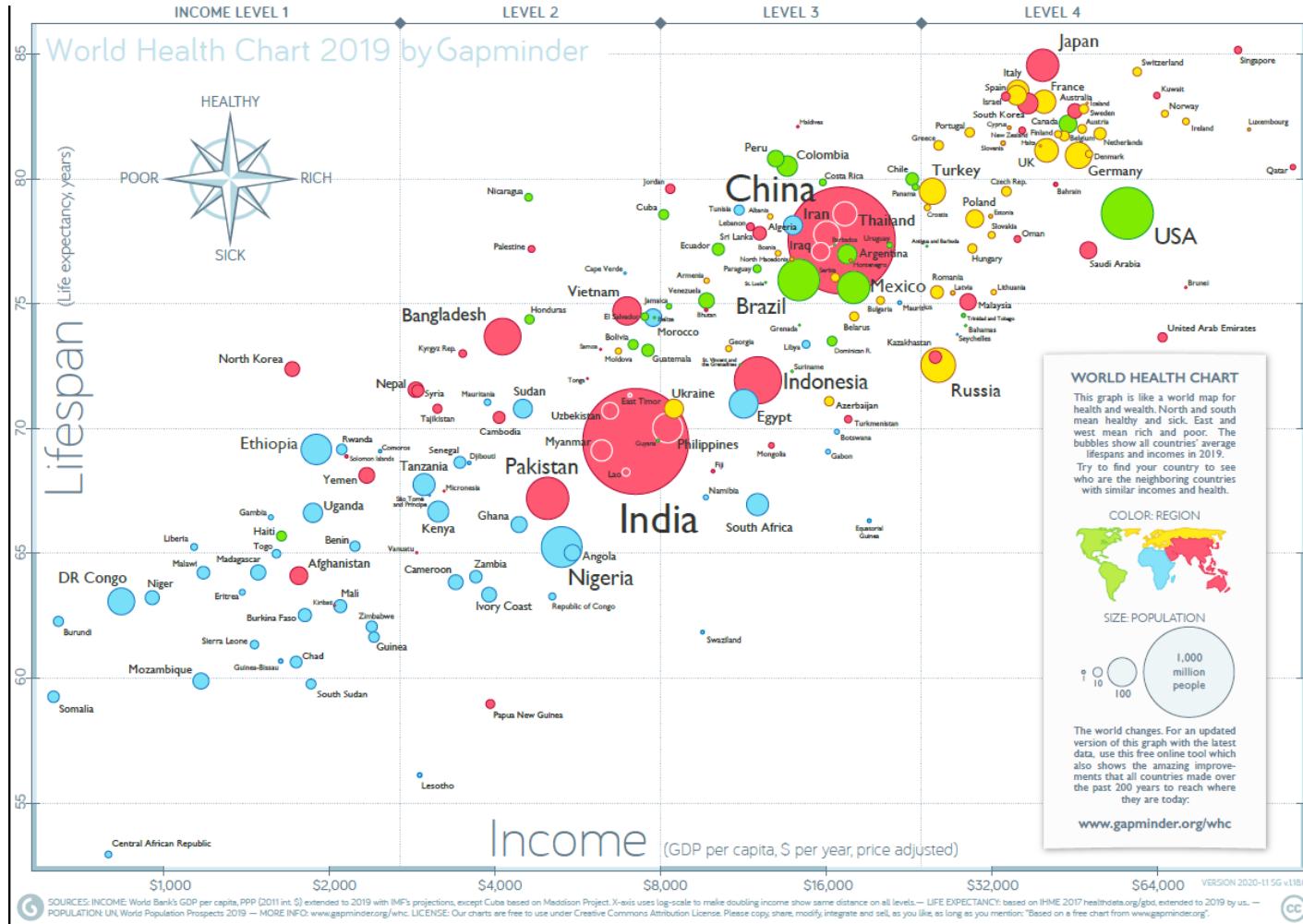
Zonder pre-attentieve eigenschappen heb je enkel kale tekst. Of een kale figuur. Er is geen hulp voor de lezer om te weten waar hij moet kijken.

Met pre-attentieve eigenschappen kun je:

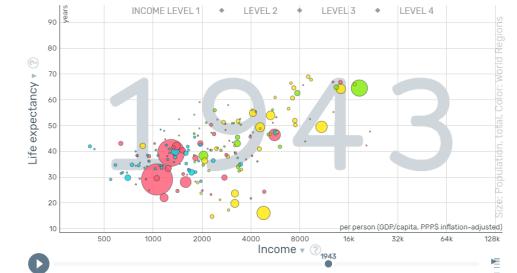
- (1) *De aandacht van de lezer trekken naar* **waar je wilt dat hij kijkt**, en
- (2) *Een visuele hiërarchie van informatie creëren.*

Dit geldt voor zowel **grafieken** als **tekst**!

Pre-attentieve eigenschappen creeëren een visuele hiërarchie van informatie



Positie
Grootte
Kleur
Beweging



<https://www.gapminder.org/tools>

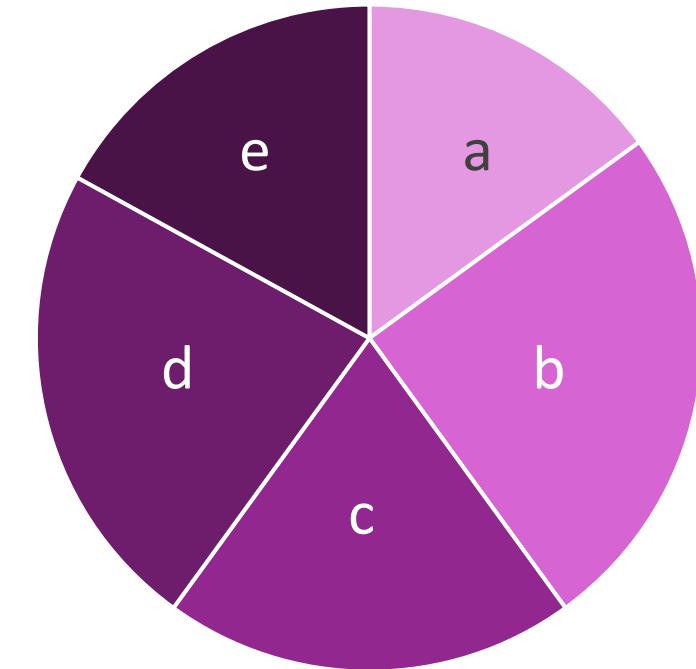
<https://www.youtube.com/watch?v=jbkSRLYSOjo>

Pre-attentieve visuele eigenschappen helpen om **kwantitatieve** gegevens weer te geven

Welke staaf is het hoogst?

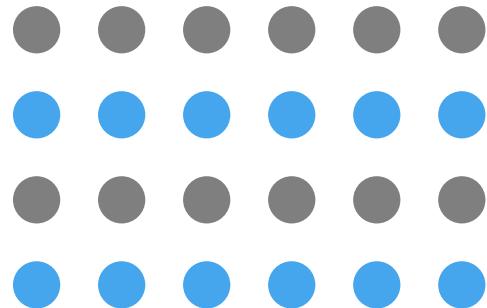


Welk punt is het grootst?

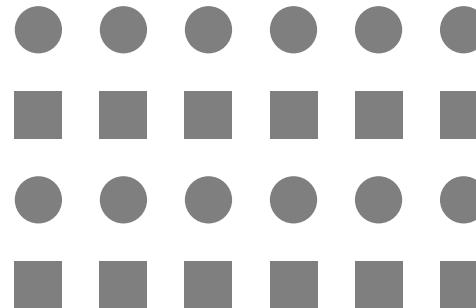


Gestalt principes beschrijven hoe ons brein visuele informatie organiseert

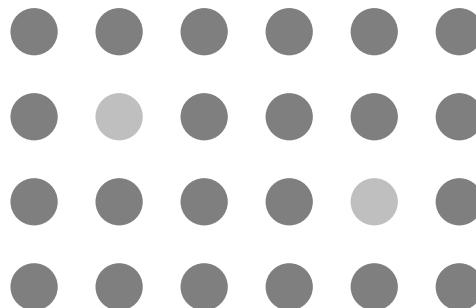
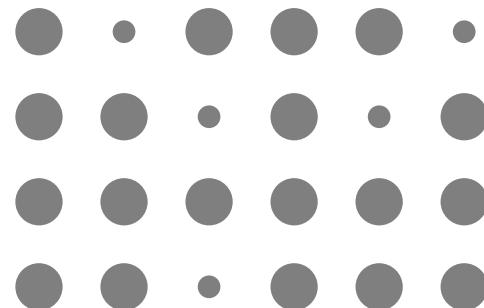
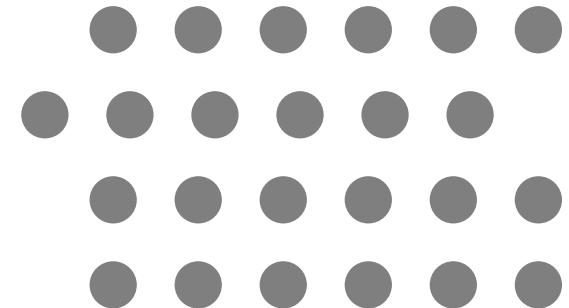
Kleur



Vorm



Positie

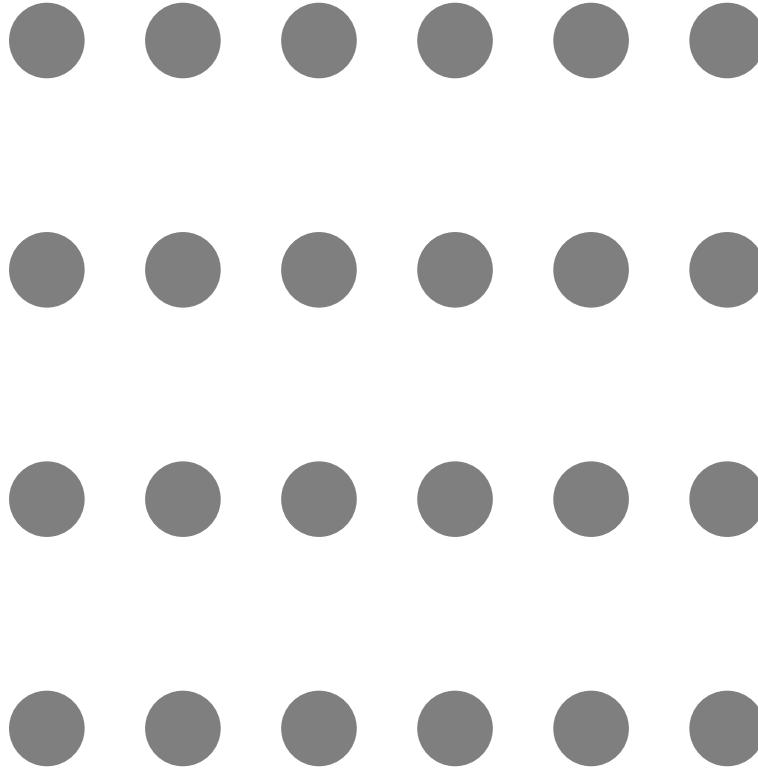


Grootte

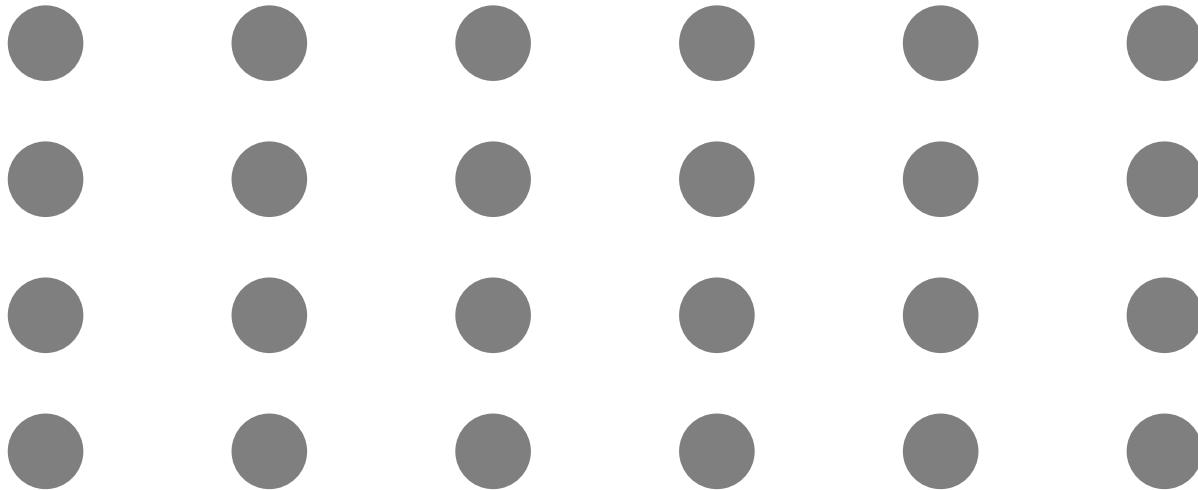
Tint

Groeperen op
Overeenkomst

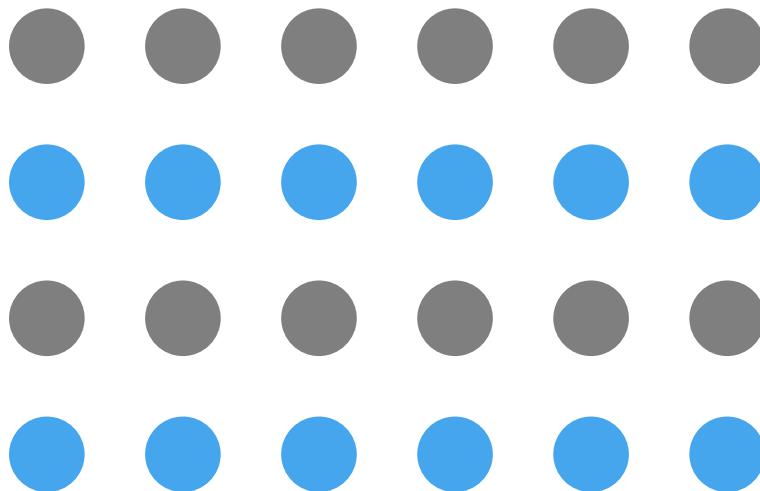
Zie je 4 rijen of 6 kolommen?



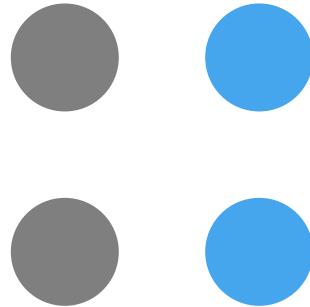
En nu?



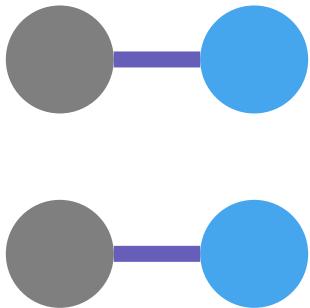
Zie je 4 rijen of 6 kolommen?



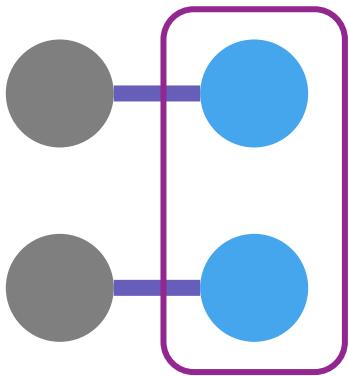
Welke stippen horen bij elkaar?



En nu...?



En nu...?

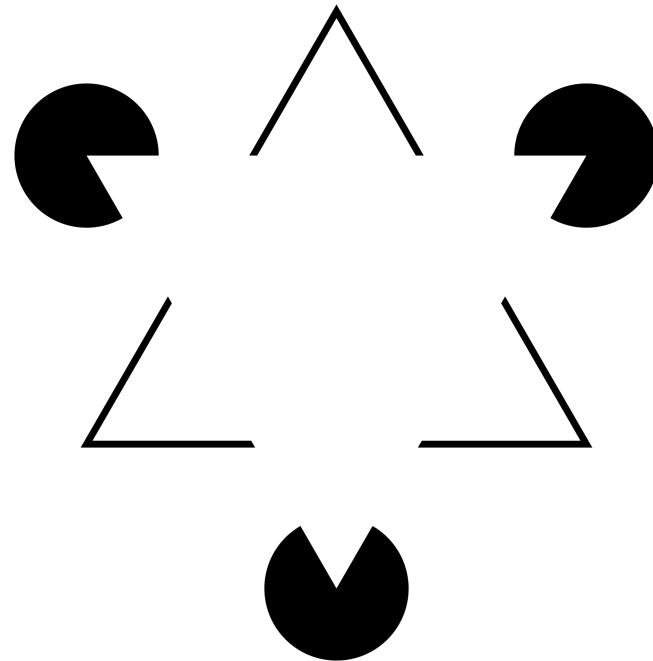
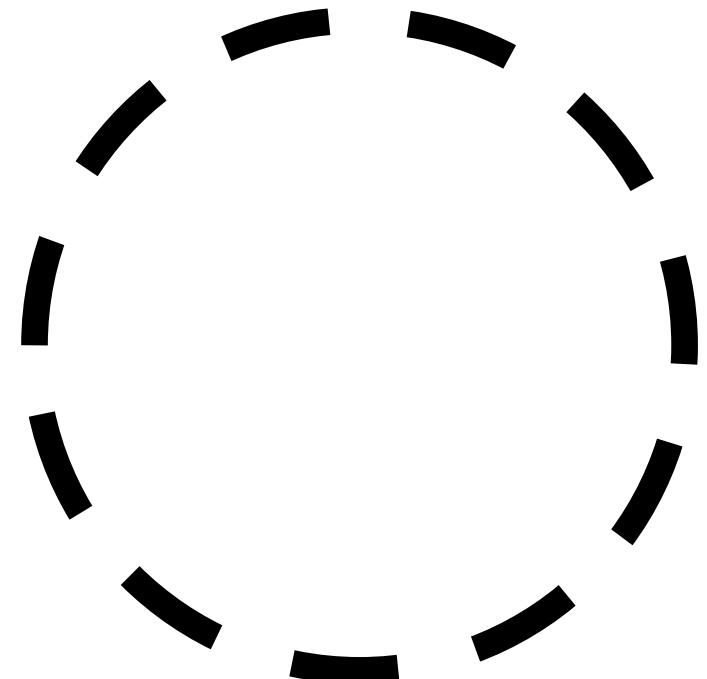


Wat staat hier?

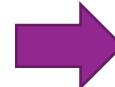
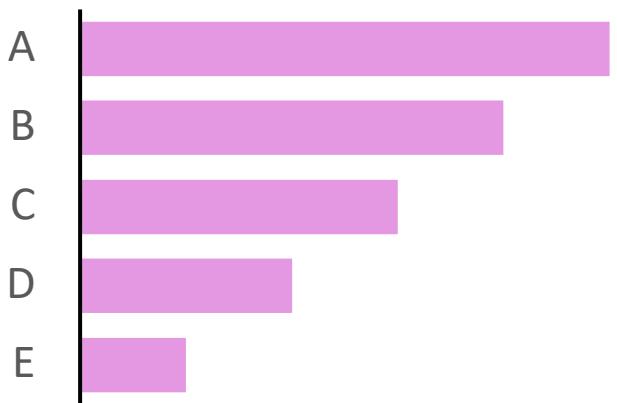
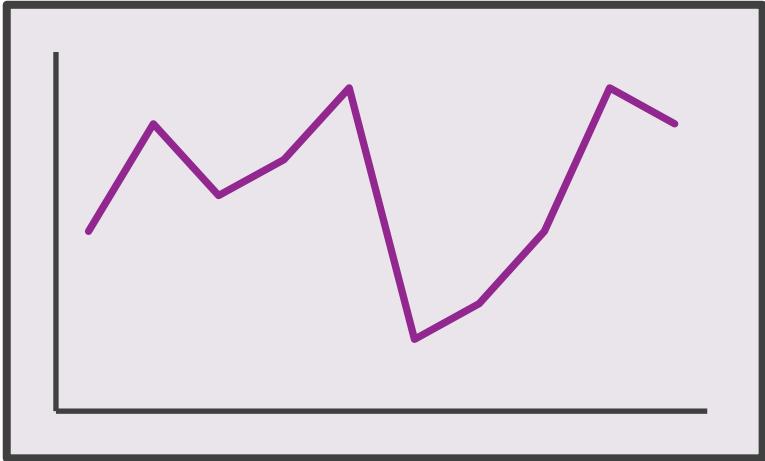
Vlgones een oznrdeeok op een Egliese uvinretsiet mkaat
het neit uit in wlkee vloogdre de Itteers in een wrood saatn,
het einge wat blegnaijk is is dat de eretse en de Itaatse
Itteer op de jiutse patals saatn.

De rset van de Itteers mgoen wlelikueirg gpletaast wdoren
en je knut vrelvognes gwoeon lzeen wat er saatt. Odmat we
neit ekle Itteer op zcih lzeen maar het wrood als gheel.

Ons brein is goed in het zien van dingen die er niet expliciet hoeven zijn

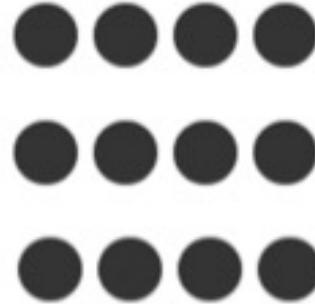


Je kunt dus best (onnodige) elementen uit een grafiek (of figuur) weglaten!

