Data Communication & Visual Storytelling

Prinzipien effektiver Datenvisualisierung

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29. September 2025

Hallo, ich bin Cédric.

hello@cedricscherer.com

Als freiberuflicher Spezialist für
Infografiken und Datenvisualisierungen

- entwickle ich Diagramme, Karten & interaktive Inhalte,
- optimiere ich Workflows zur Datenkommunikation und
- lehre ich den Prozess effektiver Datenvisualisierung – von Prinzipien über Design bis zur Umsetzung mit Code.

CÉDRIC SCHERER

Data Visualization & Information Design

gestalten statt generieren
vermitteln statt verwirren

Informationsdesign

ist die Gestaltung von Formen und Strukturen zur effizienten und effektiven Vermittlung von Wissen.

Konzeptionelle
Information

Schematische Darstellung von Objekten, Themen und Prozessen

Art der Information

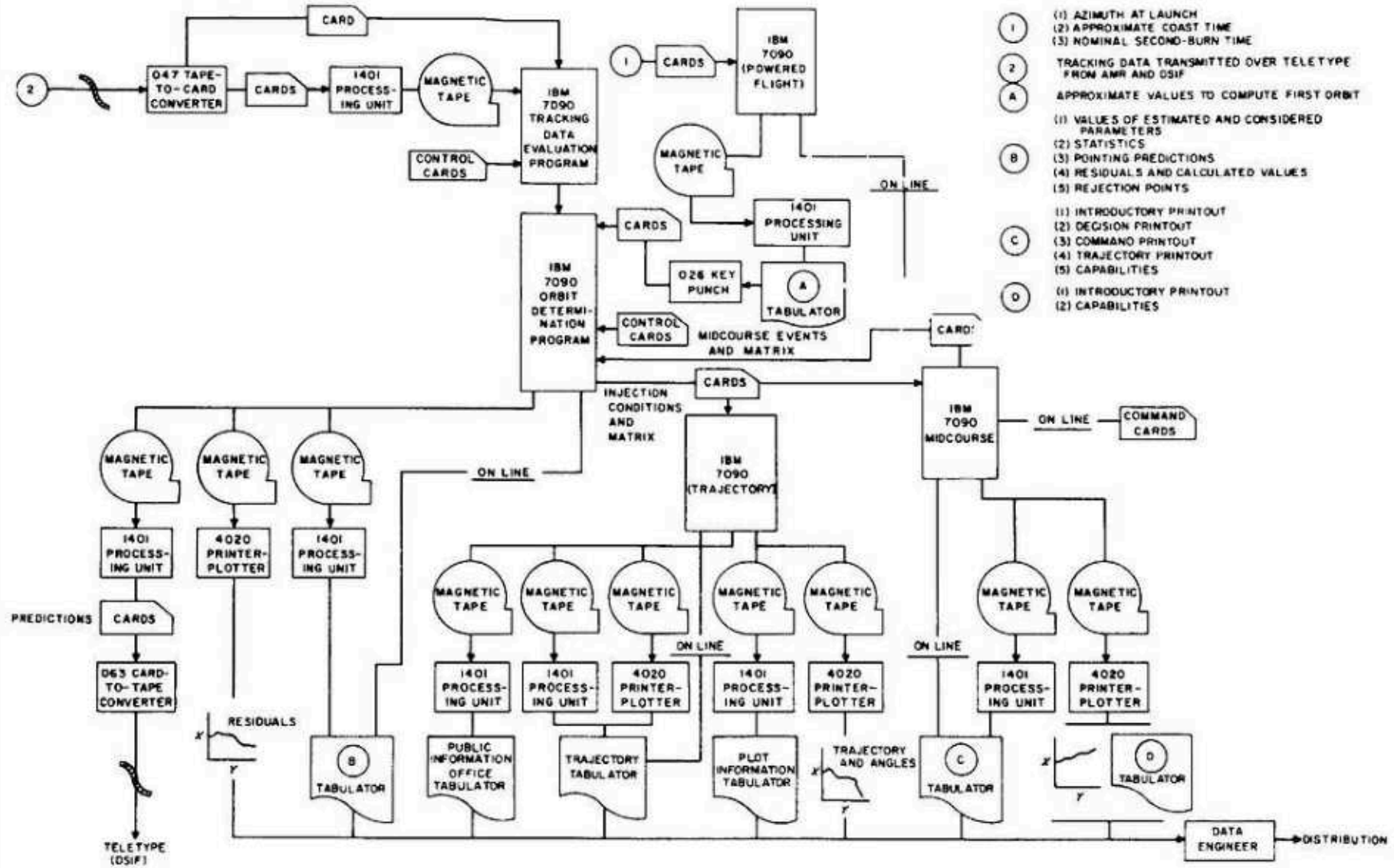
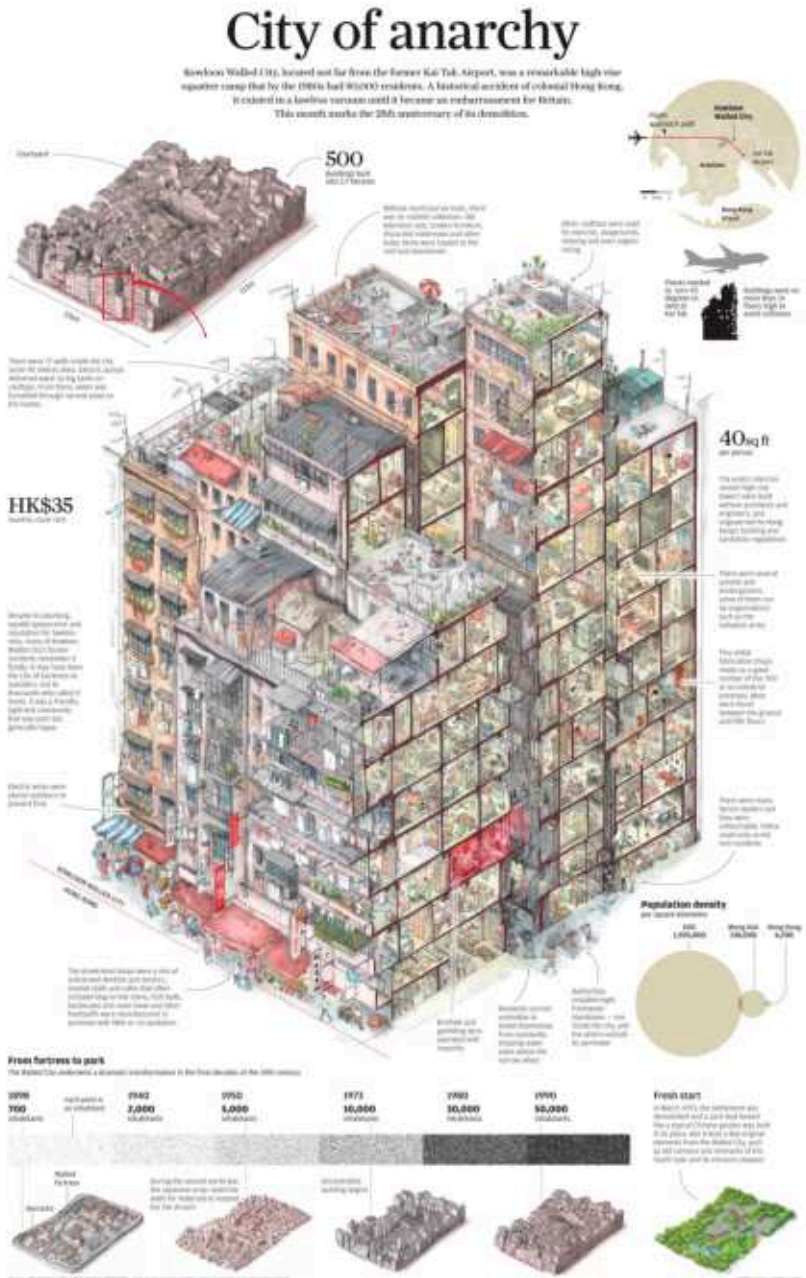


FIGURE 7–30.—Tracking-data flow chart.

Quelle: Mariner-Venus 1962 Final Project Report NASA

Quelle: Europäisches Parlament



„City of Anarchy" von Adolfo Arranz (für South China Morning Post)

Konzeptionelle Information
Schematische Darstellung von Objekten, Themen und Prozessen
Art der Information
Messbare Information
Systematische Darstellung von Datenwerten (in quantifizierbarer Form)

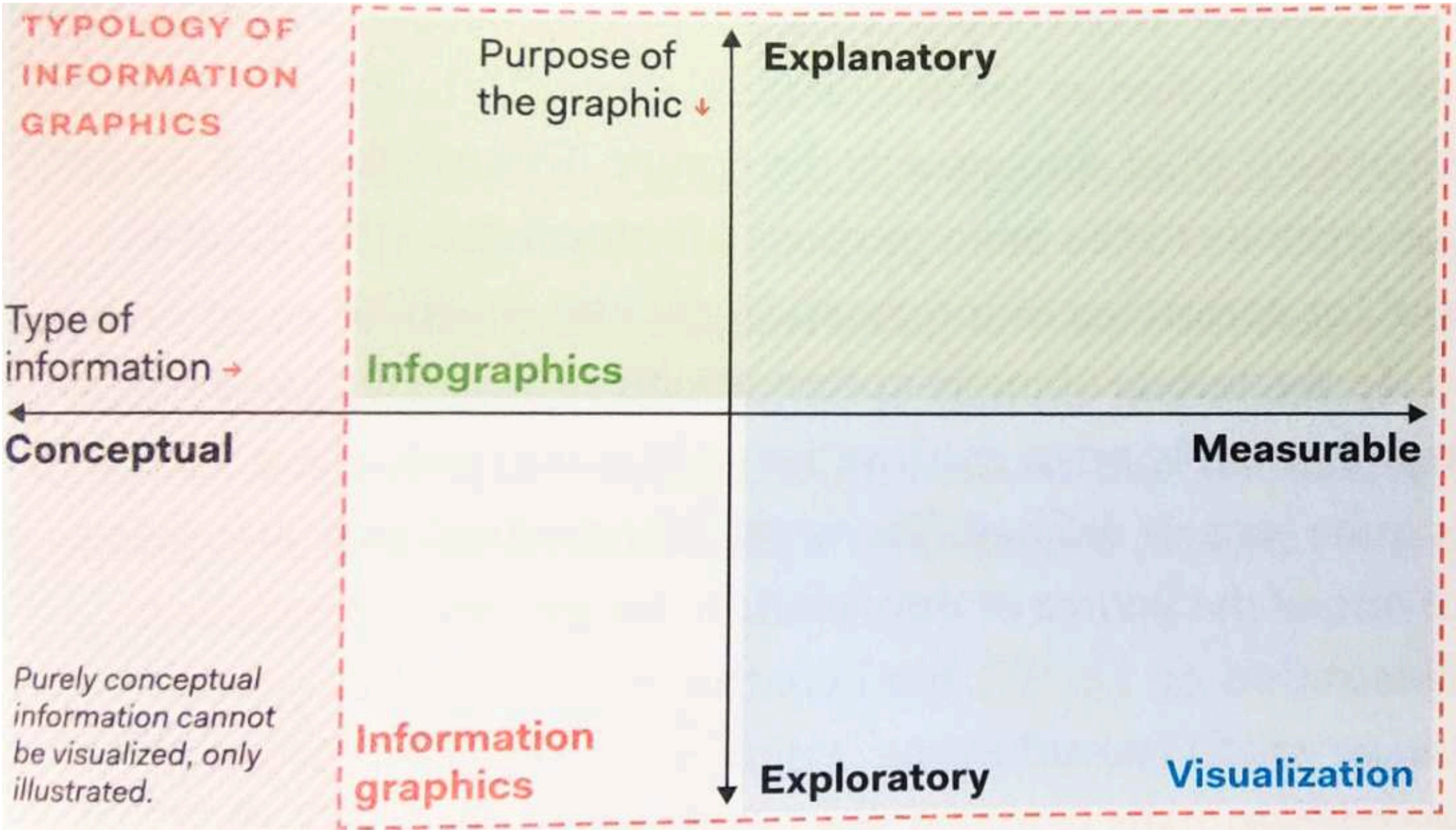
Datenvisualisierung

ist die systematische Darstellung von Zahlen, Kategorien und Beziehungen in quantifizierbarer Form.

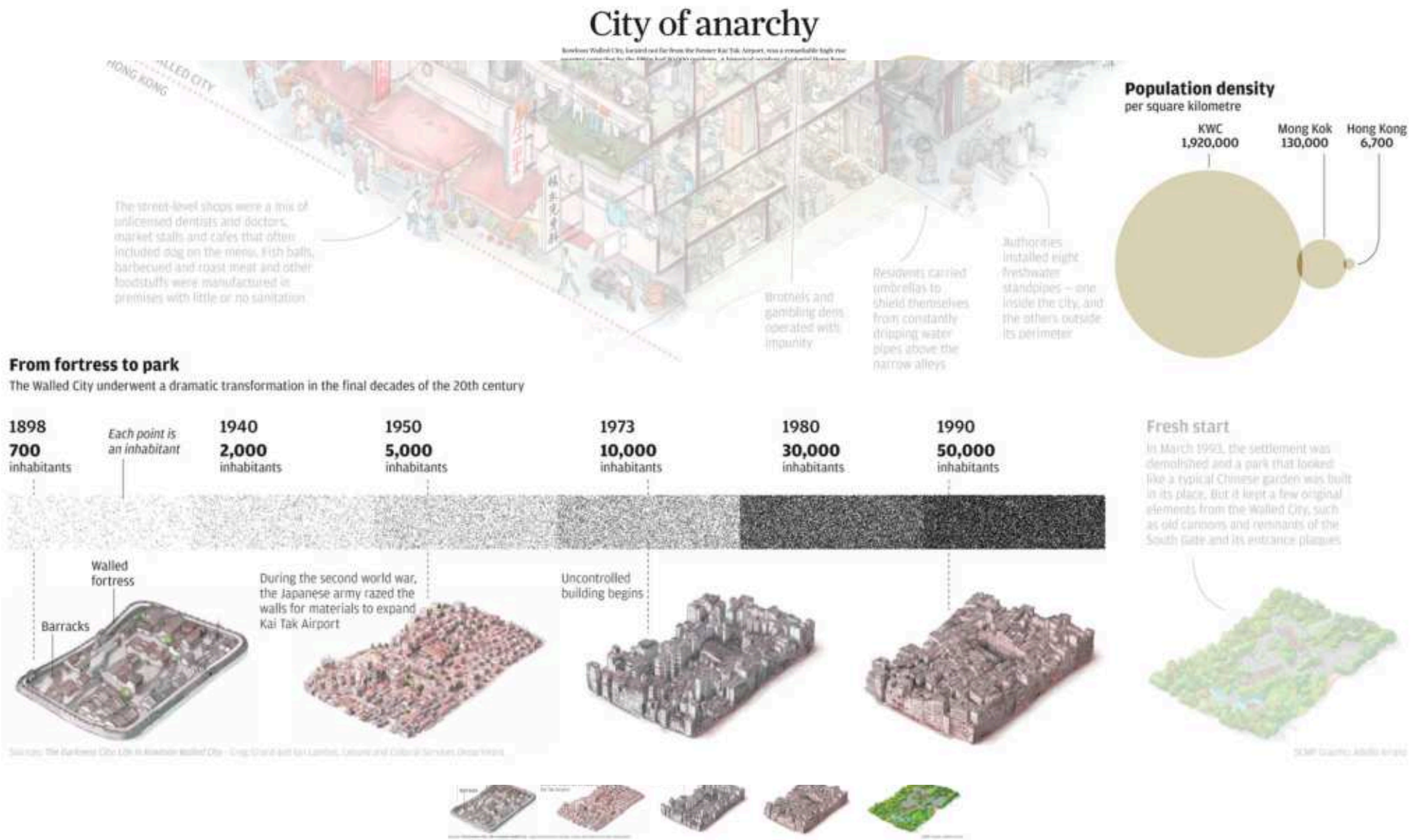
Datenvisualisierung

hilft auf Basis von strukturierter (messbarer) Inhalte zu entdecken, erkennen, erklären und entscheiden.

Erkundung von Daten
Analyse oder Anwendung zur Gewinnung von Erkenntnissen
Zweck der Darstellung
Erklärung von Daten
Präsentation zur Vermittlung der Ergebnisse und Erkenntnisse



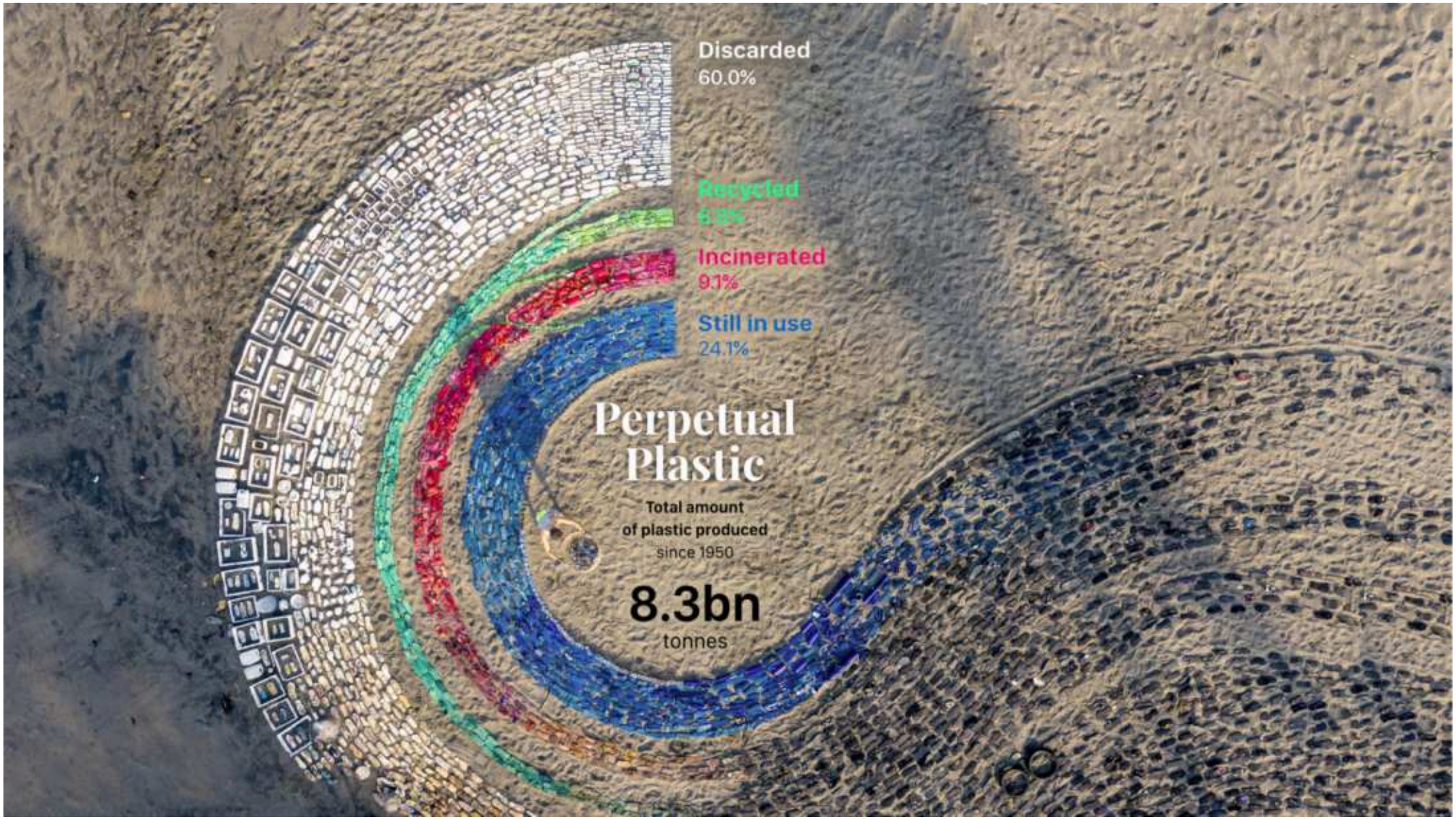
Quelle: „Data Visualization Handbook" von Juuso Koponen & Jonatan Hildén (2020), Seite 25



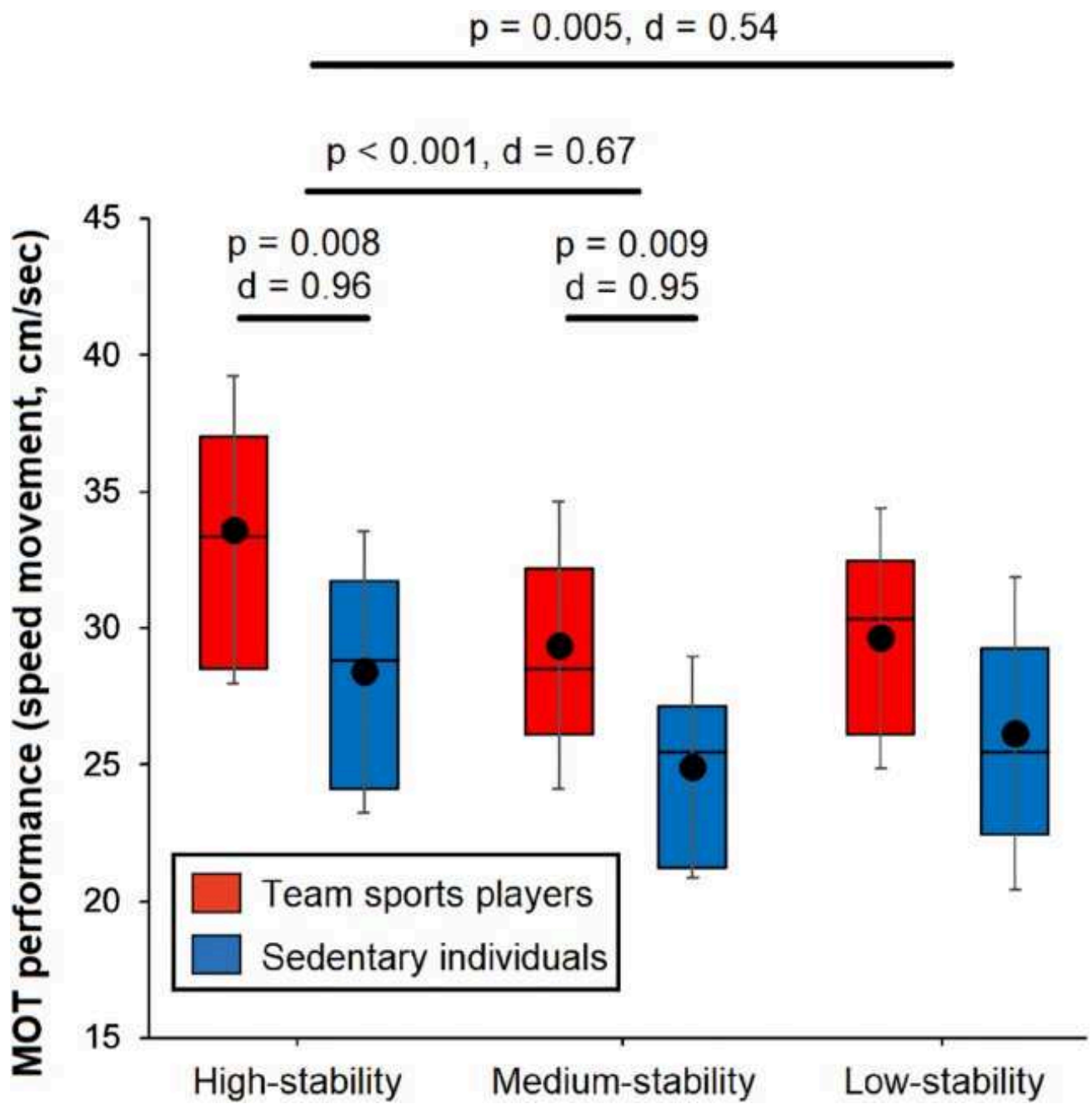
„City of Anarchy" von Adolfo Arranz (für South China Morning Post)

Höhlenmalerei im Canyon de Chelly National Monument, Arizona
Foto: Robert Alexander/Getty Images

Quelle: TheChocolateMuffinTree Blog

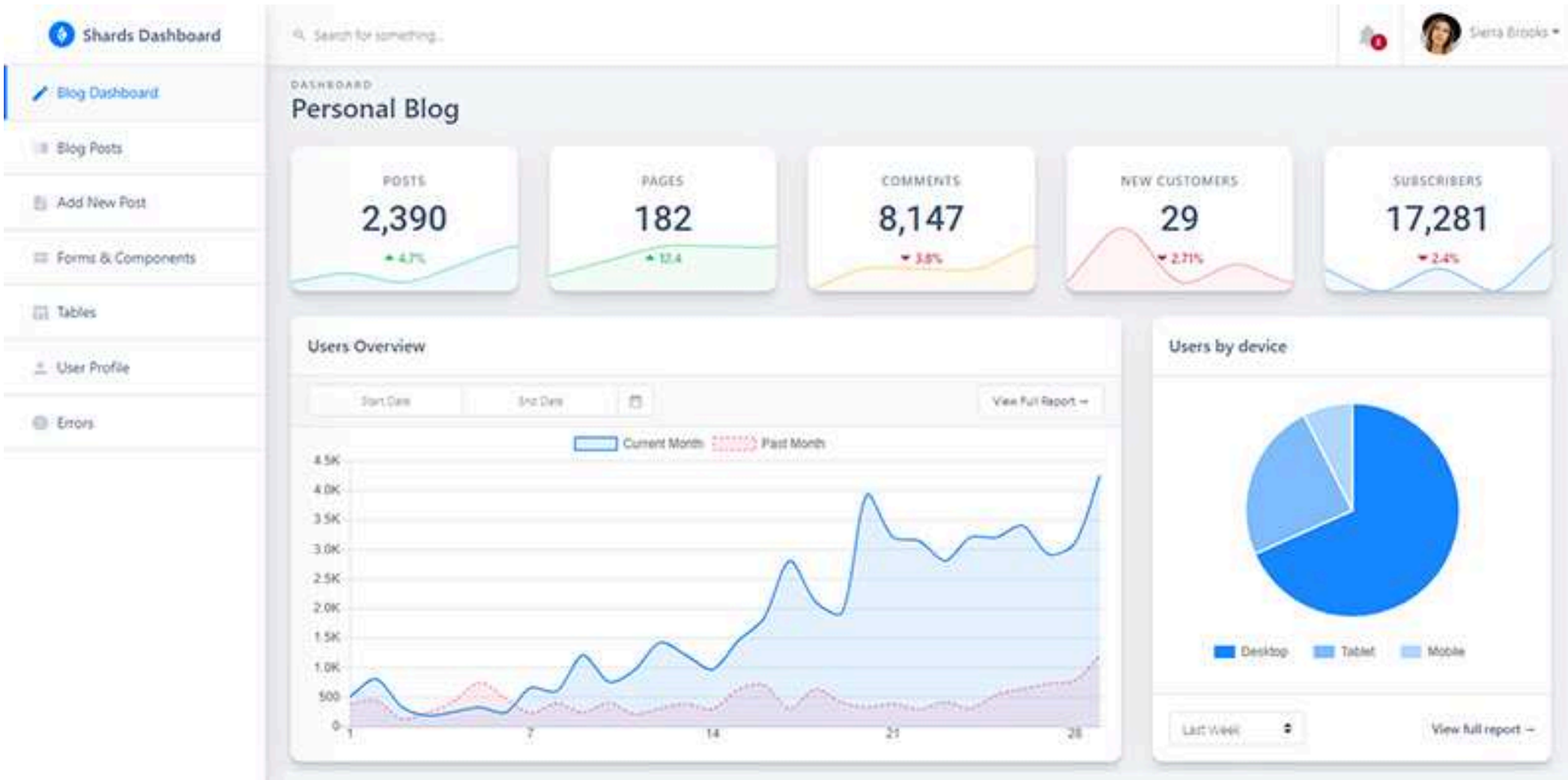


„Perpetual Plastic" von Liina Klauss, Skye Morét & Moritz Stefaner



Zwierko et al. 2022

Quelle: Financial Times

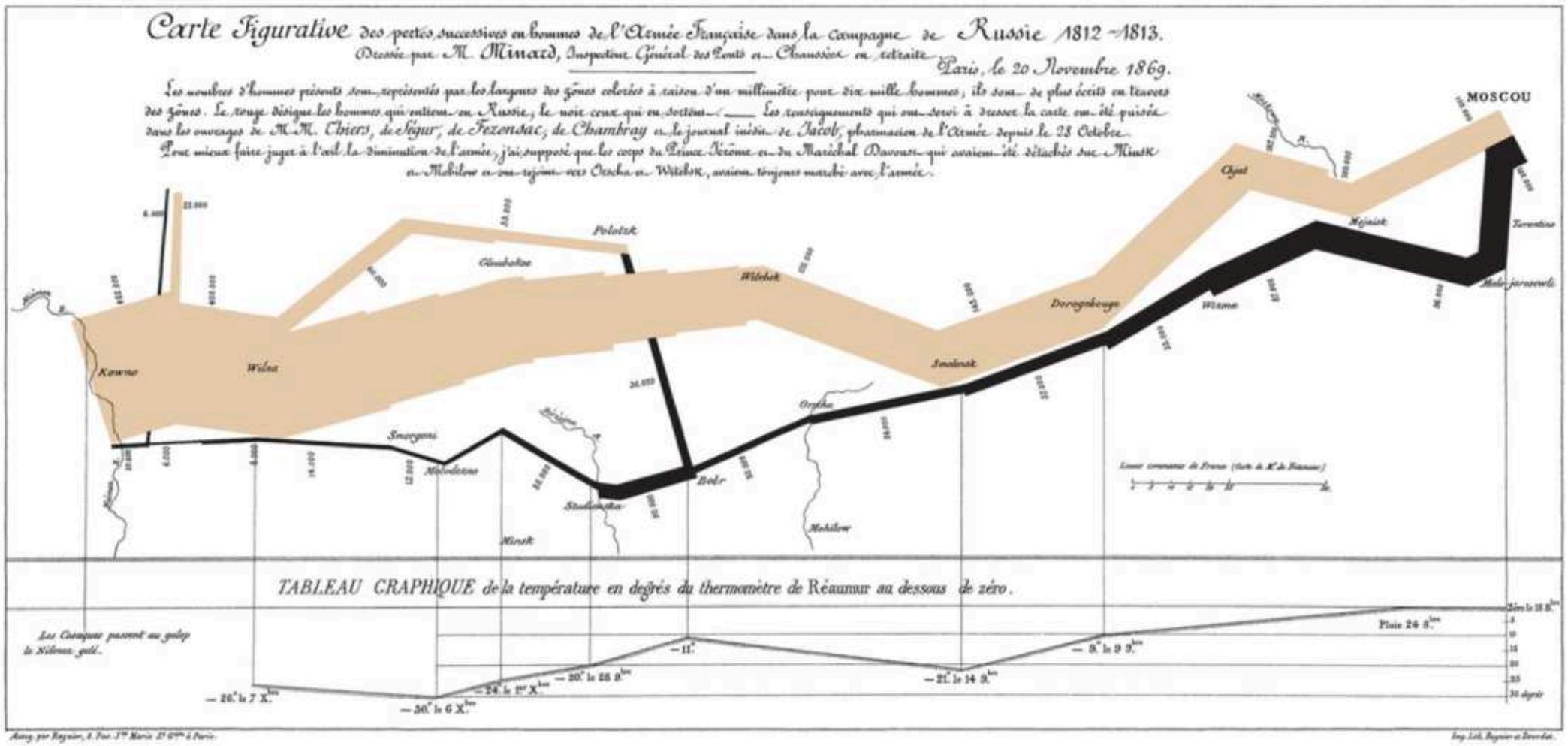


Quelle: bypeople.com

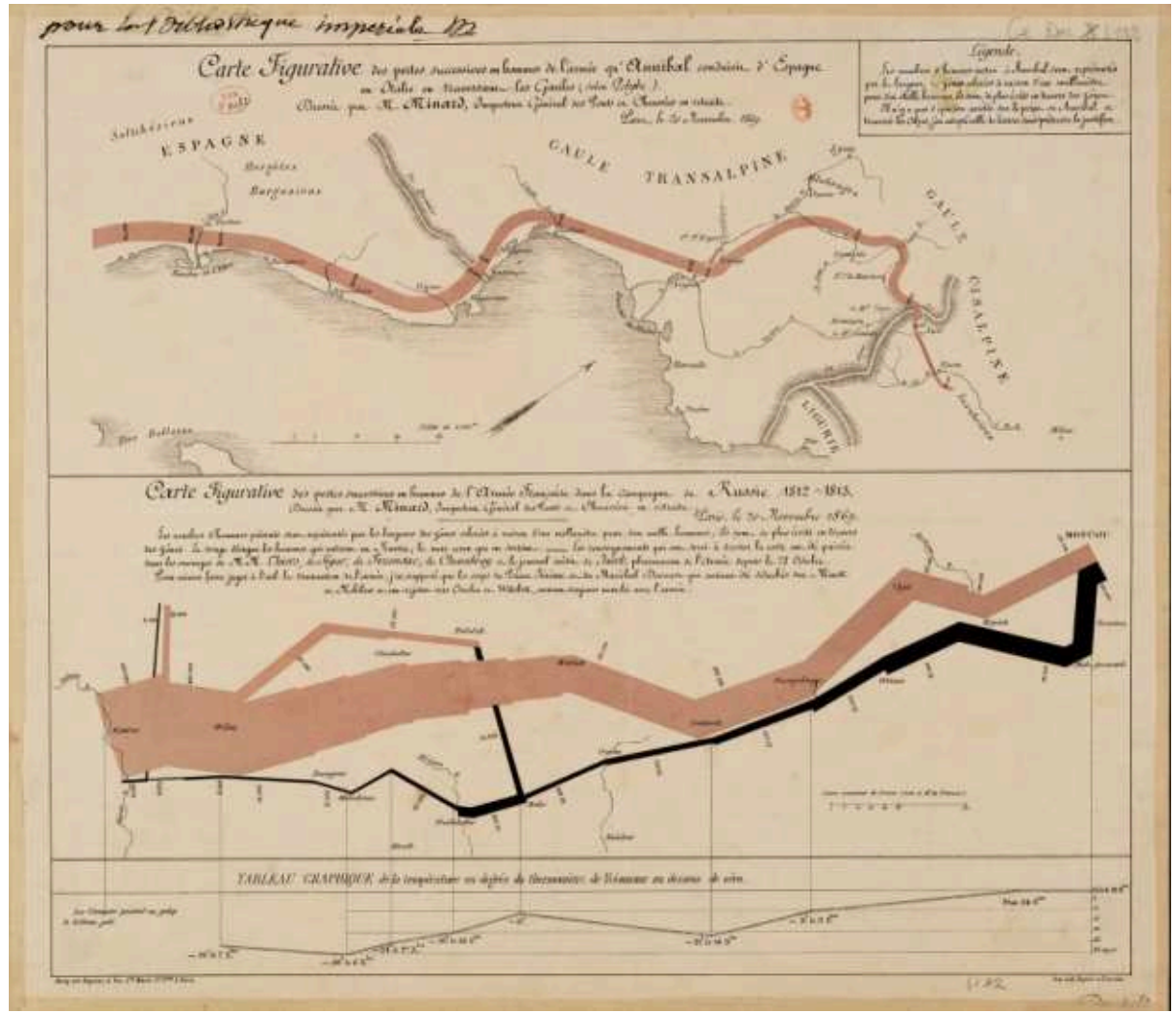
10:09
31:47.01
ZONE 3
148
23:53
TIME
IN ZONE
137BPM
AVERAGE
HR