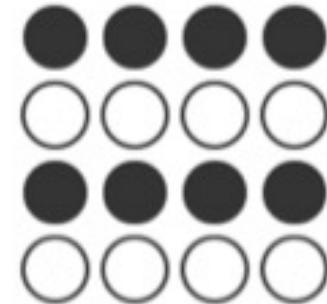


Gestalt principes: het geheel is meer dan de som der delen

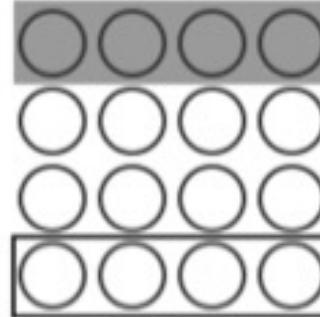
Nabijheid



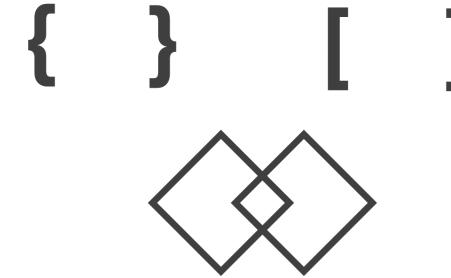
Overeenkomst



Omsluiting



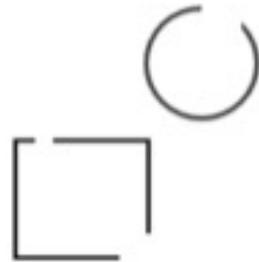
Symmetrie



Voor- en achtergrond



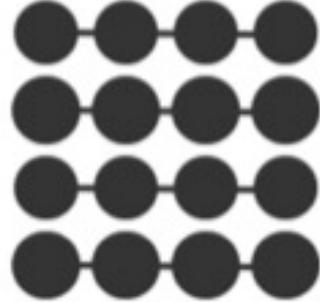
Afsluiting



Continuïteit



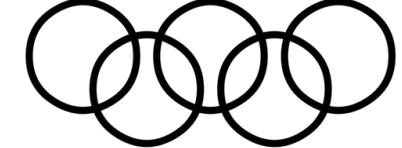
Verbinding



Gelijke richting



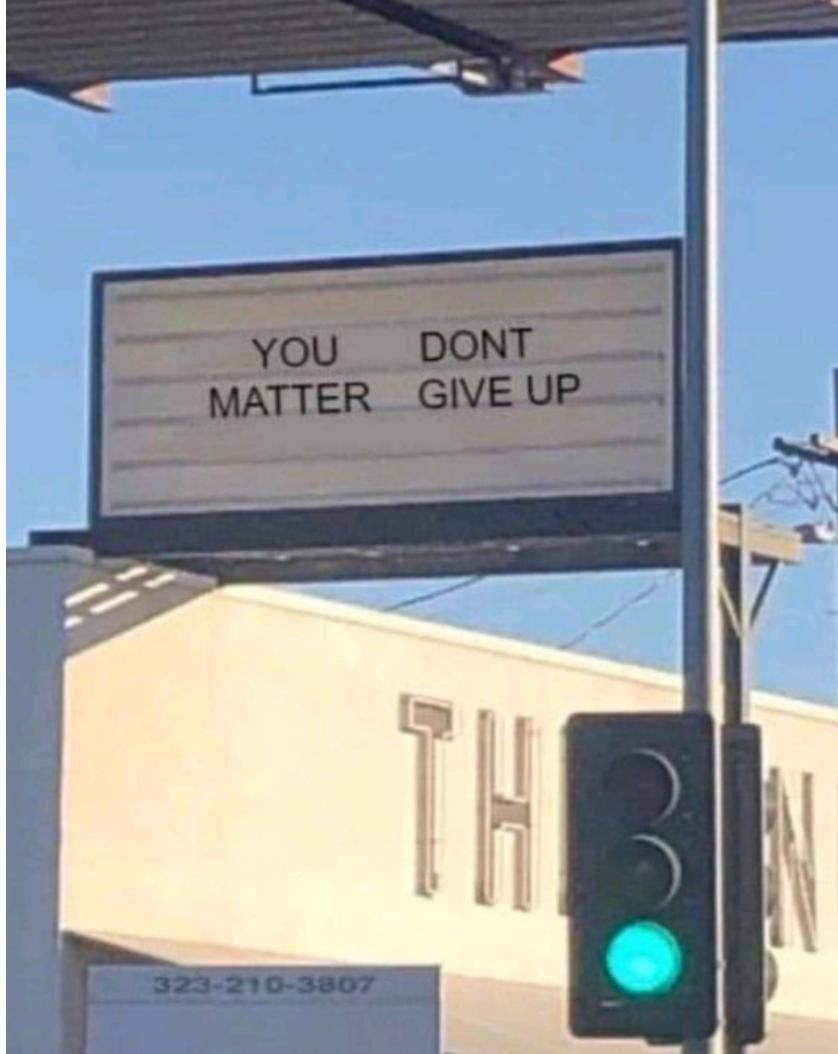
Eenvoud



Groeperen op kleur werkt niet altijd...



Groeperen op nabijheid ook niet...

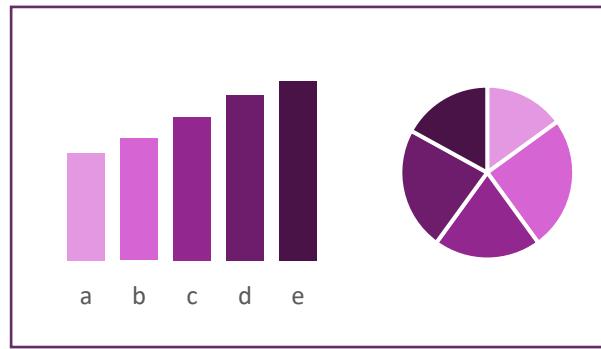


Waar zijn we **goed** in?

321654643216465132168461321
646432136748651349687463123
668432616266984892536496874
651687964649843616984616957
465167412323161689312439873
421432875943869234987596387

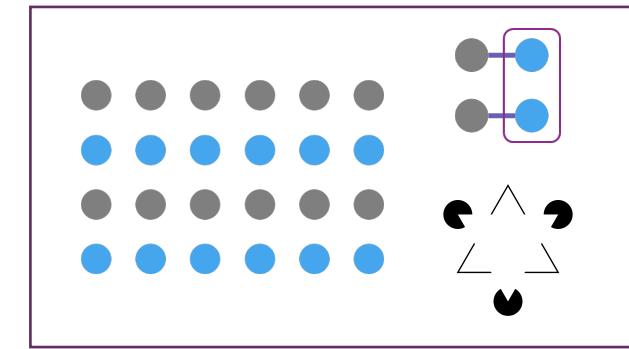
1.

Zien wat eruit springt



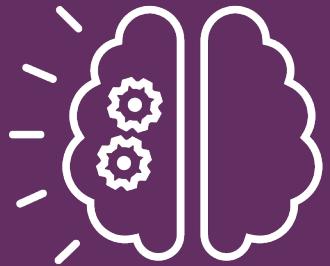
2.

Kwantitatieve informatie
afleiden uit visuele
vormen



3.

Zien wat bij elkaar hoort

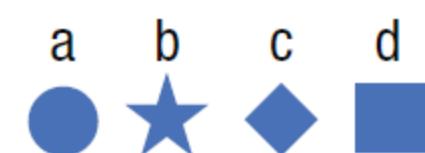
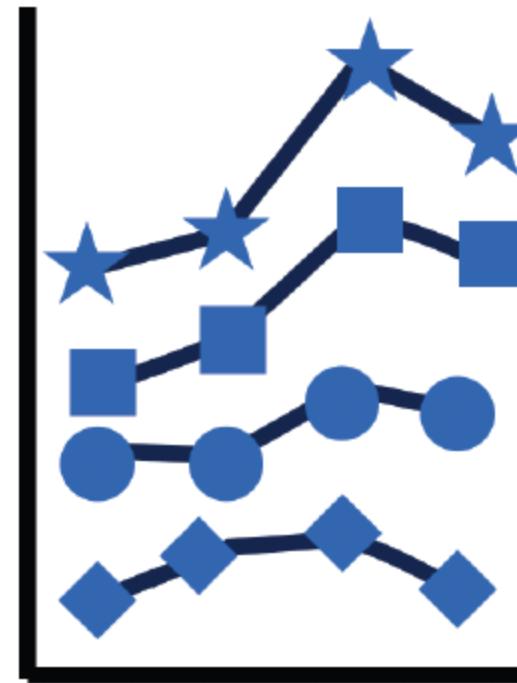
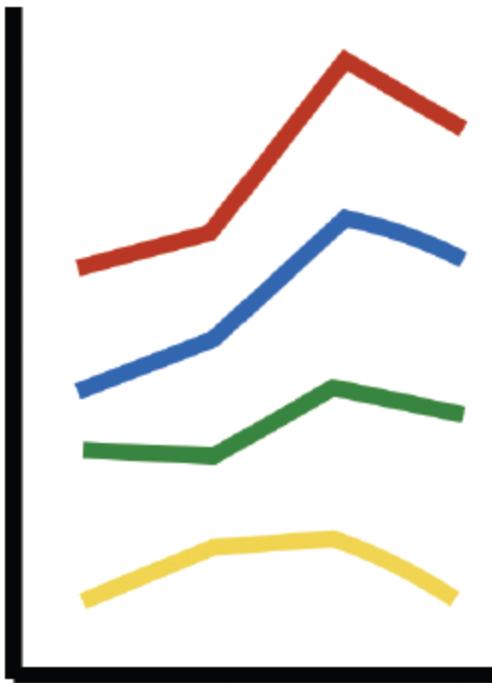
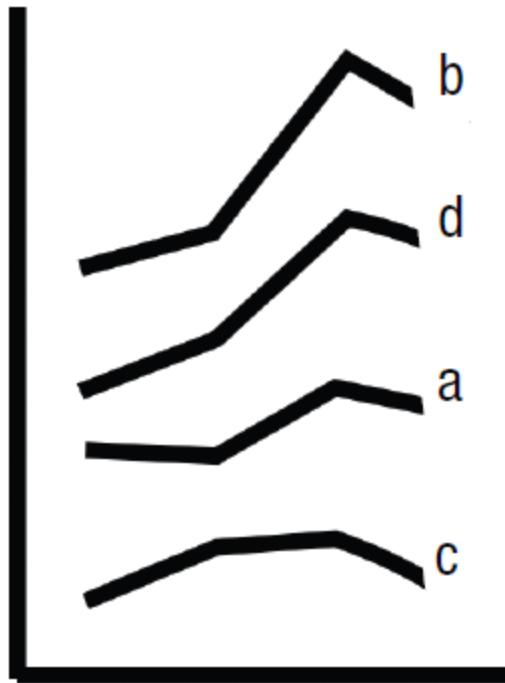


Visuele perceptie

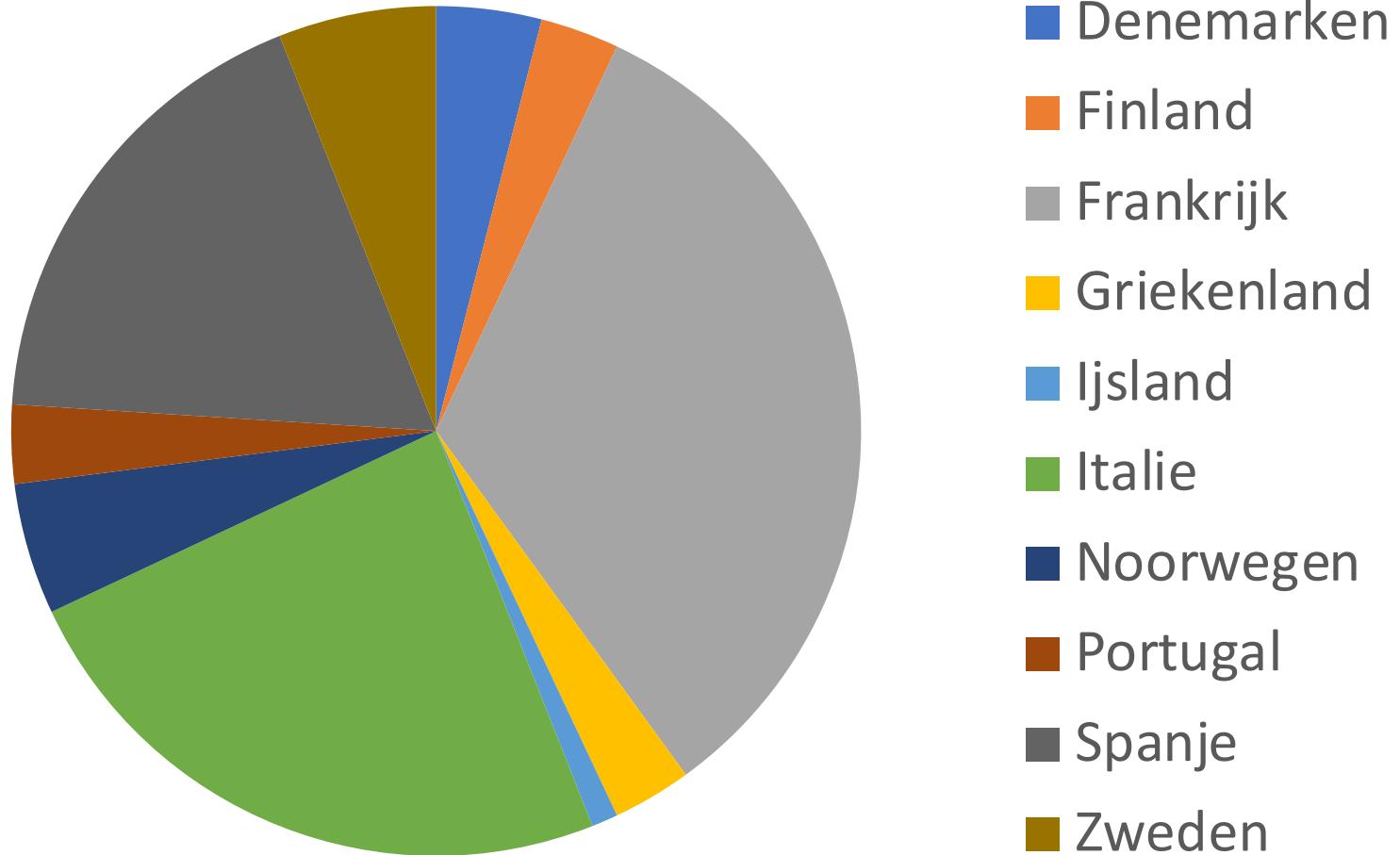
Waar zijn we **slecht** in?

“The eyes only see what the mind is prepared to comprehend.” – Henri Bergson.

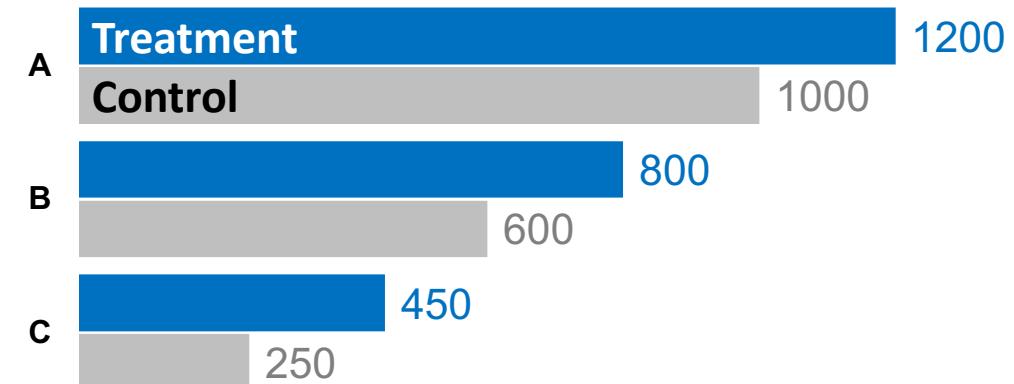
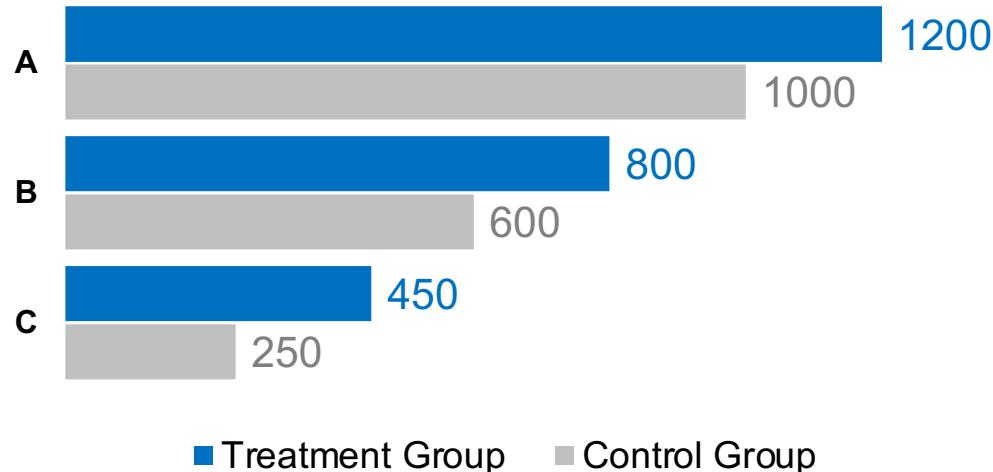
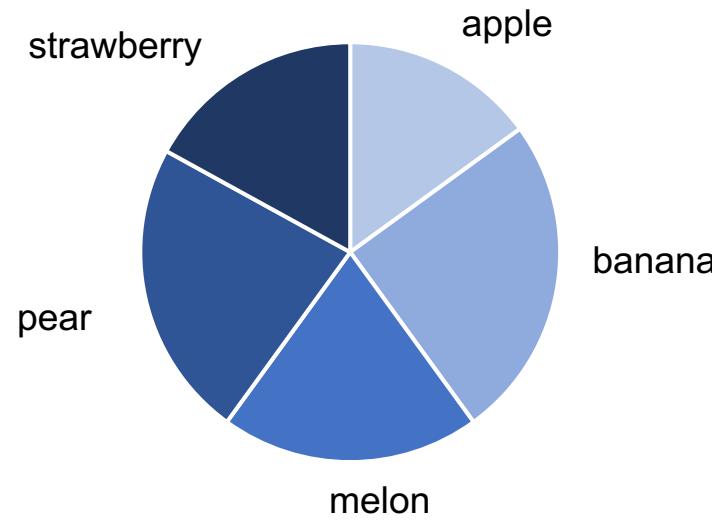
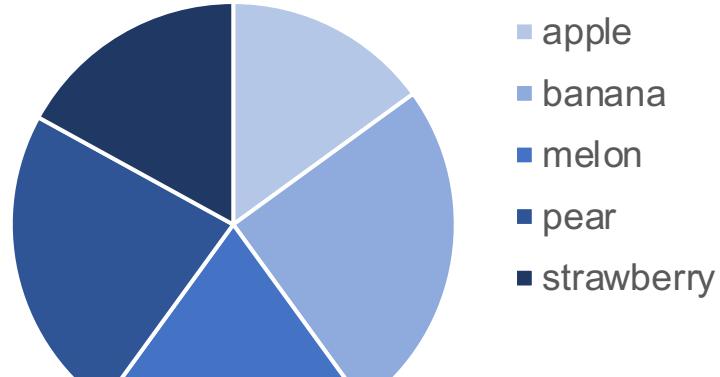
Wat is de volgorde van boven naar beneden?



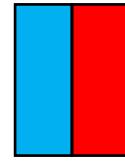
Is het vlak voor Noorwegen groter dan het vlak voor Finland?



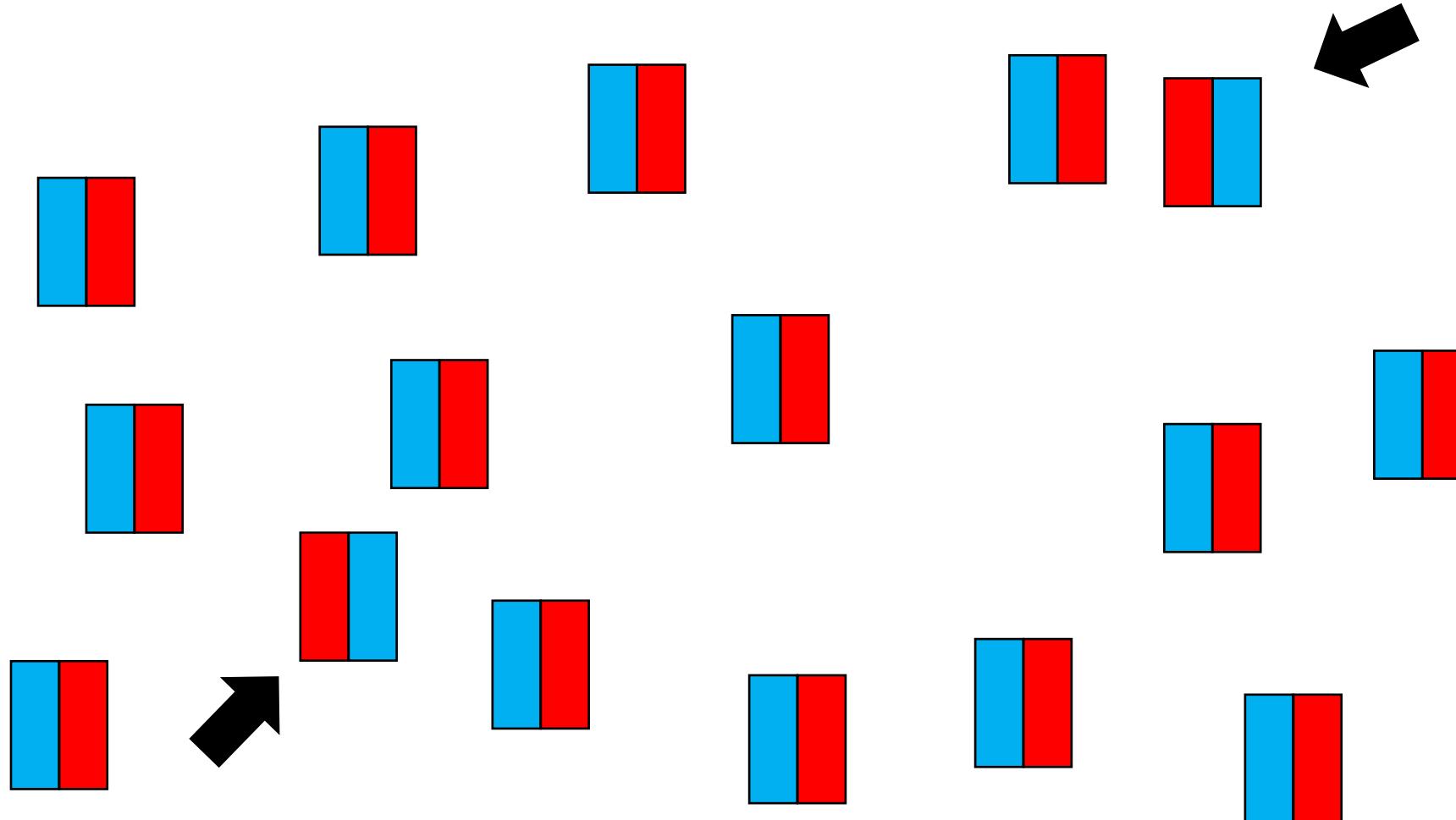
Vermijd legenda's als dat kan...