10:09

„Patchwork Kingdoms" by Nadieh Bremer

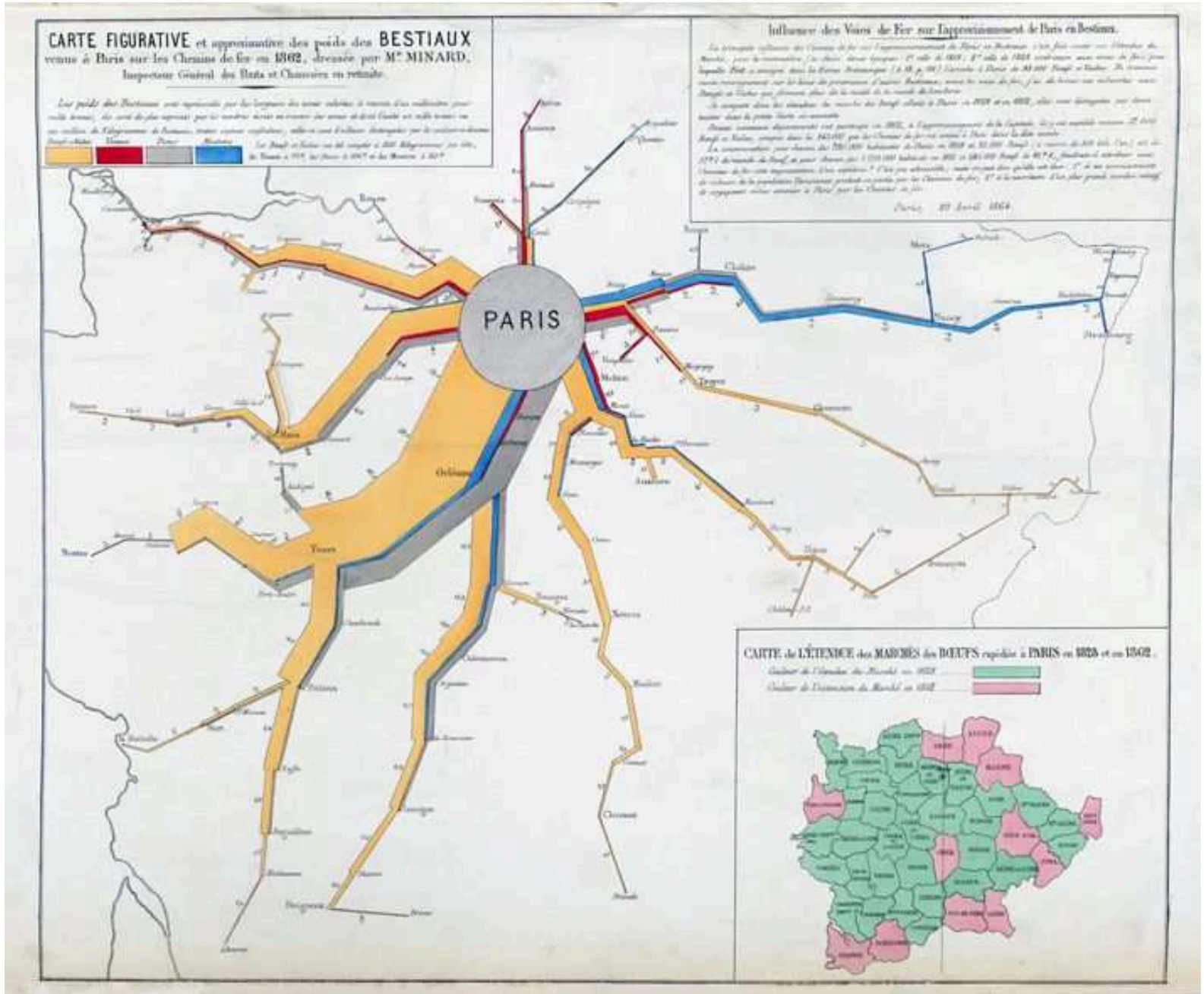


„Carte figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812–1813" von Charles Joseph Minard (1869)



„Carte figurative des pertes successives en hommes de l'Armée qu'Annibal conduisit d'Espagne en Italie en traversant les Gaules" und „Carte figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812–1813" von Charles Joseph Minard (1869)

- zeigt die Truppenstärke von Hannibal (218 v. Chr.) und Napoleon (1812-1813)
- wird als eine der besten statistischen Visualisierung überhaupt betitelt

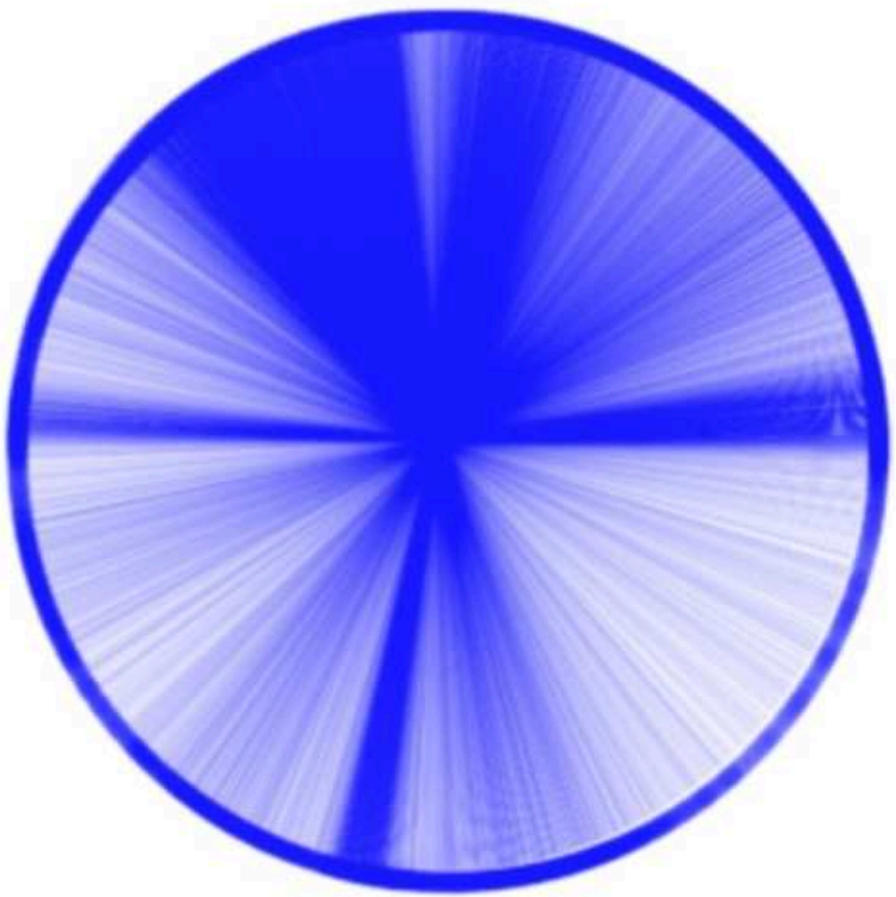


„Carte figurative et approximative des poids des bestiaux venus á Paris sur les chemins de fer en 1862" von Charles Joseph Minard (1864)

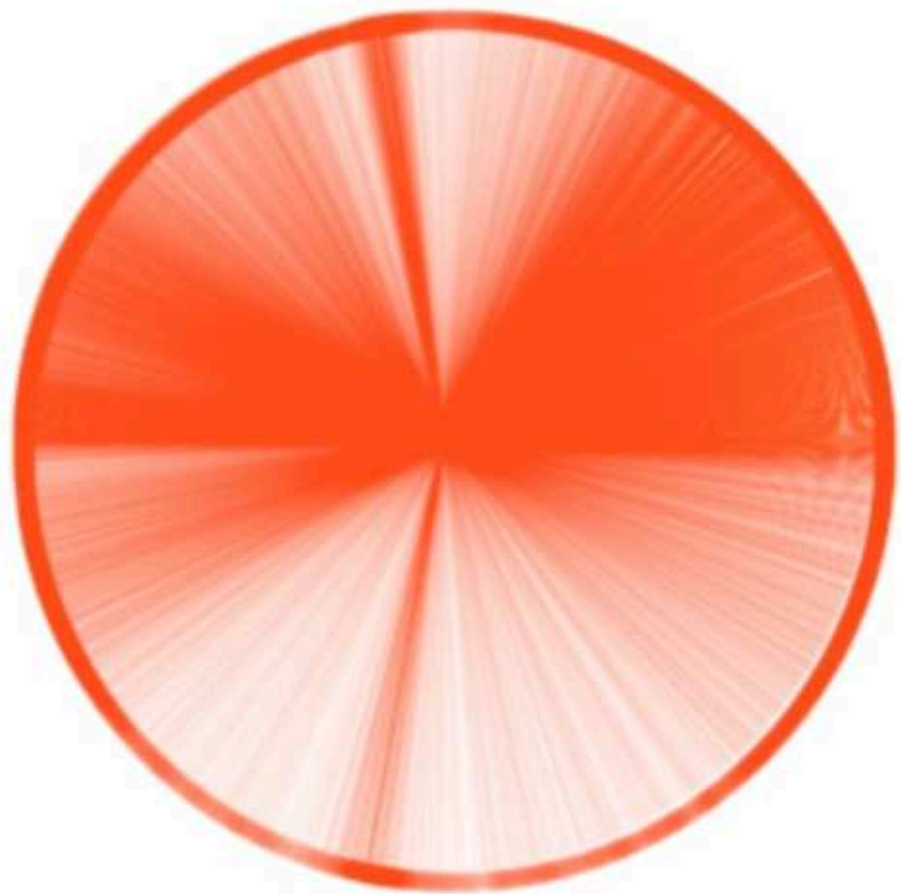
Experiment

Wenn das Jahr ein Kreis ist — wo befinden sich März und Dezember?

- Zeichne einen Kreis, der das Jahr symbolisiert.
- Markiere darauf die Positionen von März und Dezember.
- Füge einen Pfeil hinzu, der die Richtung anzeigt.
- Überlege, ob du darüber schon einmal nachgedacht hast.
- Vergleiche deine Darstellung mit denen der Anderen.

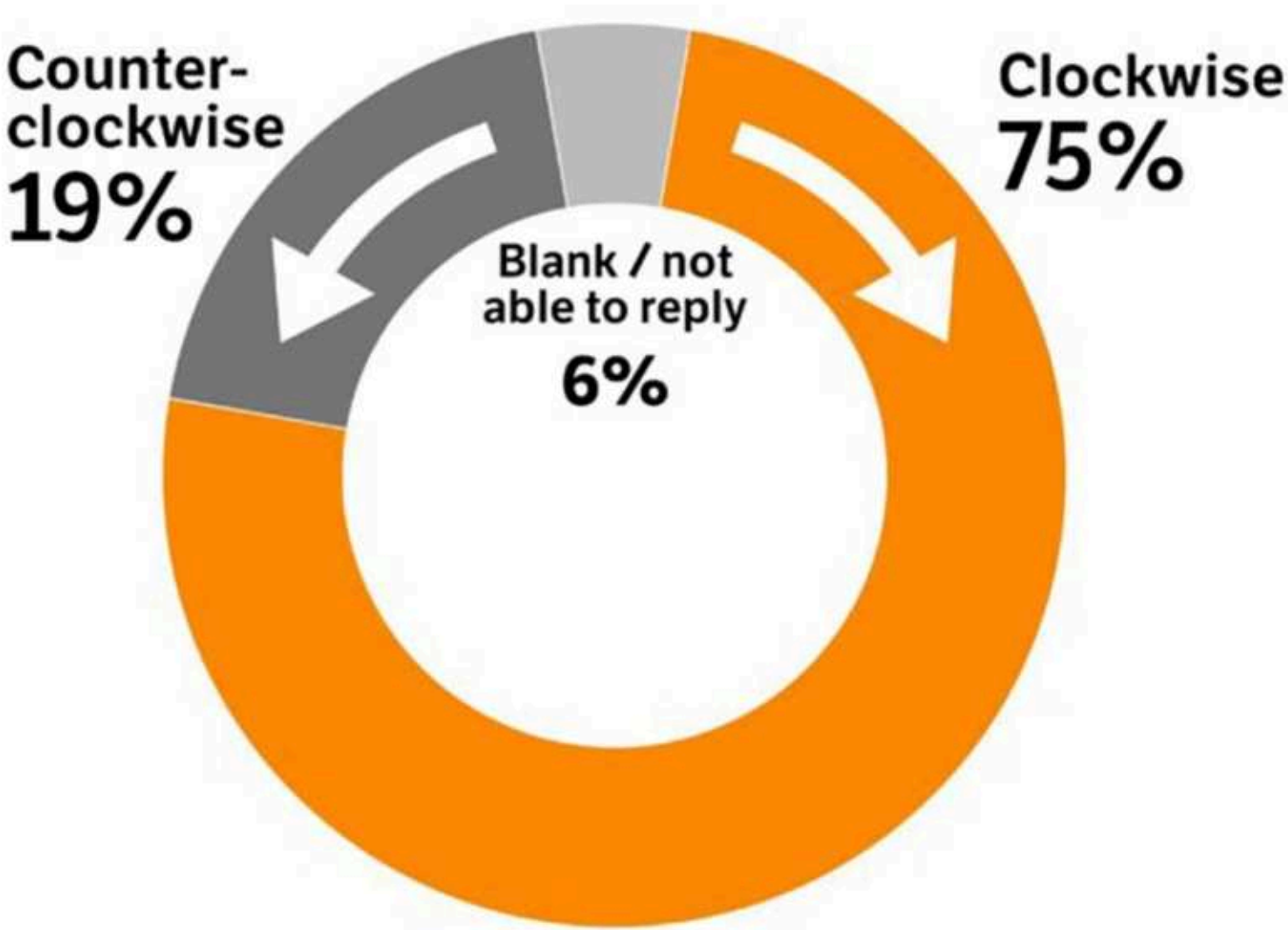


December

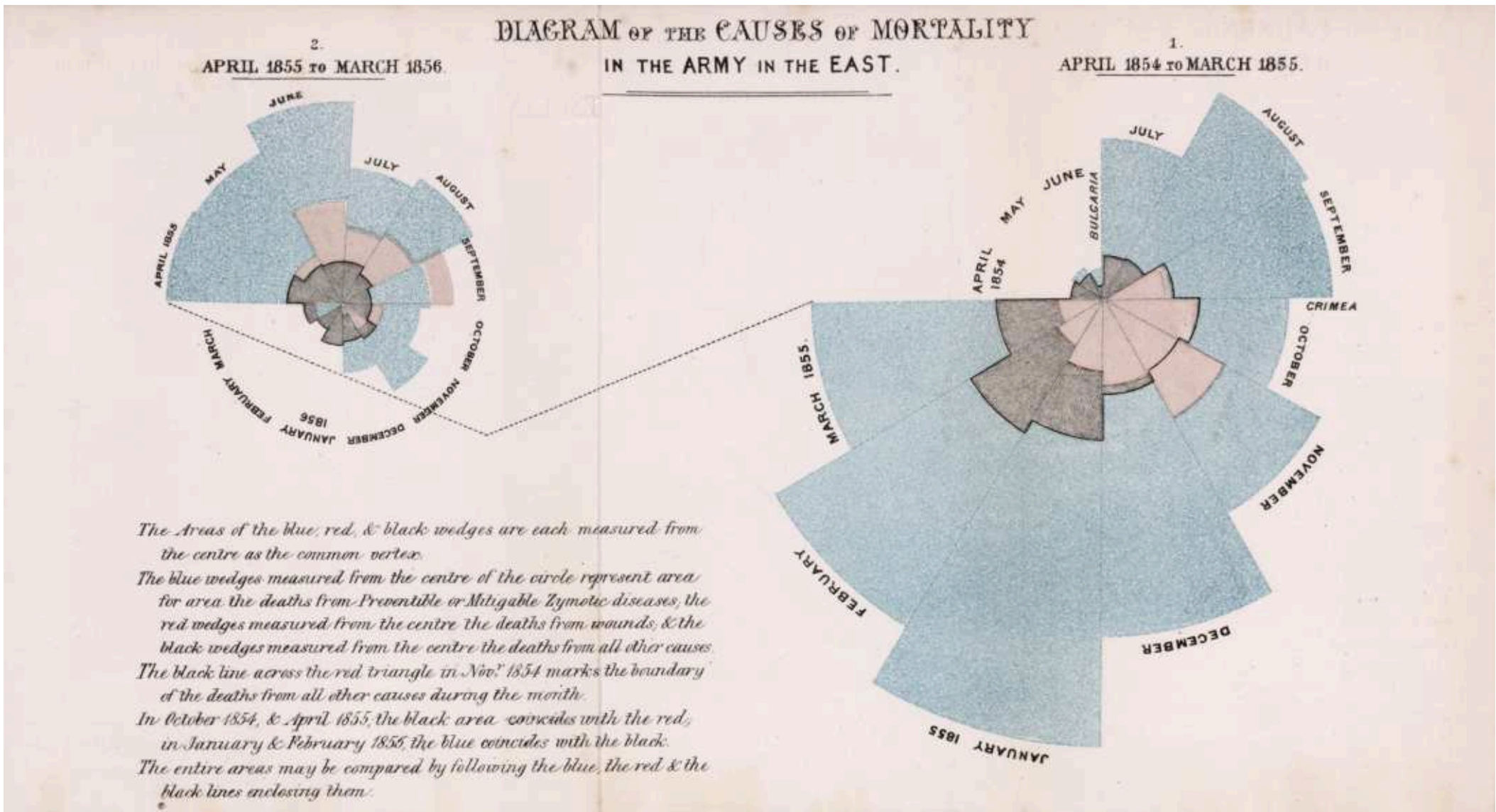


March

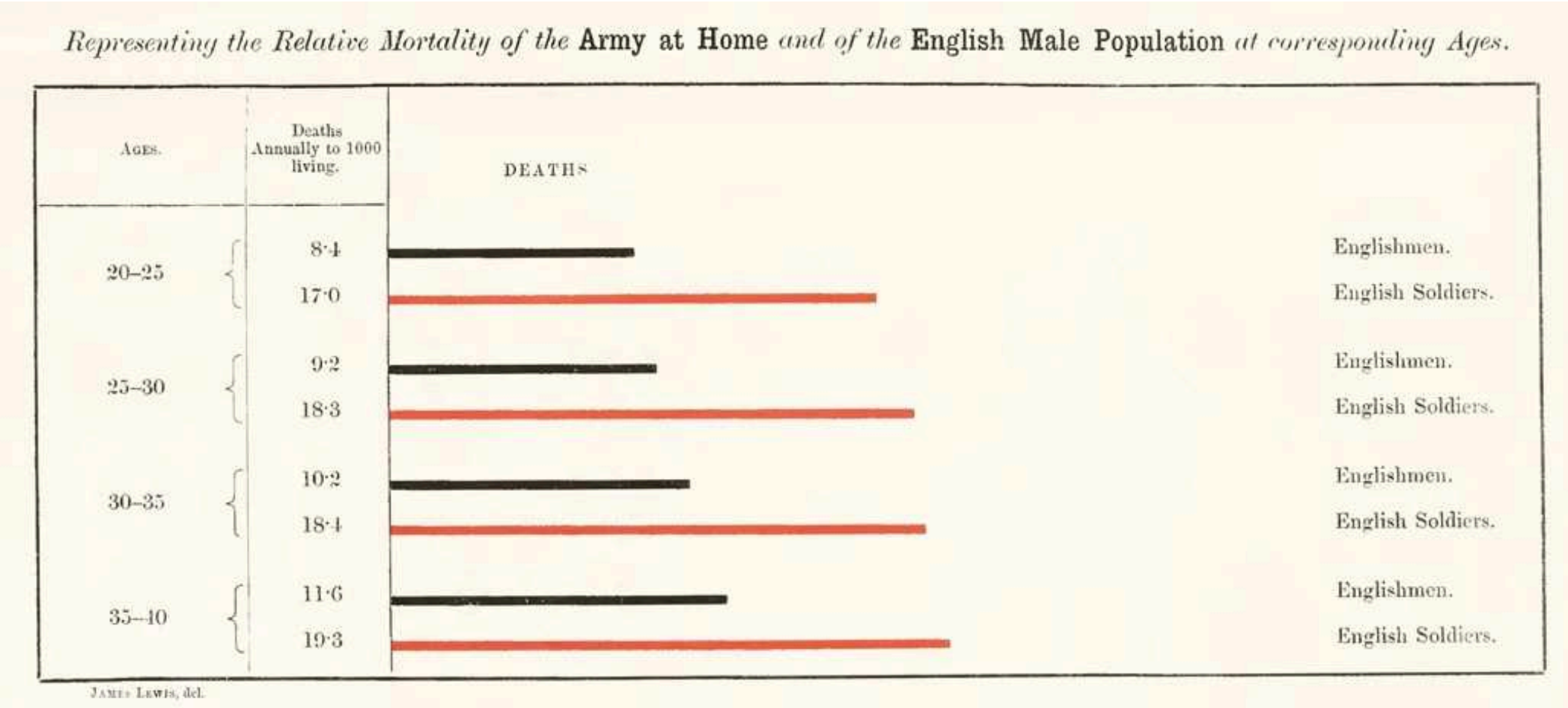
76,922 Platzierungen der Monate Dezember und März entlang eines Kreises.
Visualisierung: Henrik Lied, NRKbeta Laeng & Hofseth, *Front Psychol.* 2019



Anteil der Befragten gruppiert nach Richtung der Zeit auf dem Jahresrad.
Visualisierung: Vidar Kvien, NRK Laeng & Hofseth, *Front Psychol.* 2019



„Diagram of the causes and mortality in the army in the East" (genannt coxcomb oder rose diagram) von Florence Nightingale (1858)



„Relative mortality of the army at home and of the English male population at corresponding ages" von Florence Nightingale (1858)

Visualisiere deine Daten!

„… make both **calculations and graphs**. Both sorts of output should be studied; **each will contribute to understanding**.”

F. J. Anscombe (1973)

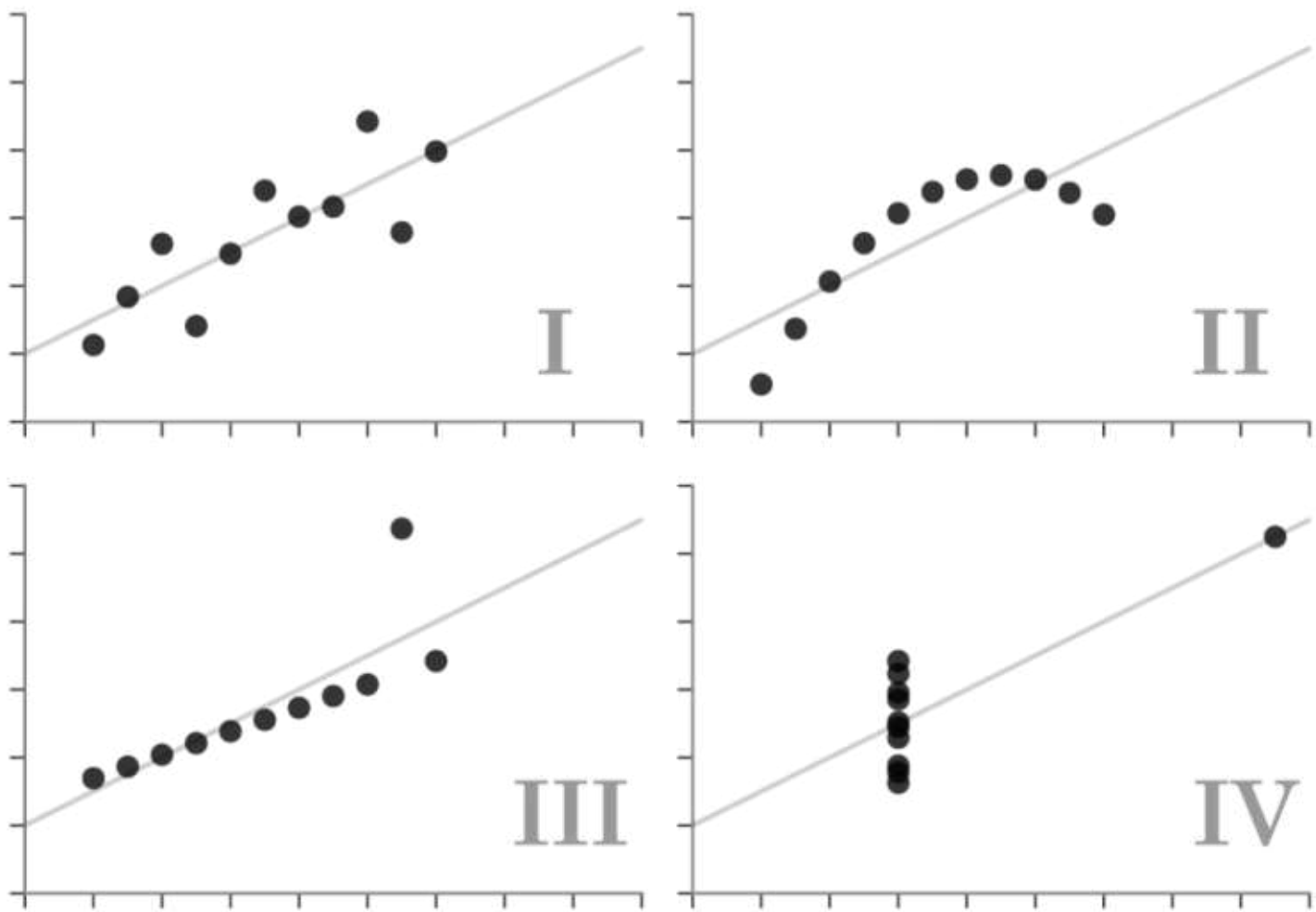
Anscombe's Quartet

I		II		III		IV	
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

Anscombe's Quartet

I	II	III	IV
$\mu_x = 9$	$\mu_x = 9$	$\mu_x = 9$	$\mu_x = 9$
$\sigma_x = 3.16$	$\sigma_x = 3.16$	$\sigma_x = 3.16$	$\sigma_x = 3.16$
$\mu_y = 7.5$	$\mu_y = 7.5$	$\mu_y = 7.5$	$\mu_y = 7.5$
$\sigma_y = 1.94$	$\sigma_y = 1.94$	$\sigma_y = 1.94$	$\sigma_y = 1.94$
$r = 0.82$	$r = 0.82$	$r = 0.82$	$r = 0.82$

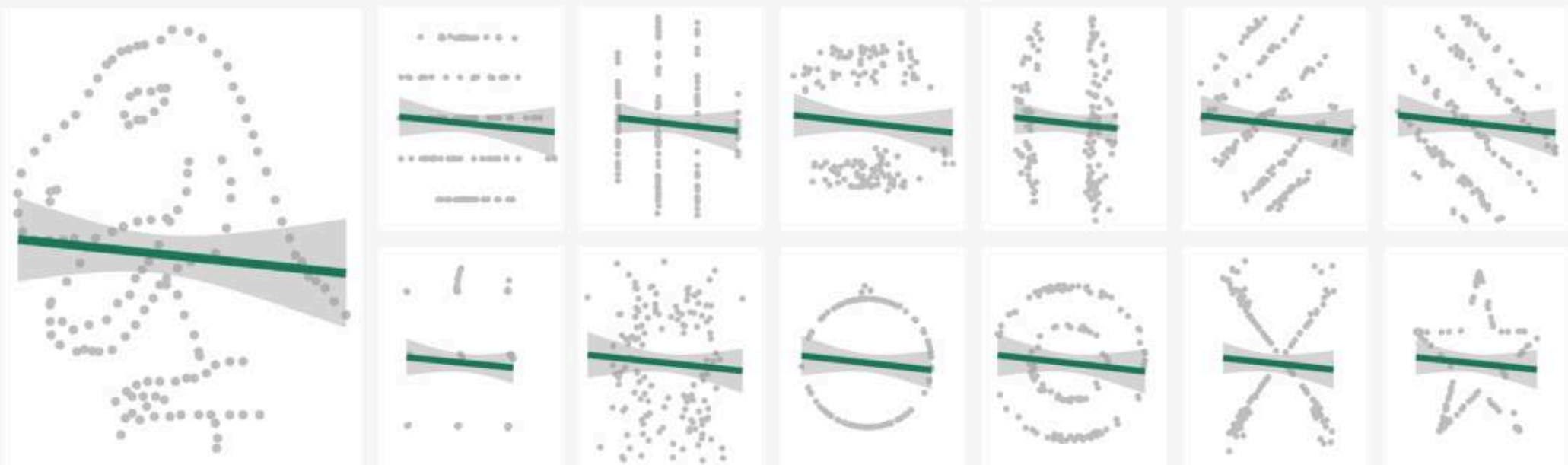
Anscombe's Quartet



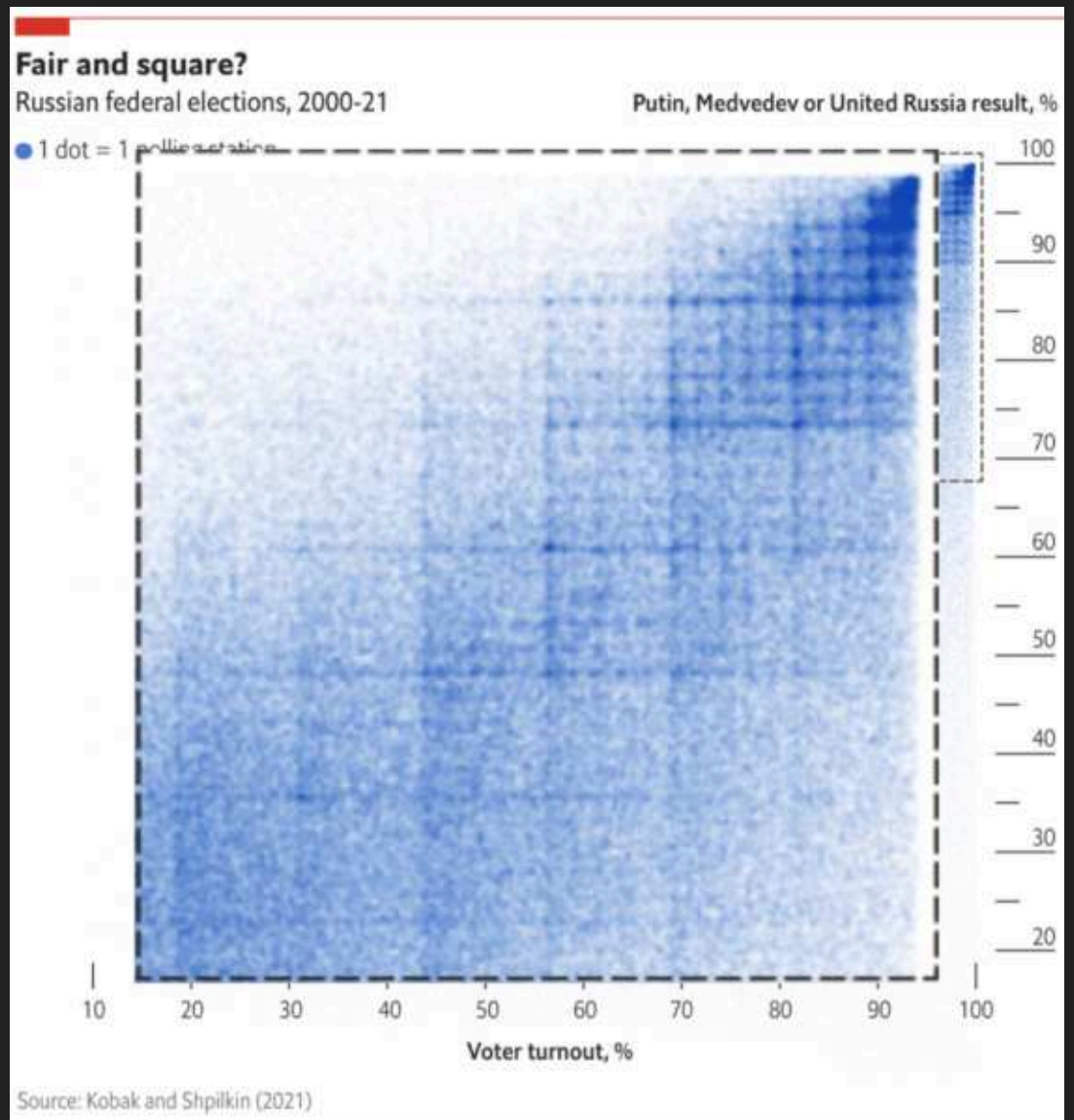
Quelle: Matejka & Fitzmaurice (2017)

The Datasaurus Dozen

A set of 13 datasets with **nigh-identical summary statistics**, which could lead one to believe the datasets are quite similar. After visualizing the data, it becomes clear that they are clearly different and visually distinct.



"Same Stats, Different Graphs: Generating Datasets with Varied Appearance and Identical Statistics through Simulated Annealing" by Justin Matejka & George Fitzmaurice (2017)

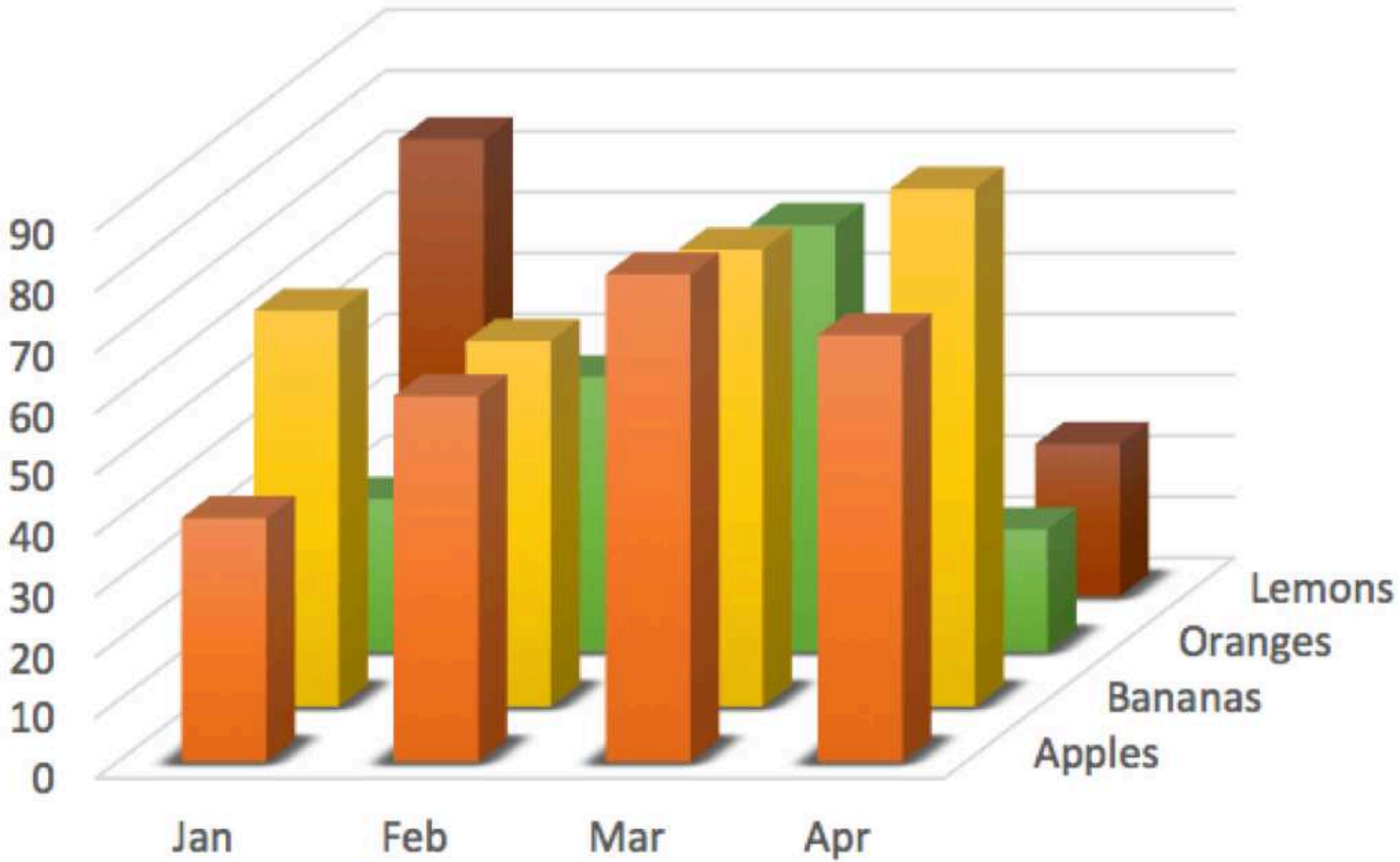


„Russian elections once again had a suspiciously neat result"
by The Economist

„When Dmitry Kobak and Sergey Shpilkin [...] analysed the results, they found that **an unusually high number of turnout and vote-share results were multiples of five** (eg, 50%, 55%, 60%), a tell-tale **sign of manipulation**."

Was macht eine „gute" Datenvisualisierung aus?

- **Integrität** (Information)
- **Bedeutsamkeit** (Erzählung)
- **Zweckmäßigkeit** (Ziel)
- **Eleganz** (Visuelle Form)


90
80
70
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
Lemons
Oranges
Bananas
Apples

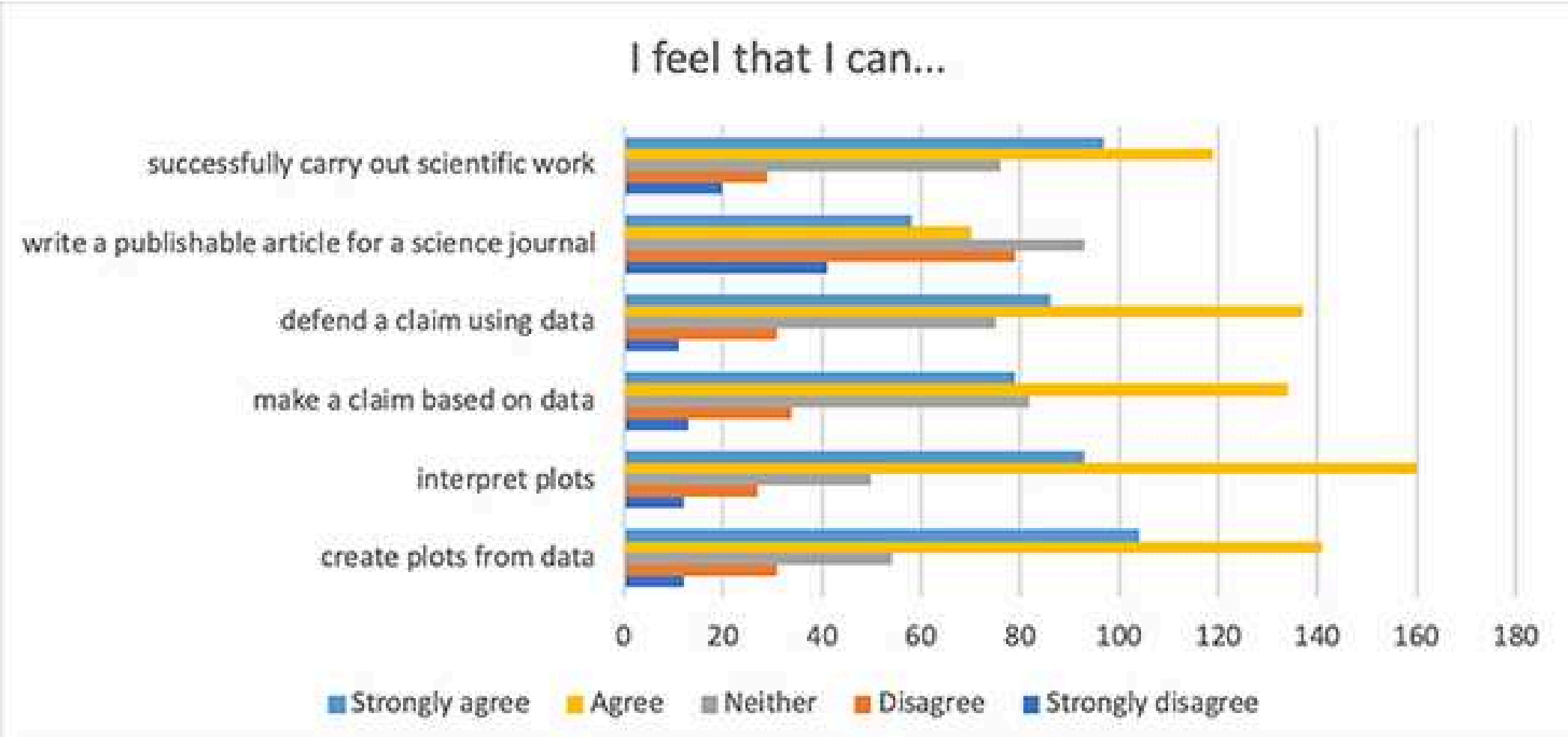


Figure 6

Histogram of responses to questions regarding perceived data analysis and reporting skills (N = 490).

Crowston, Mitchell & Østerlund (2019) doi: 10.5334/cstp.166

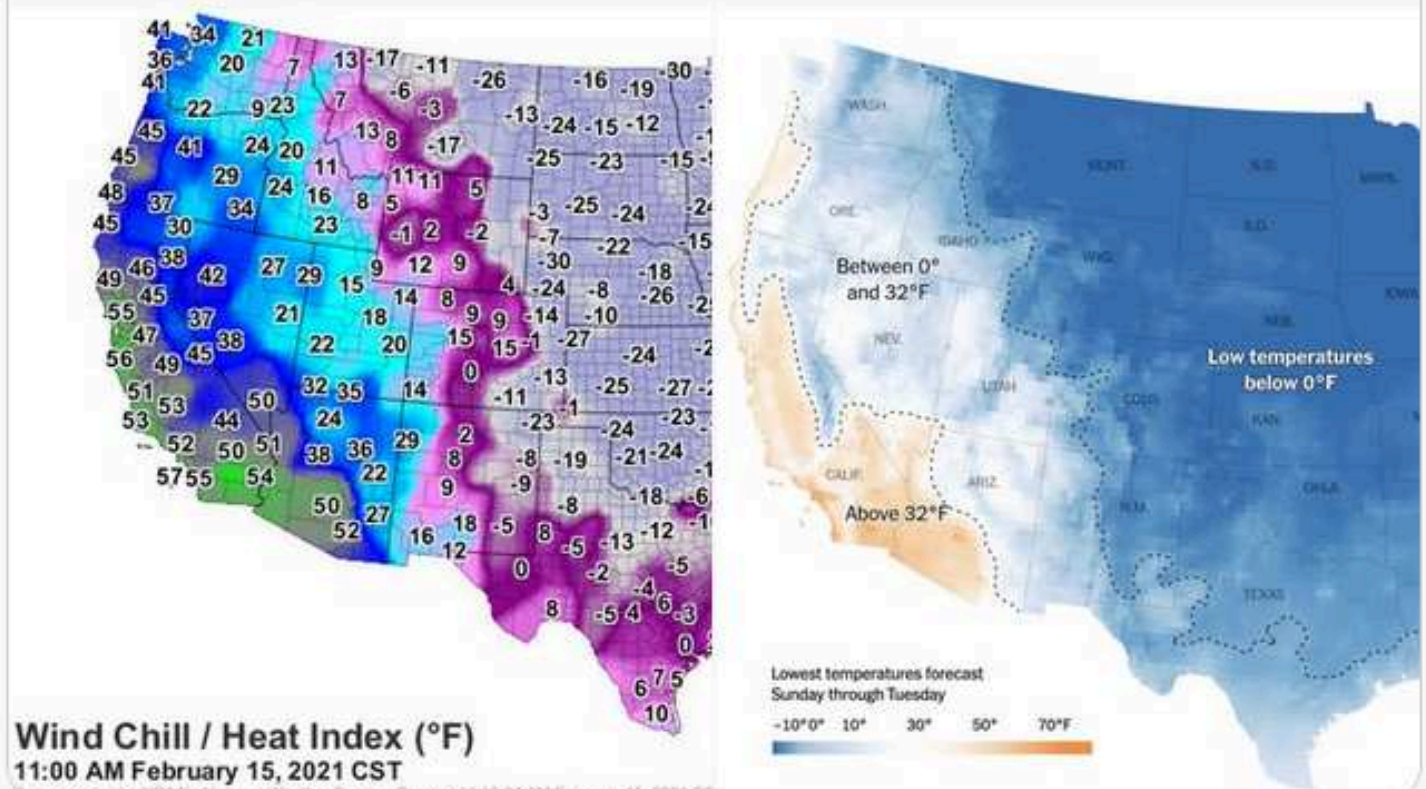
Joshua Stevens @jscarto · 10m

Visualizing data vs Data Visualization

Ben Jones @DataRemixed · 3h

Same variable, same territory, same week, two different color palettes & two different styles. @okmesonet & @nytimes.

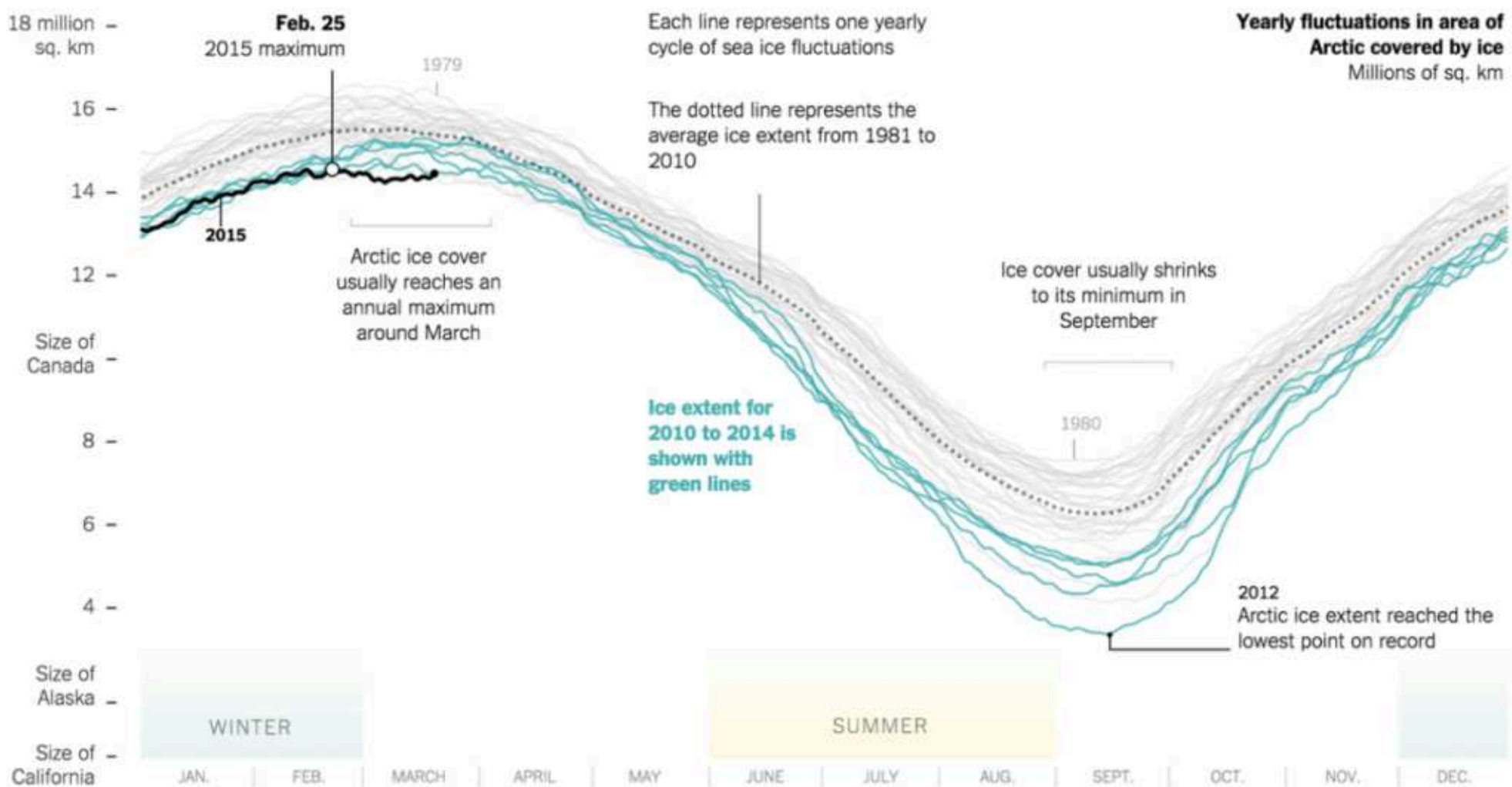
Show this thread



4 8 17

Sachsen-Anhalt	8,8	431	4,0
Schleswig-Holstein	9,1	576	3,1
Niedersachsen	17,5	349	2,1
Thüringen	3,7	229	1,8
Rheinland-Pfalz	6,6	331	1,6
Bayern	**19,0**	**269**	**1,4**
Saarland	1,1	444	1,2
Sachsen	3,9	211	1,0
Baden-Württemberg	9,1	256	0,8
Hessen	5,0	234	0,8
Nordrhein-Westfalen	13,0	380	0,7

Quelle: „Sonnenkönig oder Hochstapler?" von Patrick Stotz (Der Spiegel)



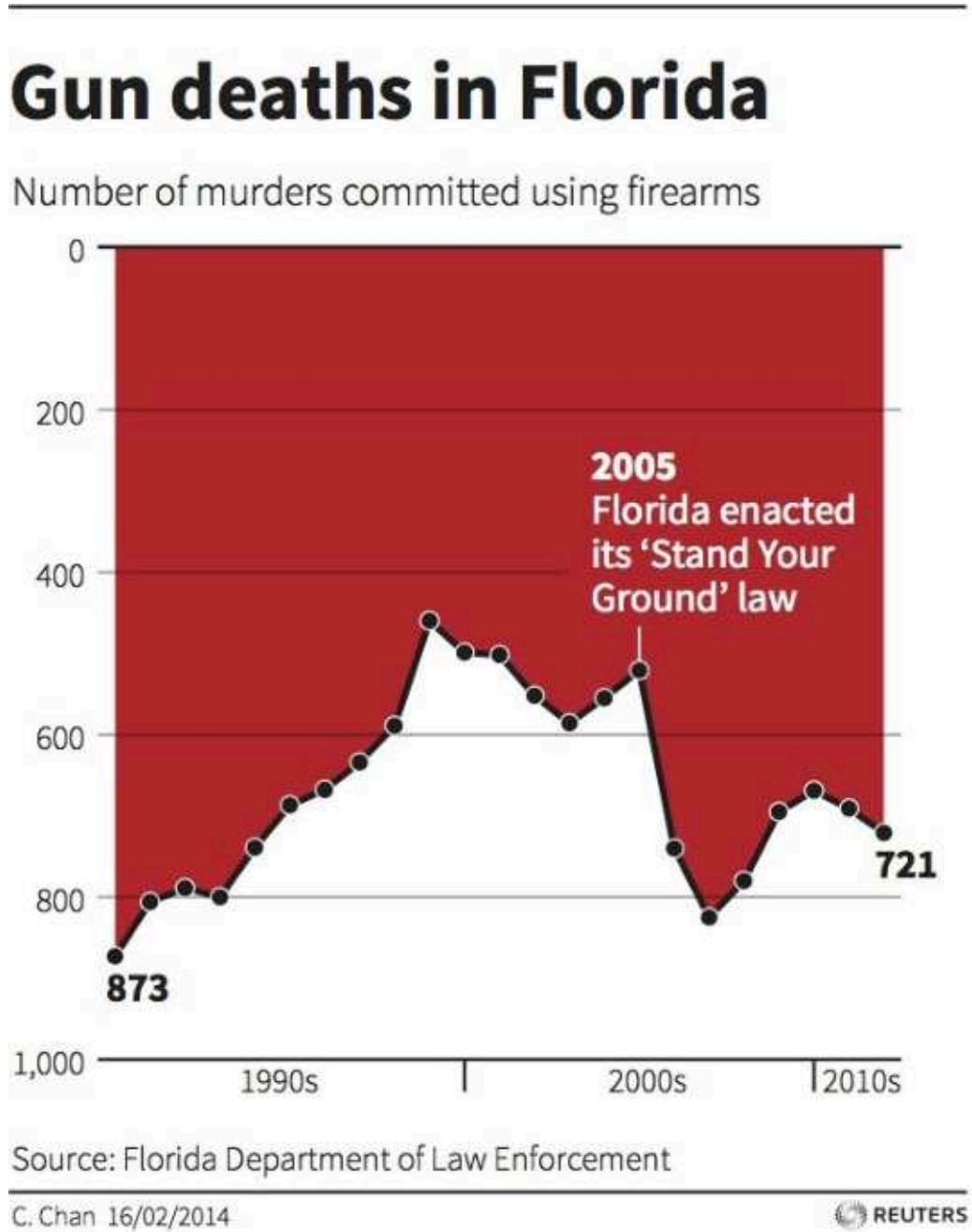
„Yearly Fluctuations in Area of Arctic Covered by Ice" von Derek Watkins (New York Times)

Diagramme bewerten

(und verbessern)

Evaluierung von Diagrammen

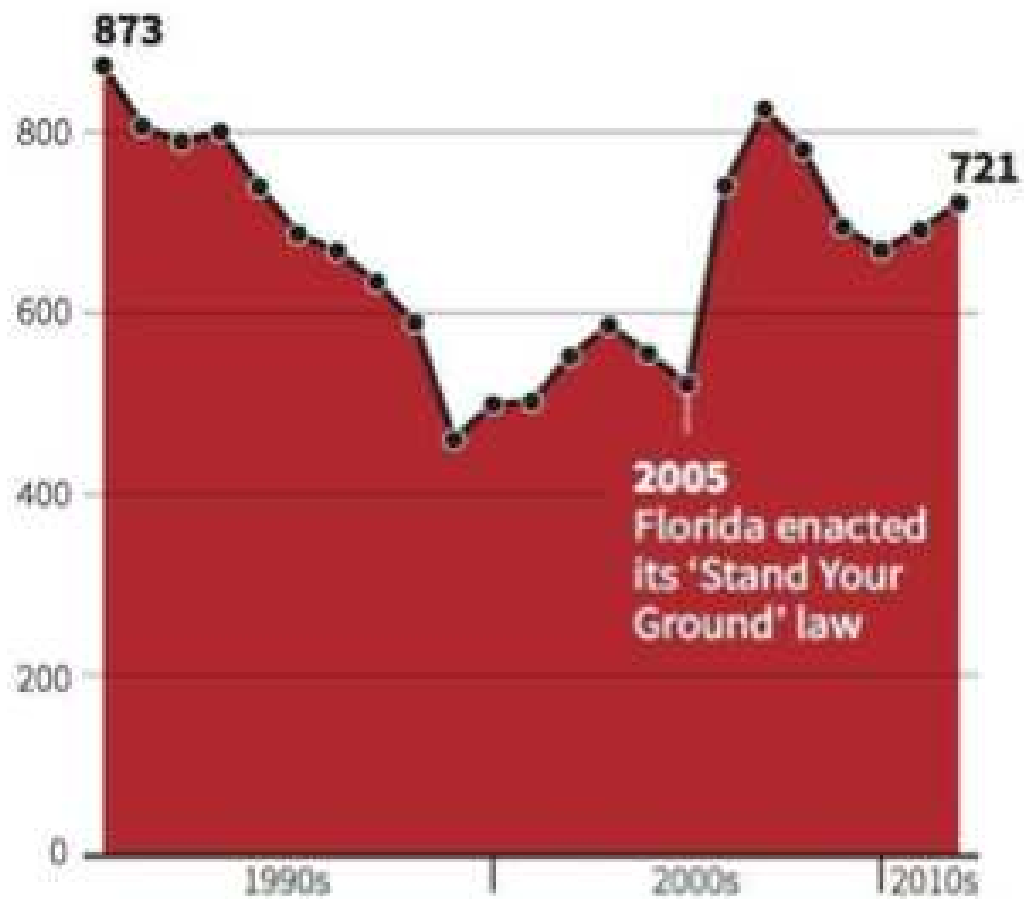
- **Zweck:** Dient die Abbildung der Erkundung oder der Erklärung?
- **Kernaussage:** Entspricht die zentrale Erkenntnis bei (kurzer) Betrachtung der beabsichtigten Take-Home Message?
- **Datenbasis:** Sind die dargestellten Daten relevant und korrekt?
- **Kontext:** Ist die Grafik an Medium und Publikum angepasst?
- **Zweckmäßigkeit:** Lassen sich die wesentlichen Fakten klar und ohne Umwege erfassen?
- **Vergleichbarkeit:** Sind Unterschiede oder Muster leicht erkennbar?
- **Gestaltung:** Unterstützen Farben, Formen und Größen die Interpretation ohne abzulenken oder zu verwirren?
- **Wirkung:** Welchen Eindruck und welche Stimmung erzeugt die Grafik? z. B. elegant, nüchtern, überladen, unausgewogen …



Reuters Graphics

Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

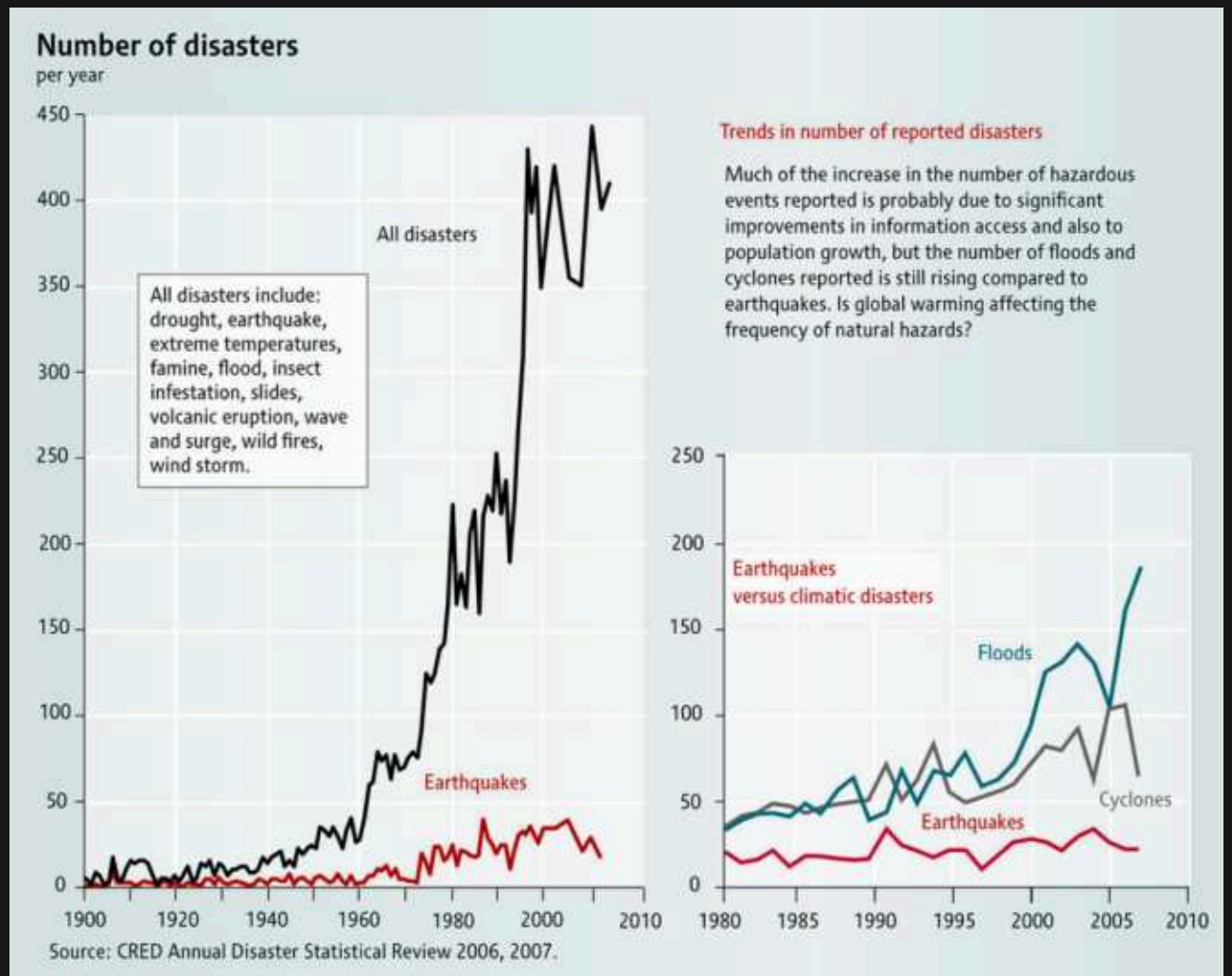
Gefunden in einer Präsentation von Paige Gillespie

Information

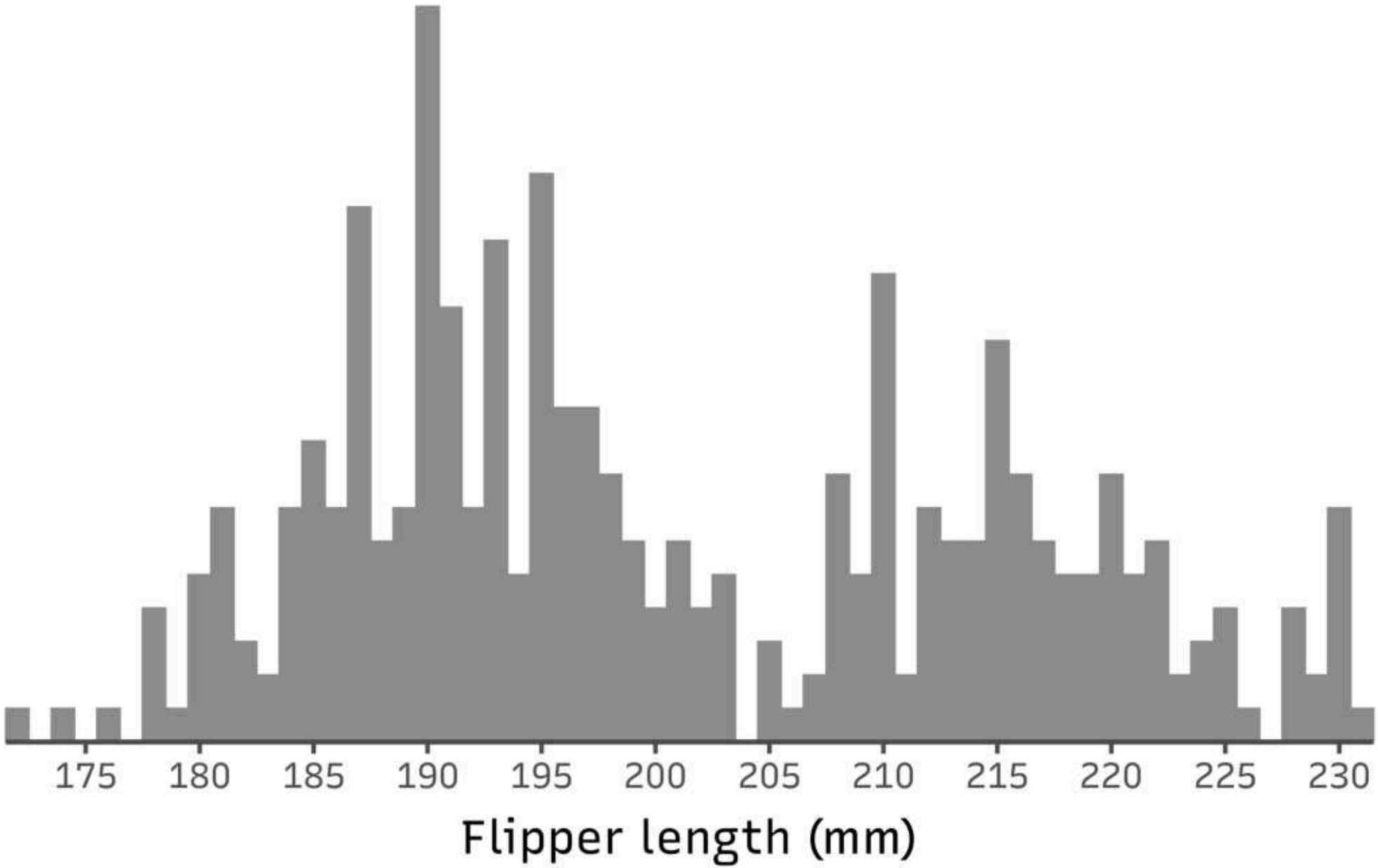
Integrität der Daten

Daten bilden die Realität nie vollständig oder perfekt ab.

WARNING!
The number of fallen meteorites
is drastically decreasing!
100
90
80
70
60
50
40
30
20
10
0
1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050



„Much of the increase of hazardous events reported is probably due to **significant improvements in information access.**"


175
180
185
190
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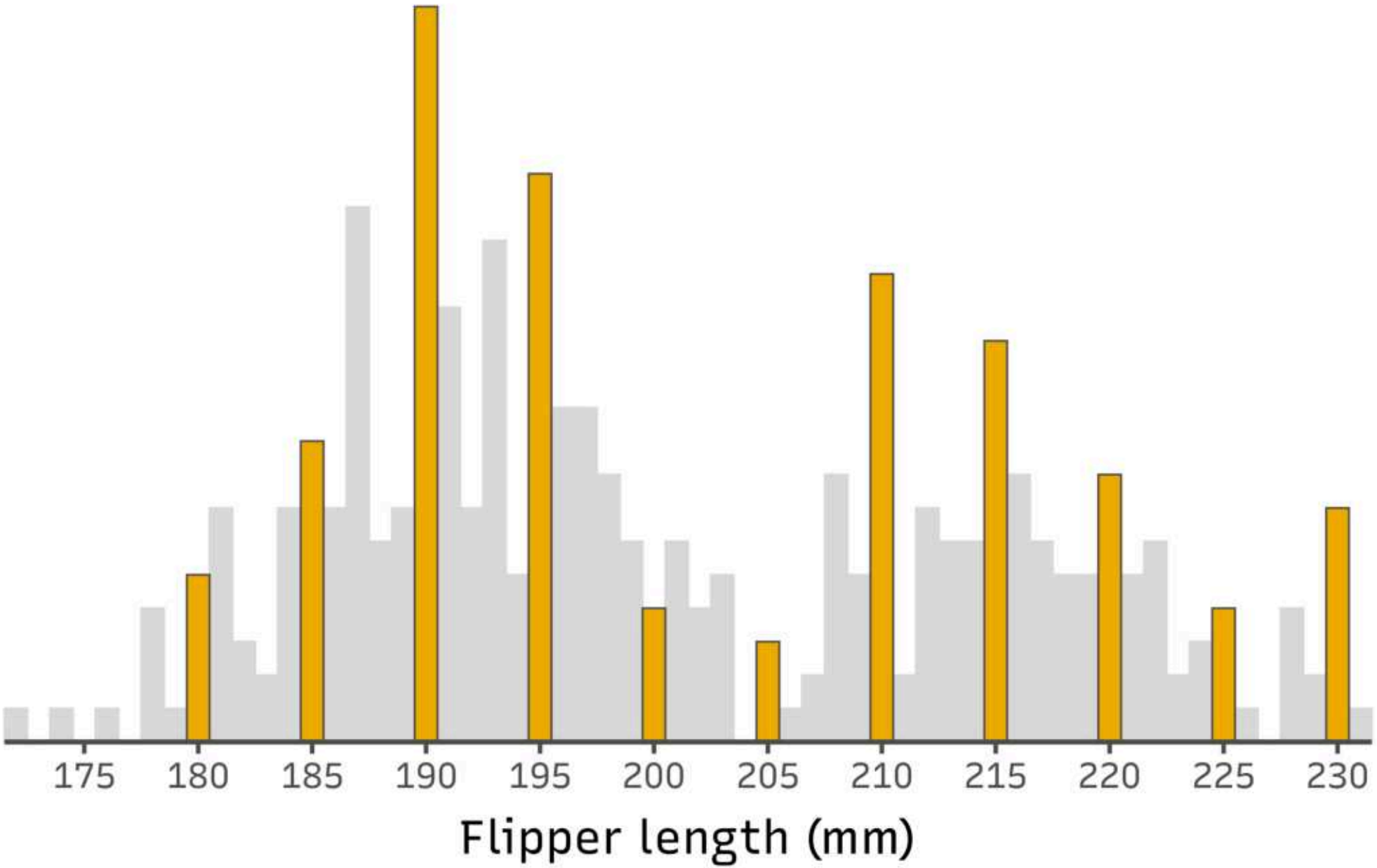
205
210
215
220
225
230
Flipper length (mm)


175
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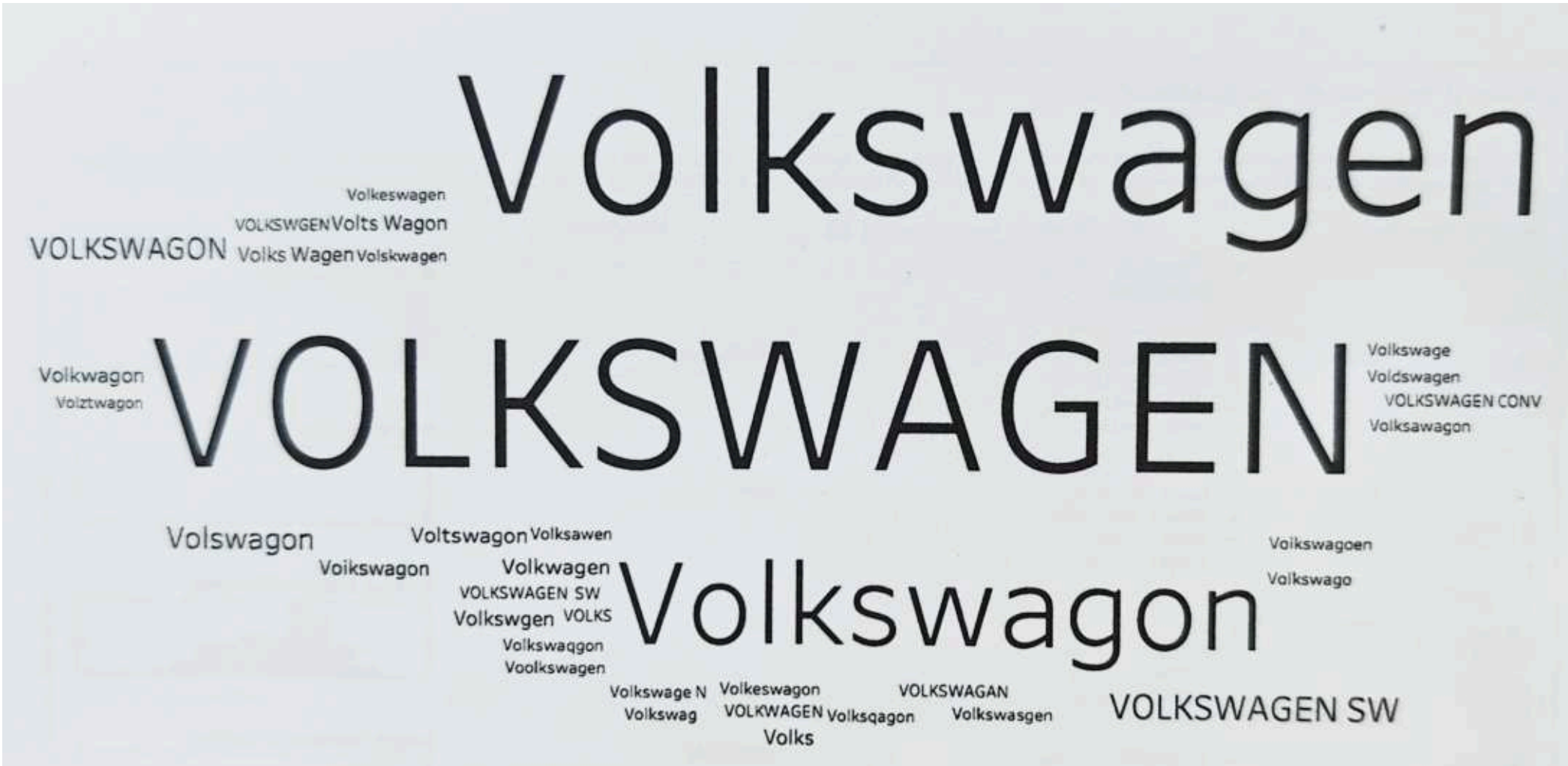
230
Flipper length (mm)



Quelle: „Avoiding Data Pitfalls" (Abb. 3.8) von Ben Jones

SCIENCE

Scientists rename human genes to stop Microsoft Excel from misreading them as dates

Illustration by Alex Castro / The Verge

/ Sometimes it's easier to rewrite genetics than update Excel

by James Vincent
Aug 6, 2020, 2:44 PM GMT+2

0 Comments

James Vincent is a senior reporter who has covered AI, robotics, and more for eight years at The Verge.