1 set van 2 kleuren vergelijken is gemakkelijk



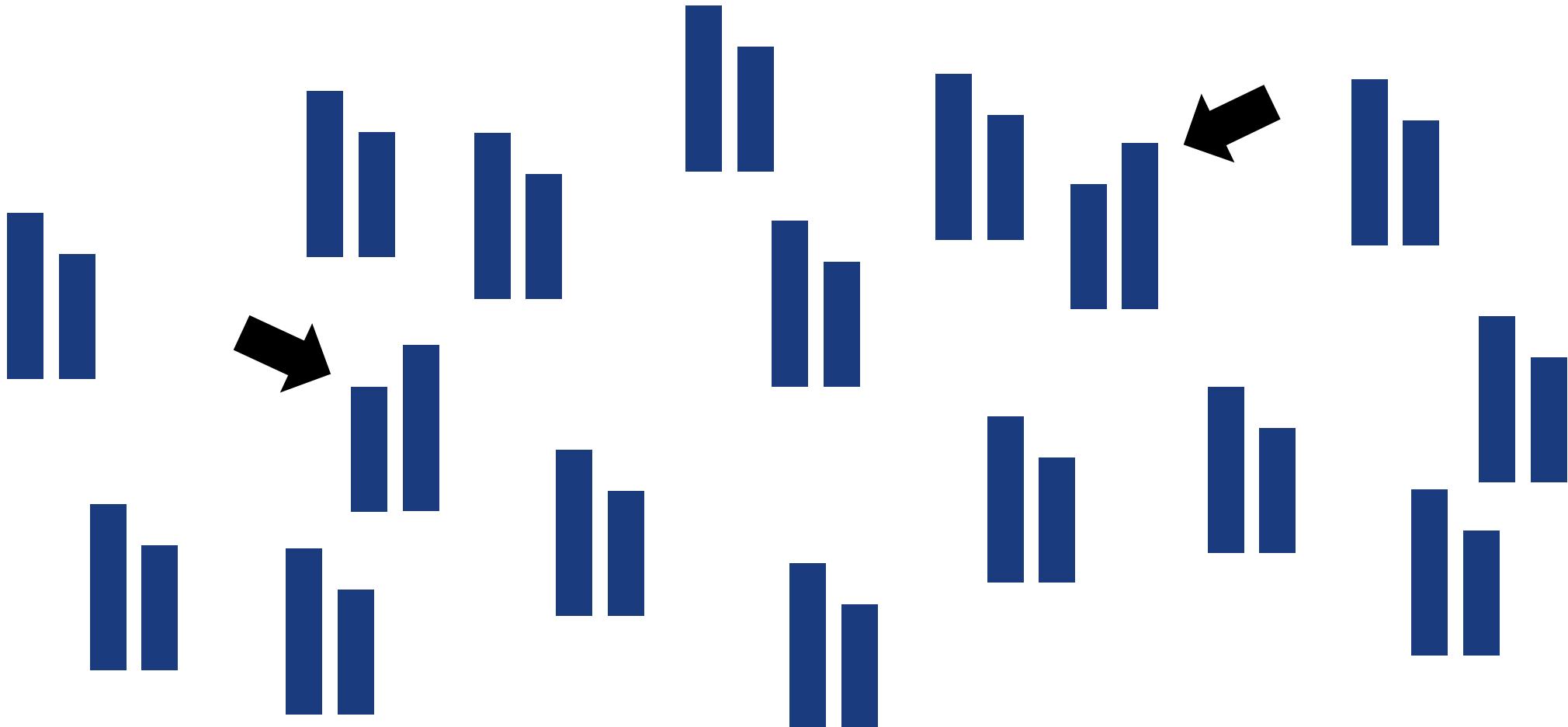
Maar: welke is anders dan de anderen?



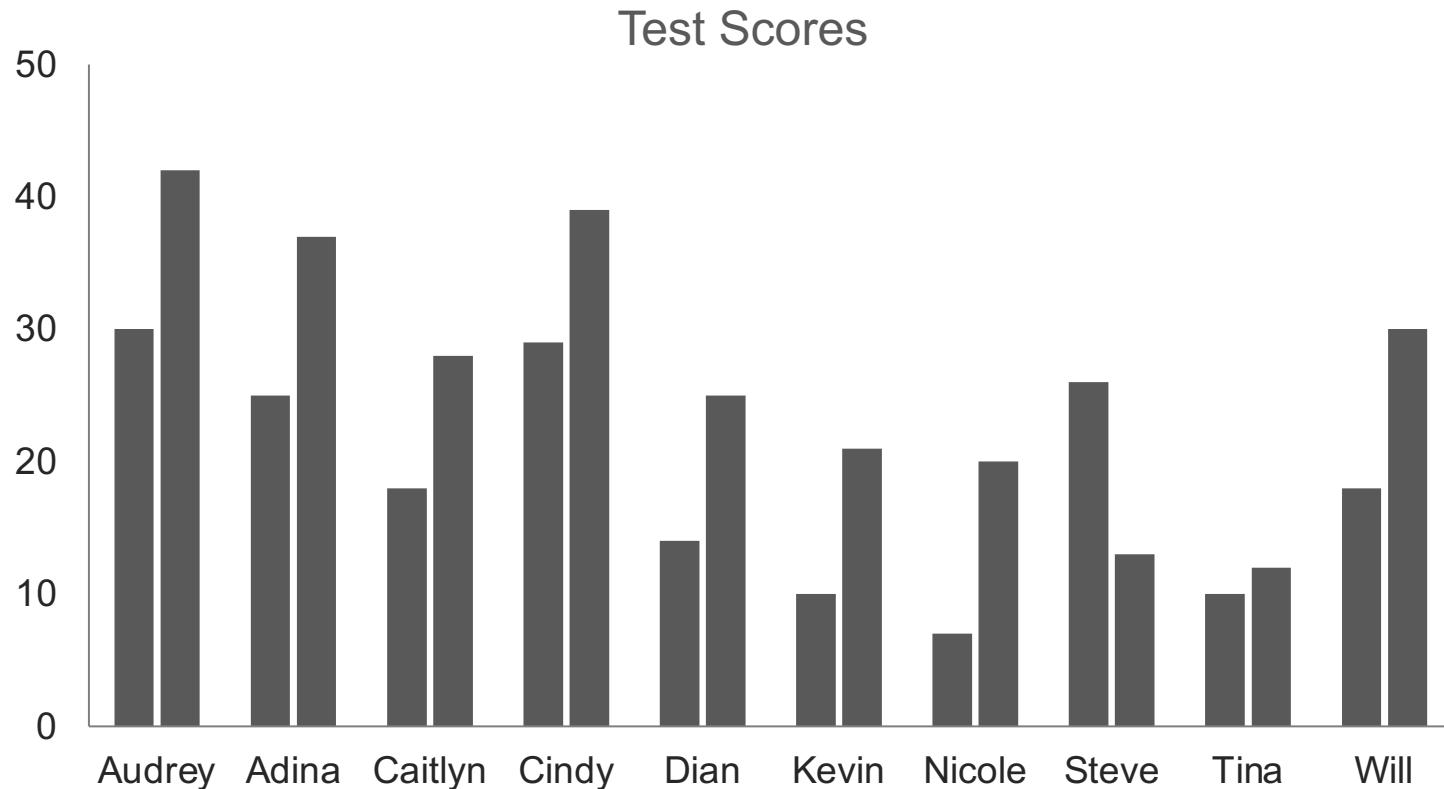
Gemakkelijk: Links is groter dan rechts



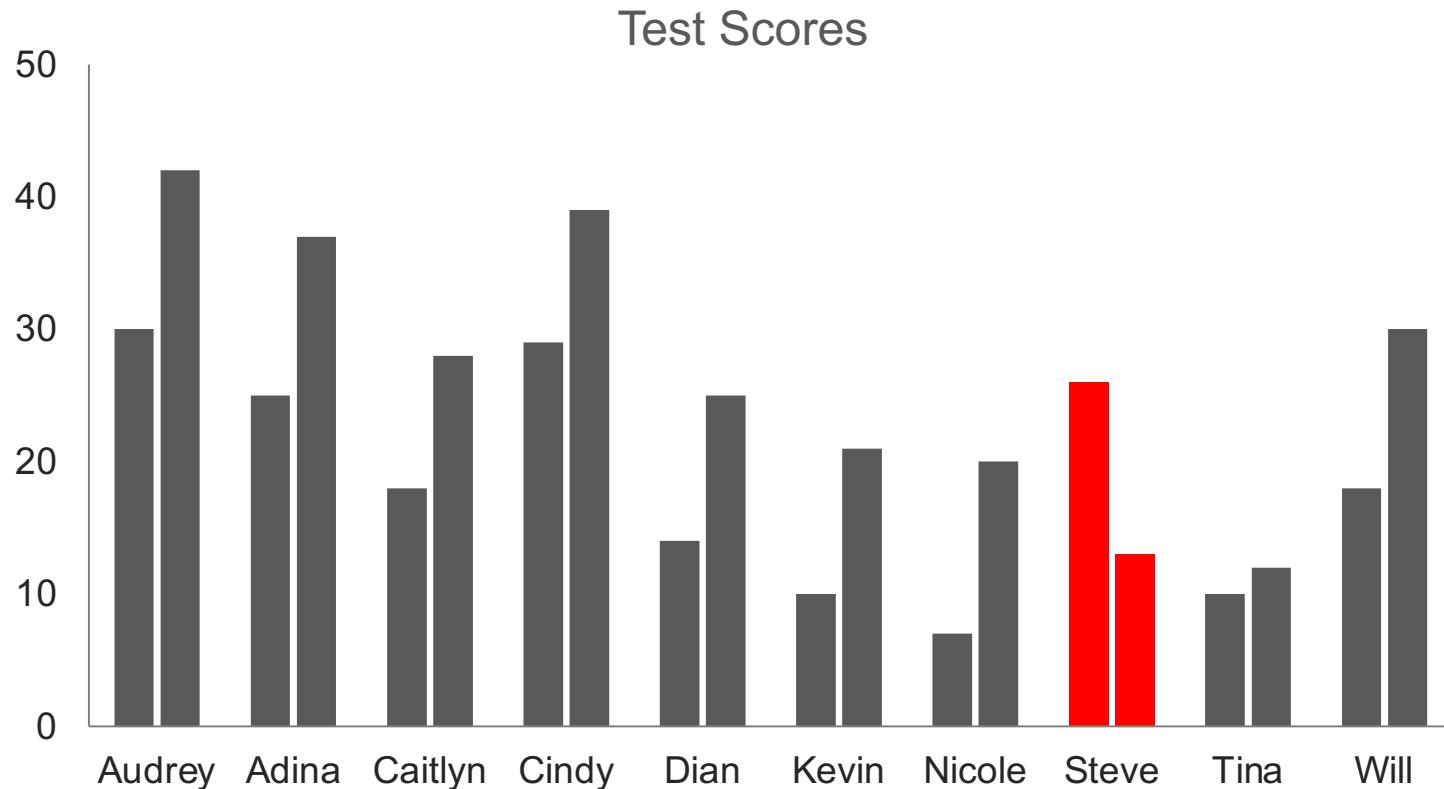
Welke combinatie is anders dan de anderen?



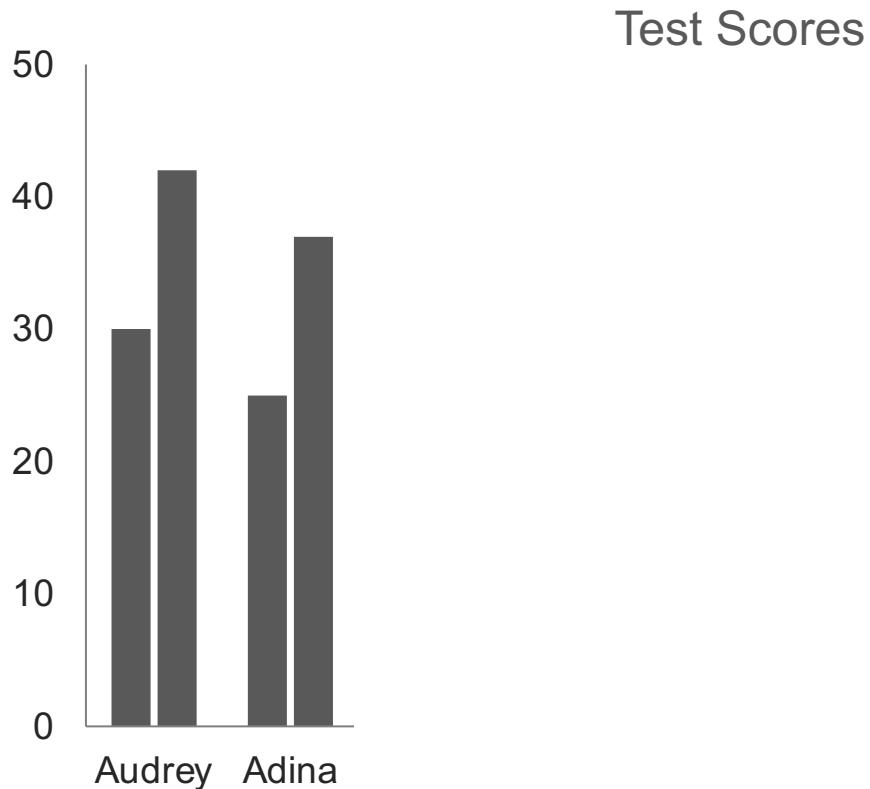
Welke student scoorde slechter op de 2e test?



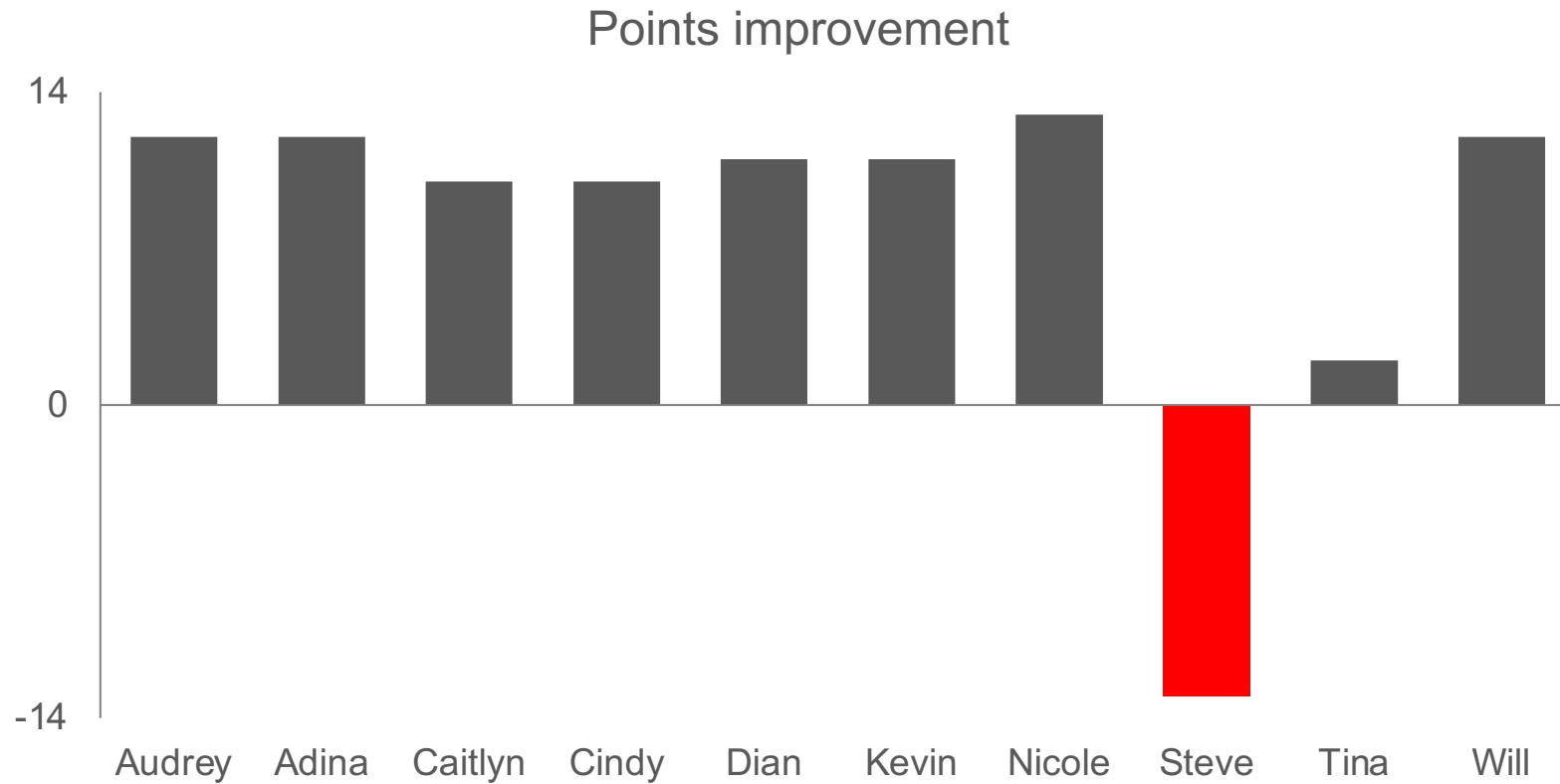
Welke student scoorde slechter op de 2e test?



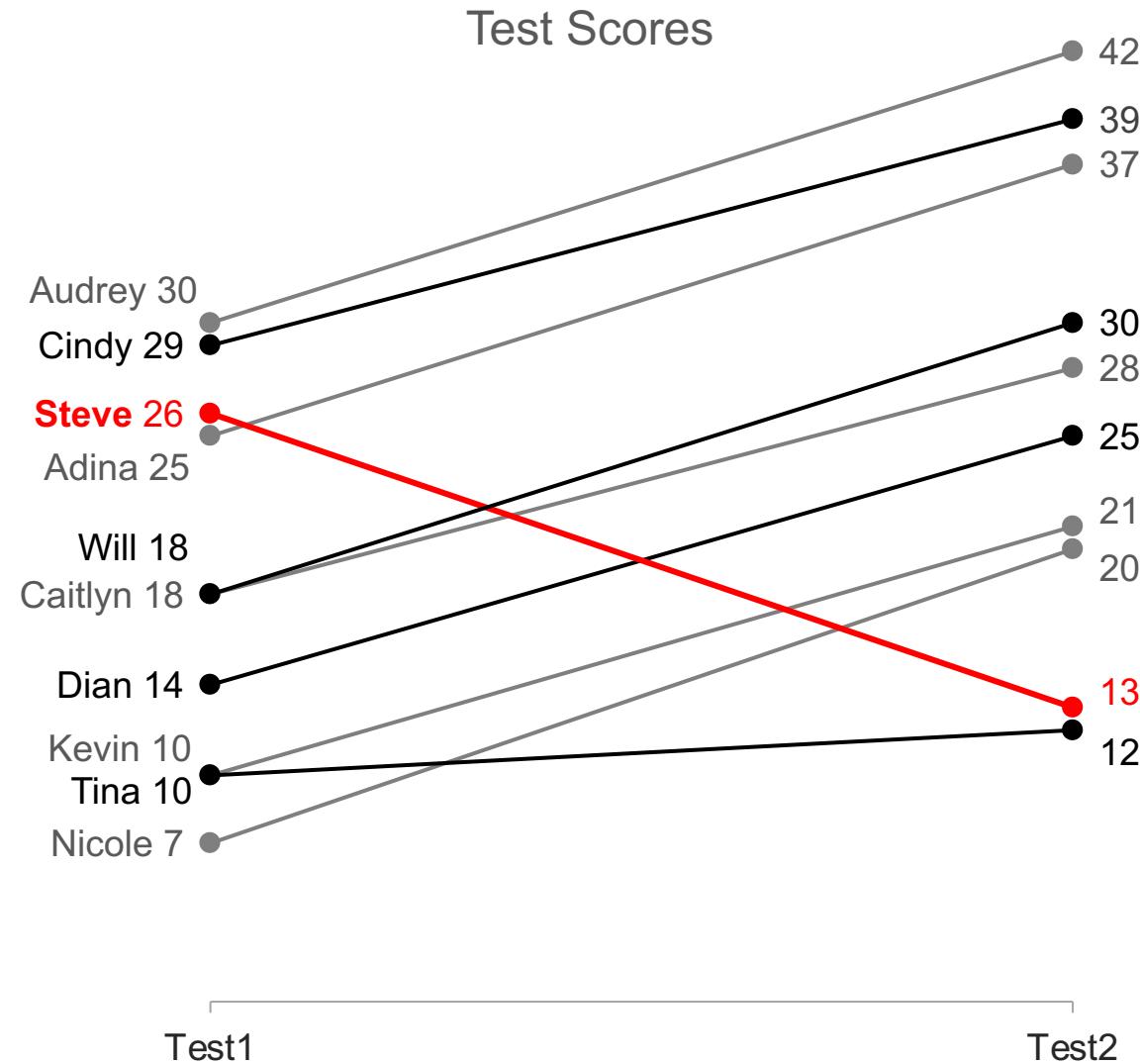
Wat is de gemiddelde toename?