Update October 24th, 2023, 11:25AM ET: *Microsoft has updated Excel on Windows and macOS, adding a toggle to turn off automatic data conversion. The original version of this article continues below.*

Quelle: The Verge

BMC Part of Springer Nature

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Genome Biology

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Comment | Open access | Published: 23 August 2016

Gene name errors are widespread in the scientific literature

Mark Ziemann, Yotam Eren & Assam El-Osta

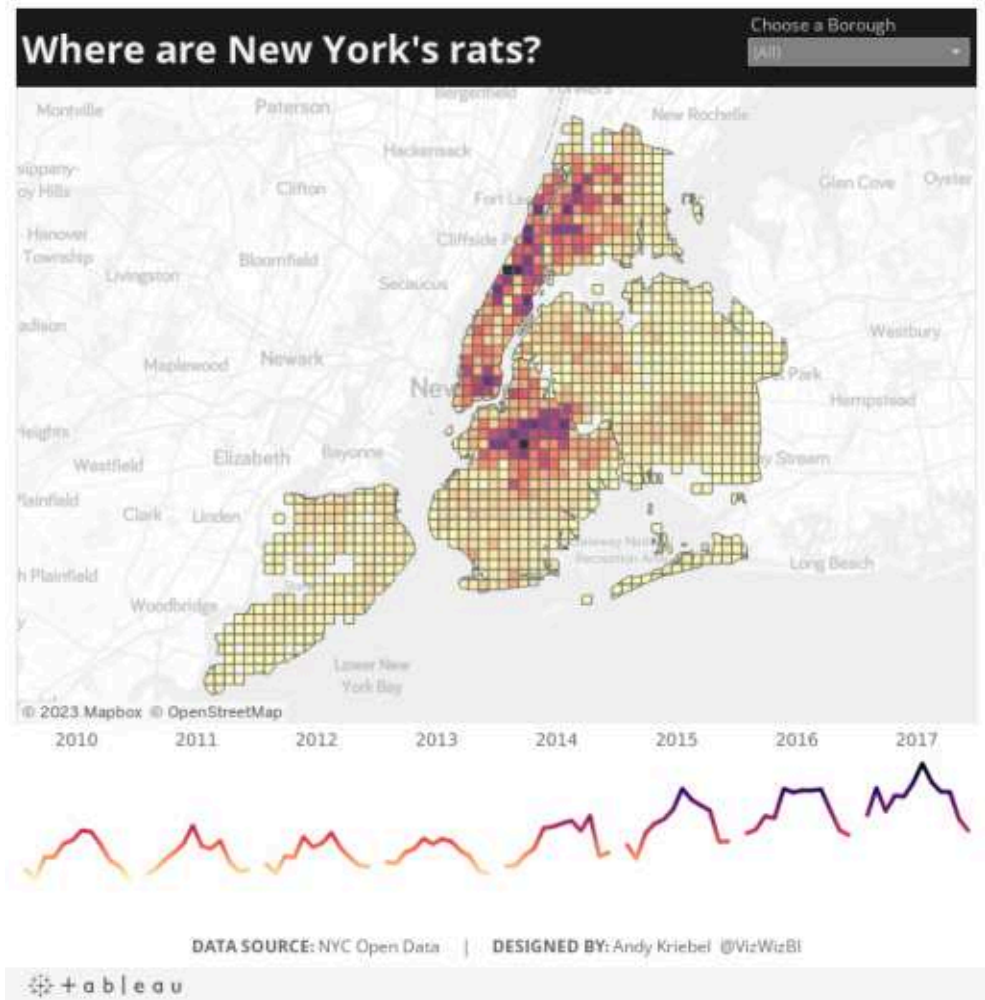
Genome Biology **17**, Article number: 177 (2016) | Cite this article

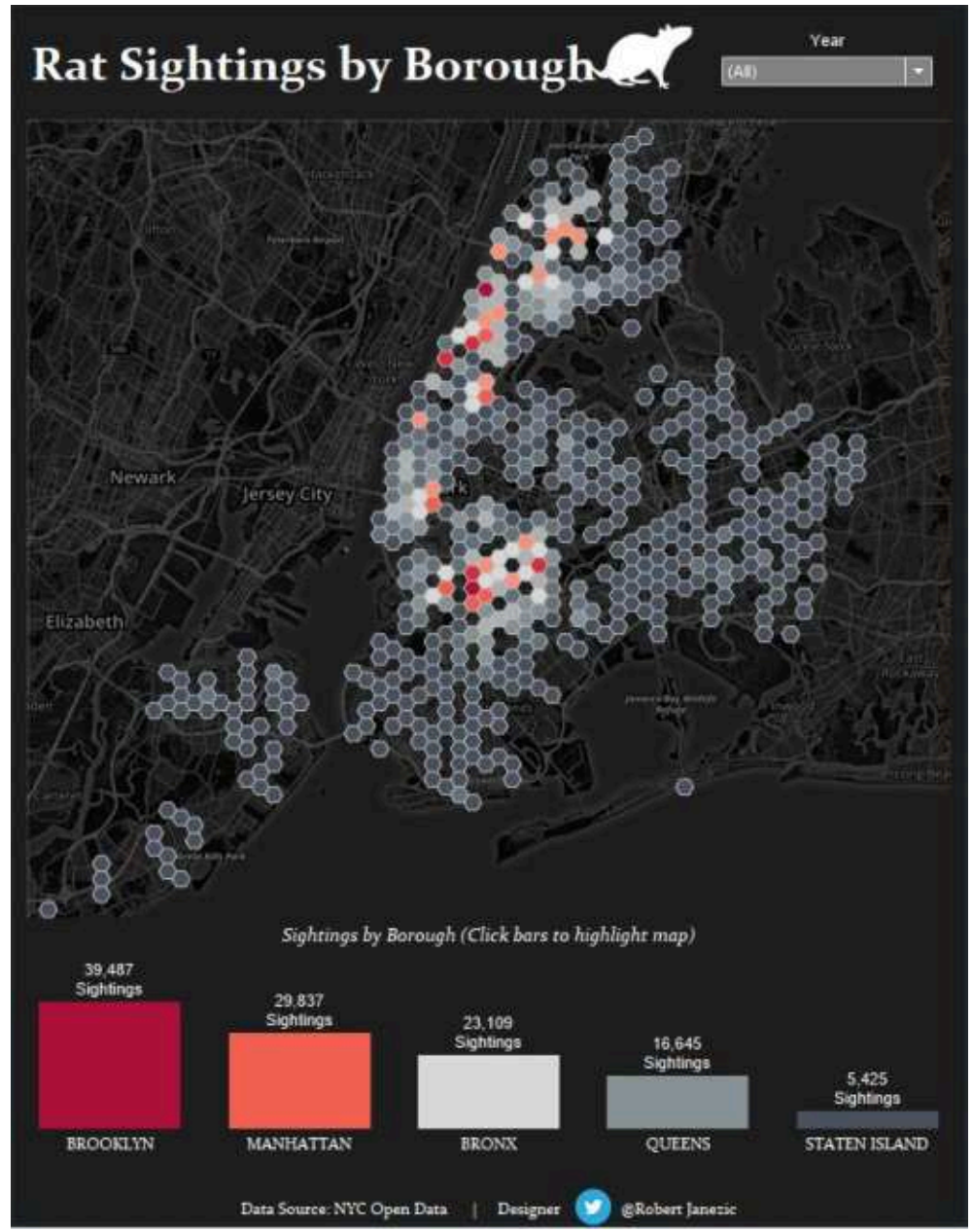
161k Accesses | **144** Citations | **2590** Altmetric | Metrics

Abstract

The spreadsheet software Microsoft Excel, when used with default settings, is known to convert gene names to dates and floating-point numbers. A programmatic scan of leading genomics journals reveals that approximately one-fifth of papers with supplementary Excel gene lists contain erroneous gene name conversions.

Ziemann, Eren & El-Osta (2016) doi: 10.1186/s13059-016-1044-7


Where are New York's rats?
Choose a Borough
(All)
Paterson
Hackensack
New Rochelle
Clifton
Glen Cove
Bloomfield
Secaucus
Westbury
Maplewood
Newark
Hempstead
Elizabeth
Bayonne
Westfield
Clark
Linden
Long Beach
Woodbridge
© 2023 Mapbox © OpenStreetMap
2010
2011
2012
2013
2014
2015
2016
2017
DATA SOURCE: NYC Open Data | DESIGNED BY: Andy Kriebel @VizWizBI
tableau

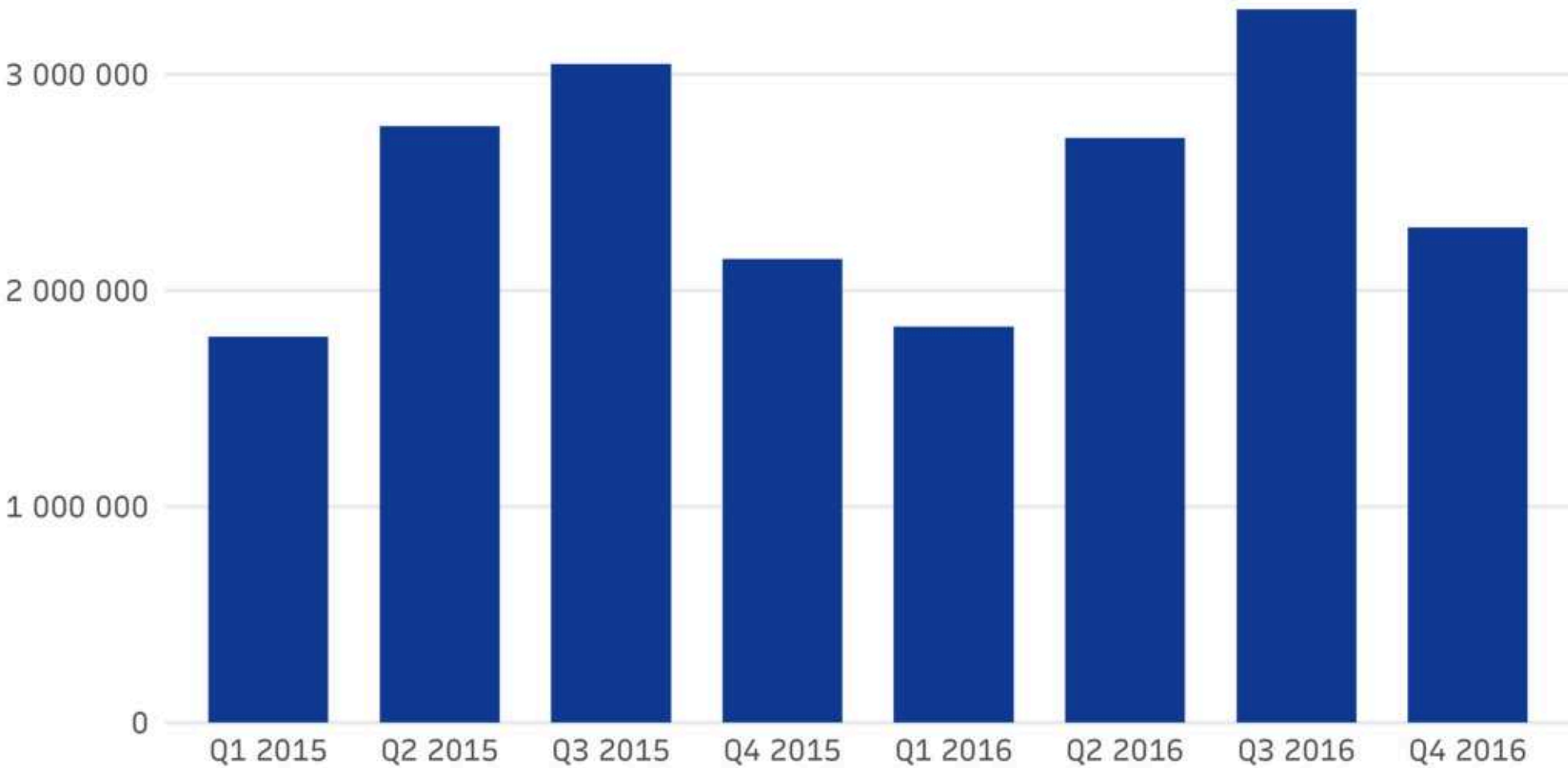

Rat Sightings by Borough
Year
(All)
Newark
Jersey City
Elizabeth
Sightings by Borough (Click bars to highlight map)
39,487 Sightings
BROOKLYN
29,837 Sightings
MANHATTAN
23,109 Sightings
BRONX
16,645 Sightings
QUEENS
5,425 Sightings
STATEN ISLAND
Data Source: NYC Open Data | Designer @Robert Janezic

Integrität der Information

- **Datenqualität:**
  - → Schätzung, Präzision und Fehler
  - → Fehler und Irrtümer bei der Berechnung
  - → unvollständige Daten und fehlende Werte
  - → zusammengefasste und relative Daten

- **Nur ein Teilabbild:**
  - → historischer oder gegenwärtiger Zustand
  - → nicht Straftaten, sondern gemeldete Straftaten

Registrierte TfL-Fahrradmieten in London pro Quartal



Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

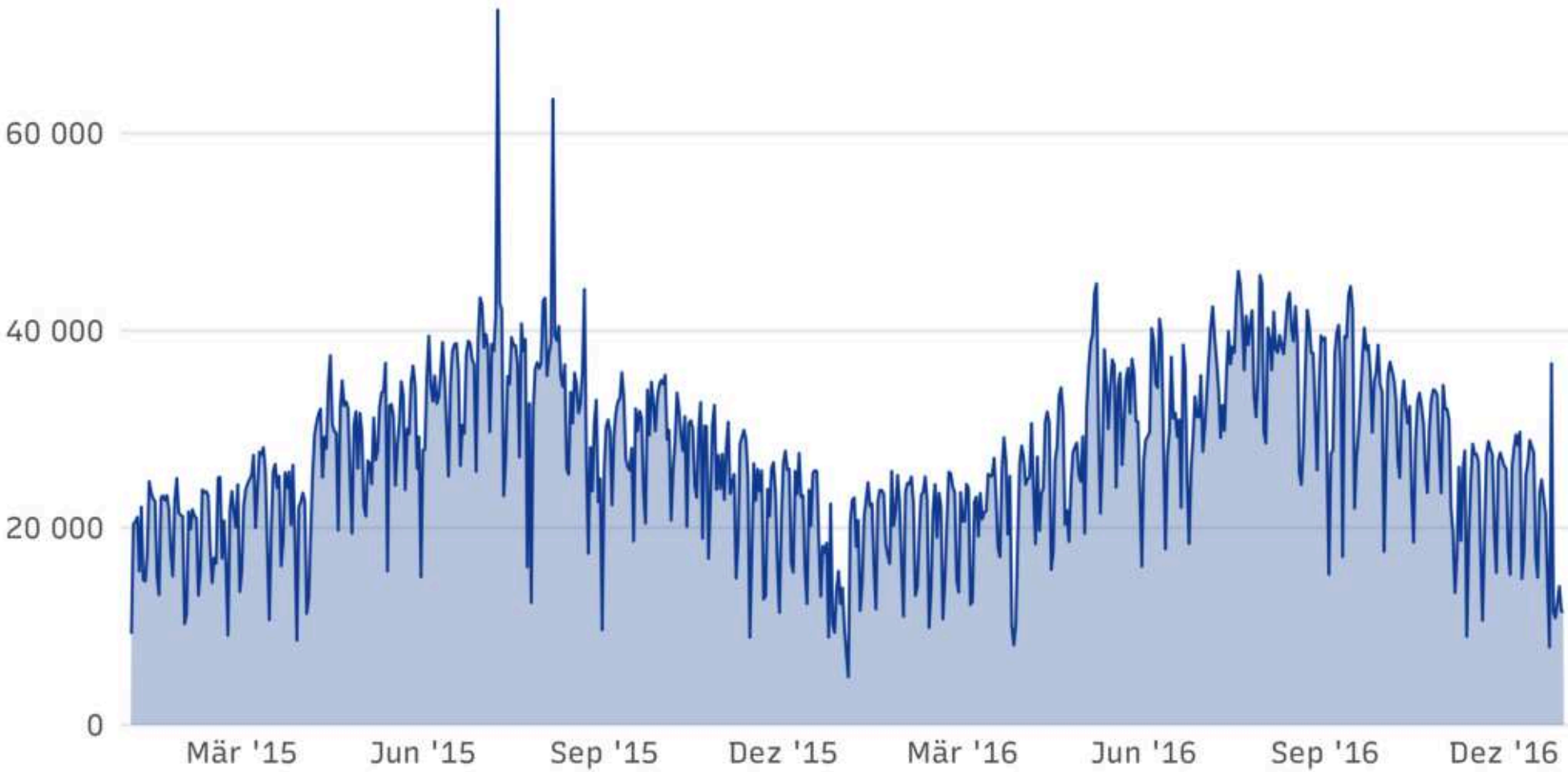
Registrierte TfL-Fahrradmieten in London pro Monat

Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

Registrierte TfL-Fahrradmieten in London pro Woche

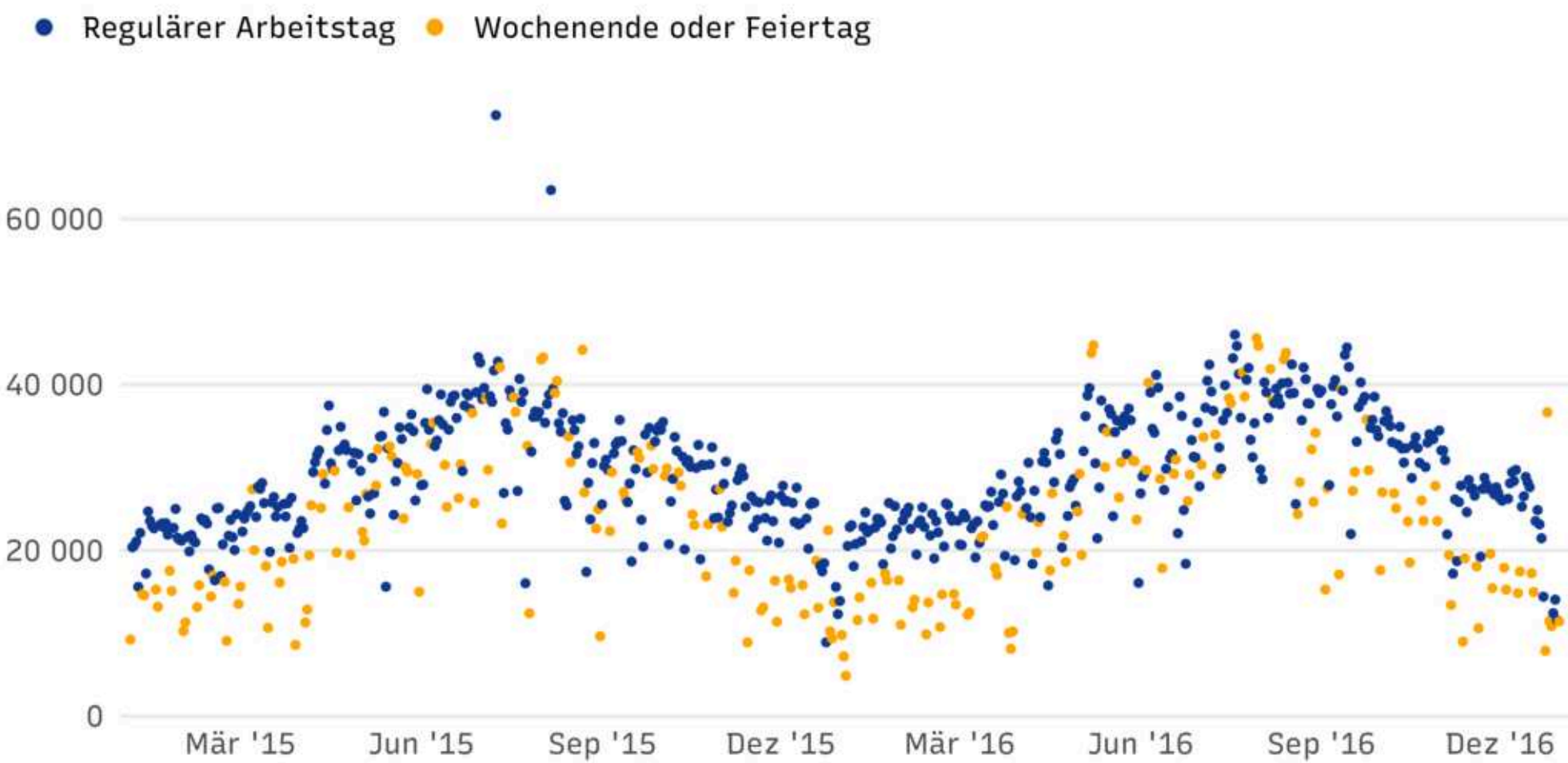
Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

Registrierte TfL-Fahrradmieten in London pro Tag



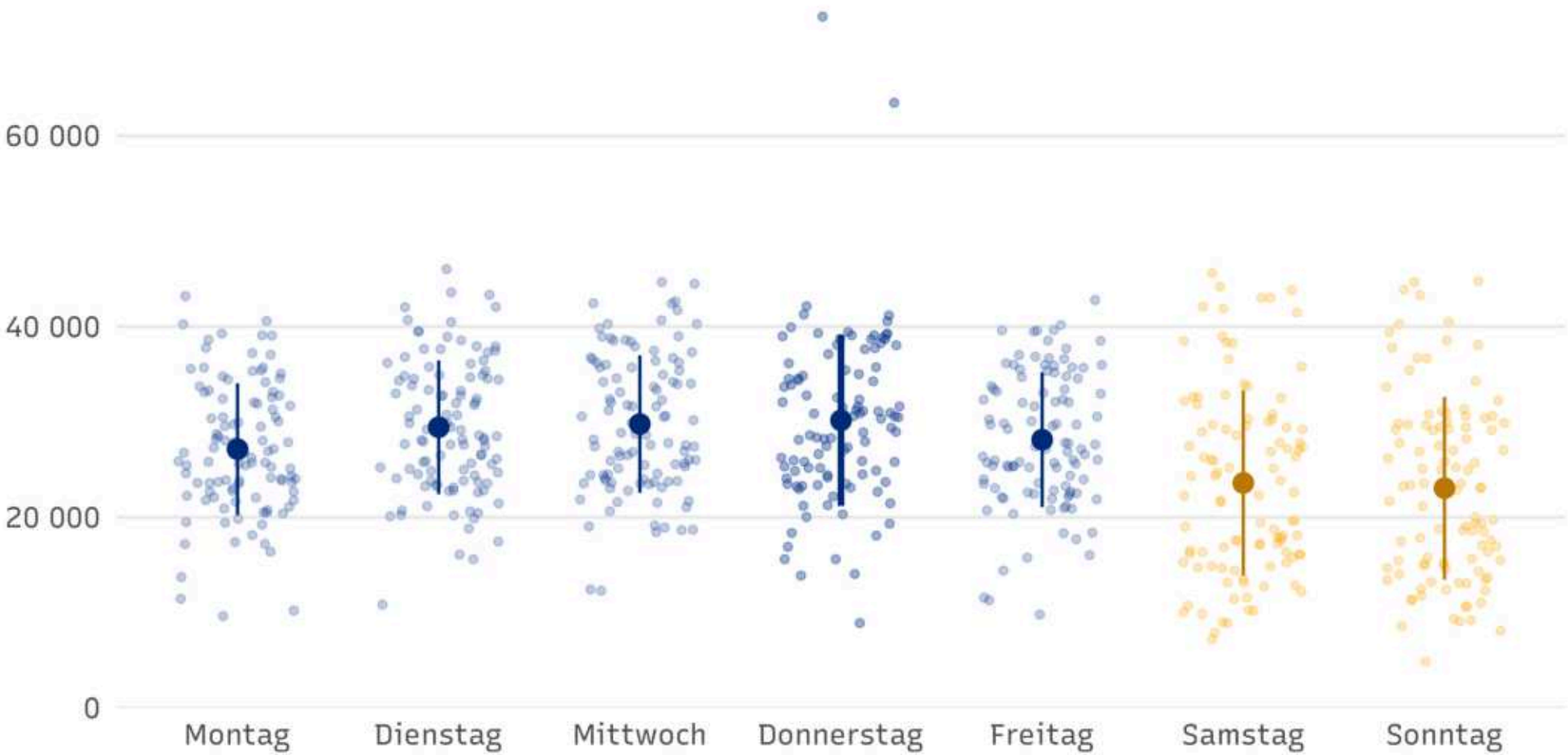
Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

Registrierte TfL-Fahrradmieten in London pro Tag



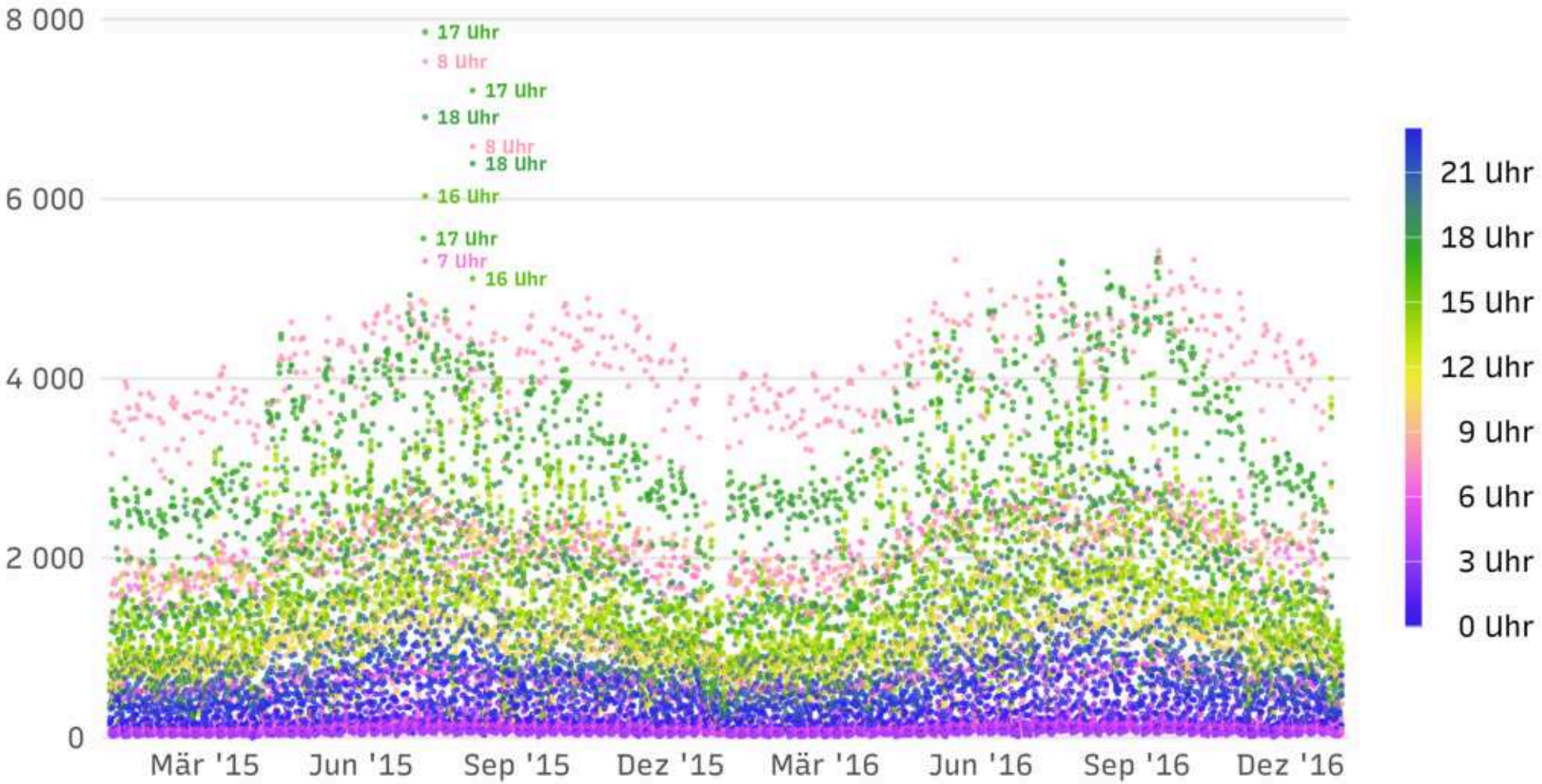
Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

Registrierte TfL-Fahrradmieten in London nach Wochentag



Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

Registrierte TfL-Fahrradmieten in London pro Stunde



Quelle: Transport for London, 2015-2016 | Powered by TfL Open Data

Fallen bei der Dateninterpretation

Mögliche “Biases & Pitfalls”:

- **Black Swan Pitfall:**
  Überbewertung seltener Ausreißer als genereller Trend
- **Confirmation Bias:**
  Fokus auf Daten, die die eigene Hypothese stützen
- **Aggregationseffekte:**
  Details gehen in zu grober Auflösung verloren
- **Visuelle Verzerrung:**
  Probleme mit Achsen, Farben oder anderen Skalen führen zu Fehleinschätzungen

Checkliste

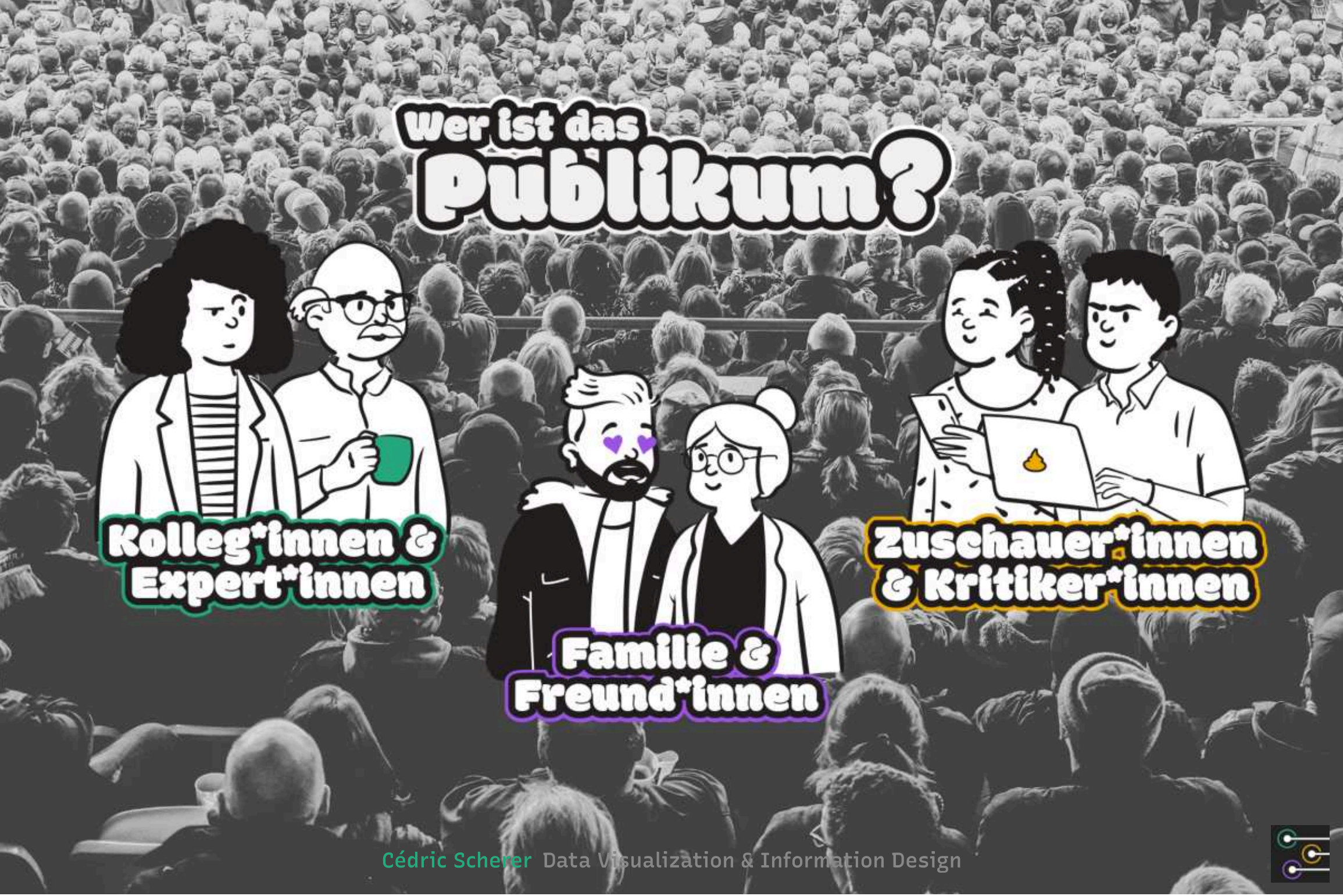
- Überlege, ob es bei deinen Daten ebenfalls zu Fehlern bei der Aufnahme, Probleme durch versteckte Mustern, “Guesstimation” oder ähnlichem gekommen sein kann.
- Prüfe deine Daten auf Vollständigkeit, Ausreißern und falsche Kodierungen.
- Frage dich, ob du unvoreingenommen alle Daten und Perspektiven geprüft hast.

Erzählung

Bedeutsamkeit für das Publikum

das
Publikum

➽ Wer ist mein Publikum?

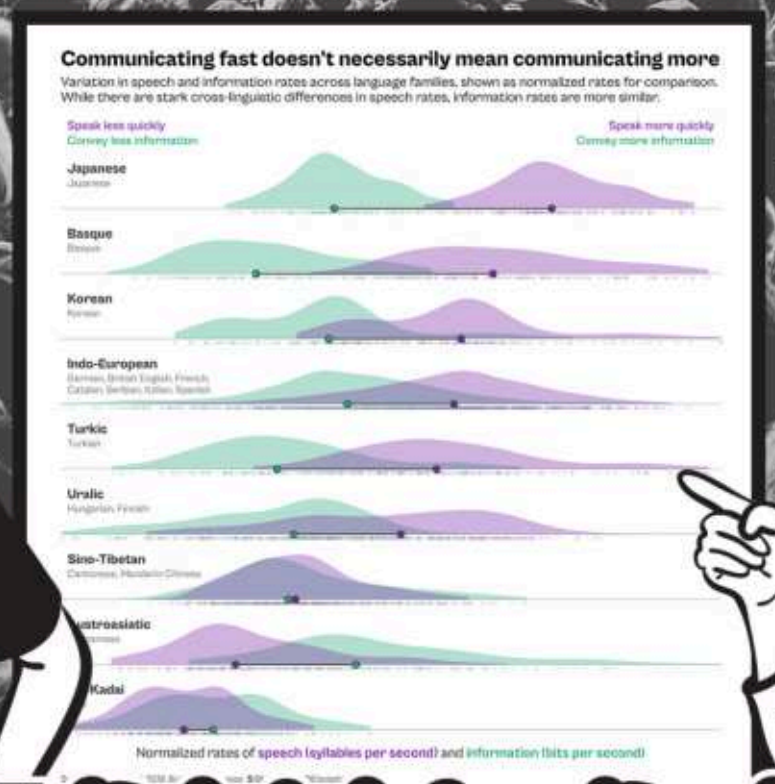

Wer ist das
Publikum?
Kolleg*innen &
Expert*innen
Familie &
Freund*innen
Zuschauer*innen
& Kritiker*innen
Cédric Scherer Data Visualization & Information Design

...und wie ausgeprägt ist ihre
Datenkompetenz?
Cédric Scherer Data Visualization & Information Design

...und wie ausgeprägt ist ihre Datenkompetenz?

(Oder: Wie viel Mühe und Zeit sind sie bereit zu investieren?)

...und wie ausgeprägt ist ihre Datenkompetenz?



(Oder: Wie viel Mühe und Zeit sind sie bereit zu investieren?)

„Wer"

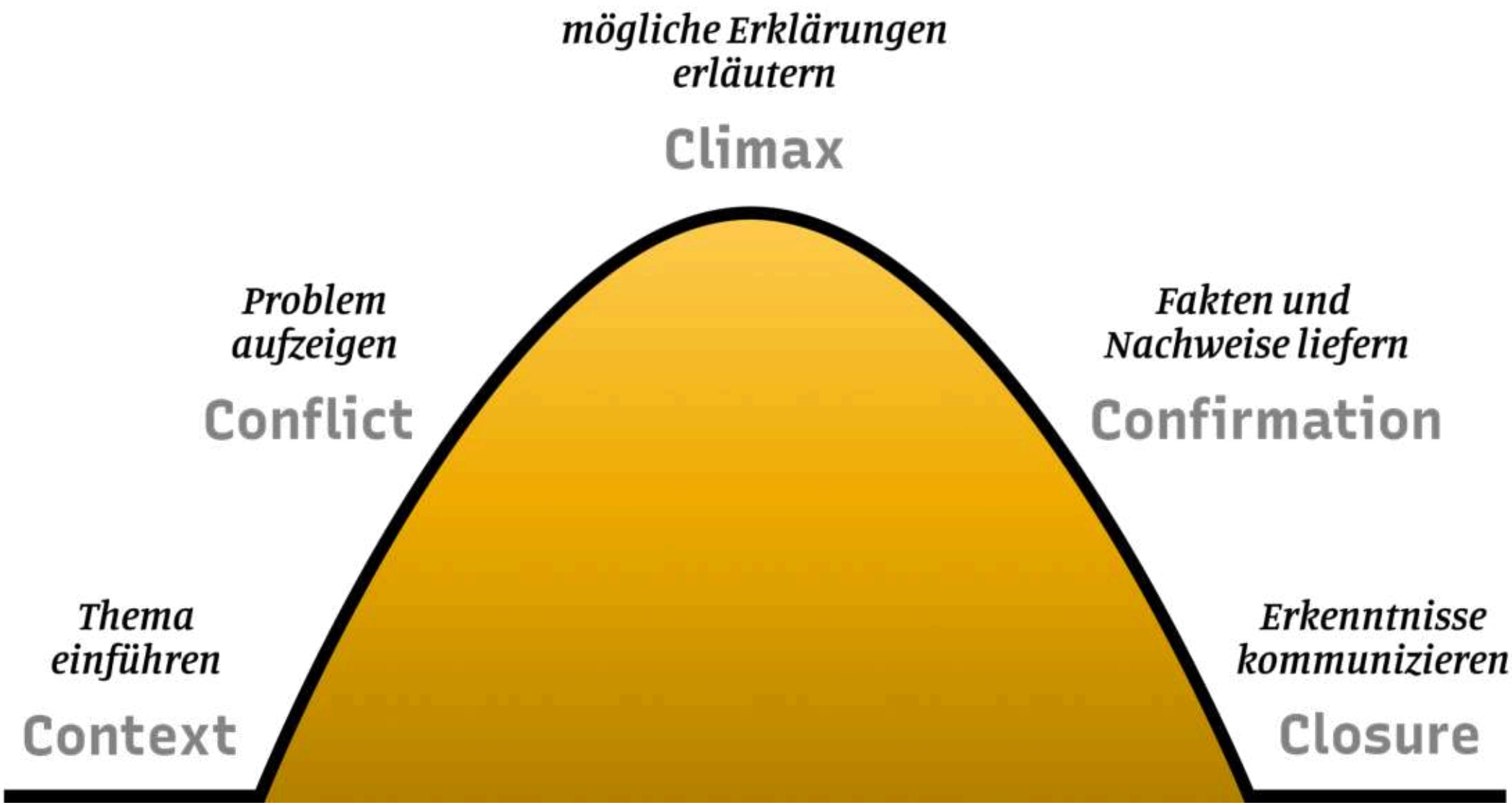
Mein Publikum

- Zielgruppe klar definieren
- zu allgemeine Beschreibungen vermeiden
- unterschiedliche Grafiken für unterschiedliche Zielgruppen

Ich

- meine Beziehung zum Publikum klarstellen
- falsche Erwartungen vermeiden
- unterschiedliche Grafiken für unterschiedliche Ziele

- **Wer** ist mein Publikum?
- **Was** möchte ich vermitteln?


mögliche Erklärungen erläutern
Climax
Problem aufzeigen
Conflict
Fakten und Nachweise liefern
Confirmation
Thema einführen
Context
Erkenntnisse kommunizieren
Closure

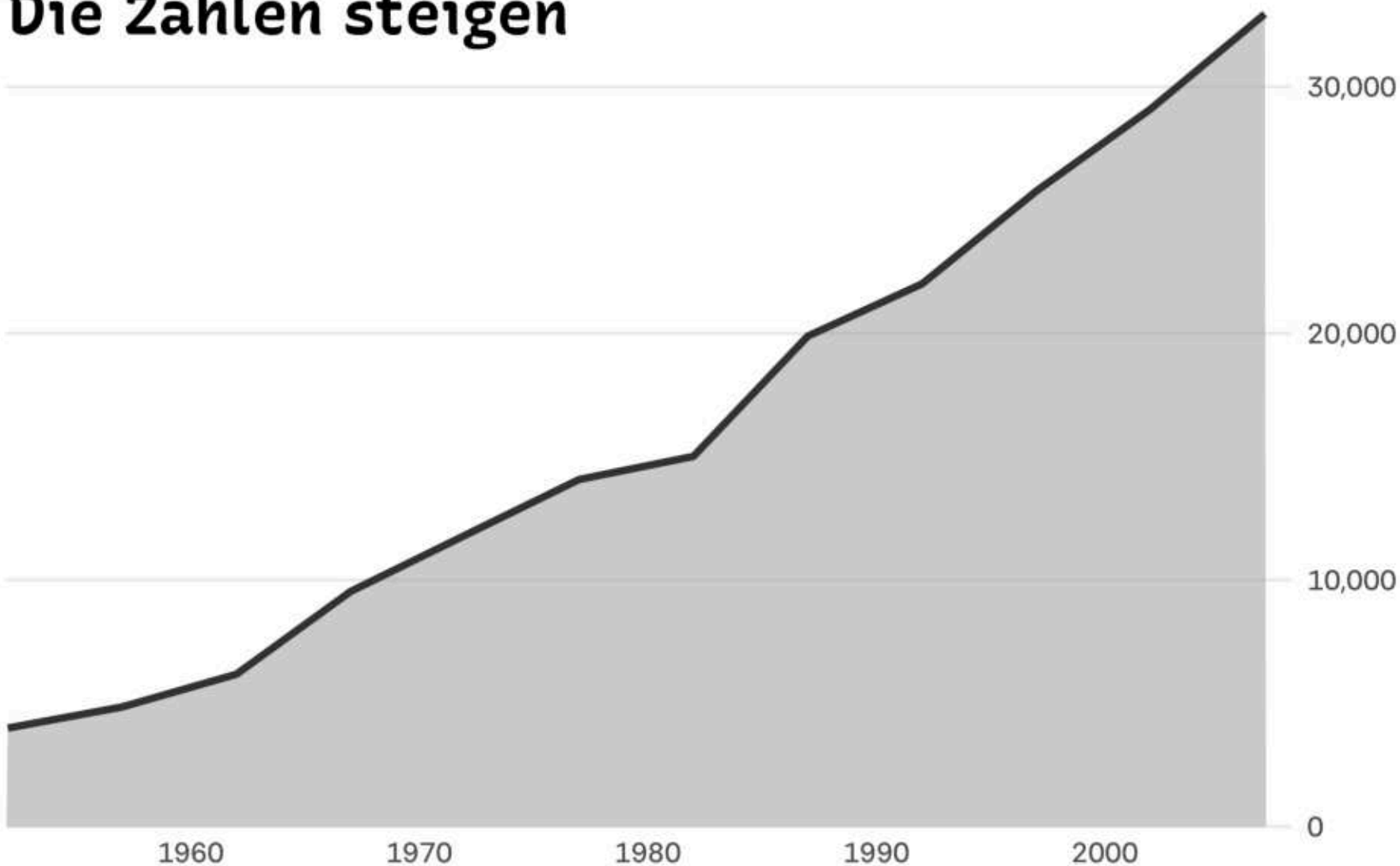
Konzept der „Big Idea"

Fasse deine Erkenntnisse in einem einzigen Satz zusammen, der vermittelt, **was sie interessant macht** und **wieso sie bedeutsam sind**.

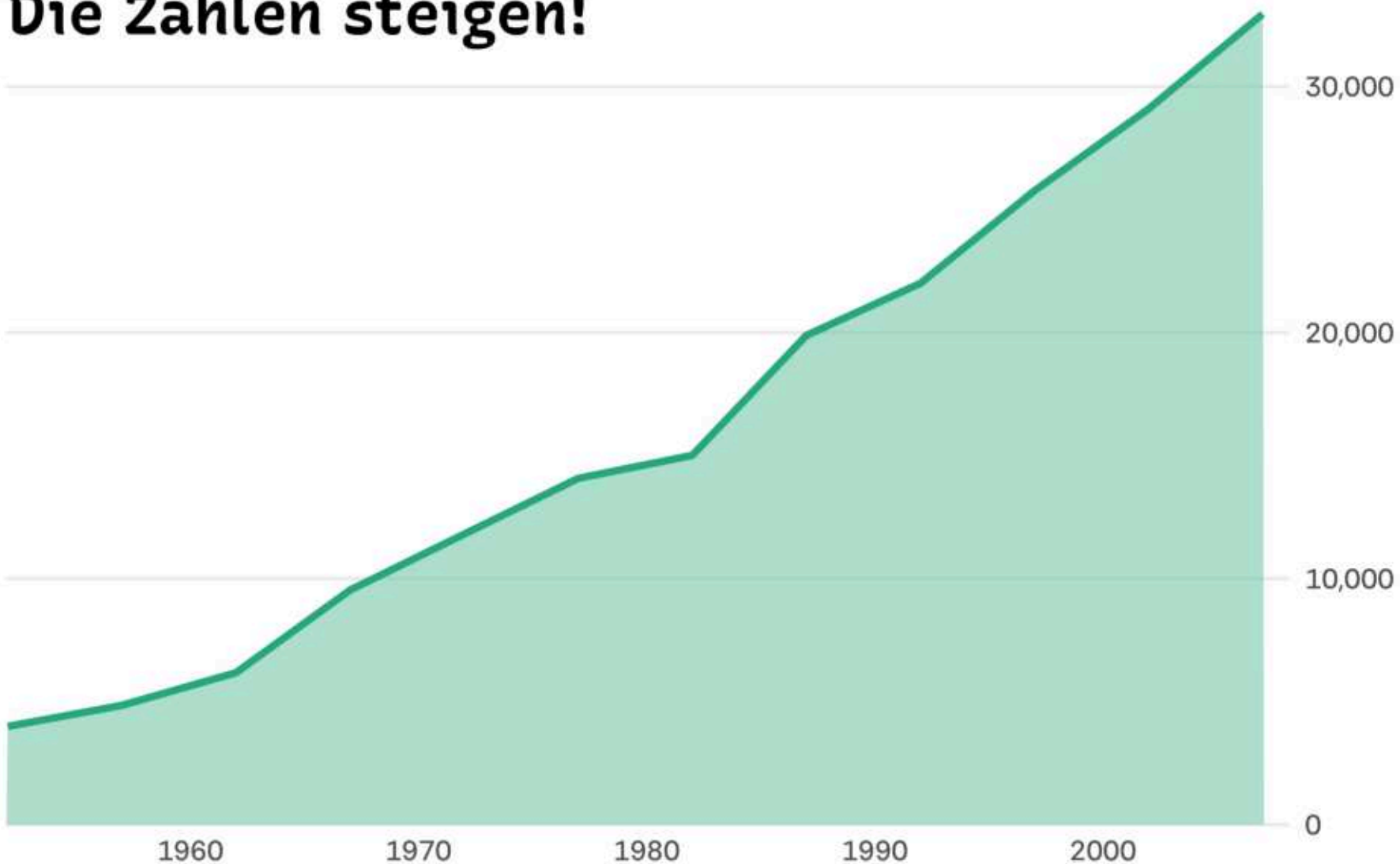
→ Nutze dies als Diagrammtitel zur zielgerichteten Entwicklung!

Trend über die Zeit

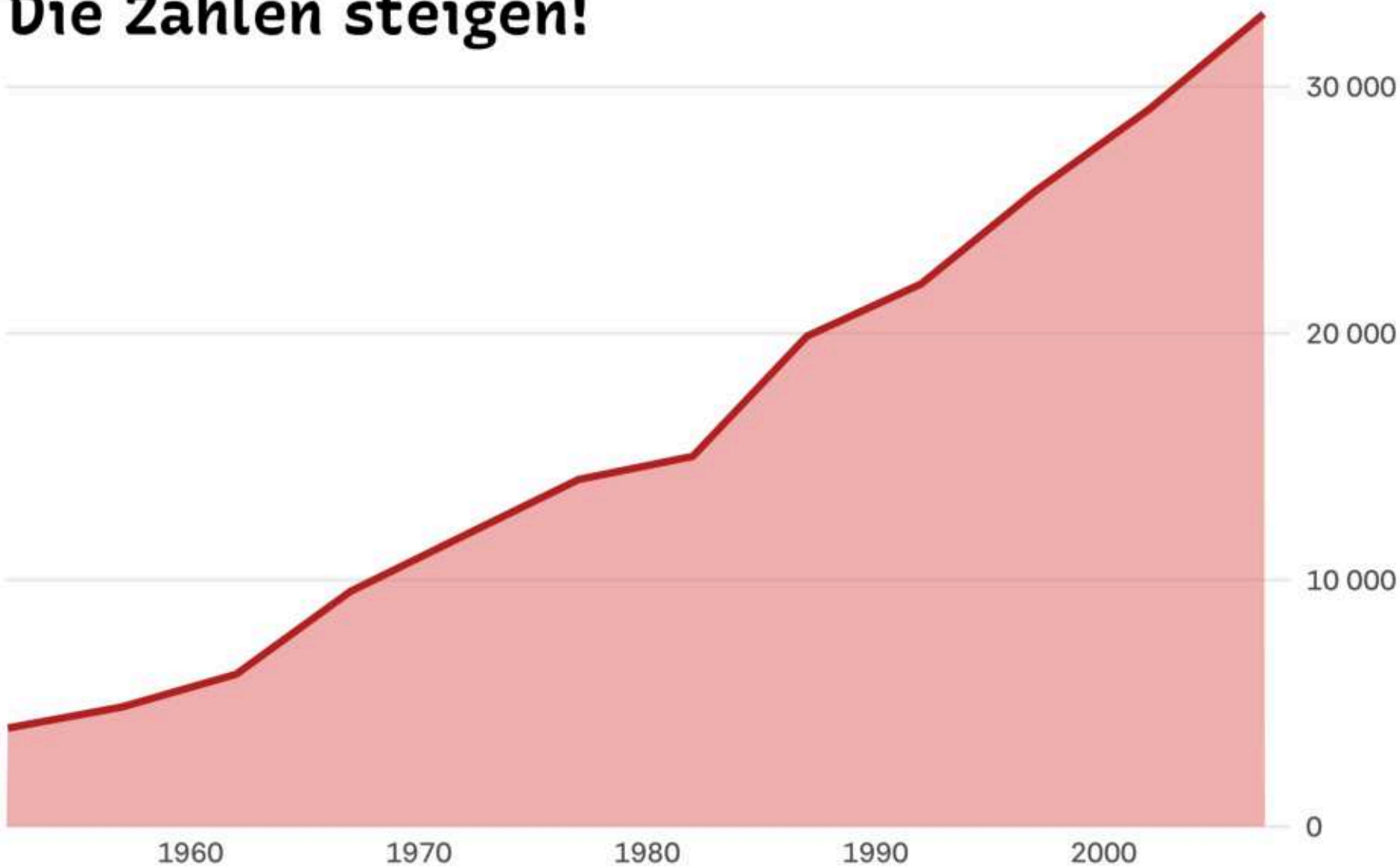
Die Zahlen steigen

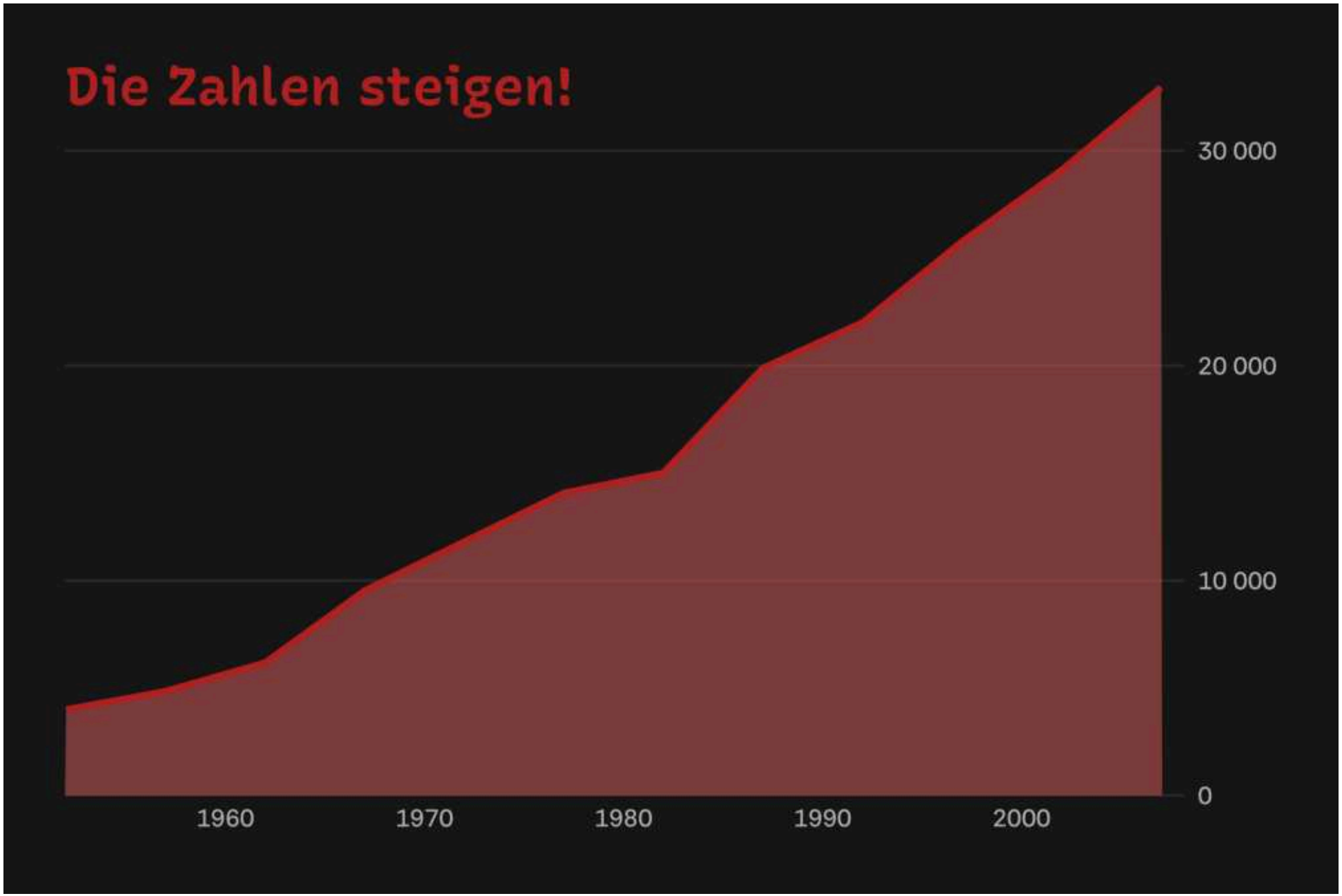


Die Zahlen steigen!

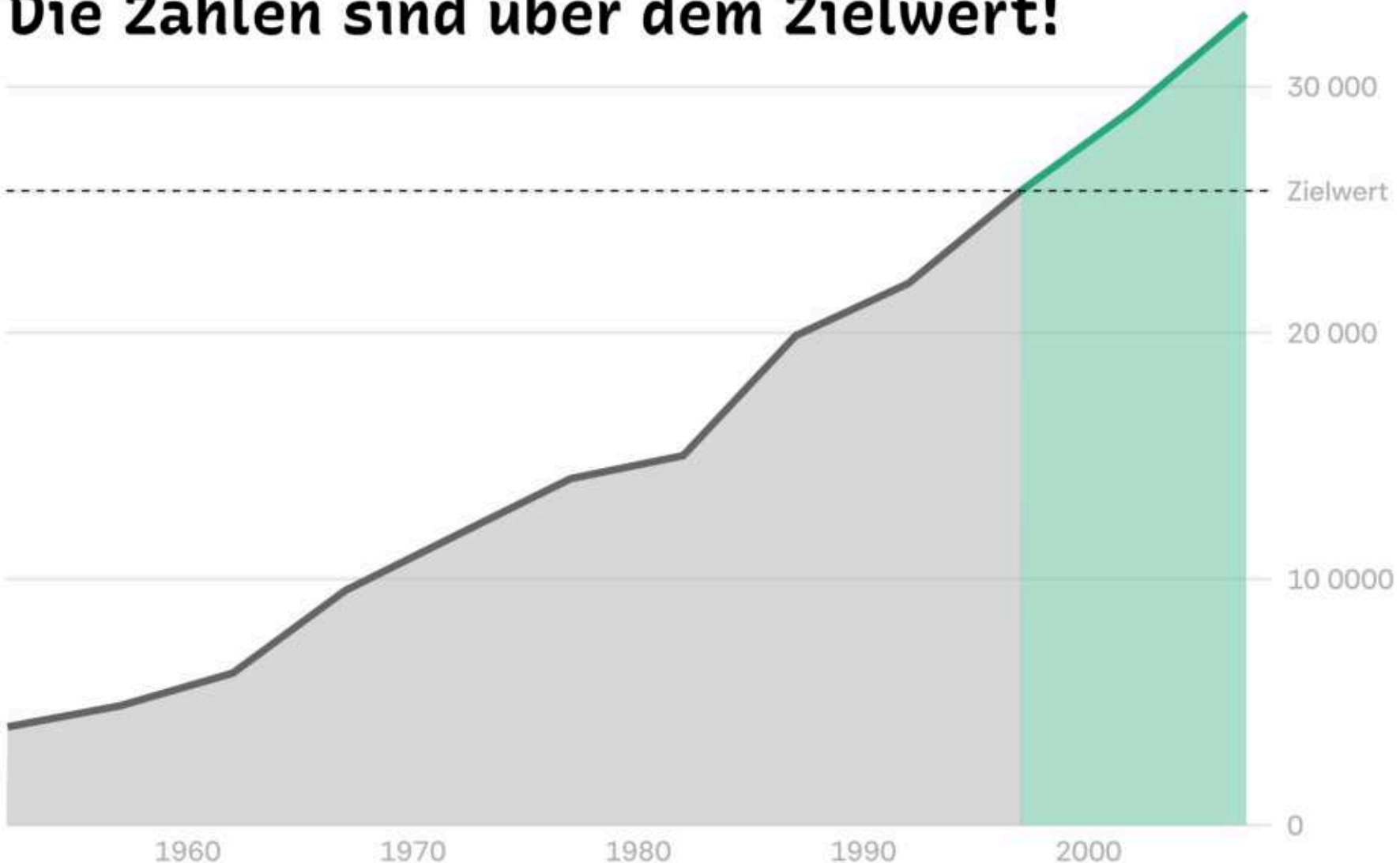


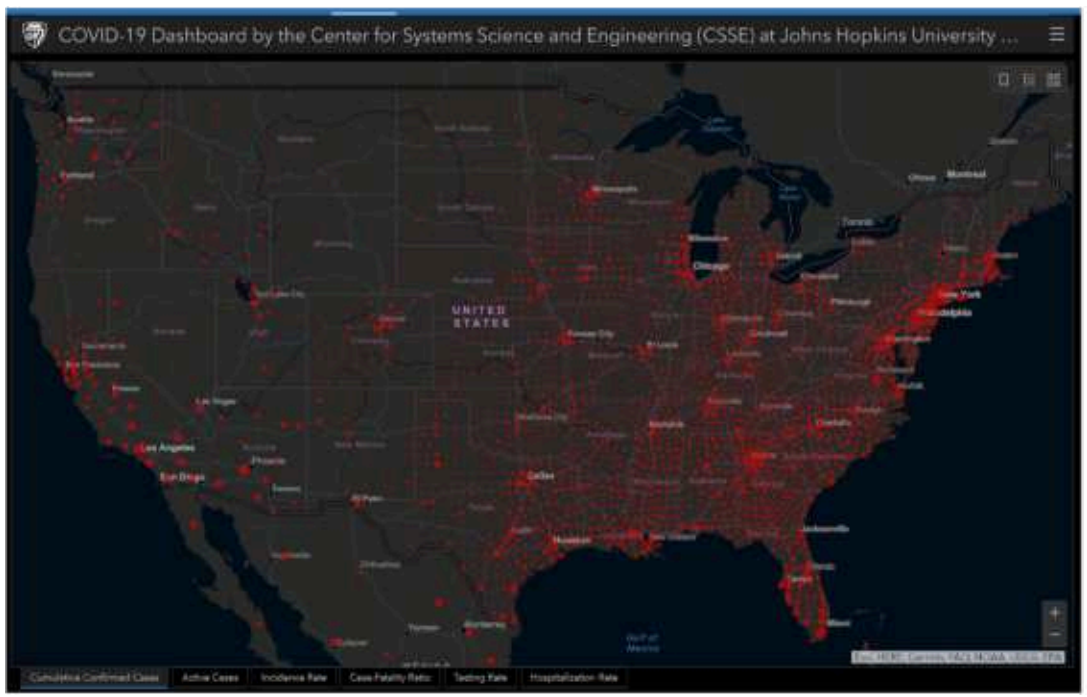
Die Zahlen steigen!

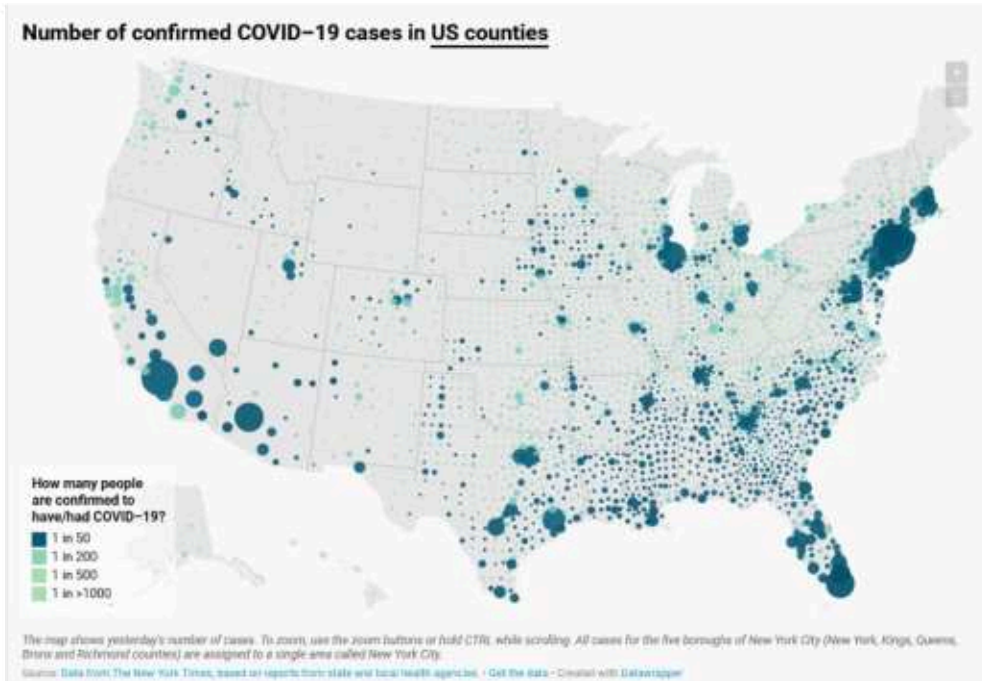



Die Zahlen steigen!
30 000
20 000
10 000
0
1960
1970
1980
1990
2000

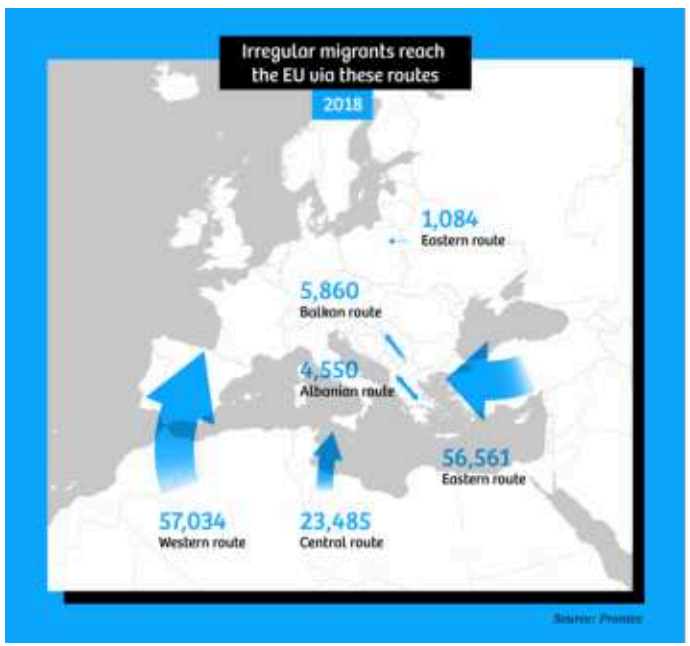
Die Zahlen sind über dem Zielwert!

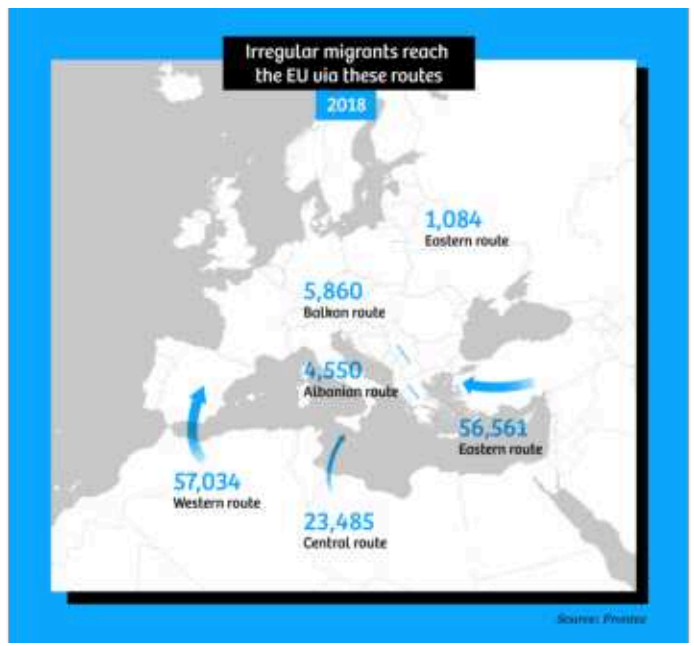


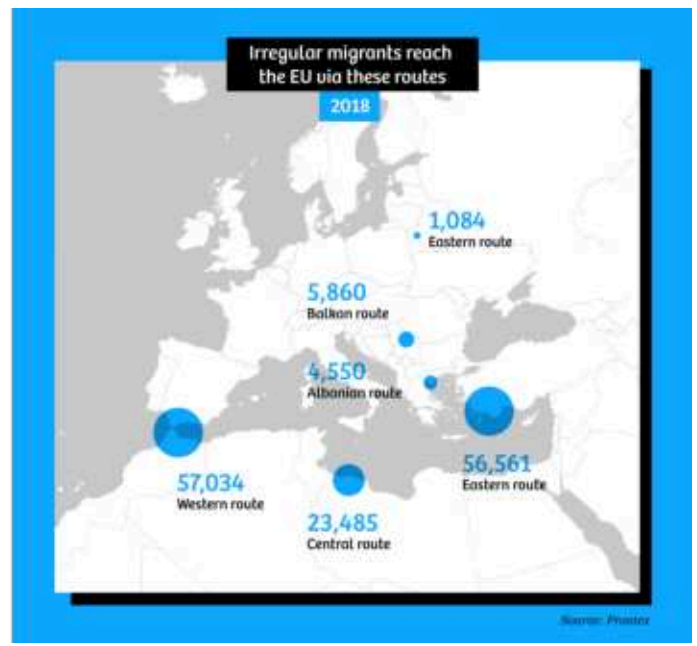




The famous COVID-19 tracker by the John Hopkins University using an „alien-death-blood visual identity" (Screenshot 2020-07-27) next to a map of confirmed COVID-19 cases by Datawrapper using more decent colors to avoid an emotion of fear (Screenshot 2020-07-27).