Zorg voor directe vergelijkingen...

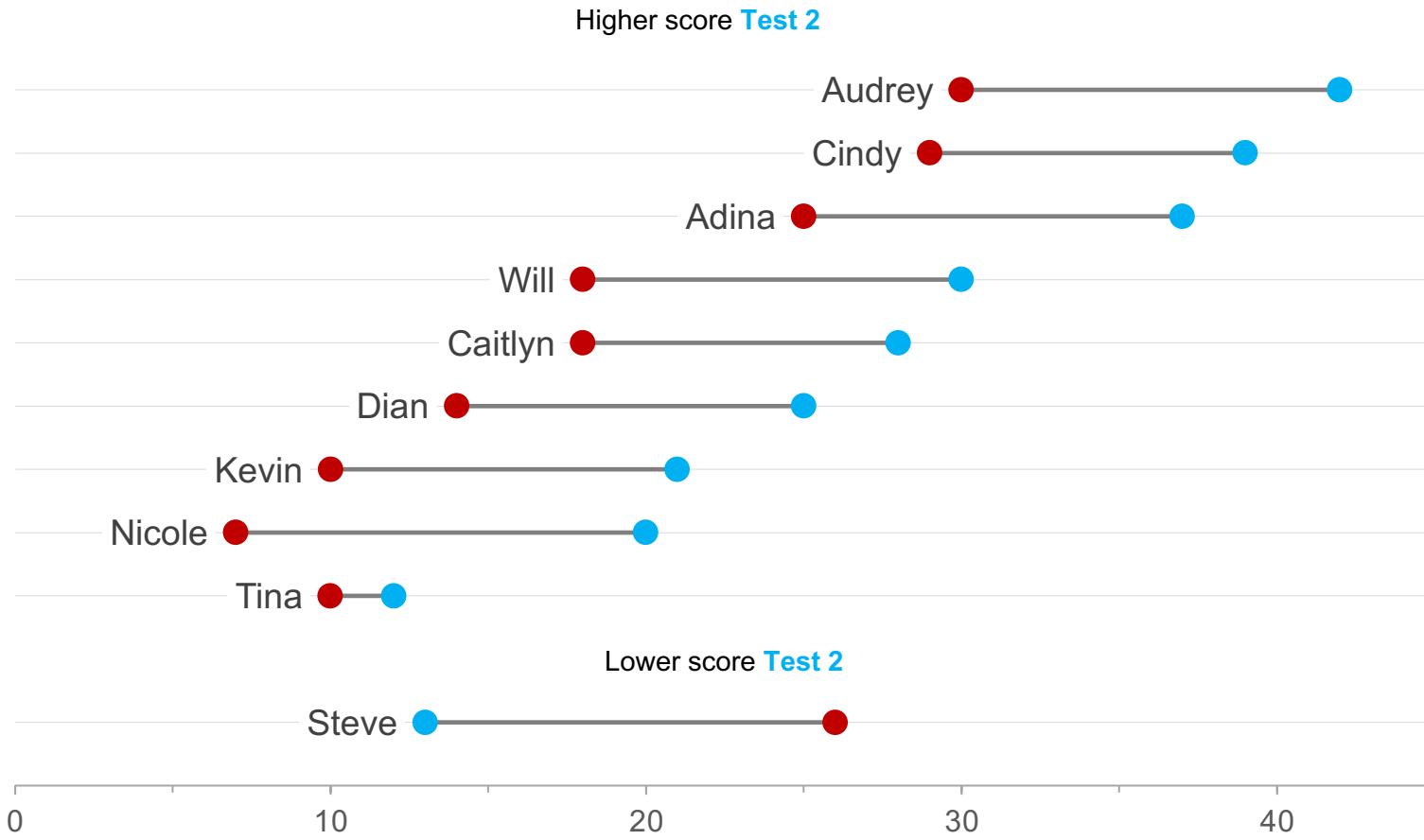


Of probeer een slope chart als alternatief...



Of een dumbbell dot plot...

Scores for **Test1** and **Test2**



Waar zijn we slecht in? Teveel informatie tegelijkertijd verwerken!



Vermijd onnodige afleiding of “chart junk”



Effective. Not optimal.

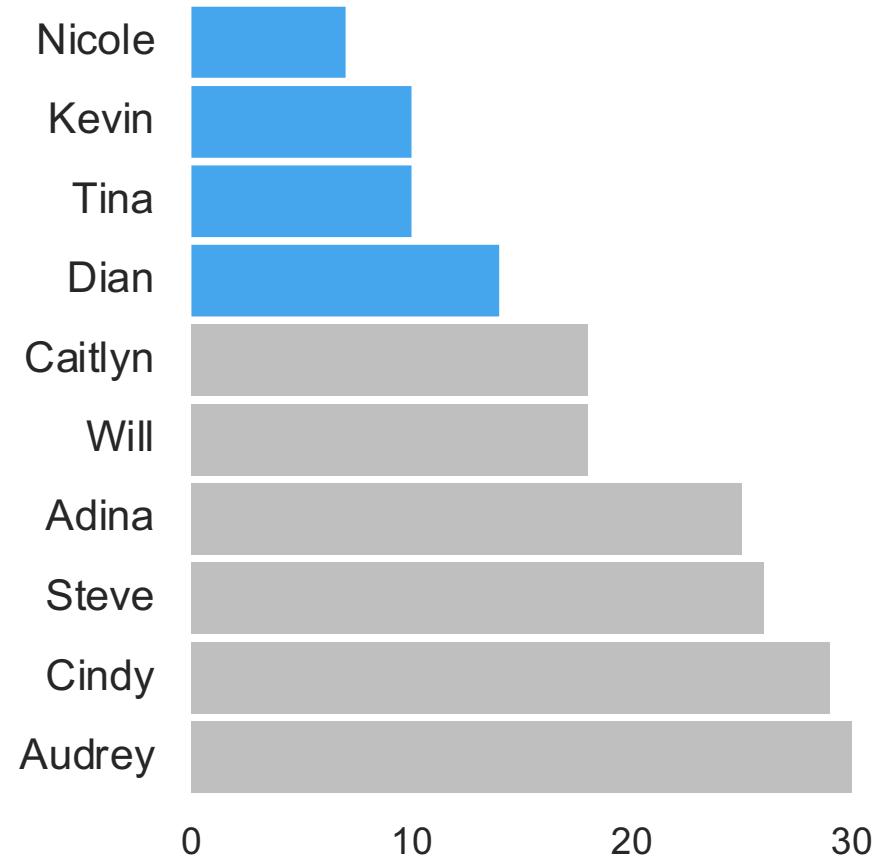
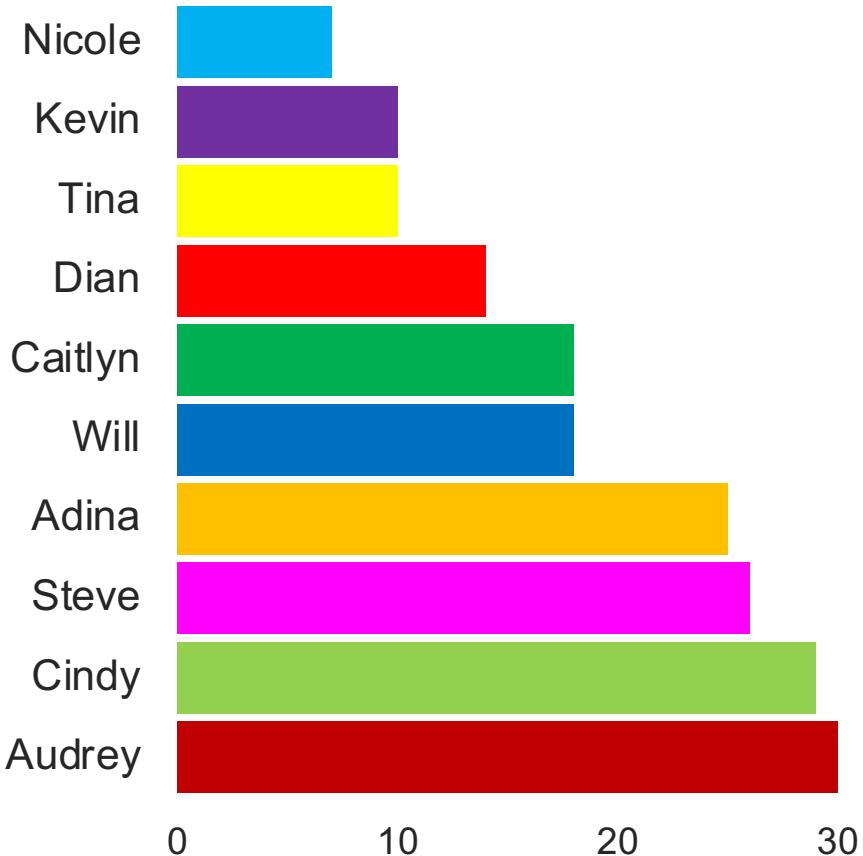


Simple, effective, optimal.



Bad.

Onnodige afleiding: geldt ook voor kleuren



... en voor tabellen

Student	Test1	Test2	Difference
Audrey	30.00	42.00	12.00 pts
Adina	25.00	37.00	12.00 pts
Caitlyn	18.00	28.00	10.00 pts
Cindy	29.00	39.00	10.00 pts
Dian	14.00	25.00	11.00 pts
Kevin	10.00	21.00	11.00 pts
Nicole	7.00	20.00	13.00 pts
Steve	26.00	13.00	-13.00 pts
Tina	10.00	12.00	2.00 pts
Will	18.00	30.00	12.00 pts

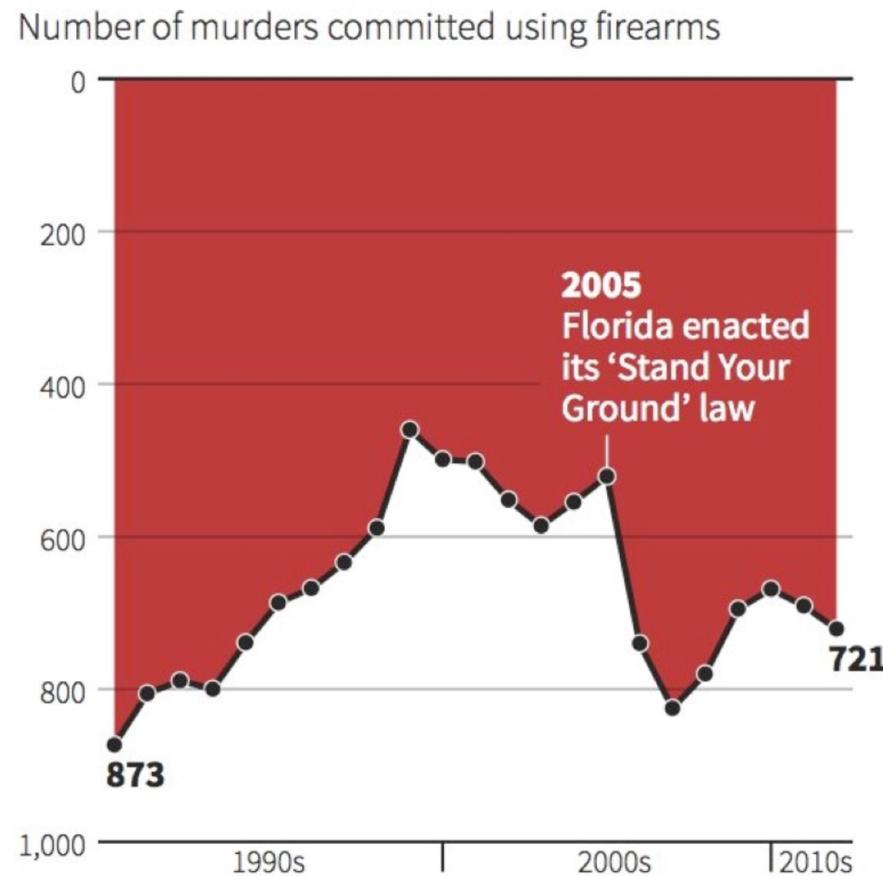
Student	Test1	Test2	Difference (pts)
Audrey	30	42	12
Adina	25	37	12
Caitlyn	18	28	10
Cindy	29	39	10
Dian	14	25	11
Kevin	10	21	11
Nicole	7	20	13
Steve	26	13	-13
Tina	10	12	2
Will	18	30	12

Waar zijn we slecht in? Tegen de natuurlijke leesrichting in gaan!



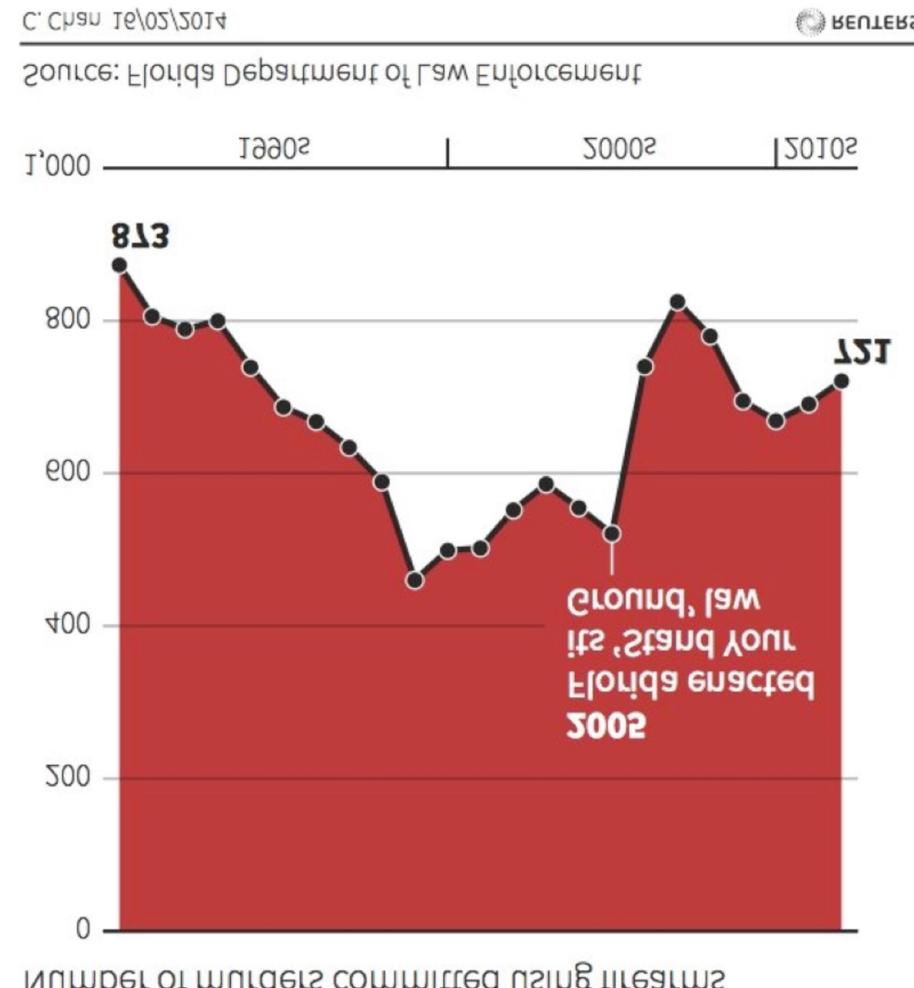
Naar beneden betekent minder, of niet?

Gun deaths in Florida



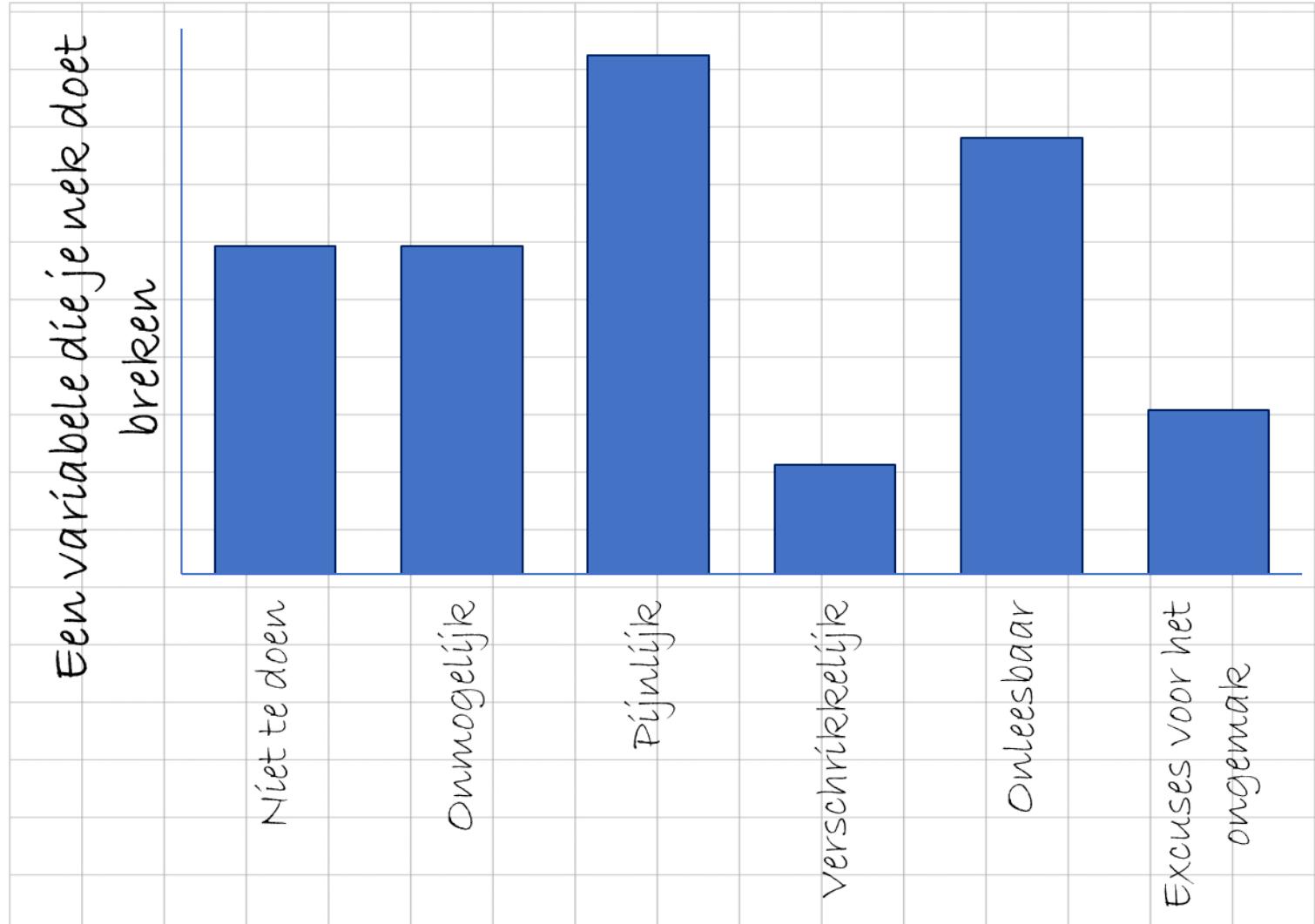
Source: Florida Department of Law Enforcement

Naar beneden betekent minder, of niet?



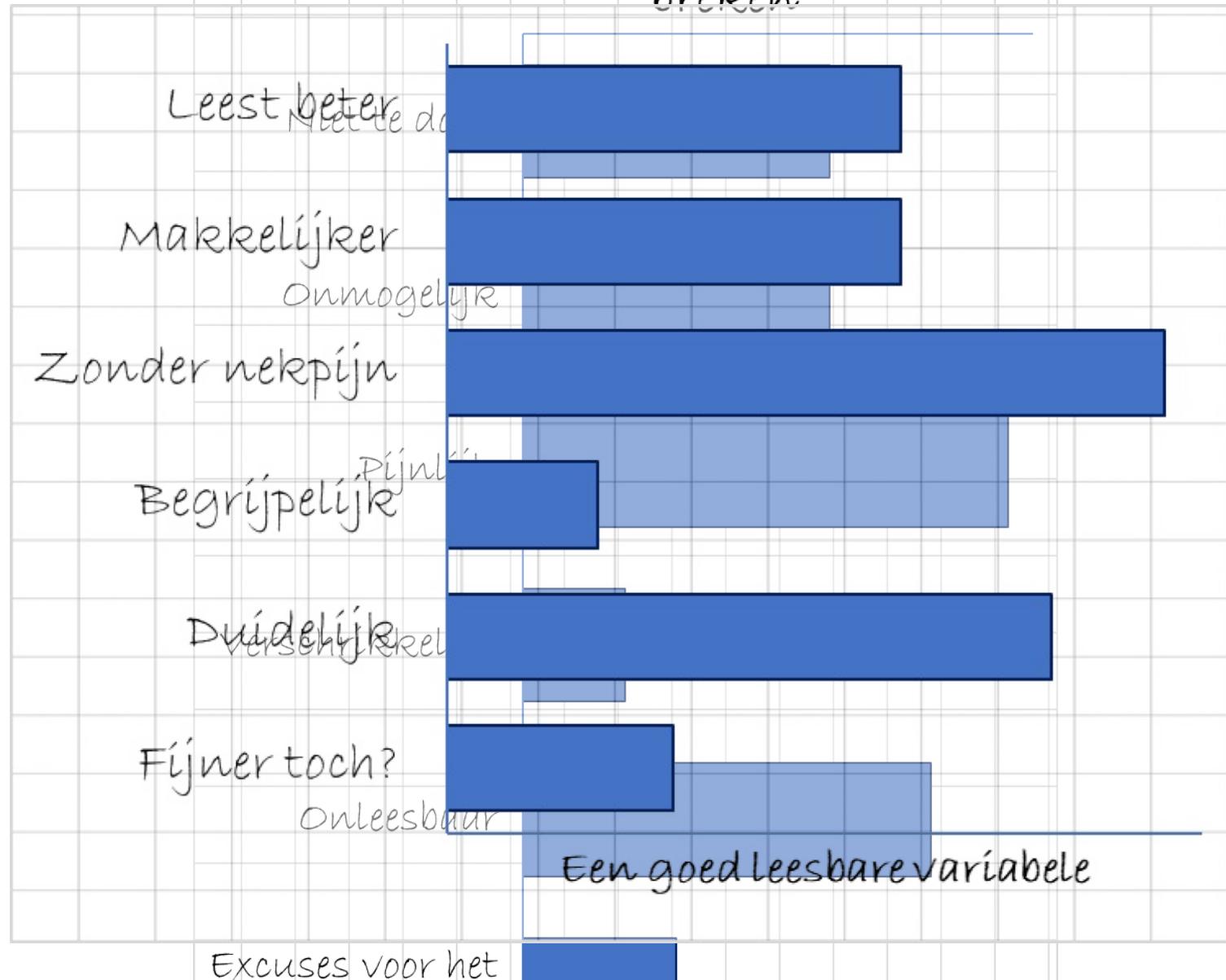
en qeats in Florida

Hoe is het om deze labels te lezen?