„How maps in the media make us more negative about migrants" von Maite Vermeulen, Leon de Korte & Henk van Houtum

„Was"

Handlung

- zentrale Botschaft klar formulieren
- Verständnis fördern und/oder Reaktionen anstoßen

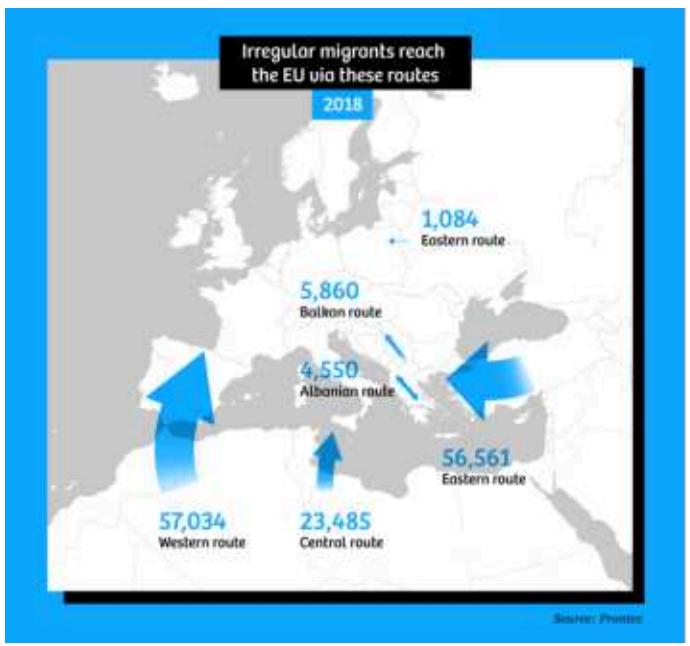
Mechanismus

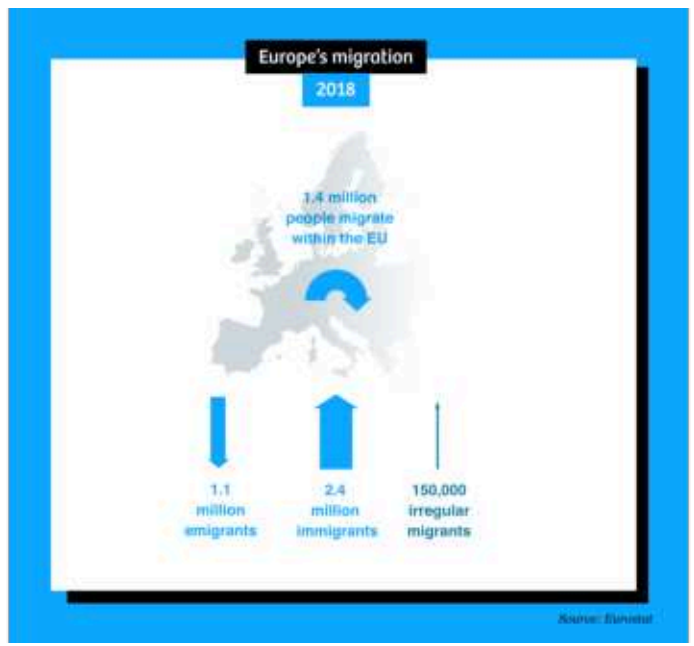
- primäre Kommunikationsmethode bestimmen

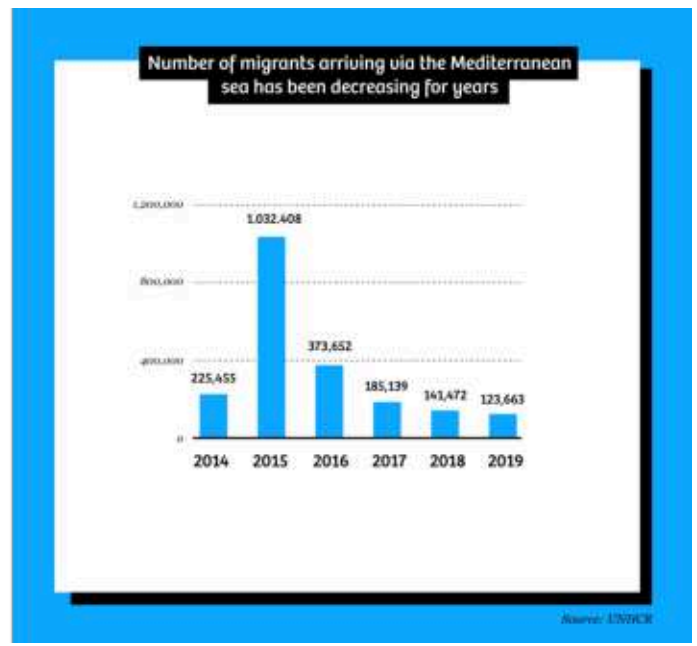
Tonfall

- gewünschte Stimmung der Kommunikation bedenken

- **Wer** ist mein Publikum?
- **Was** möchte ich vermitteln?
- **Wie** kann ich die Botschaft untermauern?



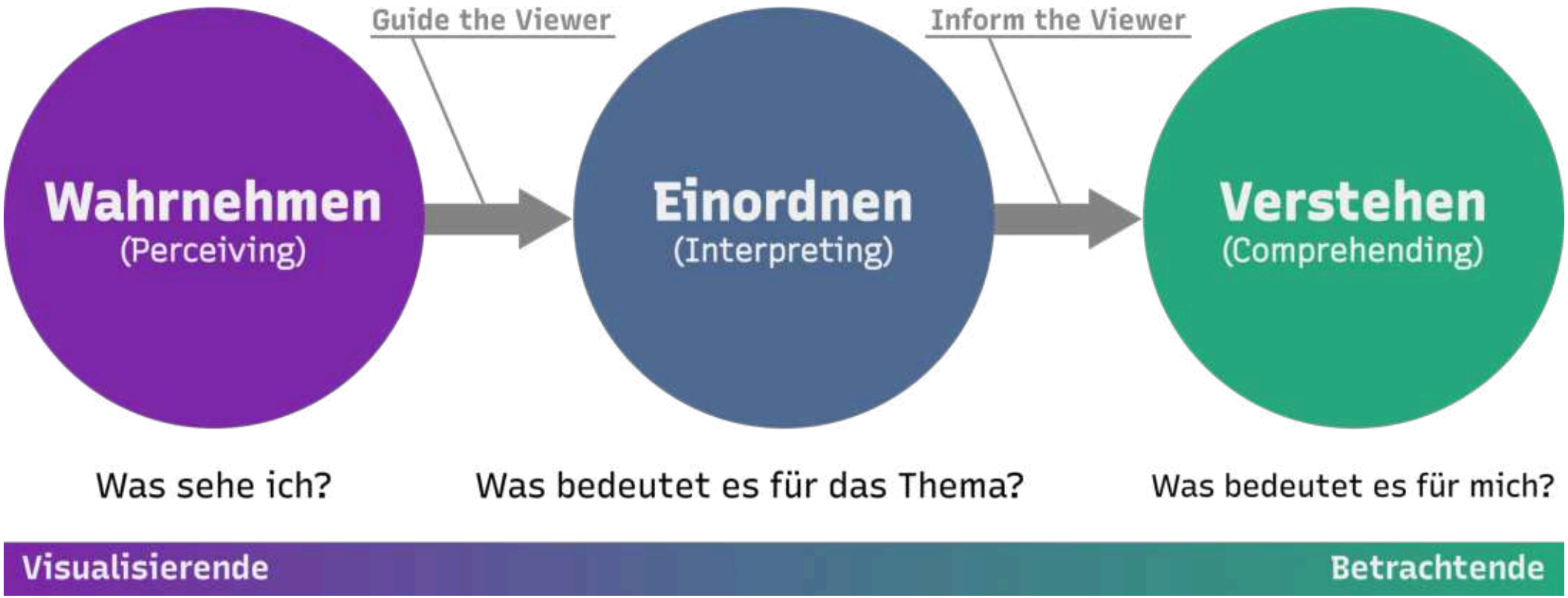




„How maps in the media make us more negative about migrants" von Maite Vermeulen, Leon de Korte & Henk van Houtum

Kontext

- Wie kann die wichtigste Botschaft, die das Publikum mitnehmen sollte, untermauern?
- Welche (Hintergrund-)Informationen sind wesentlich? Was ist dafür irrelevant?
- Welche potenziellen Voreingenommenheiten könnten bei (einigen) Betrachtenden bestehen?
- Welche Faktoren könnten die eigene Position schwächen? Kann man ihnen proaktiv begegnen?



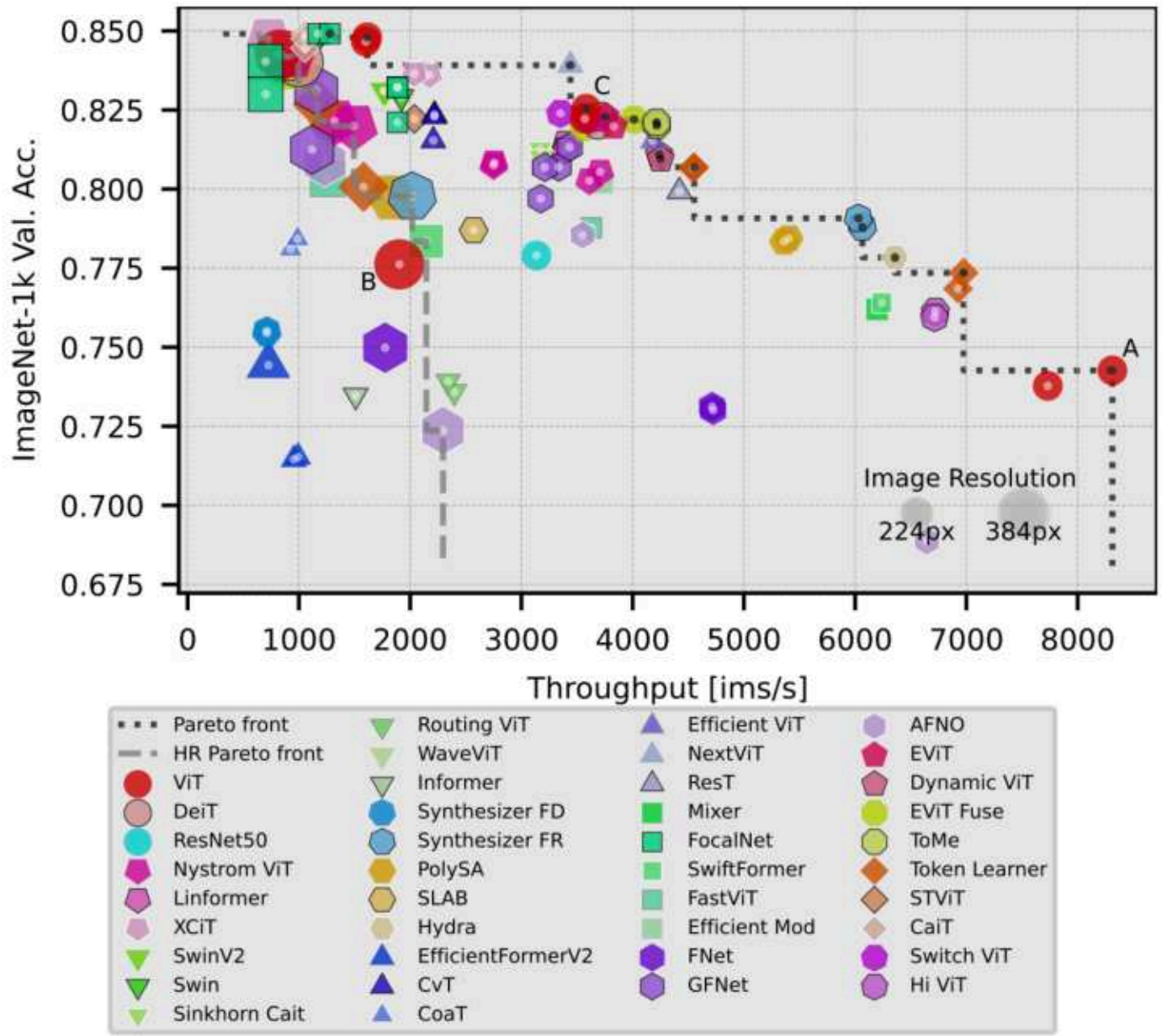
Überarbeitet und erweitert nach einem Originalschema von Andy Kirk

Ziel

Zweckmäßigkeit der Darstellung

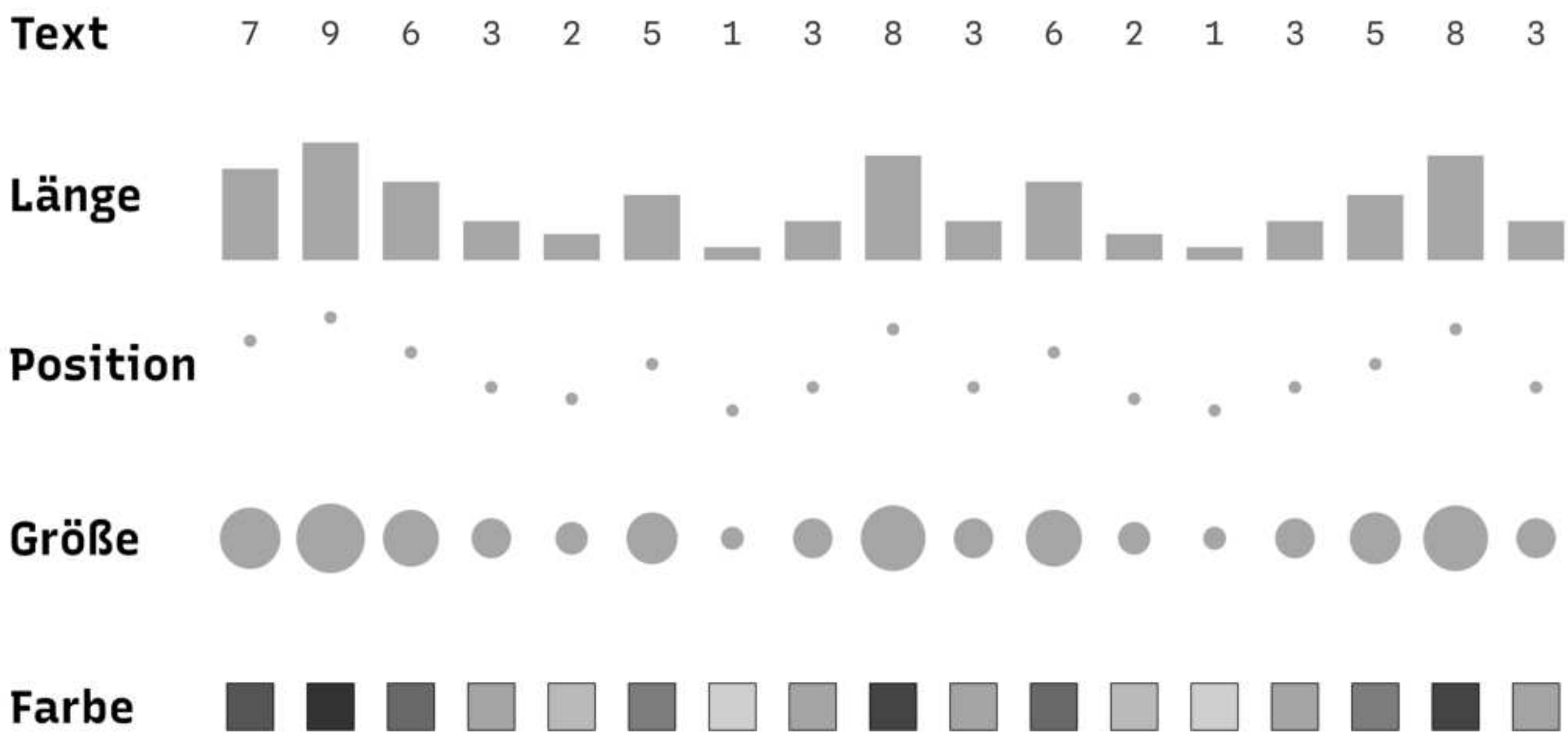
Kodierungen

Zuordnung von Datenwerten zu visuellen Eigenschaften.



Quelle: Nauen et al. 2025

Gleiche Werte, andere Kodierung



Journal of the American Statistical Association, September 1984

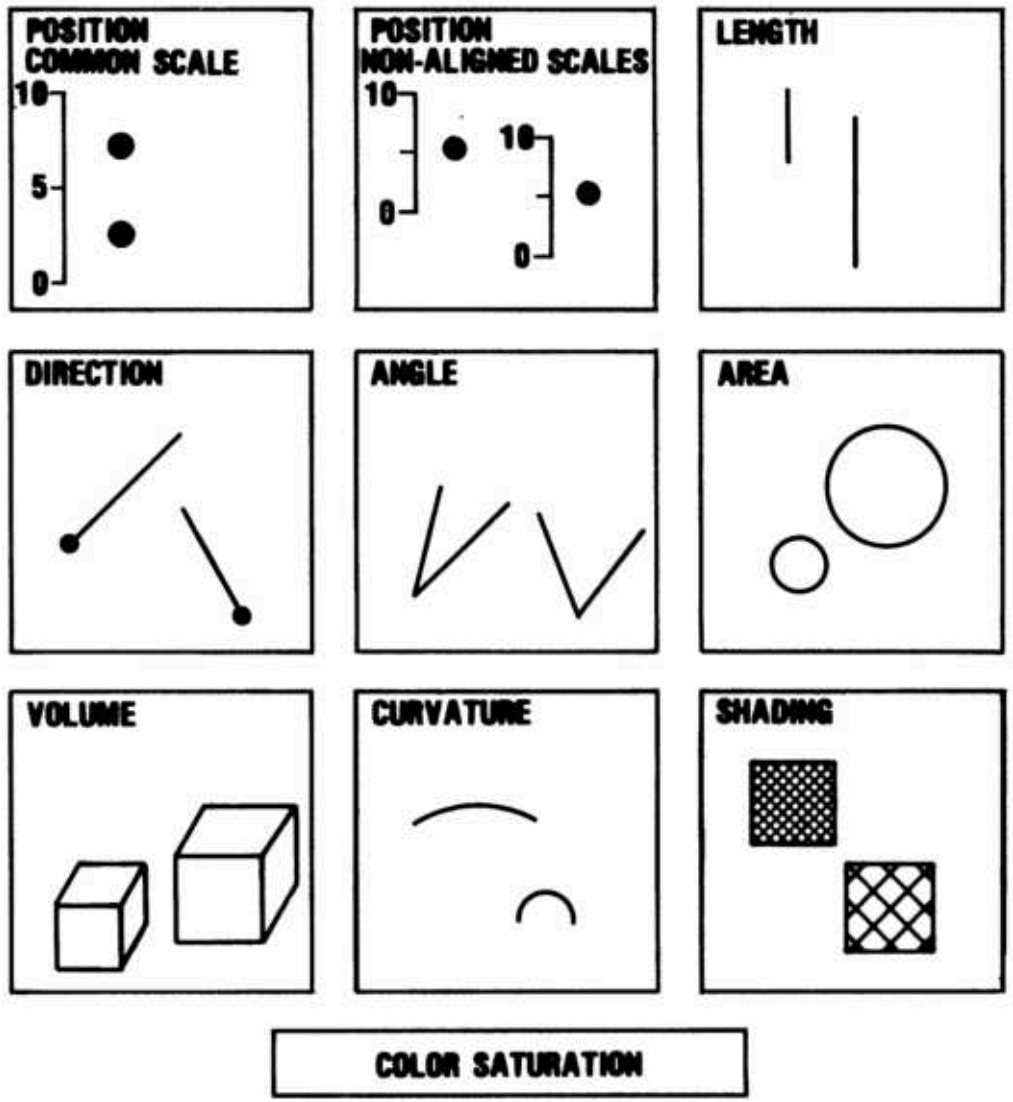
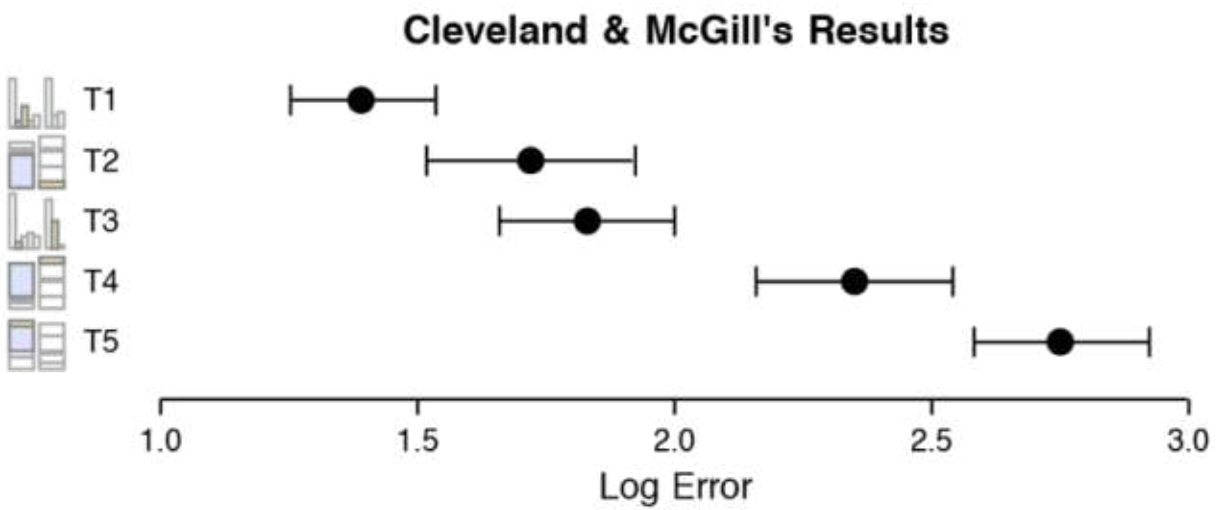
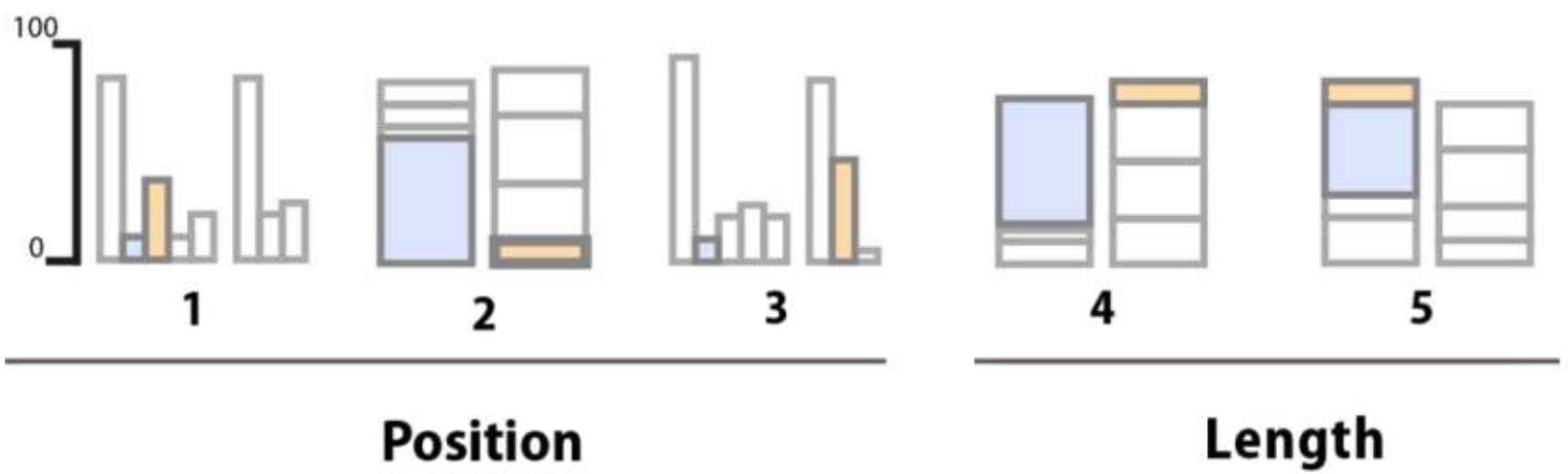


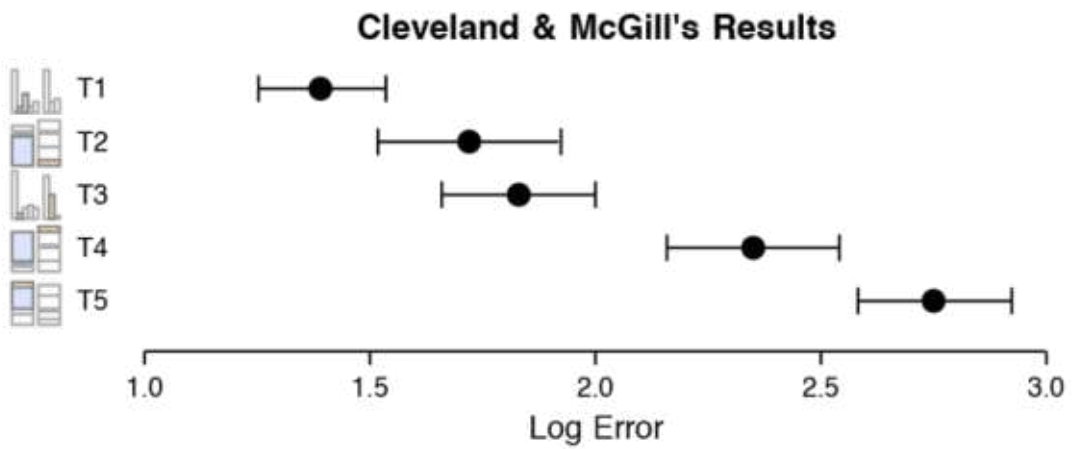
Figure 1. Elementary perceptual tasks.

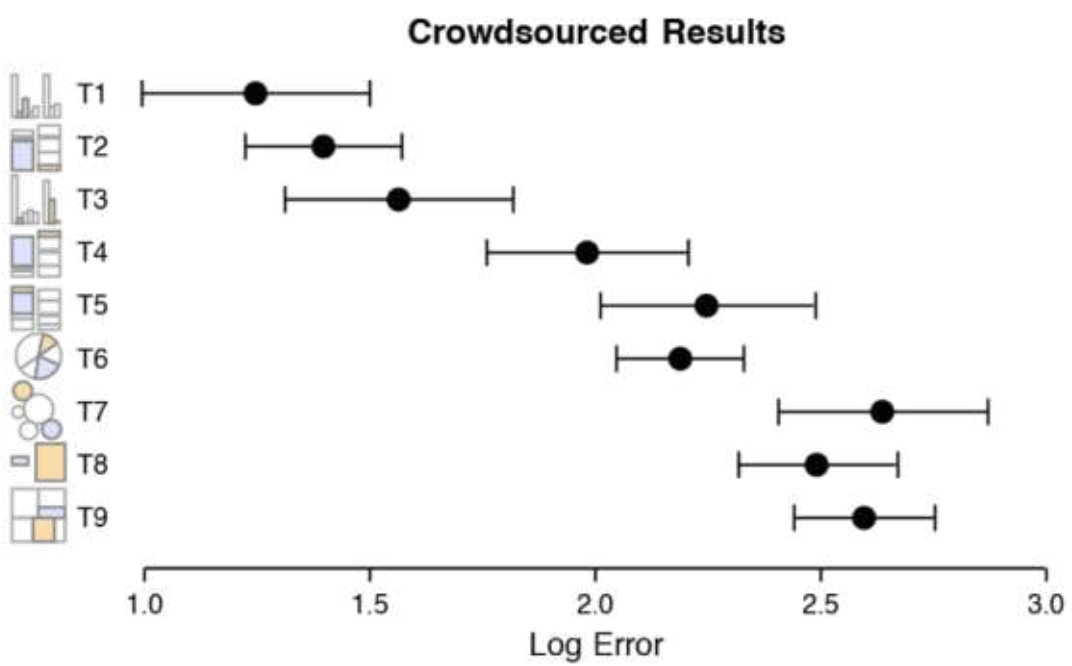
Cleveland & McGill (1984)





Quelle: „Data Visualization: A Practical Introduction" von Kieran Healy
Ergebnisse basierend auf Cleveland & McGill (1984, 1987) und Heer & Bostock (2010)





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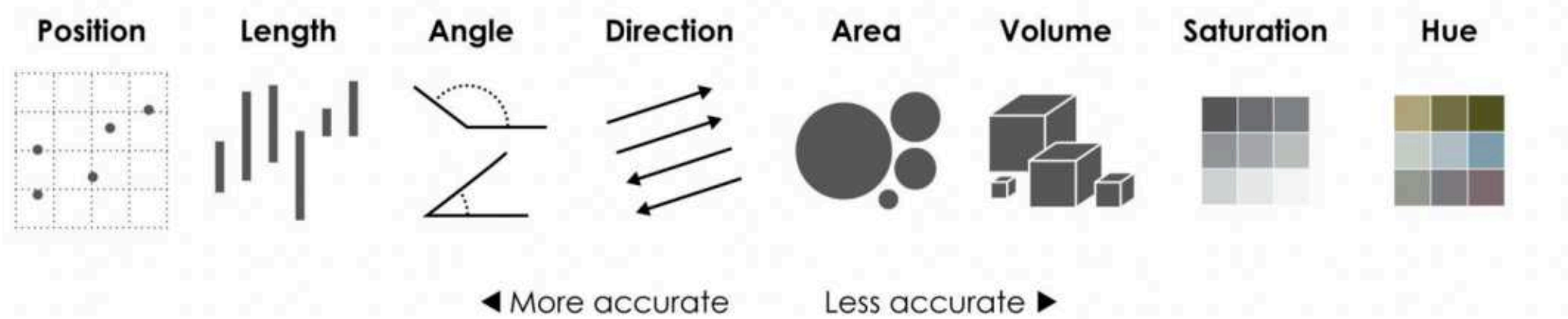
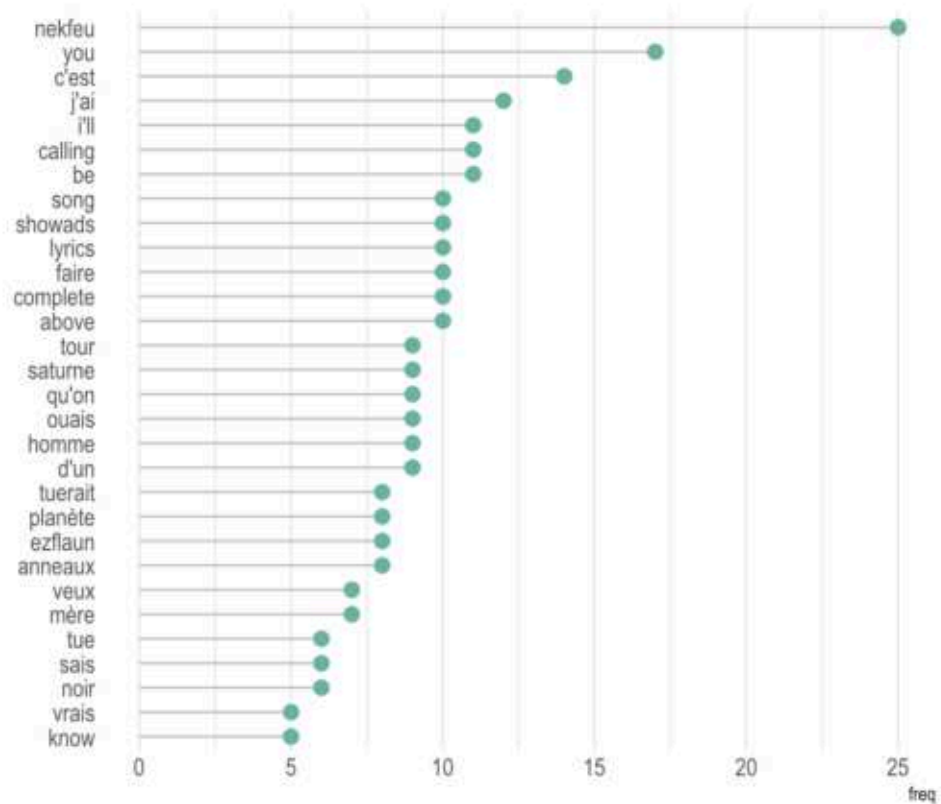


Quelle: „Data Points" von Nathan Yau (S. 104)



Quelle: From Data to Viz

Gruppe A
Gruppe B
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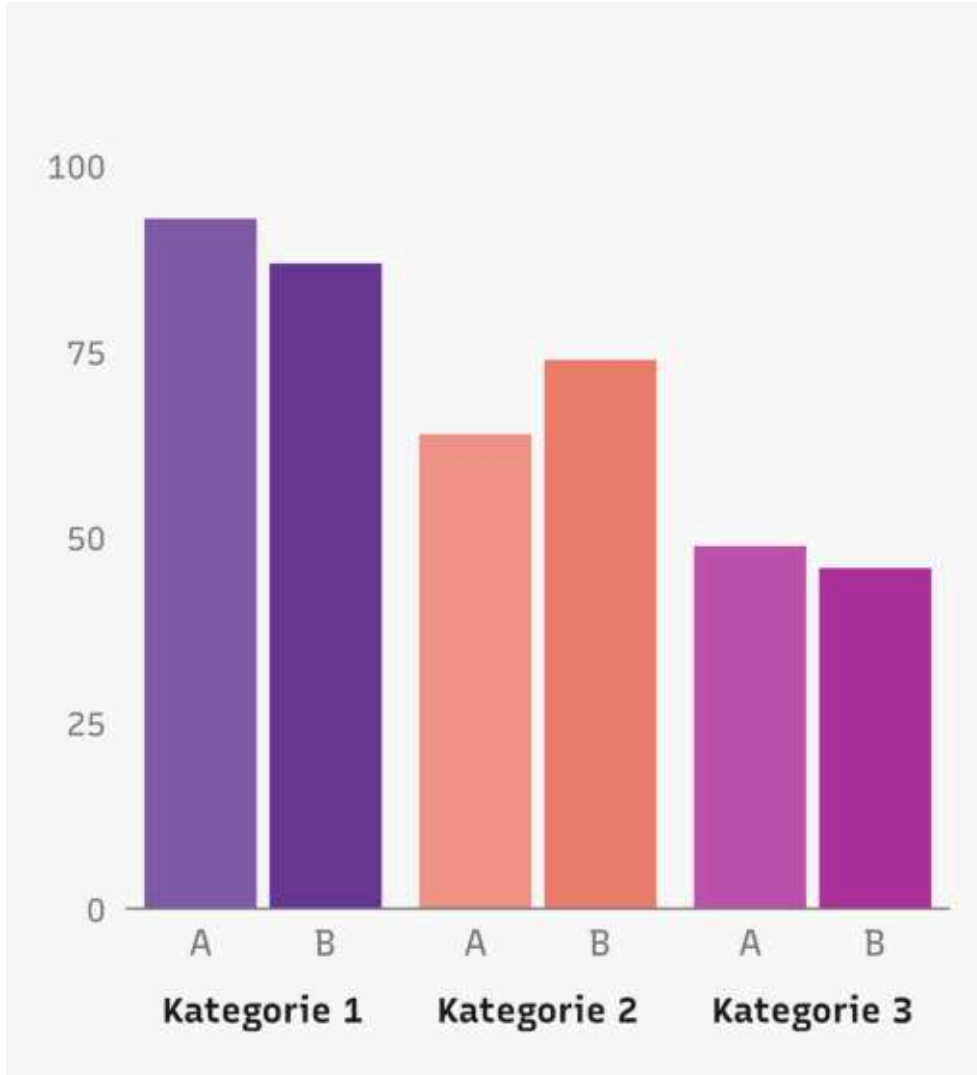
Kategorie 2
Kategorie 3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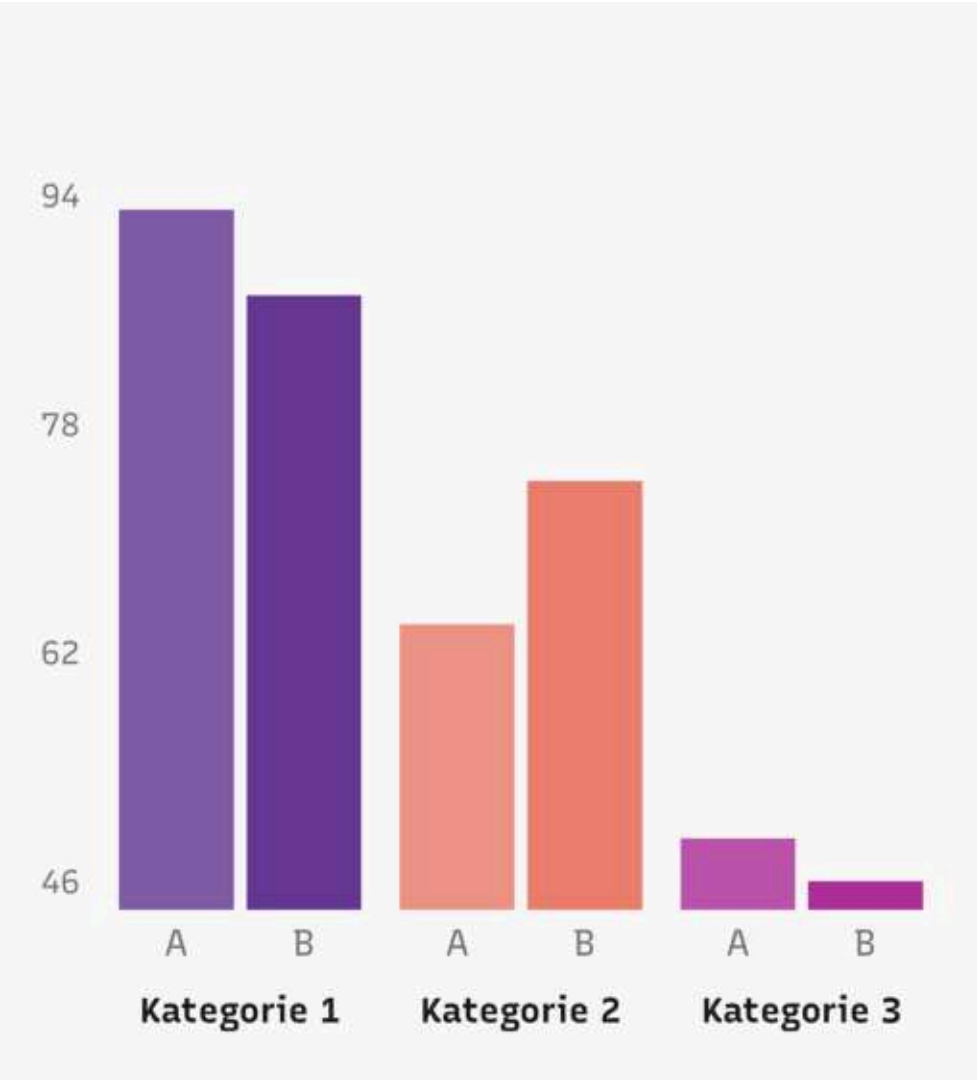
Kategorie 3

„There’s a strand of the data viz world that argues that **everything could be a bar chart**.