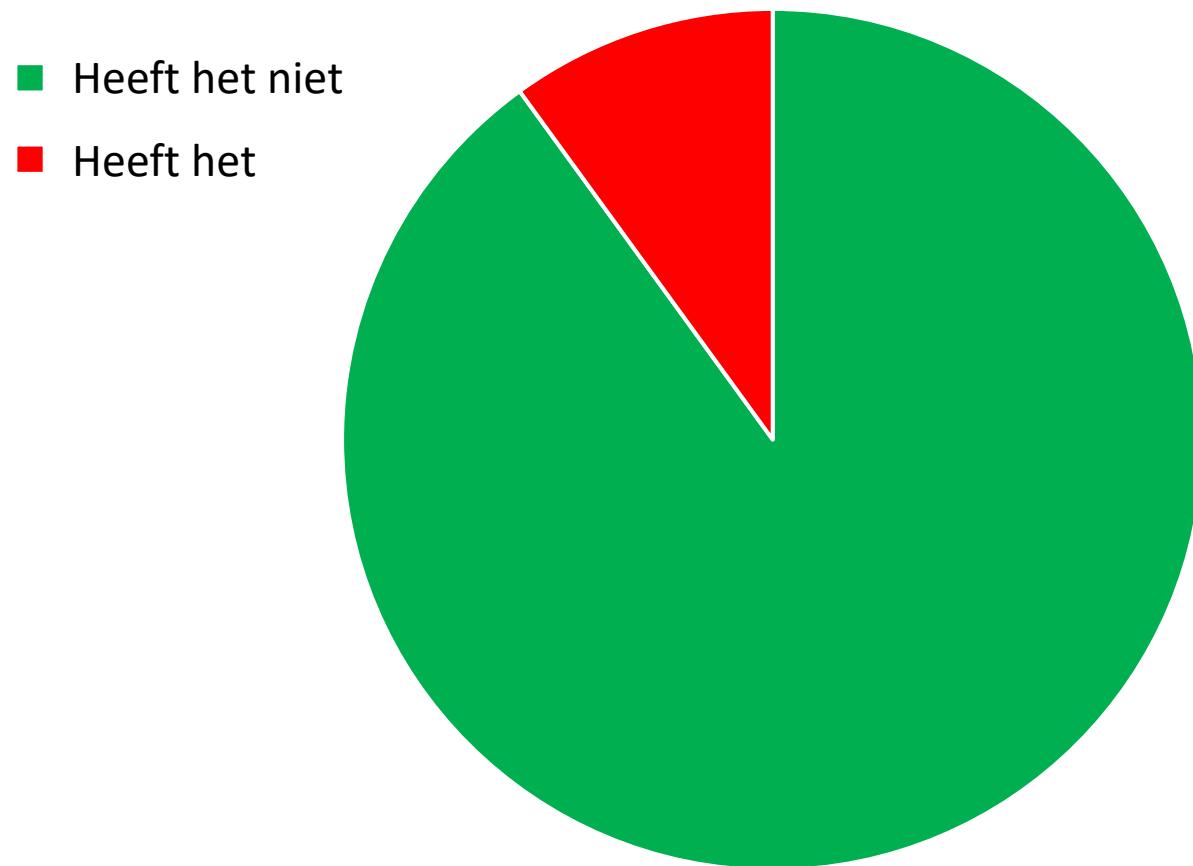
Hoe is het om deze labels te lezen?

Een variabelenlabel die je niet doet
breken.

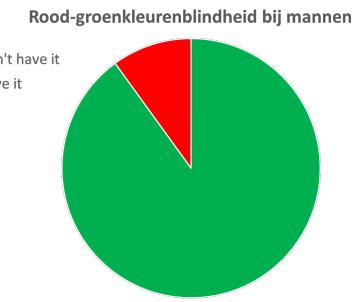
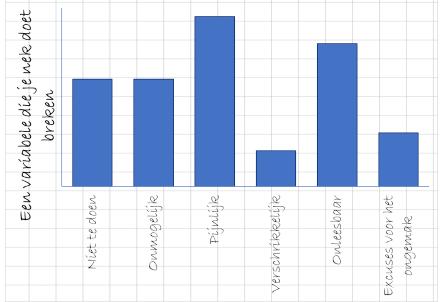
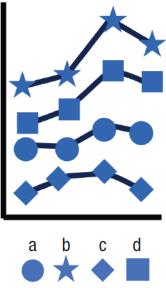
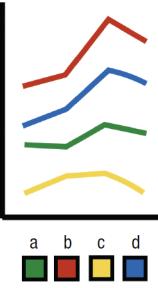


Welk percentage mannen zal deze grafiek (niet) begrijpen?

Rood-groenkleurenblindheid bij mannen



Waar zijn we **slecht** in?



1.

Korte termijn geheugen

2.

Teveel informatie tegelijkertijd verwerken

3.

Tegen de natuurlijke leesrichting in lezen

4.

Verschil tussen groen en rood waarnemen (~8% mannen)



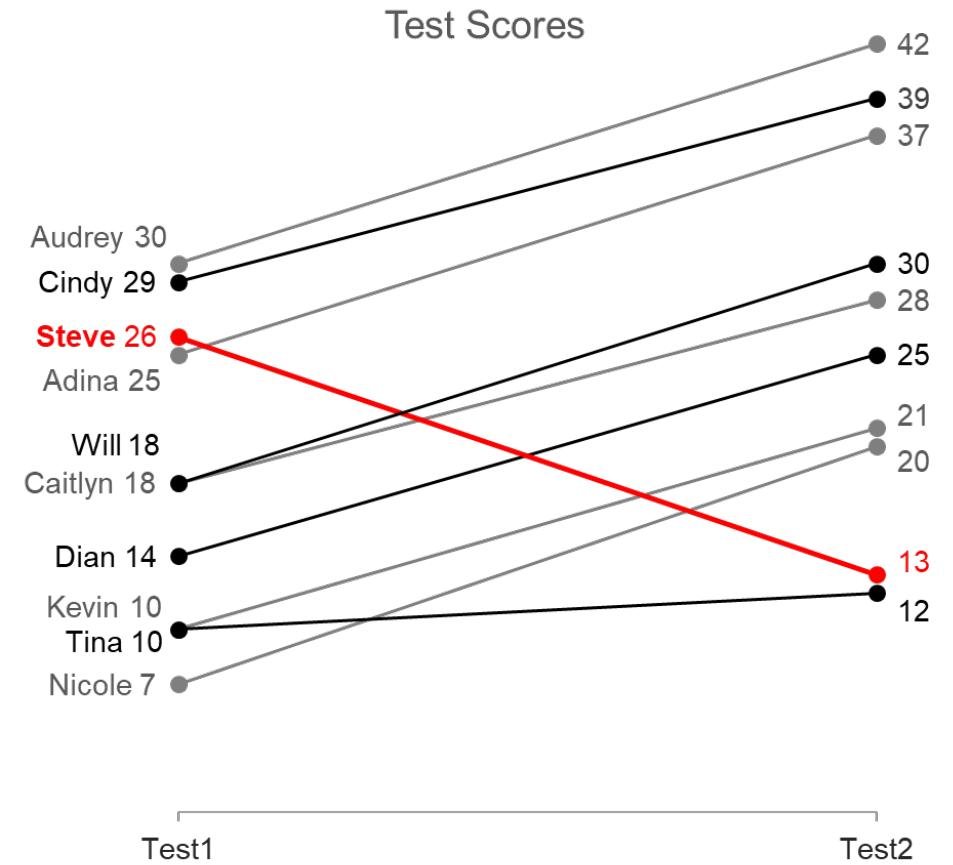
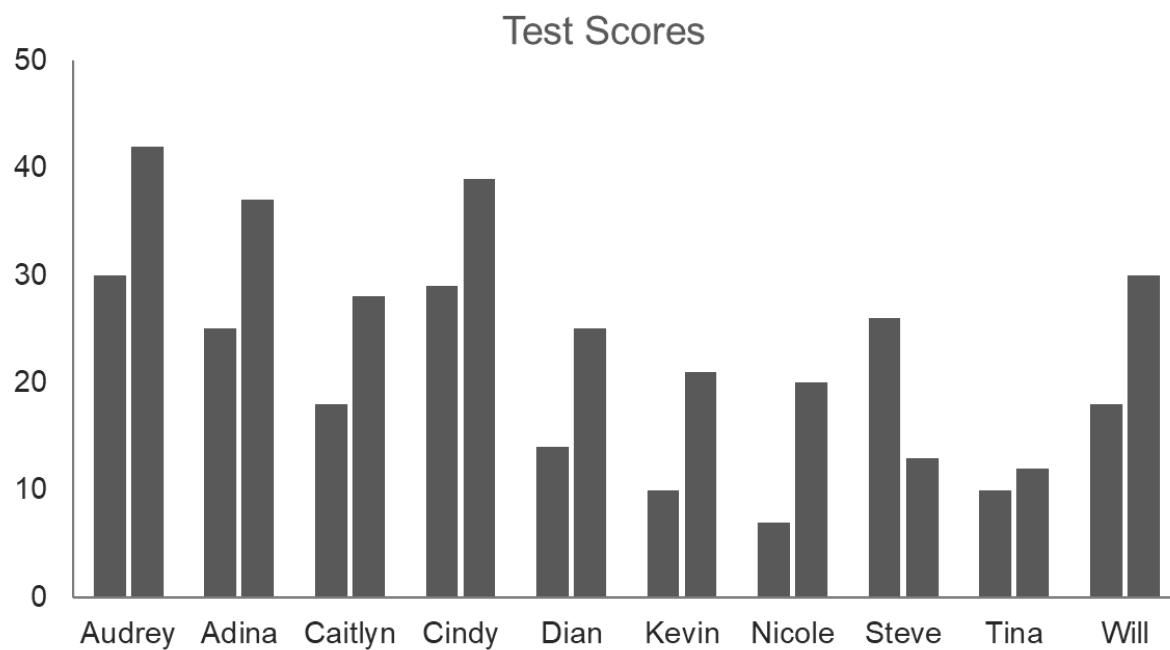
Alles tezamen

Hoe visuele (data-)
communicatie ?

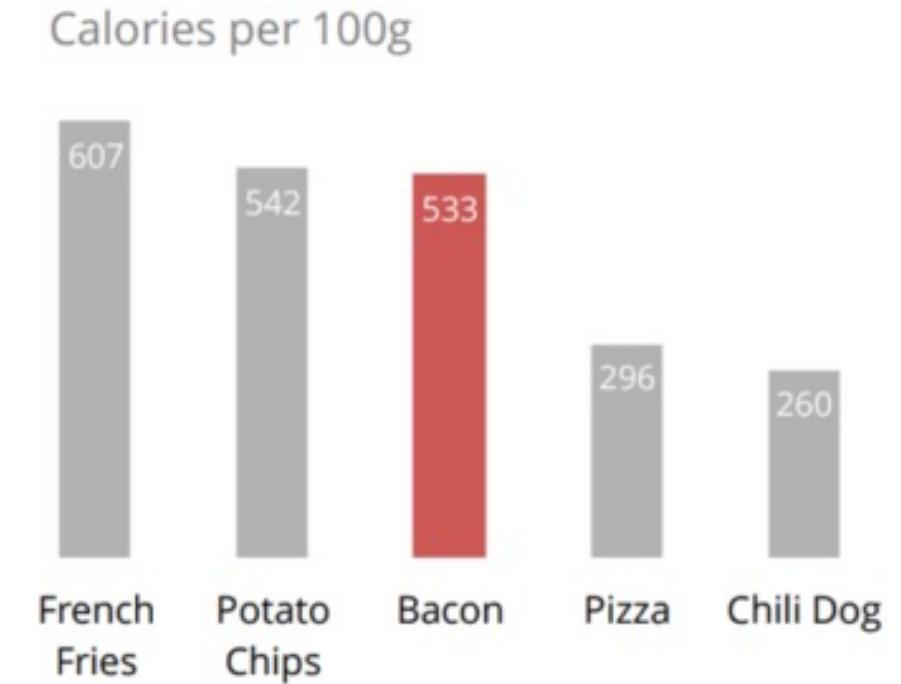
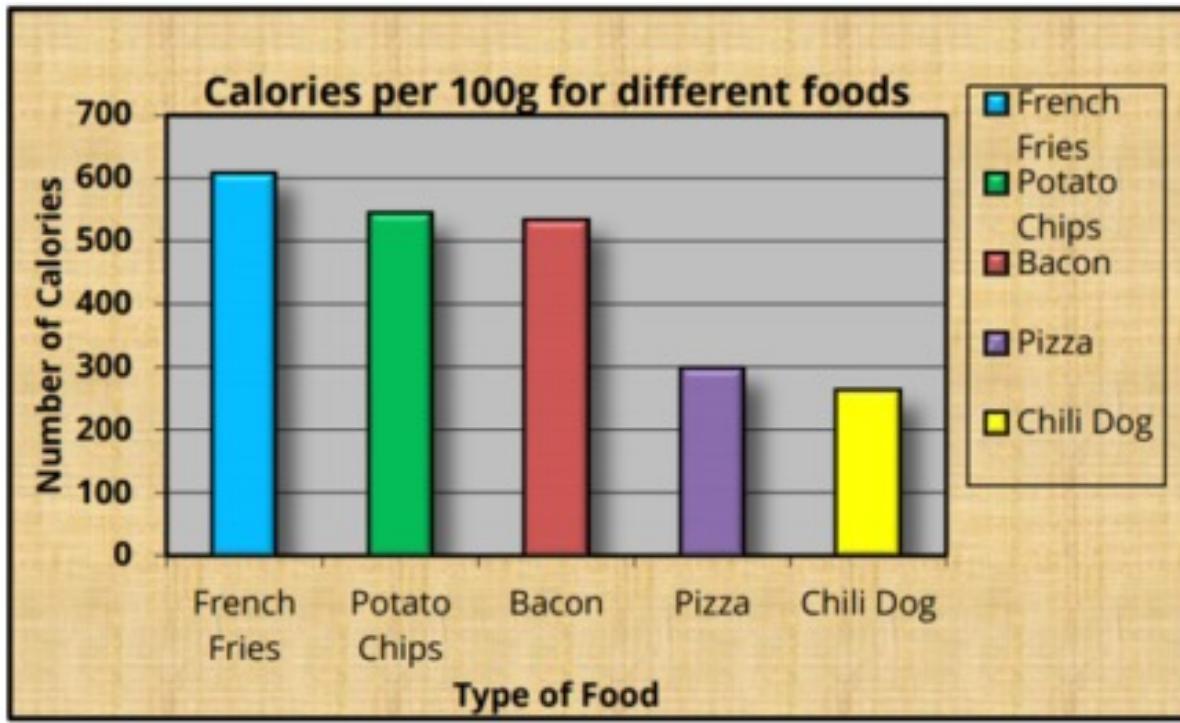
5 stappen voor effectieve (data-) visualisaties

1.  **Eenvoudig**
2.  **Helder**
3.  **Duidelijk**
4.  **Intuitief**
5.  **Toegankelijk**

1. Eenvoudig: zorg voor directe vergelijkingen

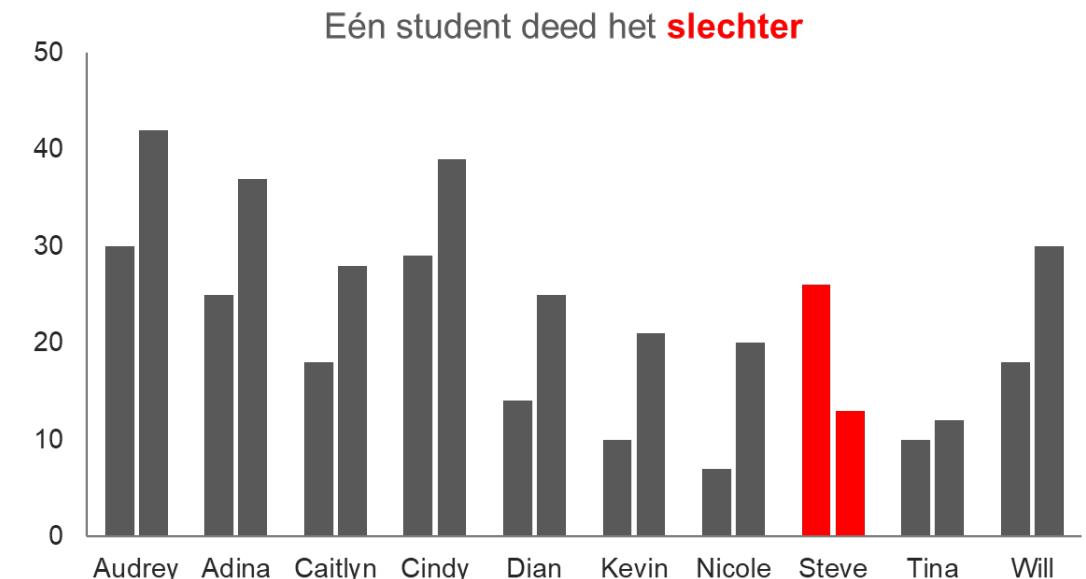
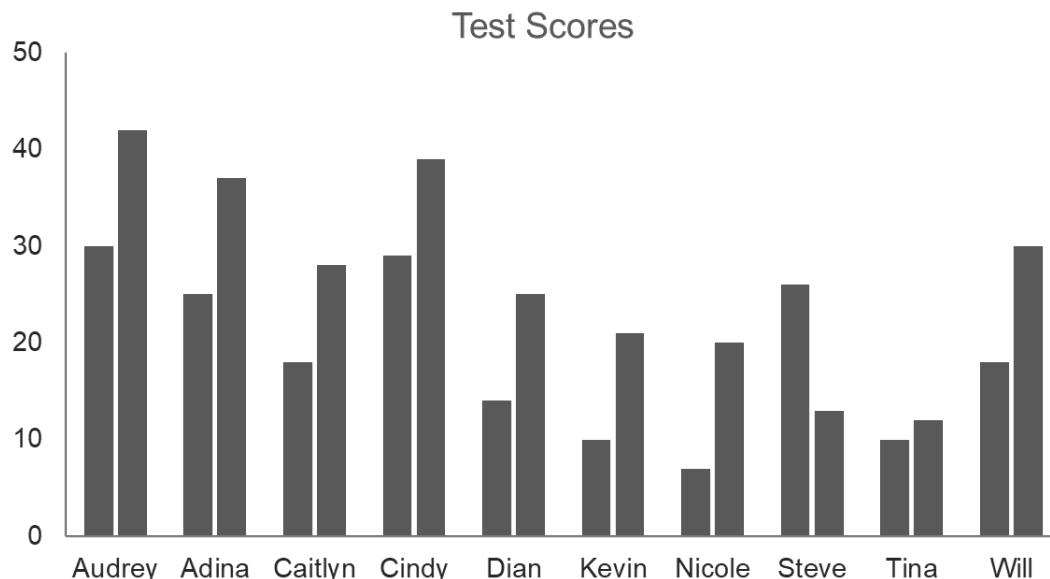


2. Helder: verwijder onnodige elementen

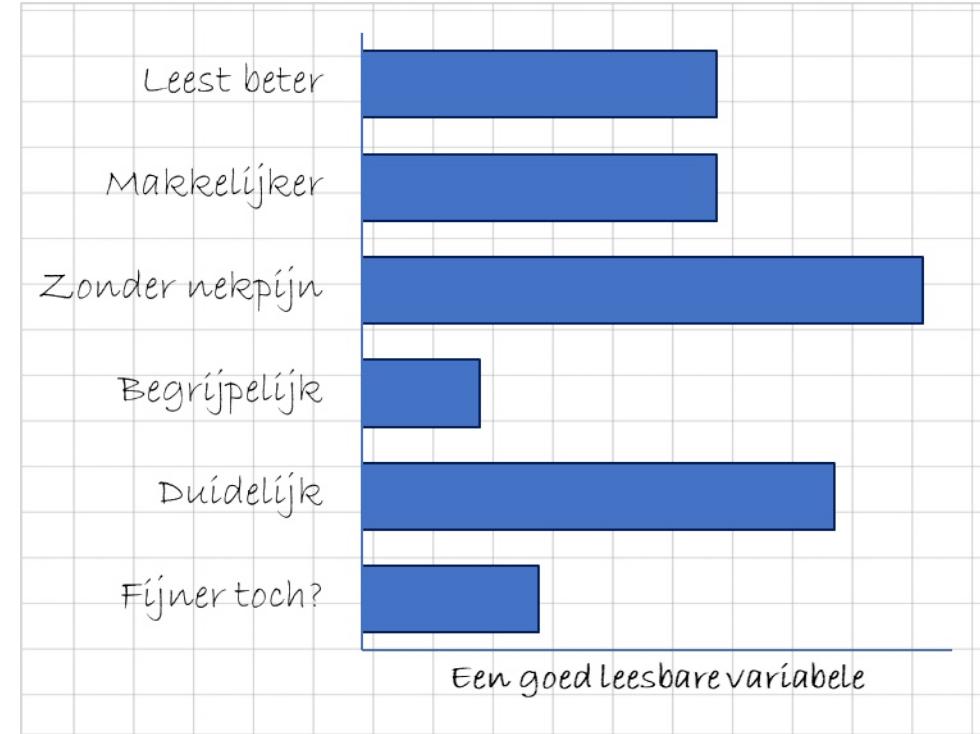
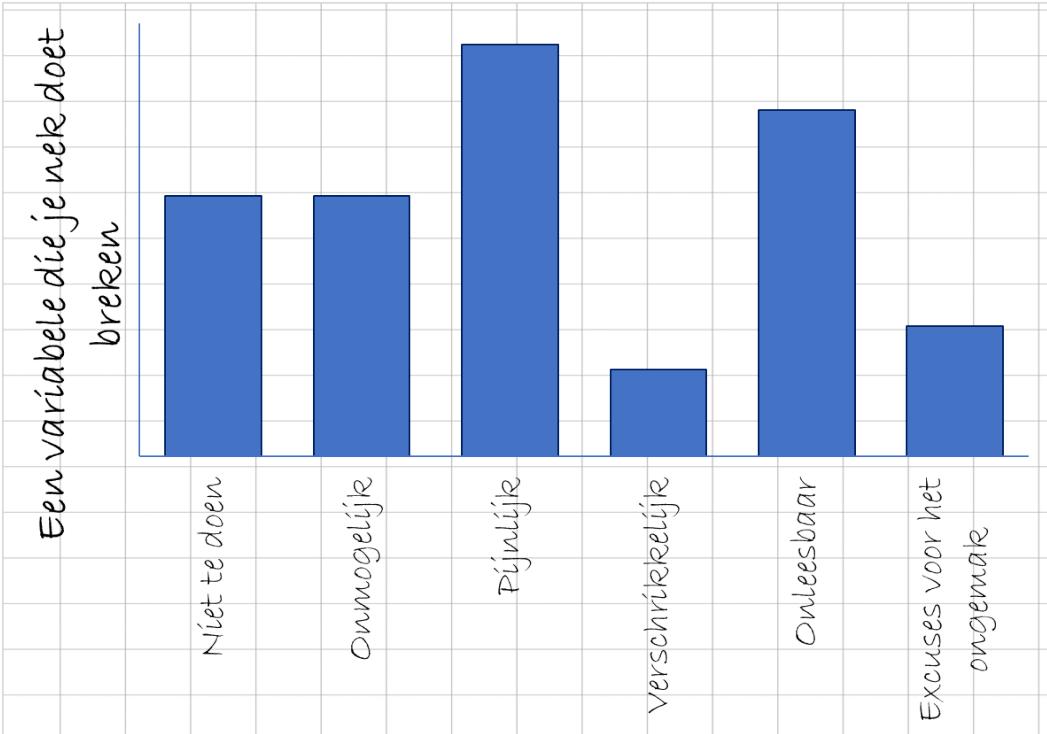


3. Duidelijk: benadruk wat belangrijk is

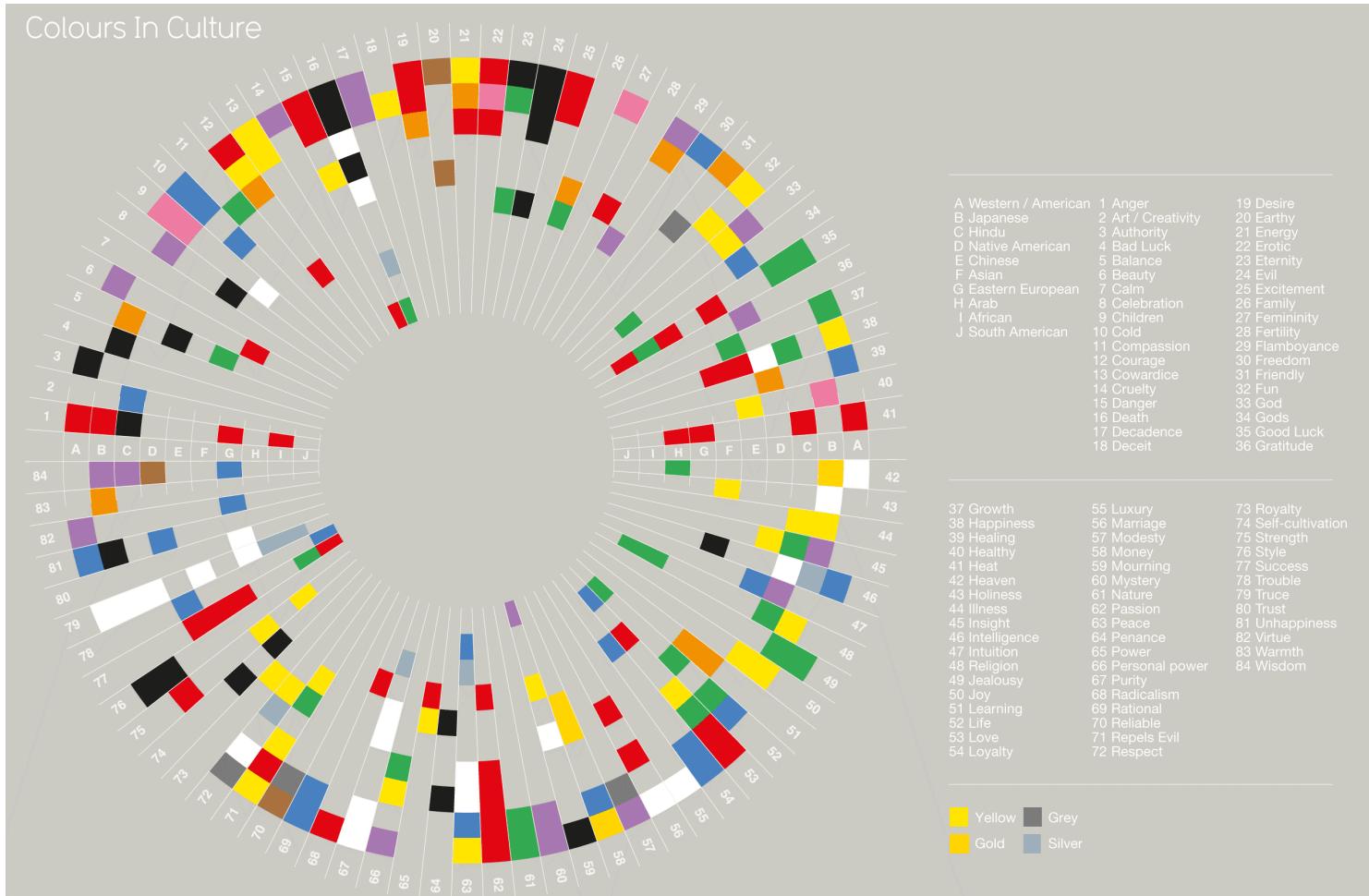
Welke student scoorde slechter?



4. Intuïtief: volg de natuurlijke leesrichting



5. Toegankelijk: Denk aan leesbaarheid en gekozen kleuren



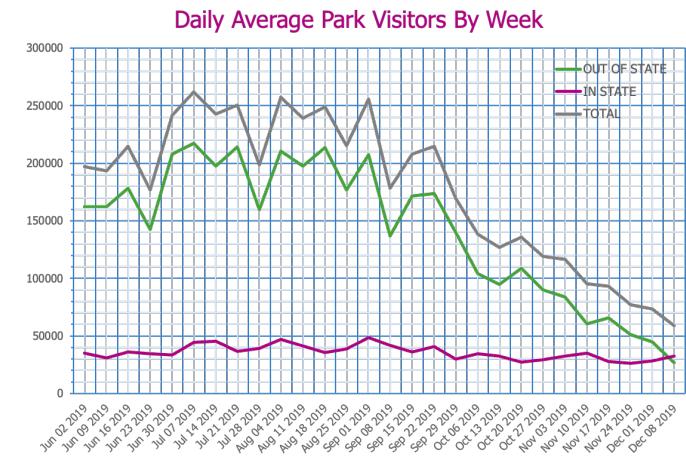
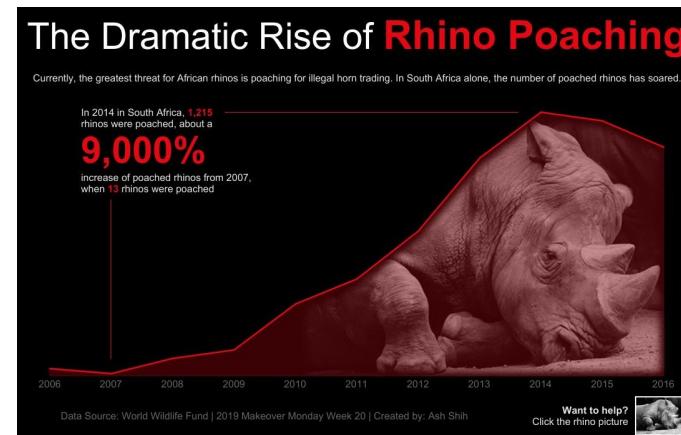
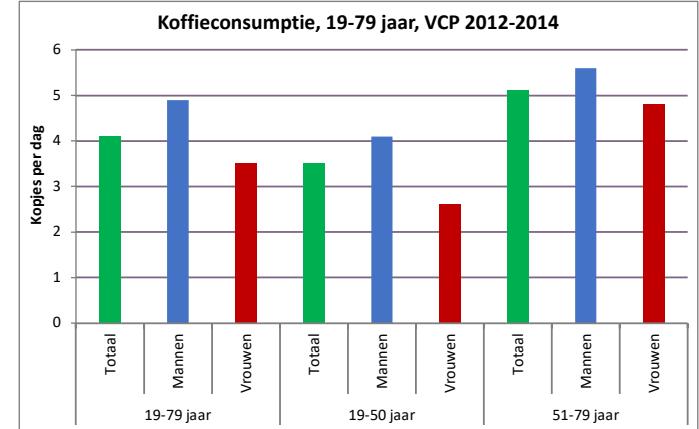
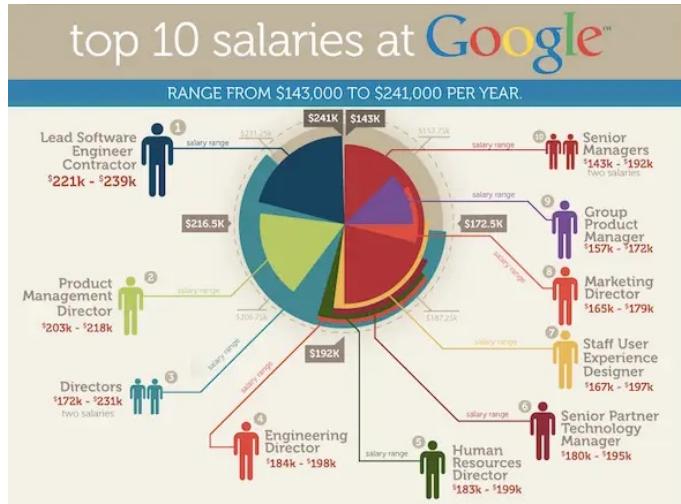
Oefening:

Zien, verwonderen en verbeteren

Zien, verwonderen, verbeteren

In groepjes van 3-5:

Kies een figuur en
beantwoord de vragen



Zien, verwonderen en verbeteren



Zien (< 15 sec):

- Wat is het 1e dat opvalt?

Een gedachte, een kleur, een datapunt, een gevoel, een indruk, een woord, een (groep) element(en).

- Wat is je 1e gevoel bij de figuur?



Verwonderen:

- Begrijp je de figuur? Wat is je niet duidelijk?
- Wat is de boodschap?
- Hoe effectief is de figuur in het overbrengen van de boodschap?\



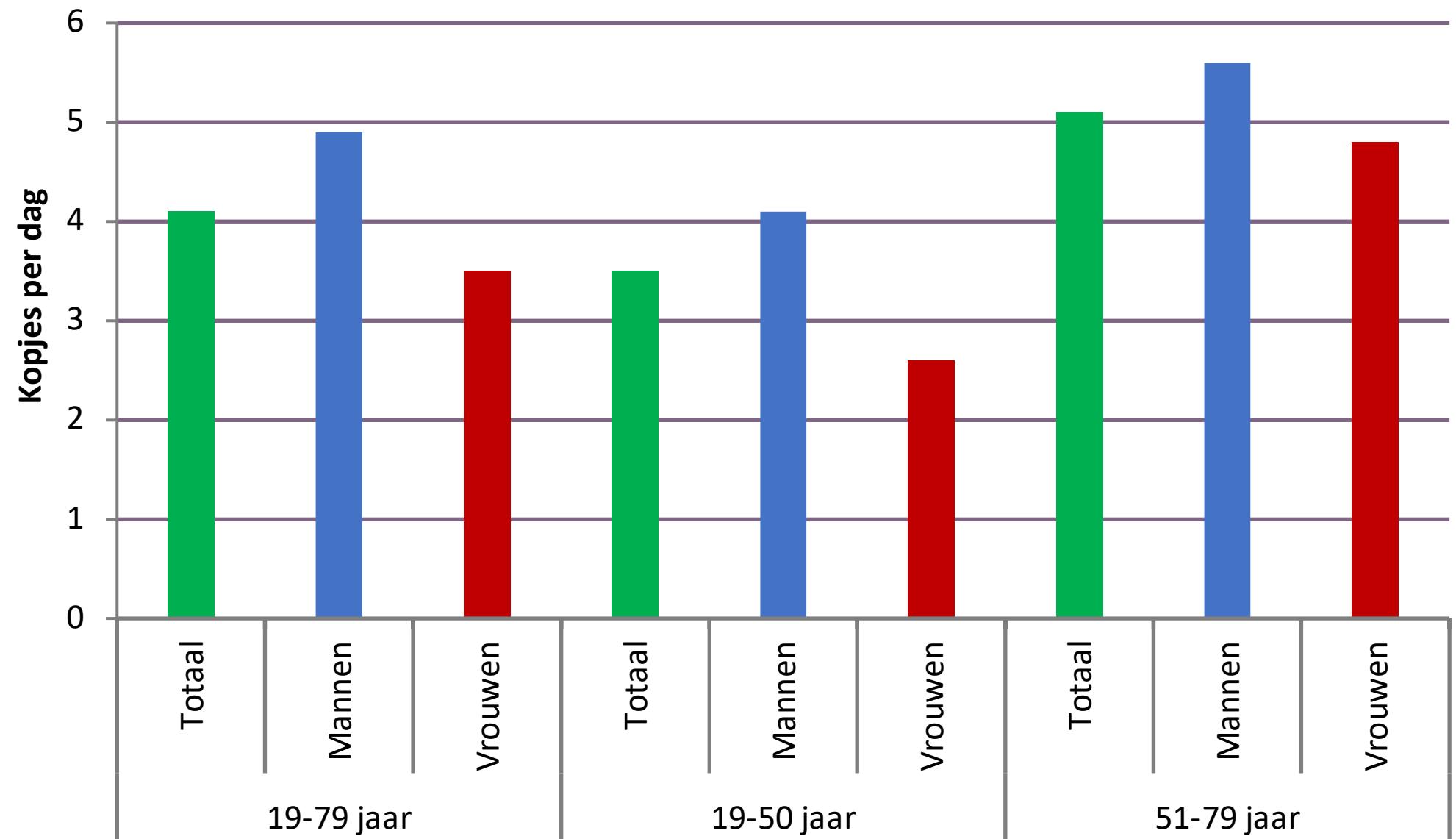
Verbeteren:

- Hoe zou je de figuur de boodschap beter kunnen overbrengen? Is de figuur **Eenvoudig, Helder, Duidelijk, Intuitief, Toegankelijk?**
- Wat is je uiteindelijke gevoel bij de visual?