That’s possibly true but also possibly **a world without joy**.”

Amanda Cox (2013)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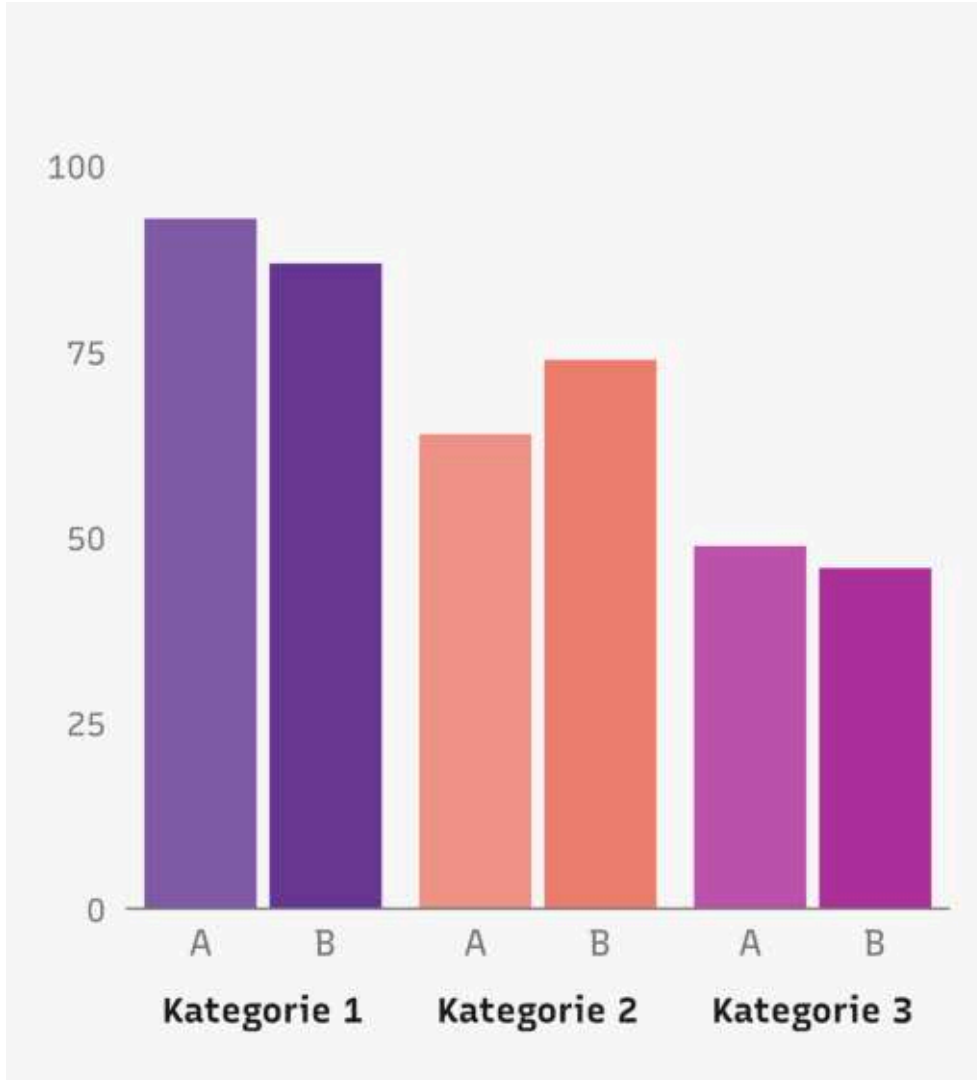
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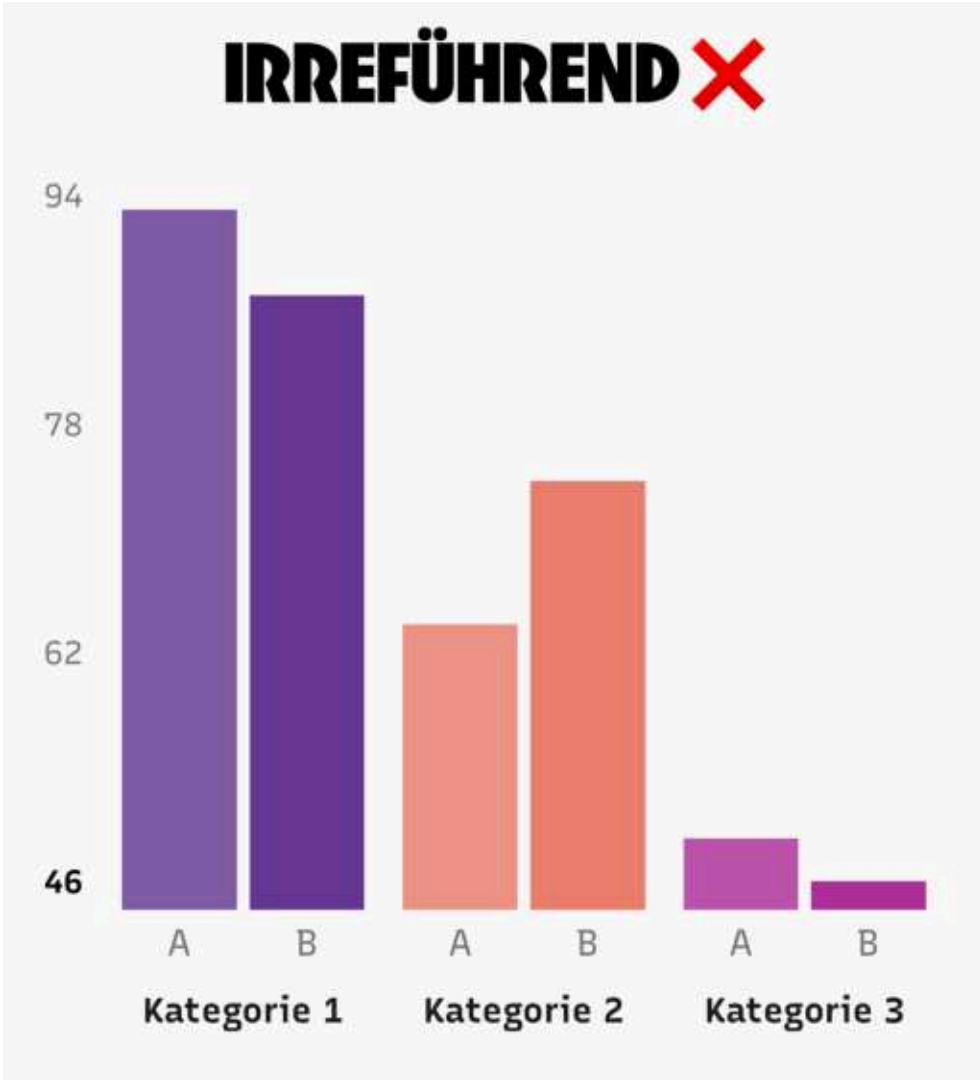
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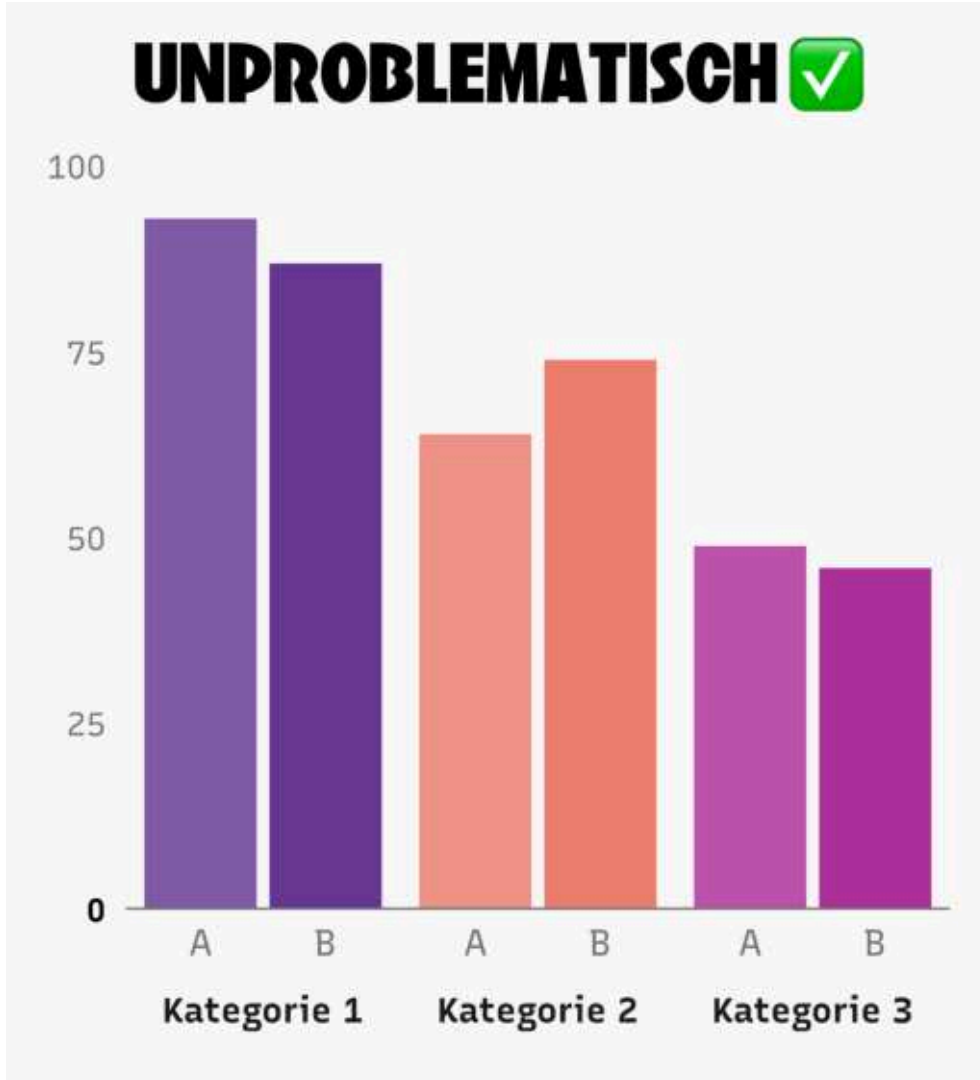
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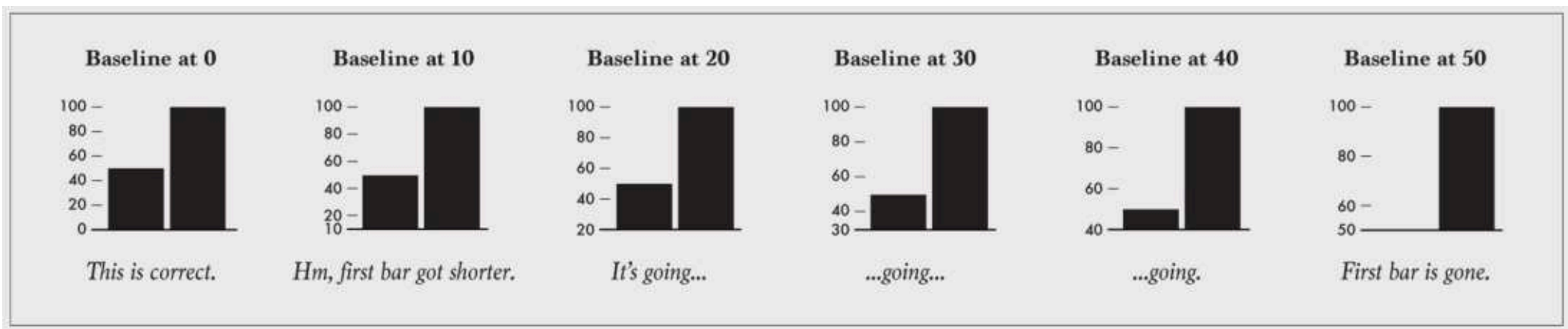


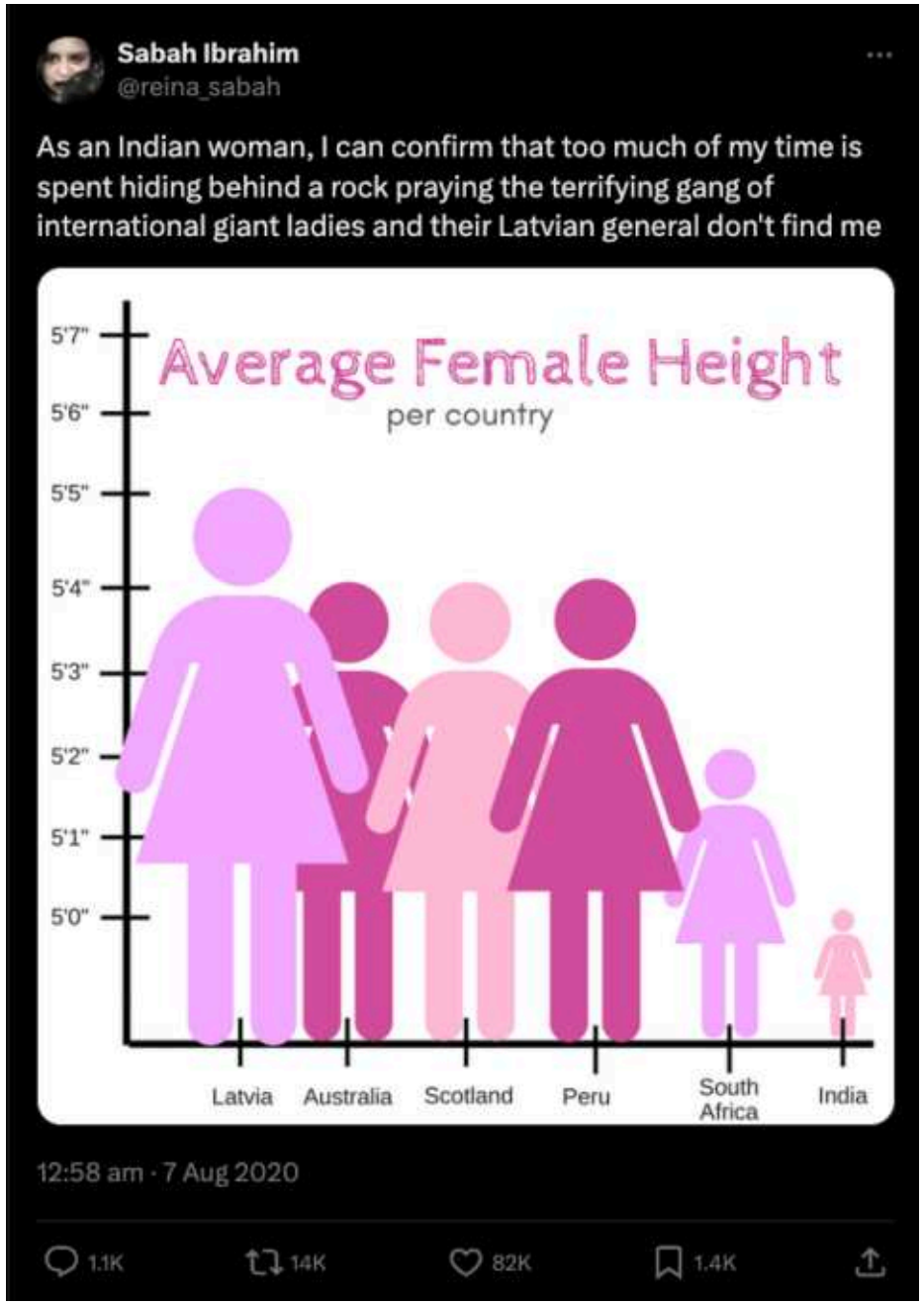
Quelle: Nathan Yau

Zufriedenheit

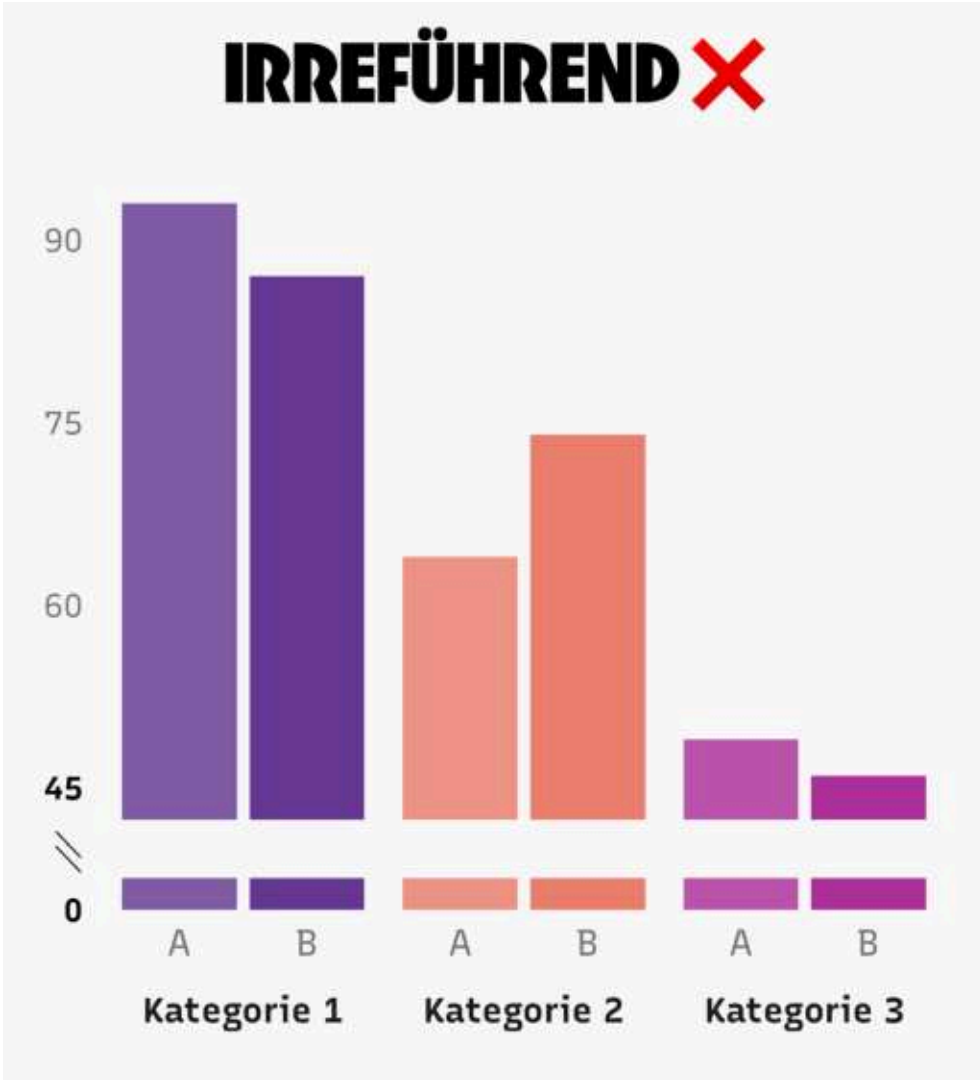
Wie zufrieden fühlen Sie sich in Ihrer Rolle als Freelancer?

Quelle: Freelancer-Kompass 2024

mehr dazu: z.B. Witt (2019) und Correl, Bertini & Francoeri (2020)



Sabah Ibrahim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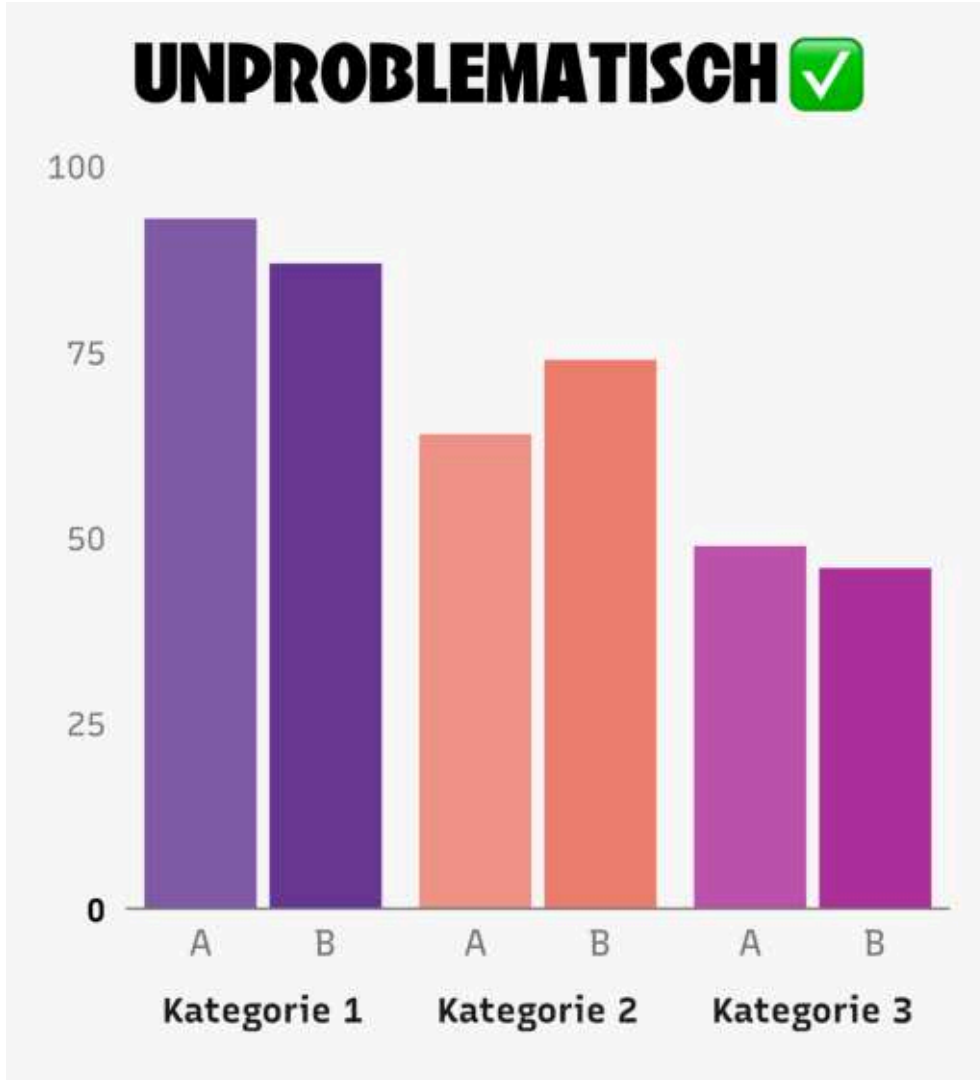
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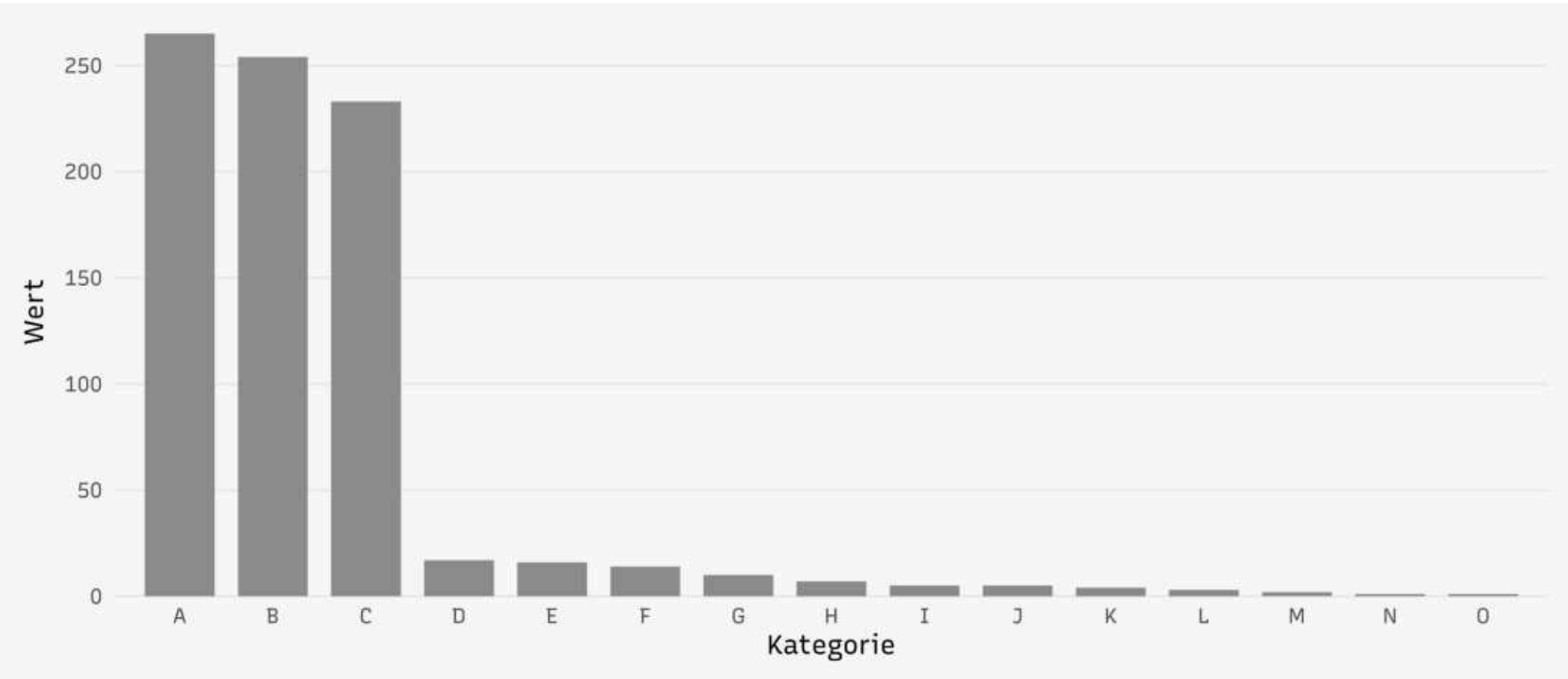
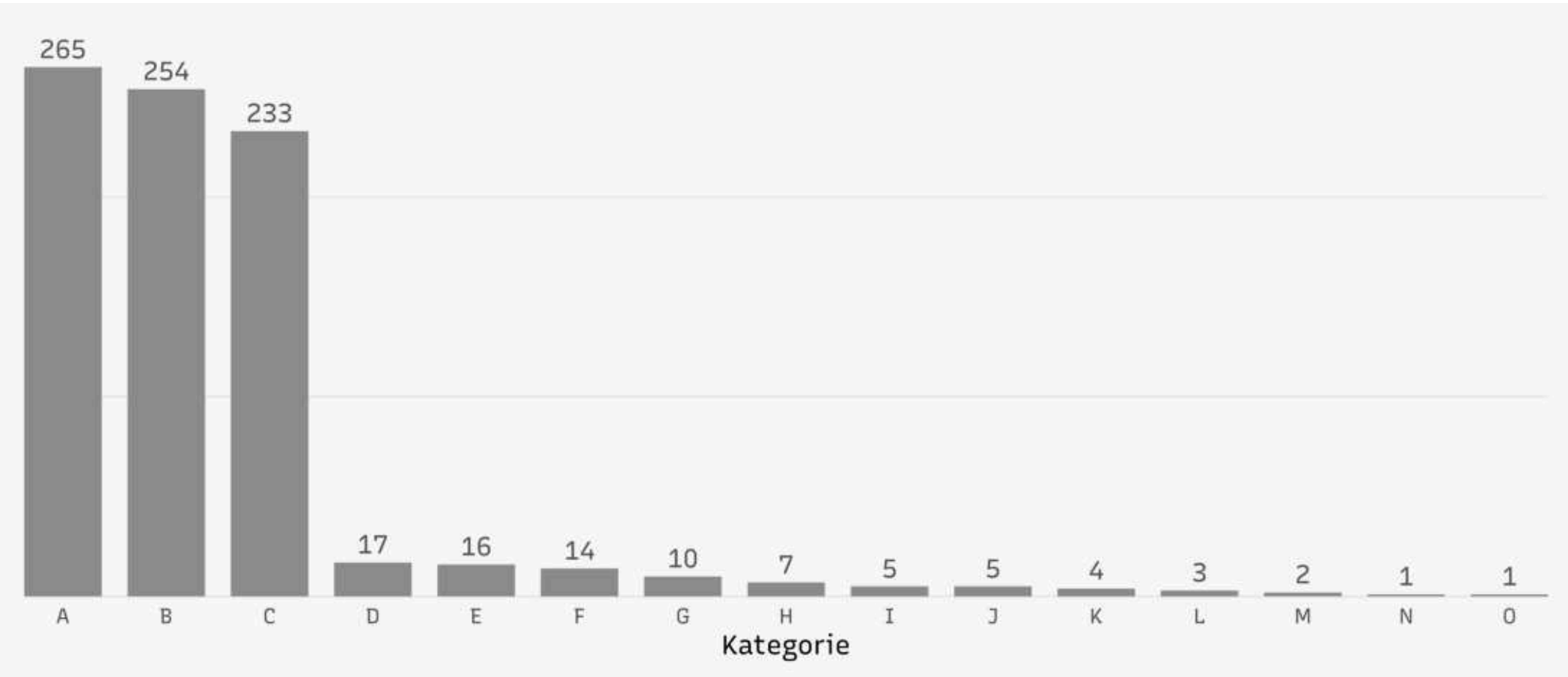
Schiefe Datenverteilung?



Schiefe Datenverteilung?



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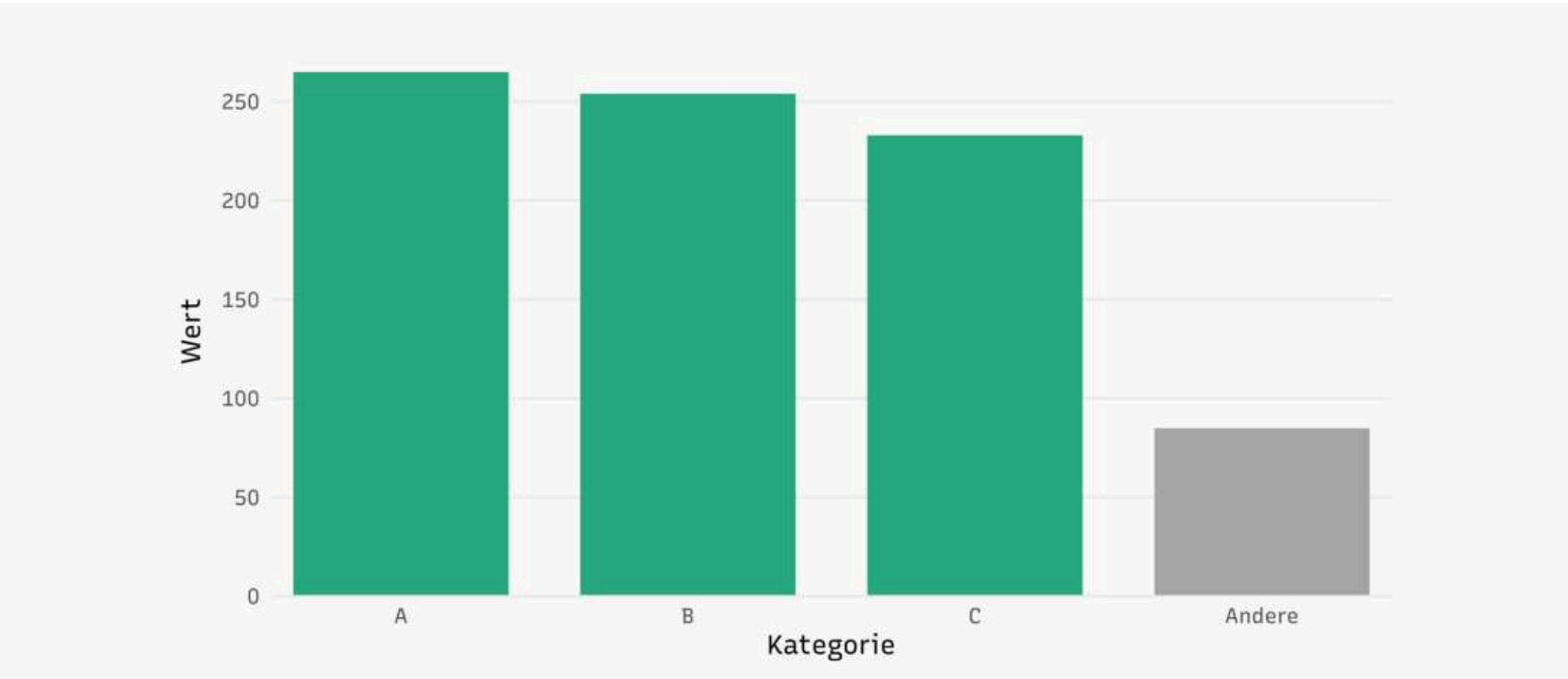
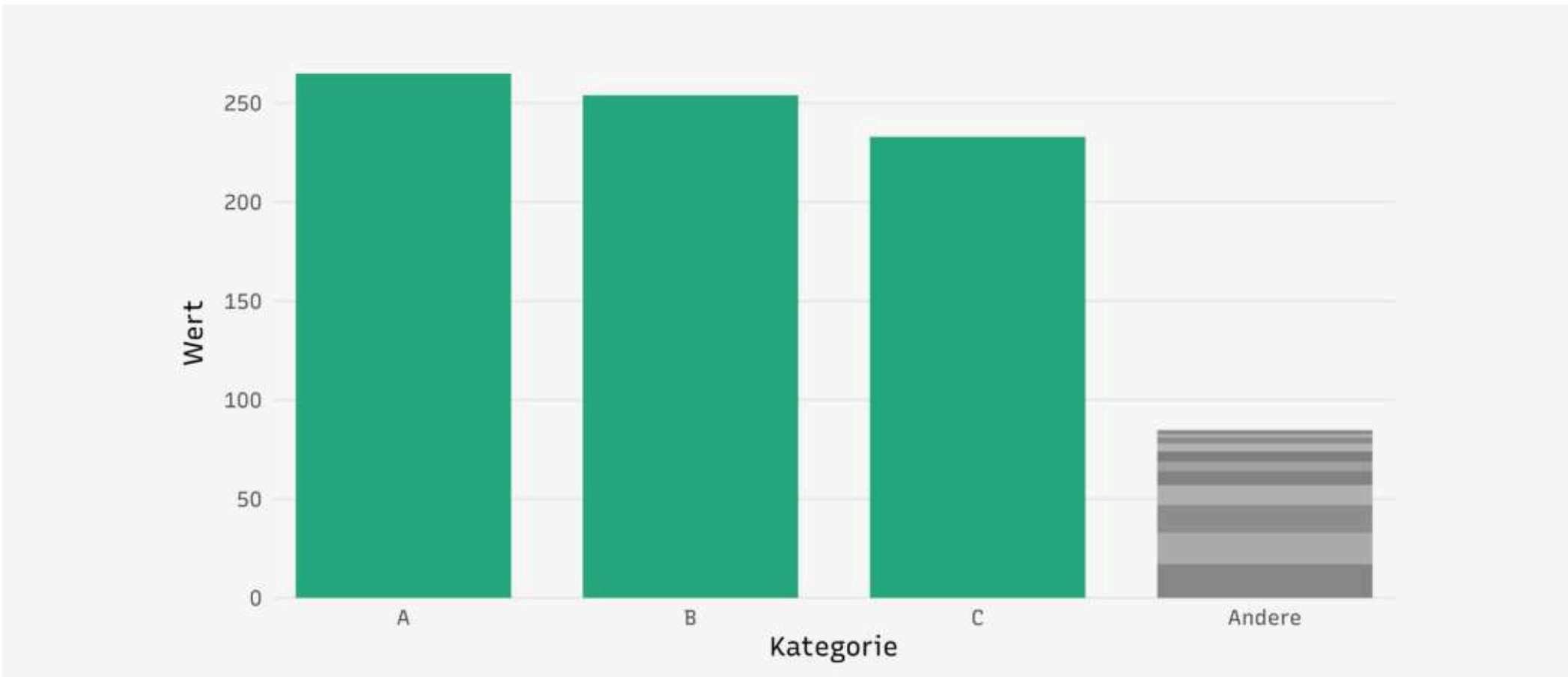


Schiefe Datenverteilung?