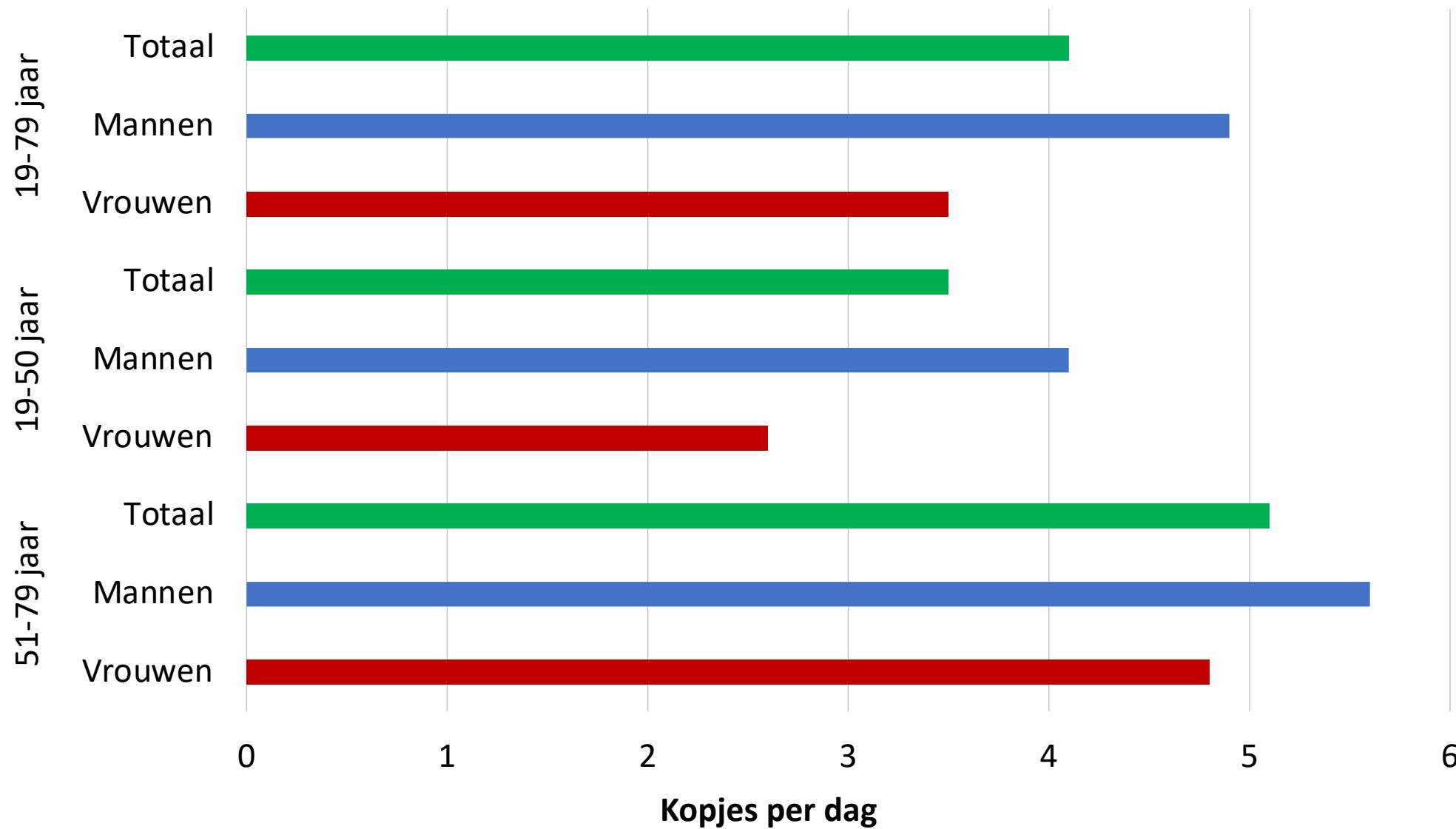
10 min



Koffieconsumptie, 19-79 jaar, VCP 2012-2014

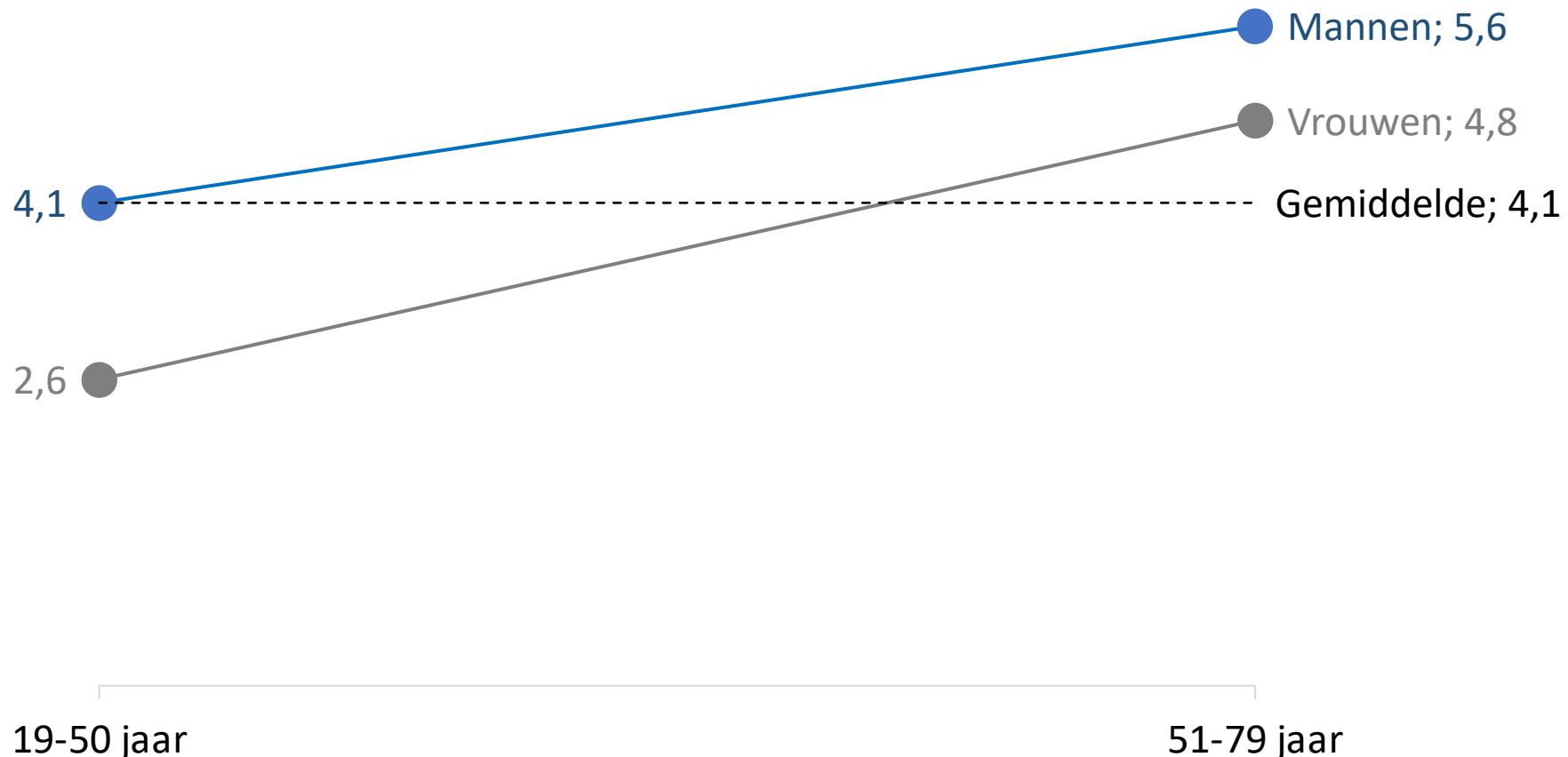


Koffieconsumptie, 19-79 jaar, VCP 2012-2014



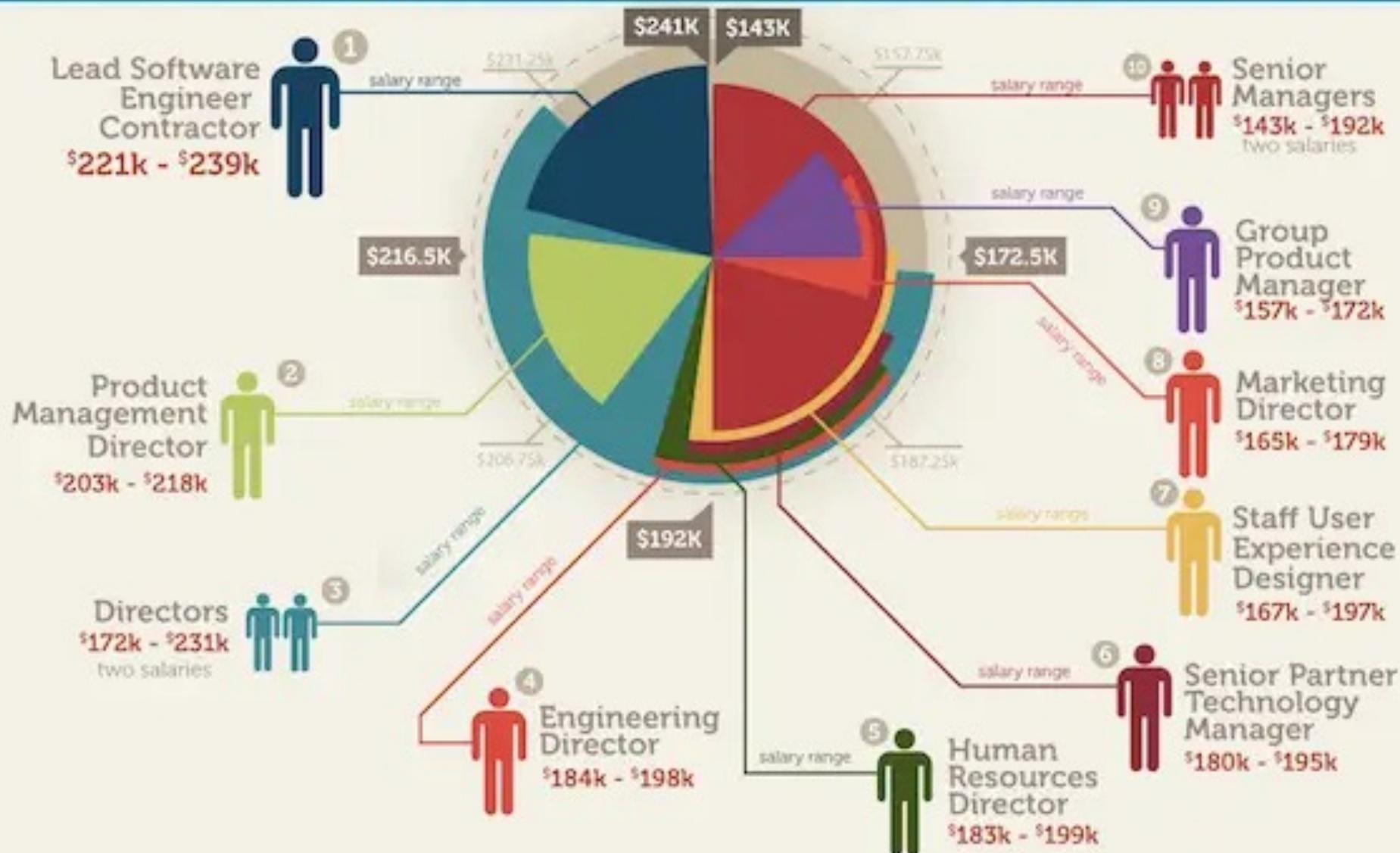
De koffieconsumptie voor volwassenen tussen 19-79 jaar (in aantal kopjes per dag)

Mannen drinken meer koffie dan vrouwen en het drinken van koffie neemt toe met de leeftijd

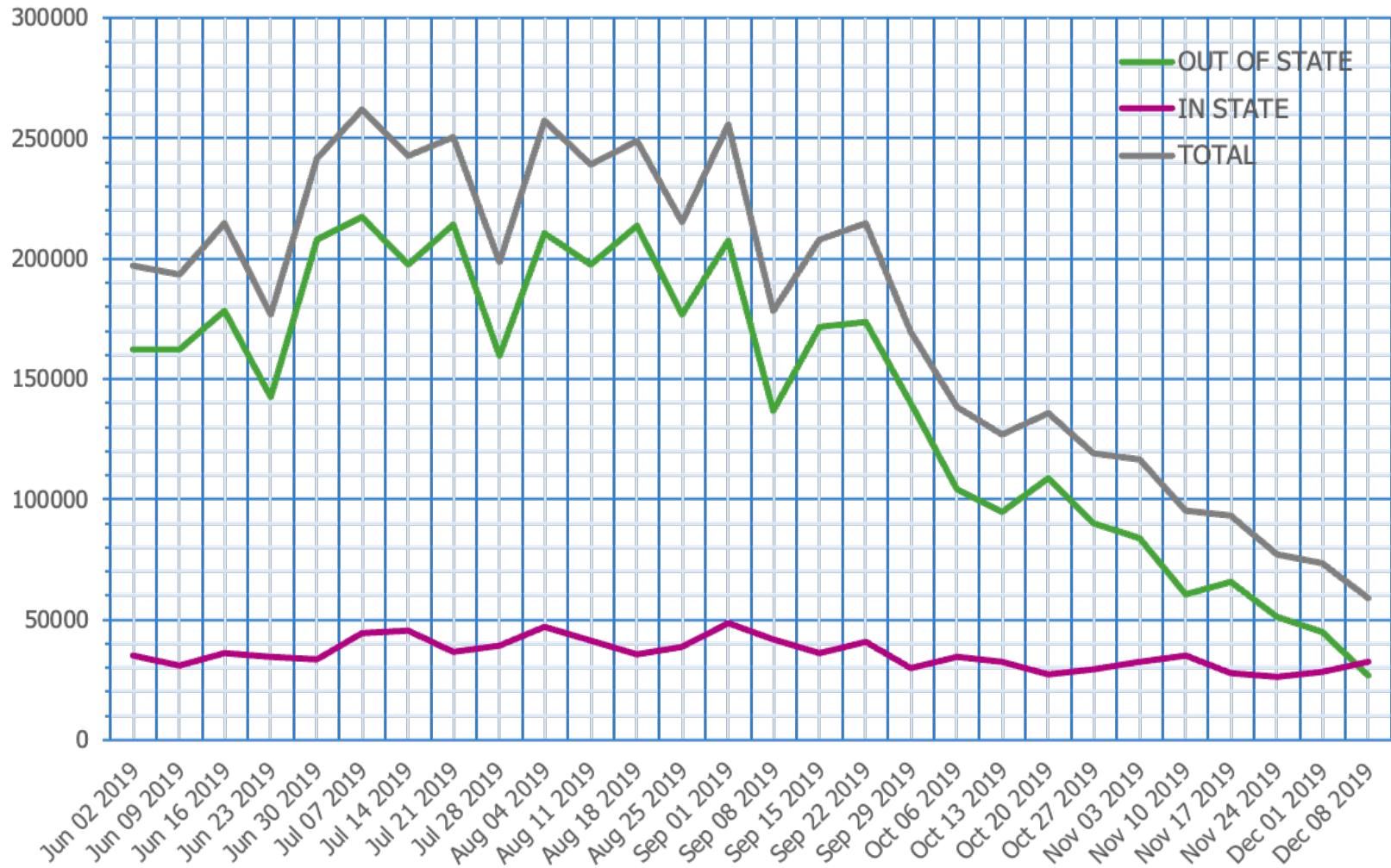


top 10 salaries at Google

RANGE FROM \$143,000 TO \$241,000 PER YEAR.

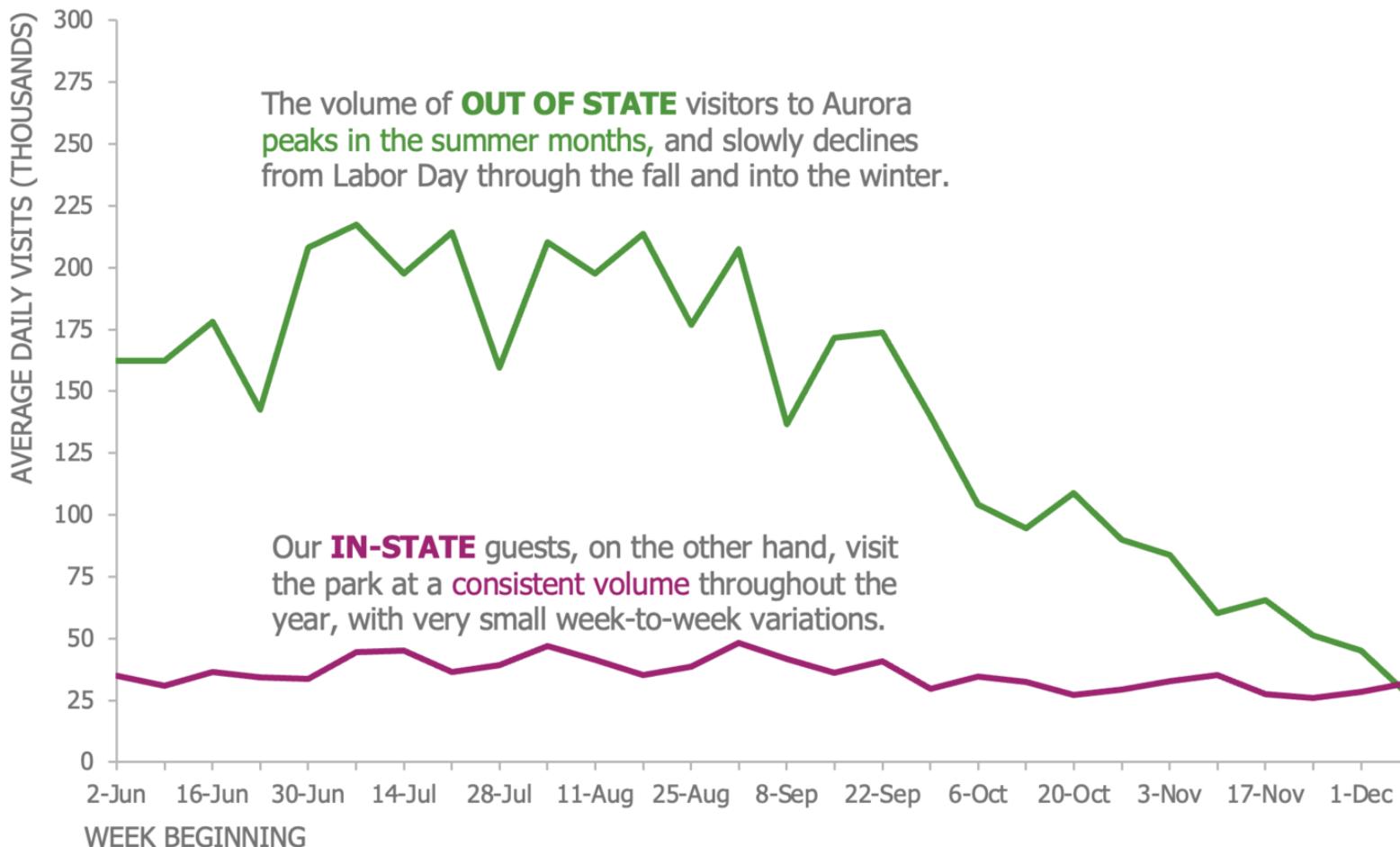


Daily Average Park Visitors By Week



Daily visitors to Aurora Park in summer/fall 2019

VALUES ARE CALCULATED WEEKLY AS A 7-DAY AVERAGE



The volume of **OUT OF STATE** visitors to Aurora peaks in the summer months, and slowly declines from Labor Day through the fall and into the winter.

Our **IN-STATE** guests, on the other hand, visit the park at a consistent volume throughout the year, with very small week-to-week variations.

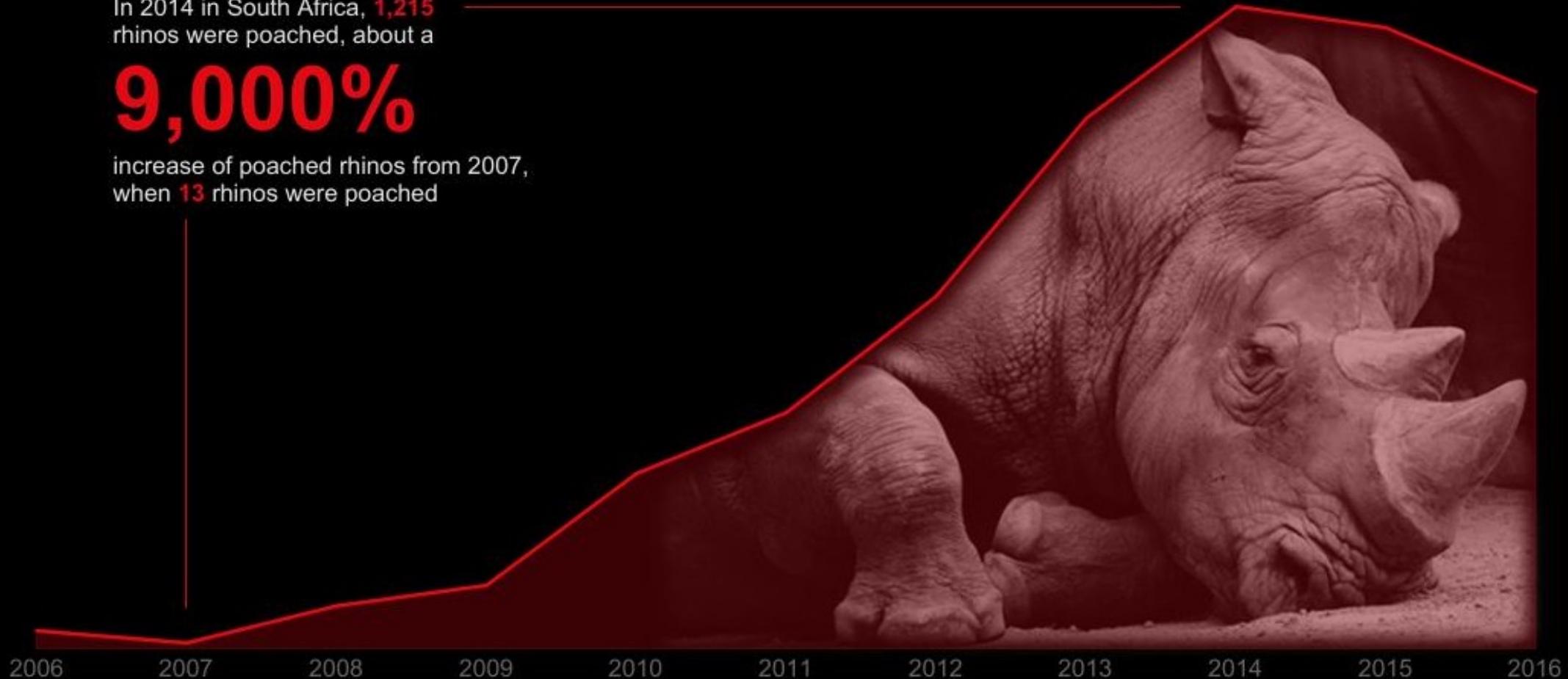
The Dramatic Rise of **Rhino Poaching**

Currently, the greatest threat for African rhinos is poaching for illegal horn trading. In South Africa alone, the number of poached rhinos has soared.

In 2014 in South Africa, **1,215**
rhinos were poached, about a

9,000%

increase of poached rhinos from 2007,
when **13** rhinos were poached



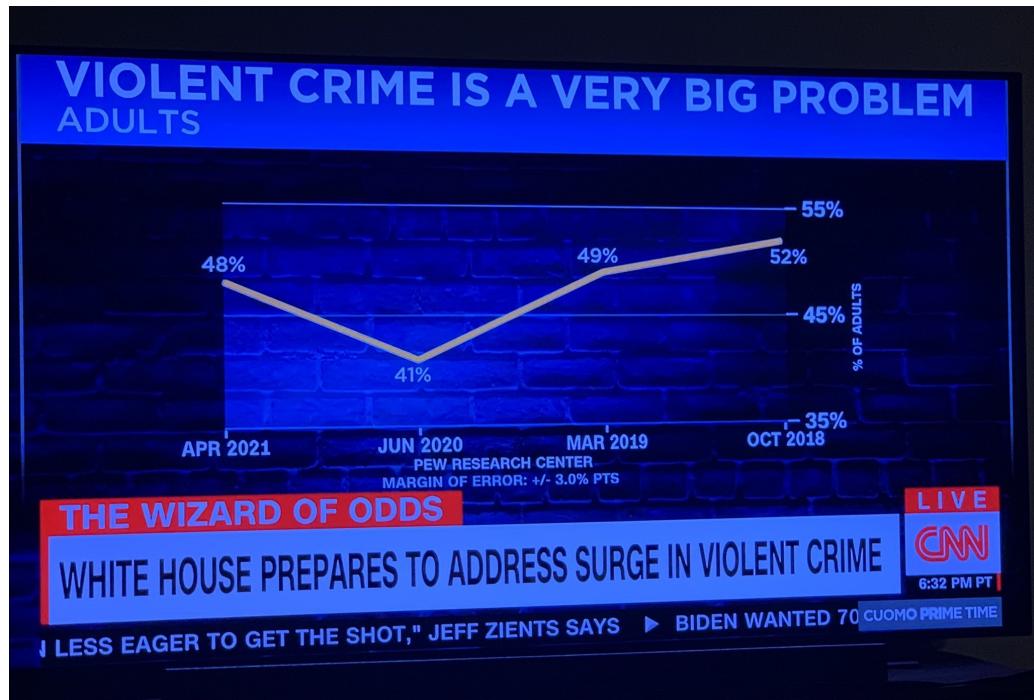
Data Source: World Wildlife Fund | 2019 Makeover Monday Week 20 | Created by: Ash Shih

**Want to help?
Click the rhino picture**



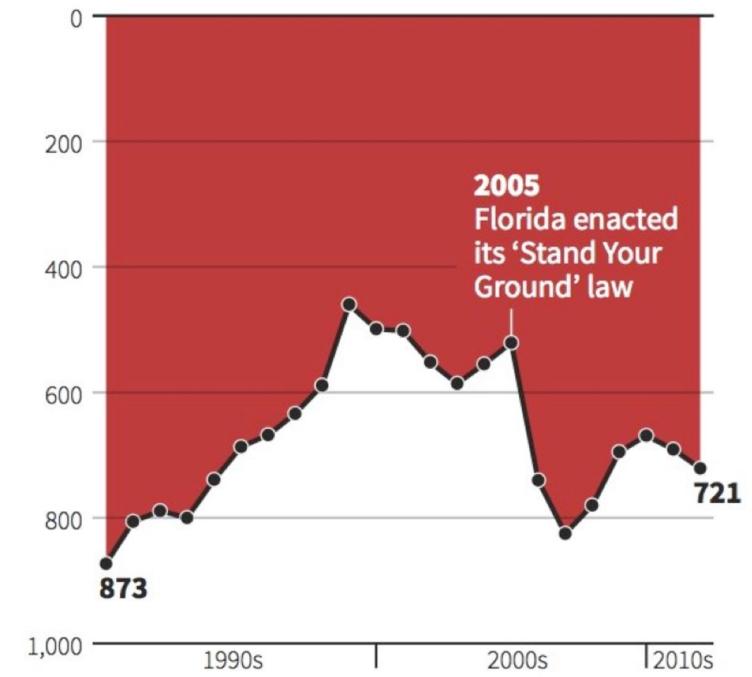
Tot slot: Hoe het NIET moet...

Draai nooit de assen om...



Gun deaths in Florida

Number of murders committed using firearms

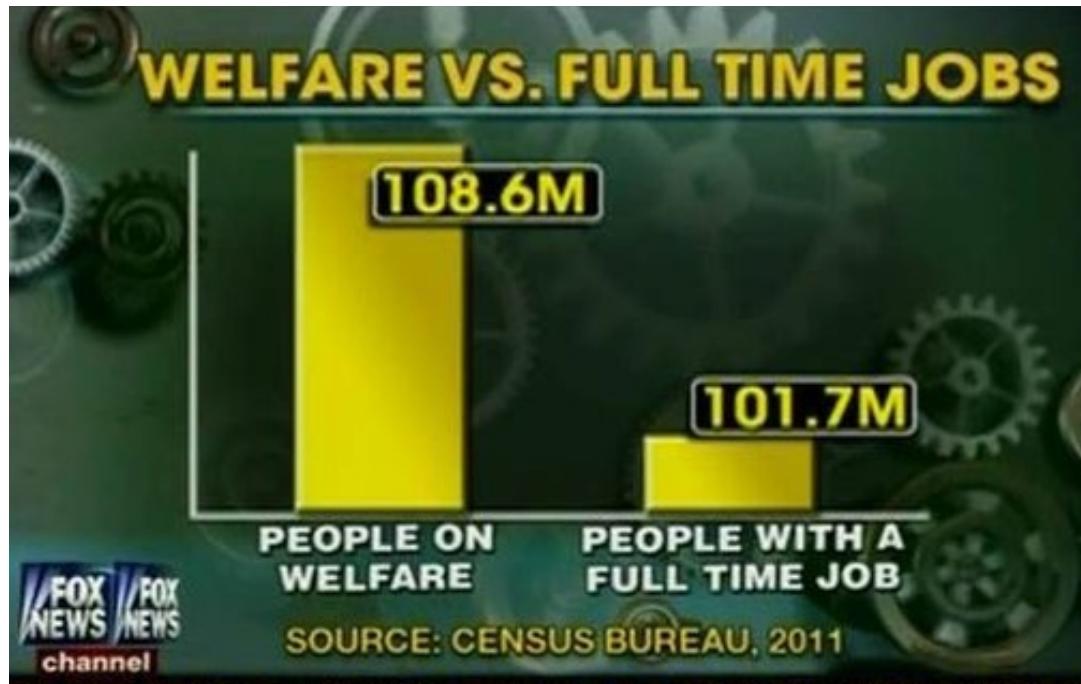


Source: Florida Department of Law Enforcement

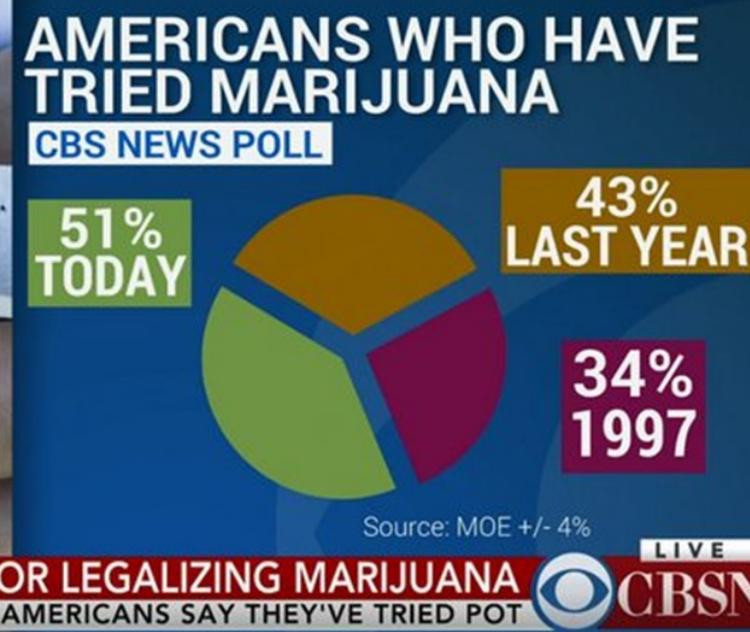
C. Chan 16/02/2014

REUTERS

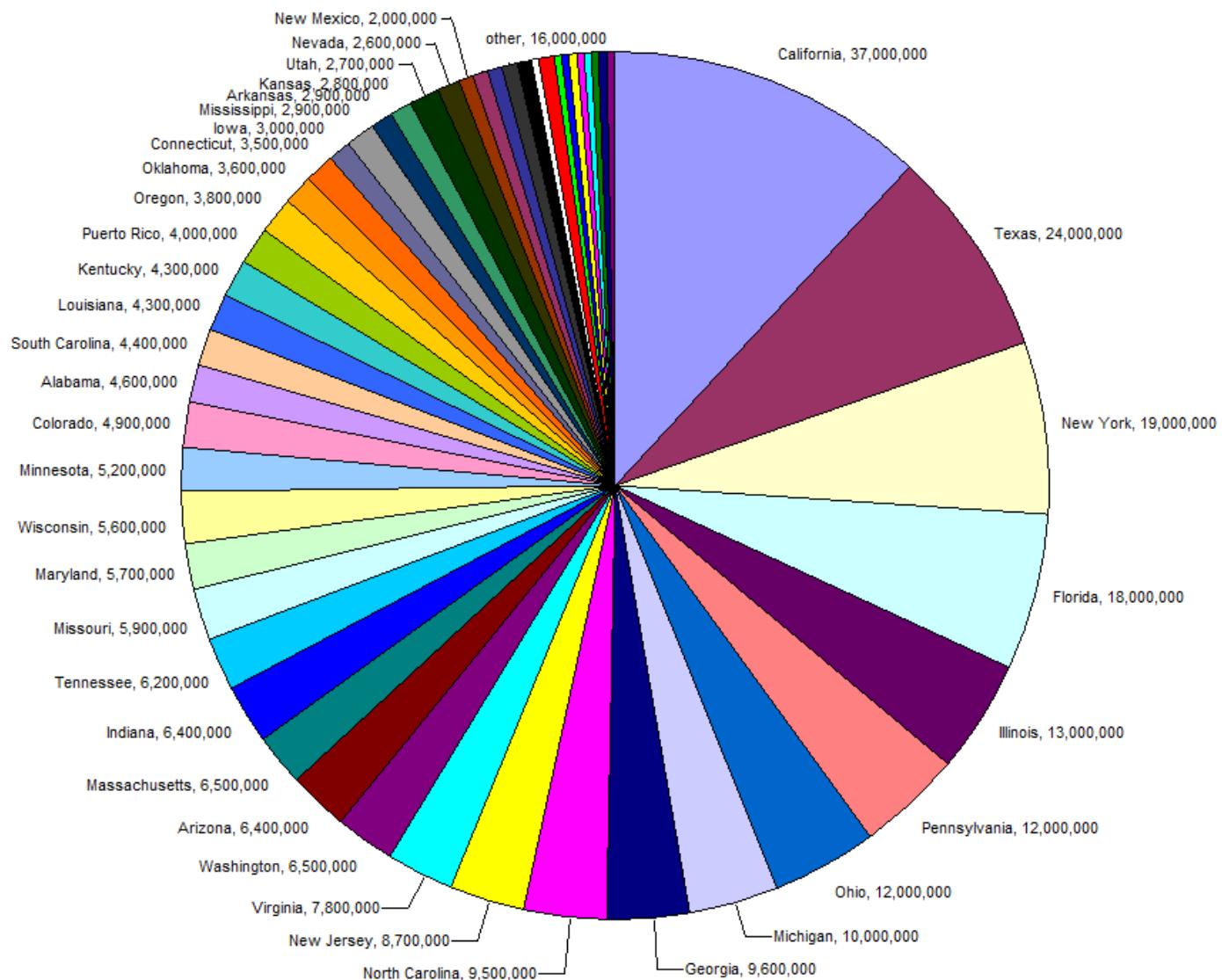
Knip nooit de y-as op (o.a. staafdiagram)



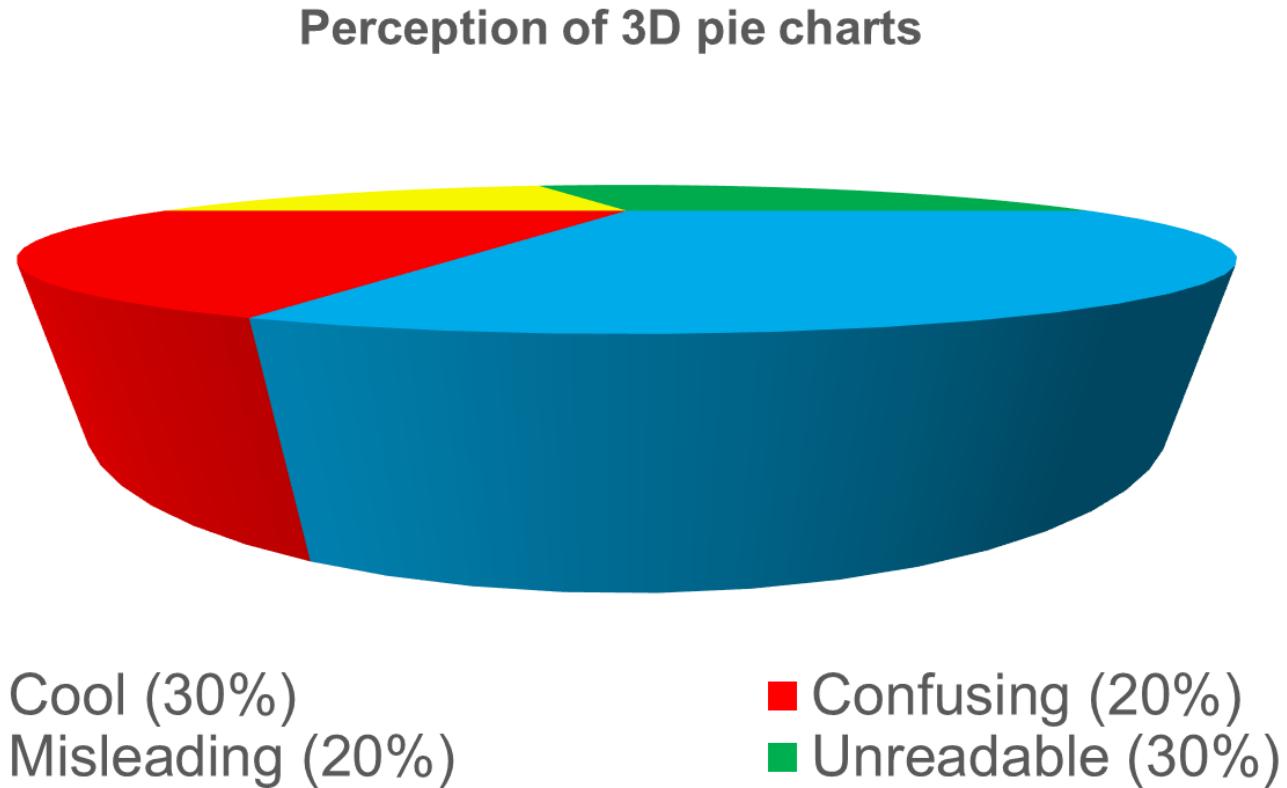
Check je getallen...



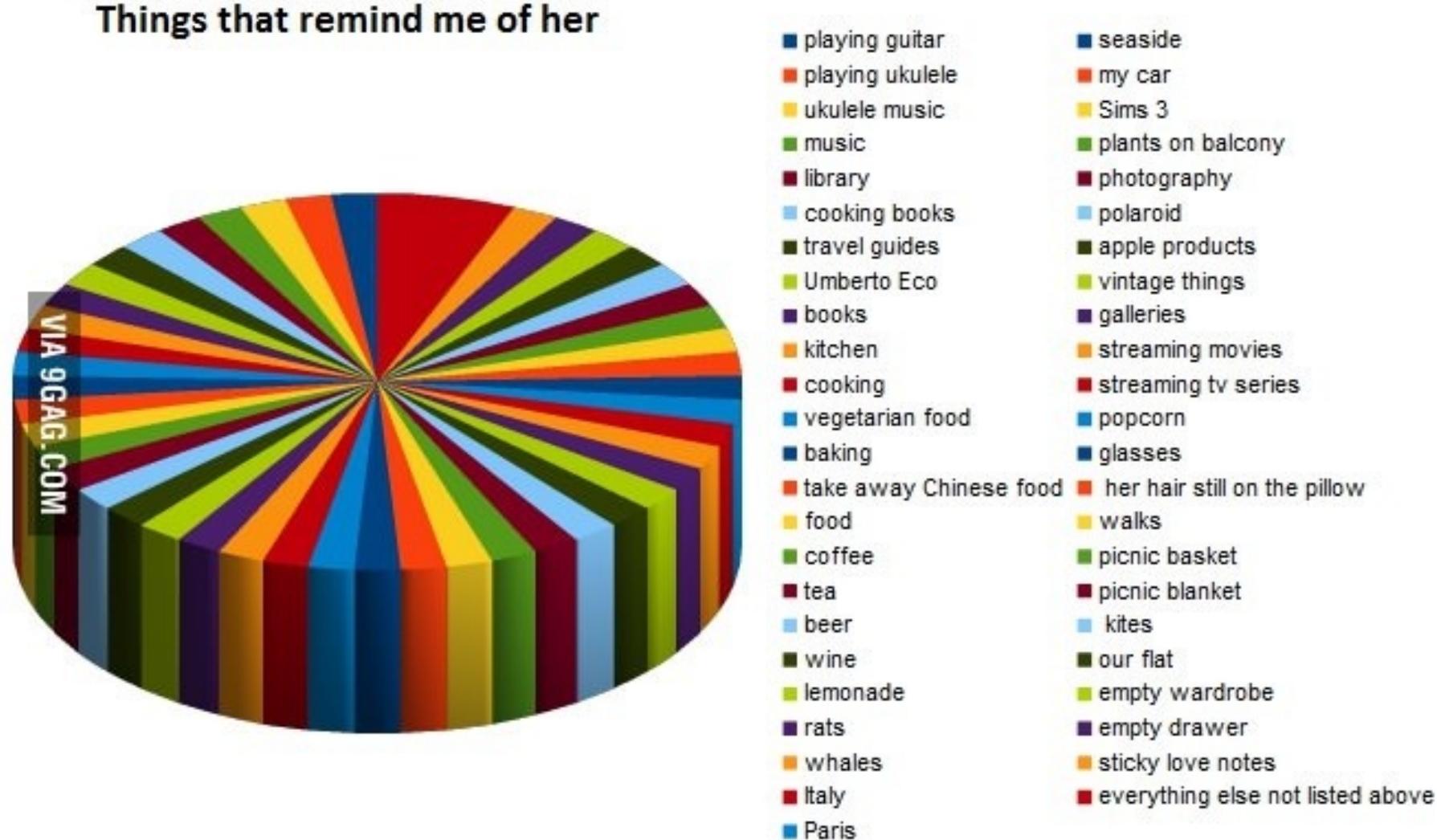
Gebruik geen taartdiagram bij >5 categorieën



Gebruik geen 3D taartdiagram



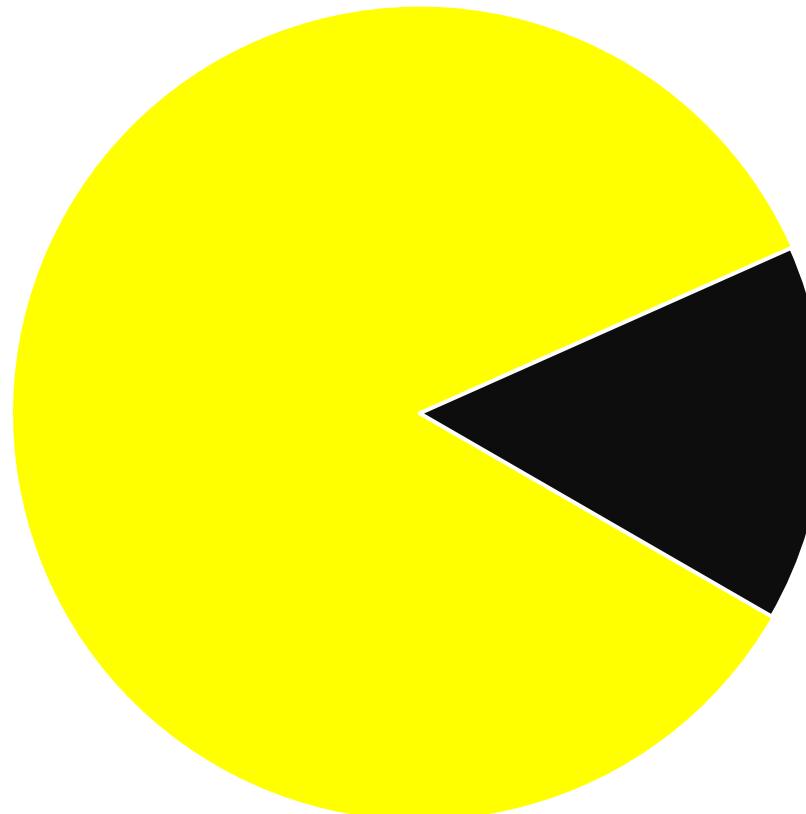
Of 3D taartdiagram met >5 categorieën...



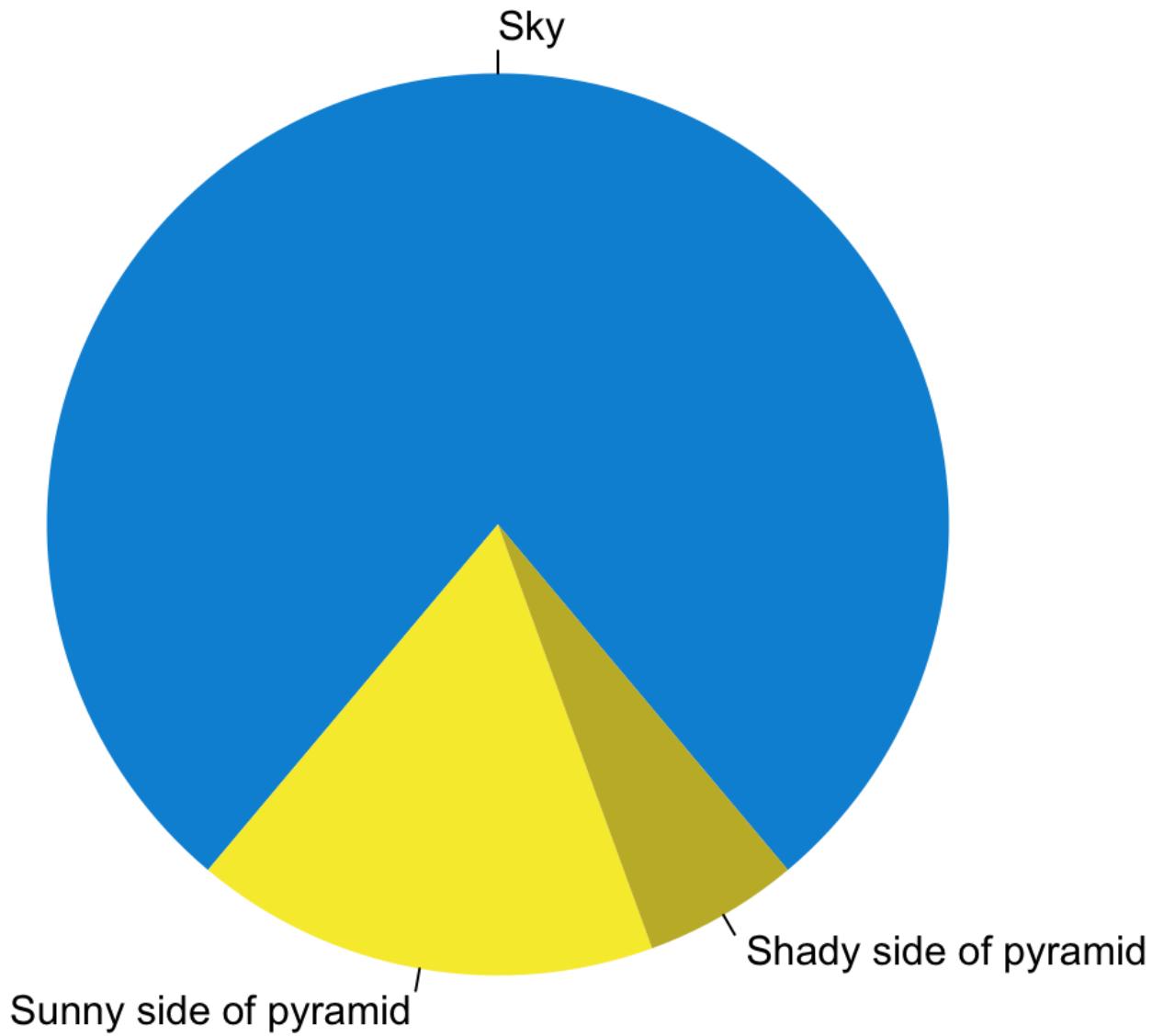
Een taartdiagram werkt prima voor 2 groepen!

Percentage of chart that looks like Pacman

- Pacman
- Not Pacman



Ook voor 3 groepen werkt een taartdiagram



De beste taartdiagram ever?



Dankjewel!



Irene van den Broek, PhD

✉ Irenevandenbroek@gmail.com

✉ @IrenevdBroek

✉ @JeBentWatJeMeet

Happy
Viz-ing!



<https://www.jebentwatjemeet.nl>

<https://irenevdb.rbind.io>