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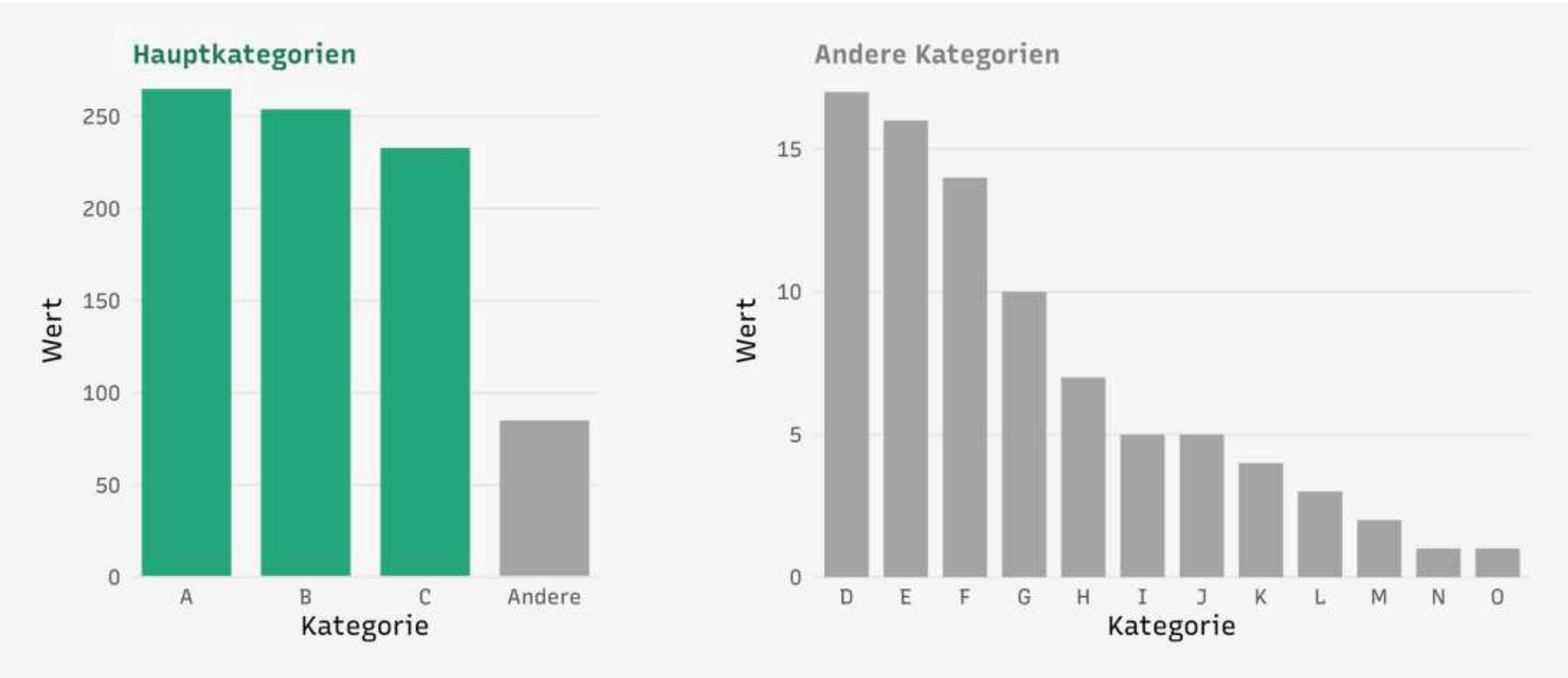

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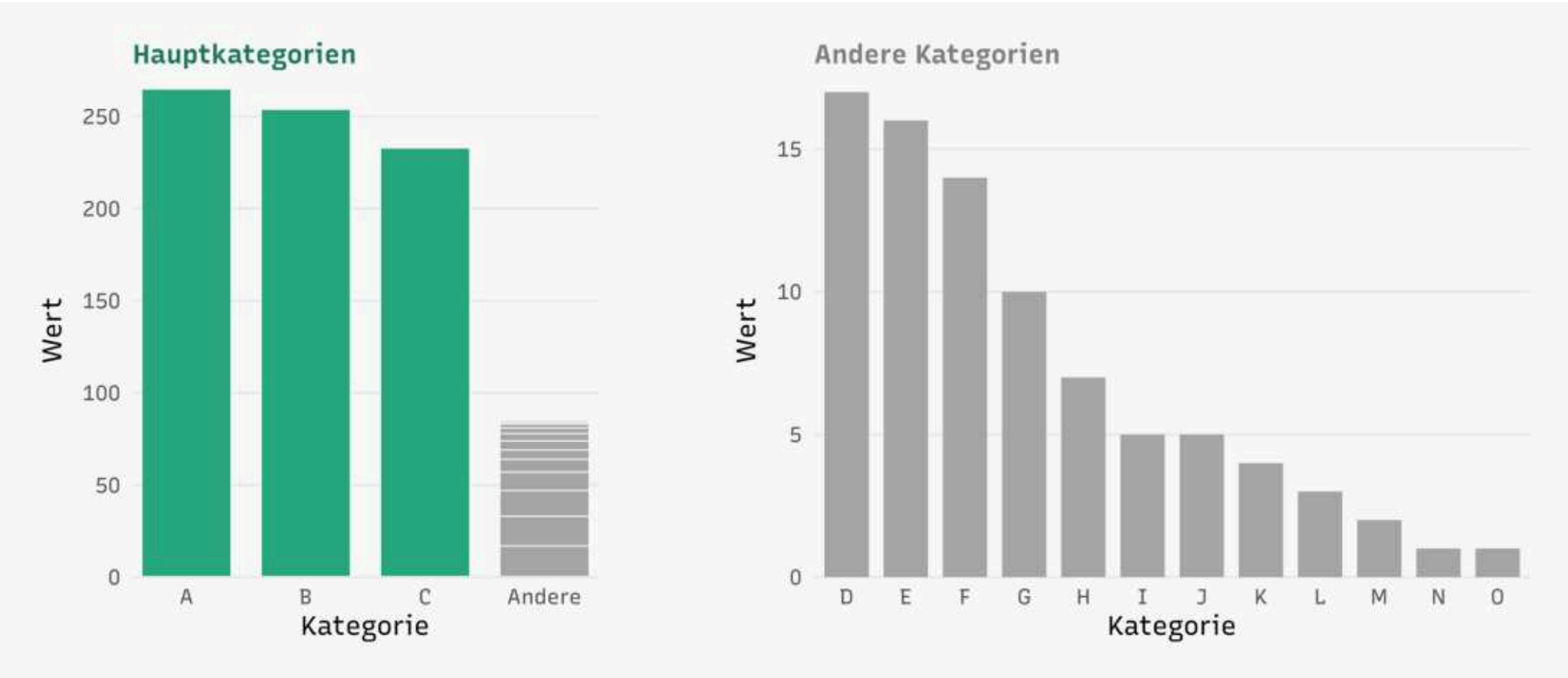

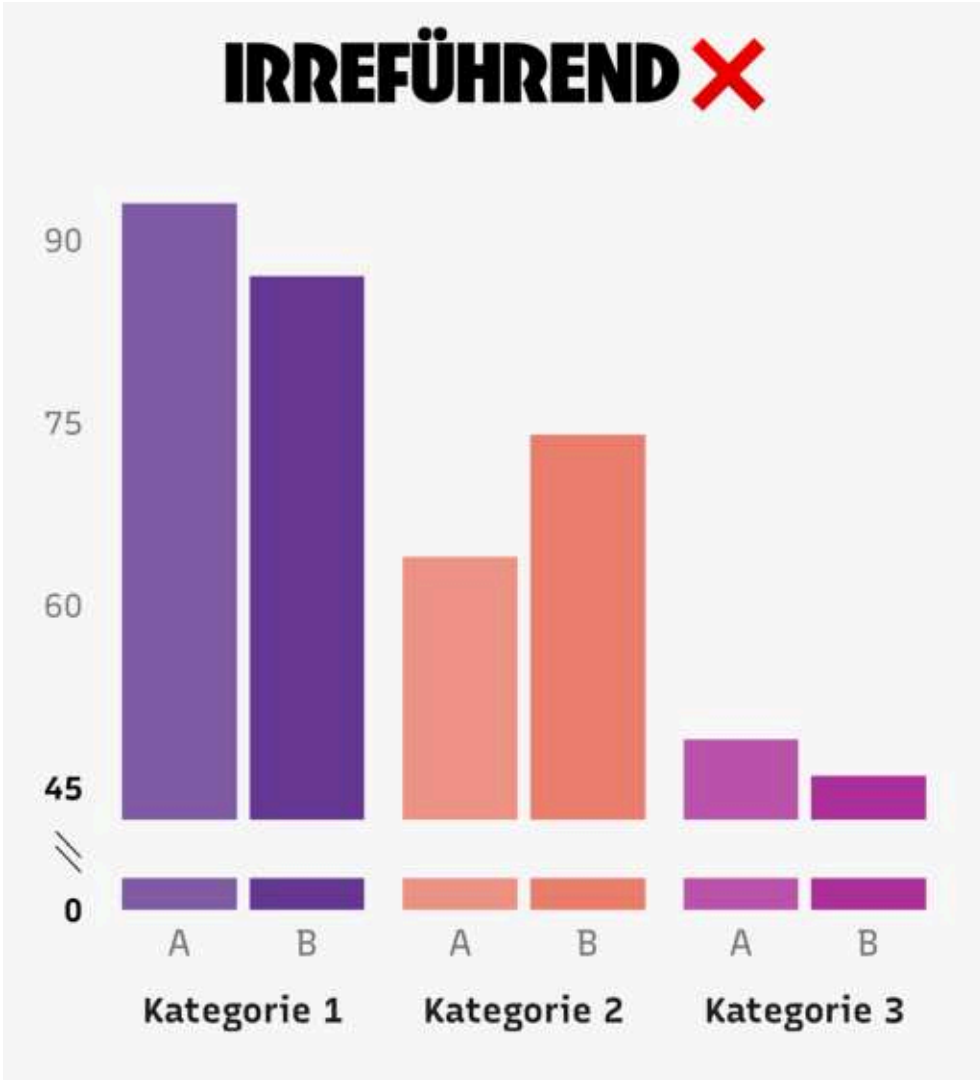
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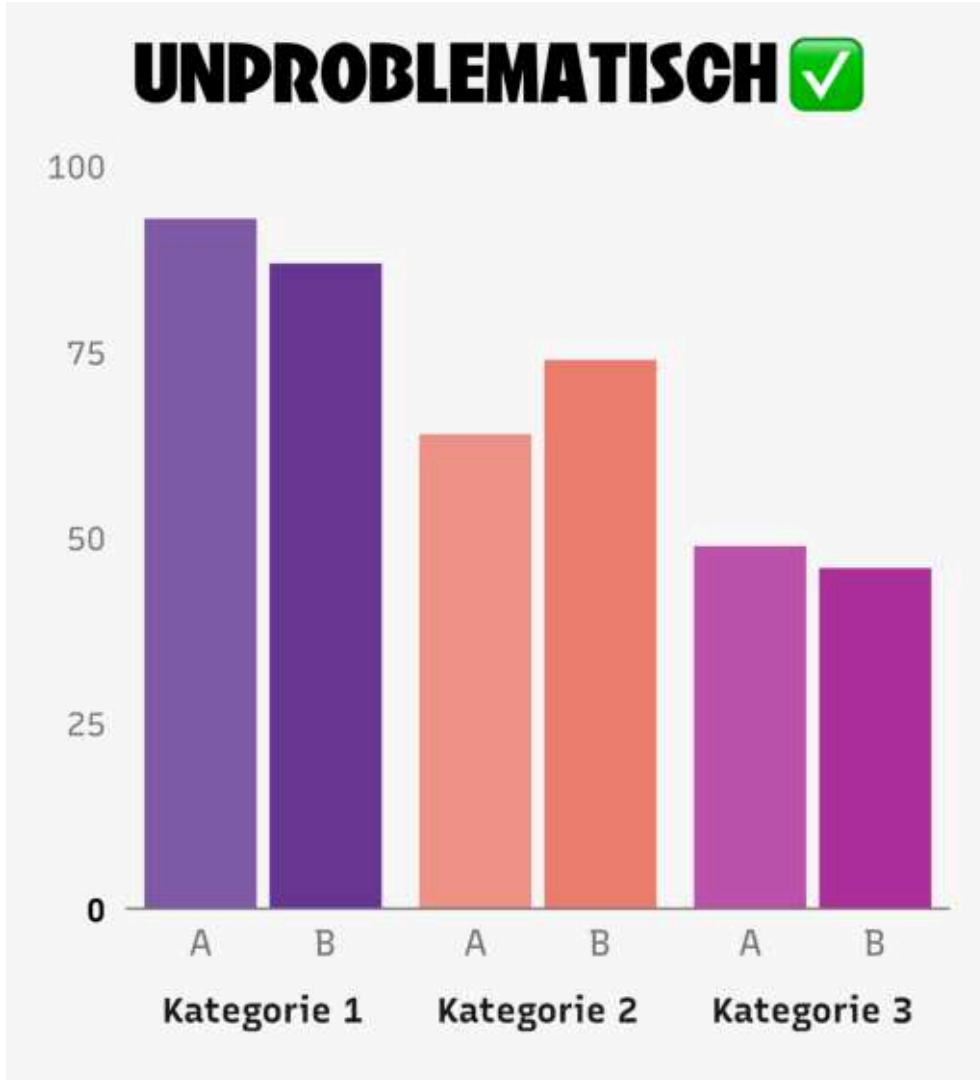
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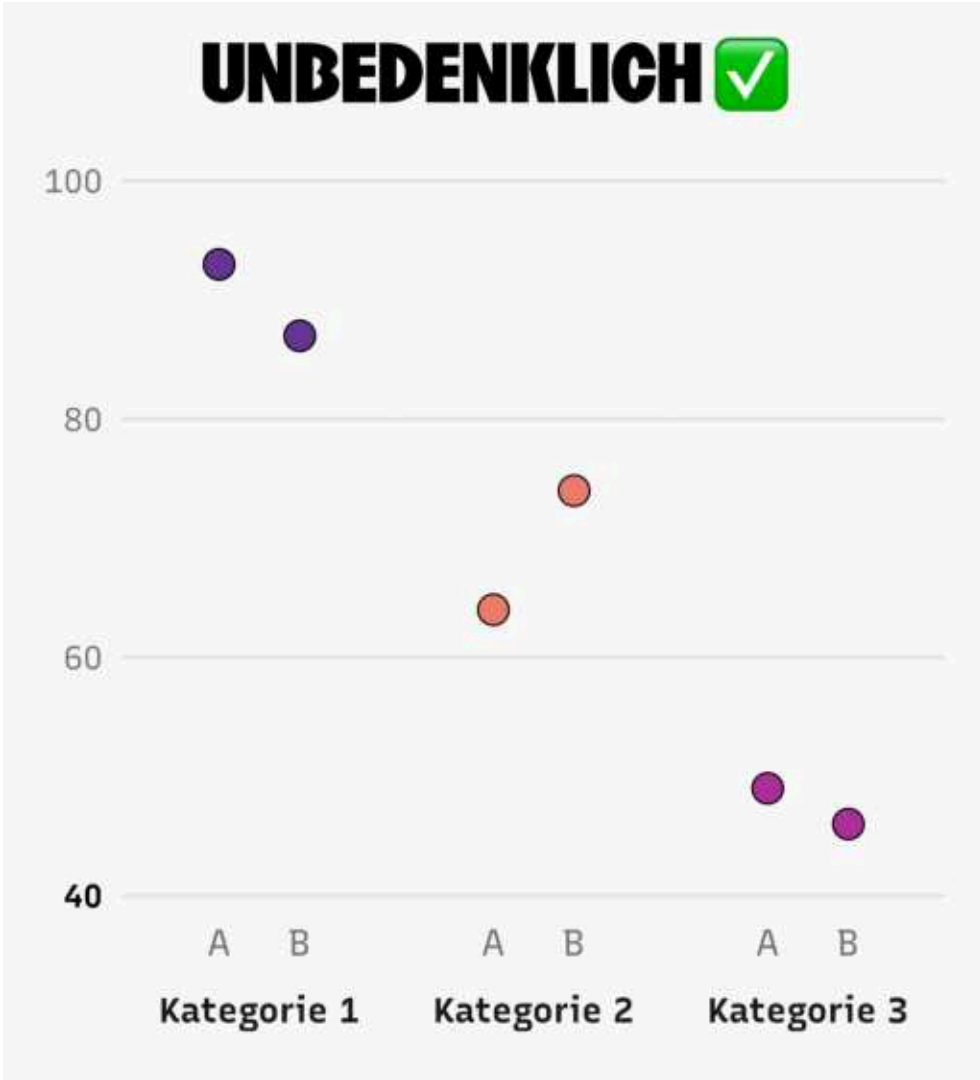
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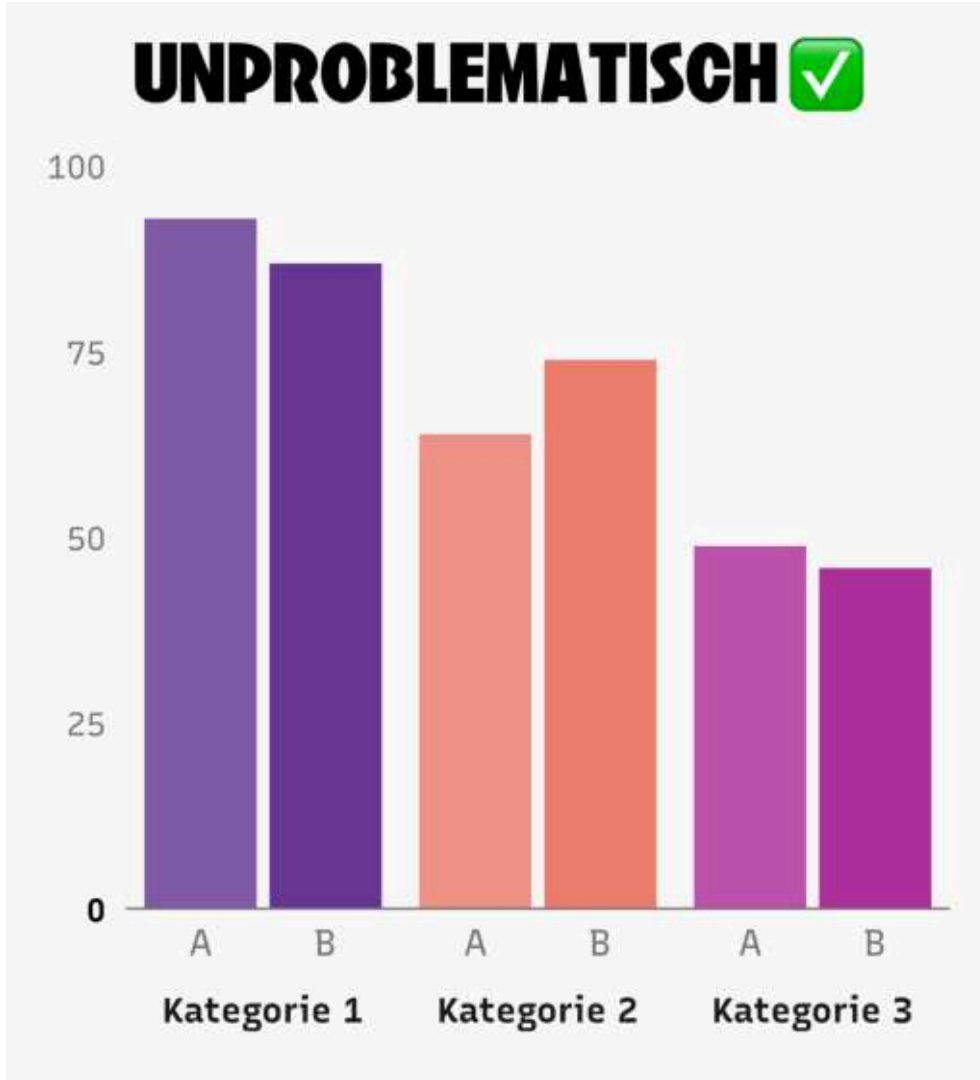
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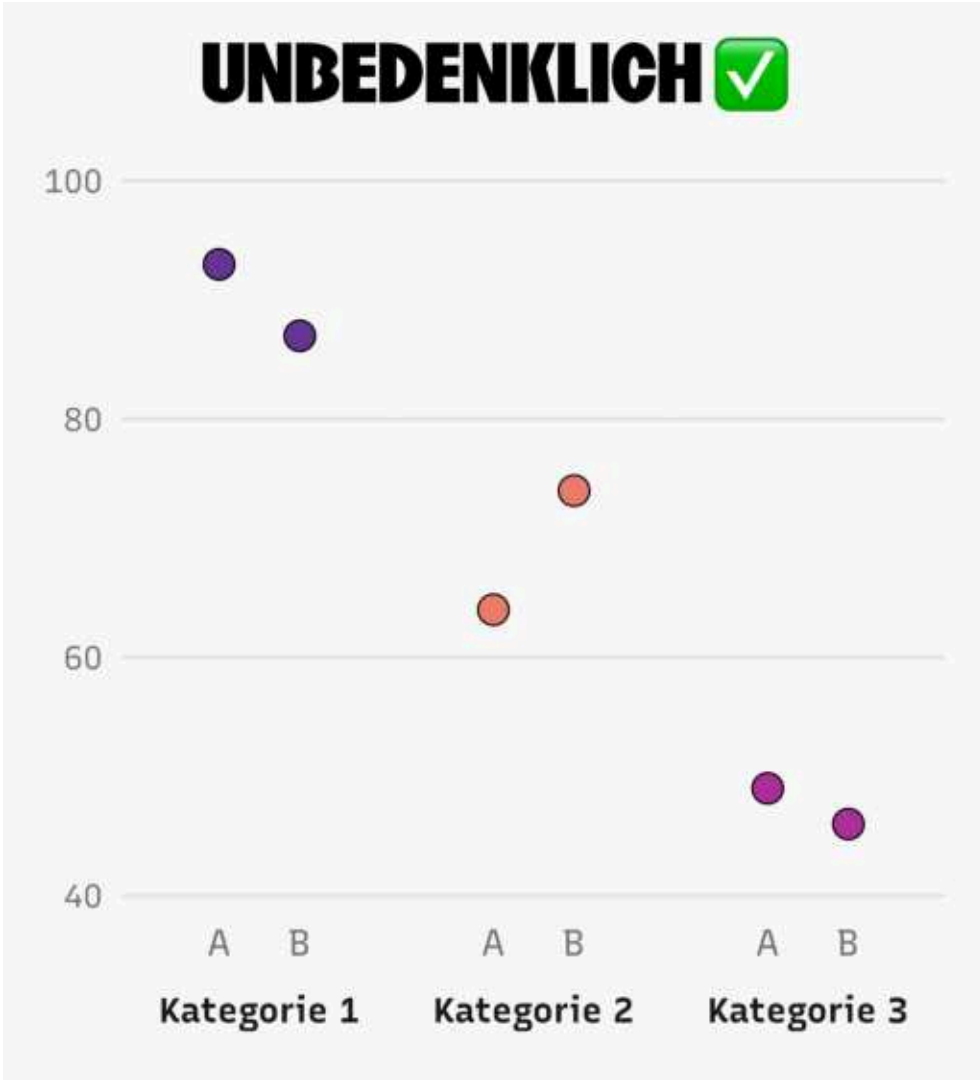
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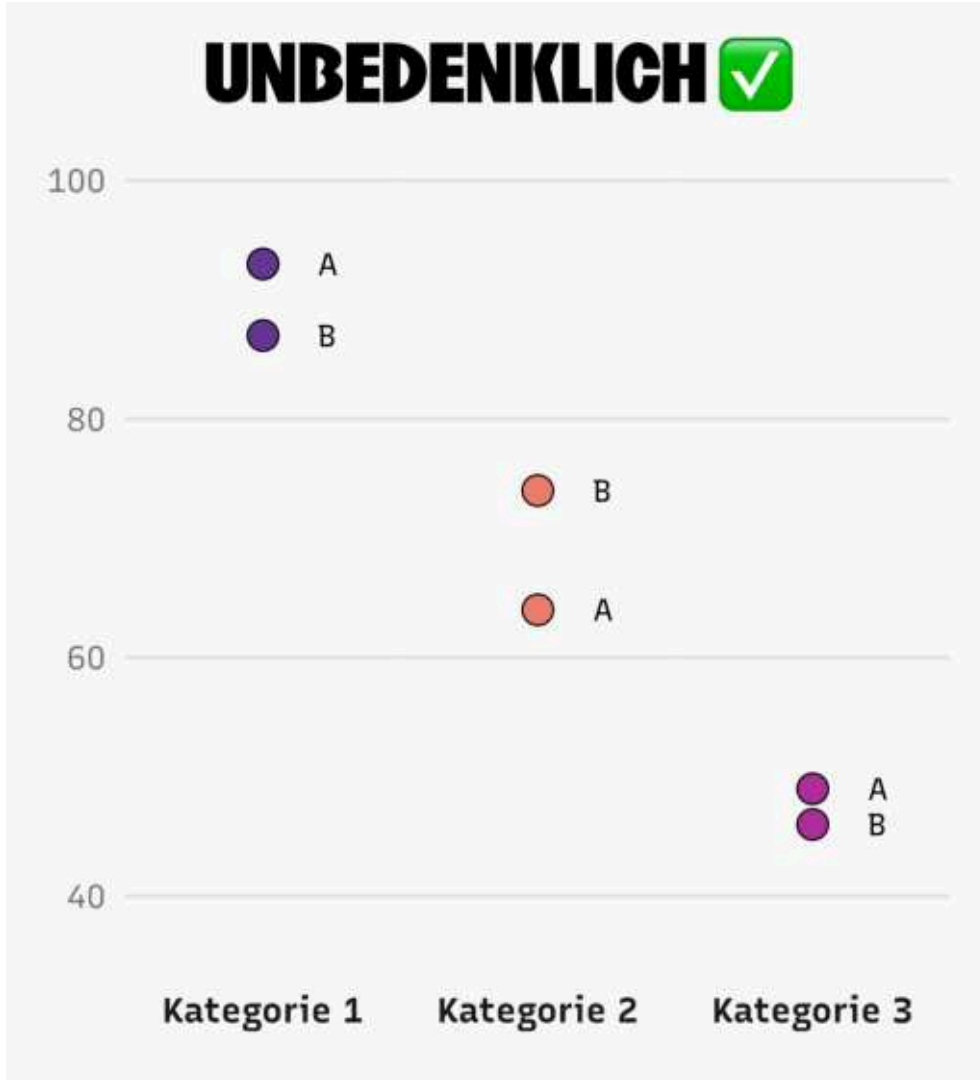
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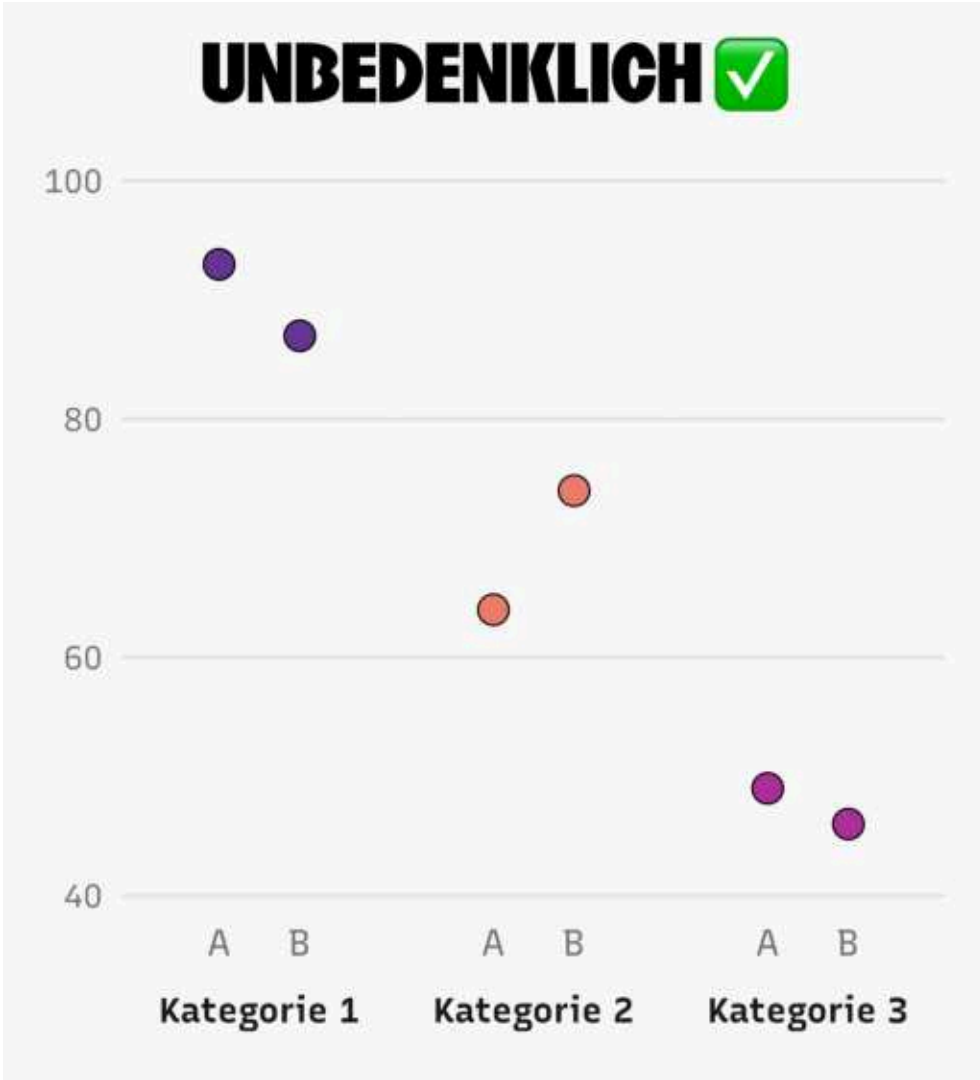
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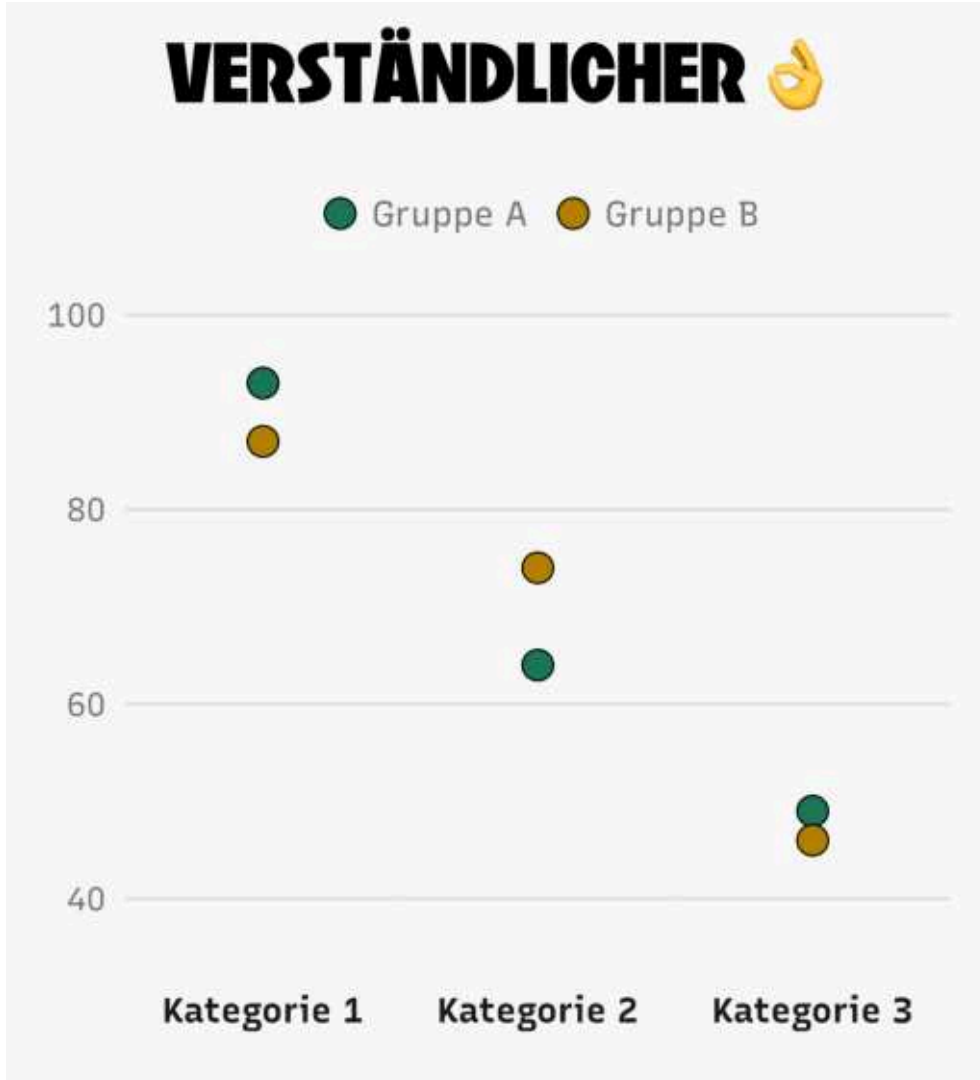
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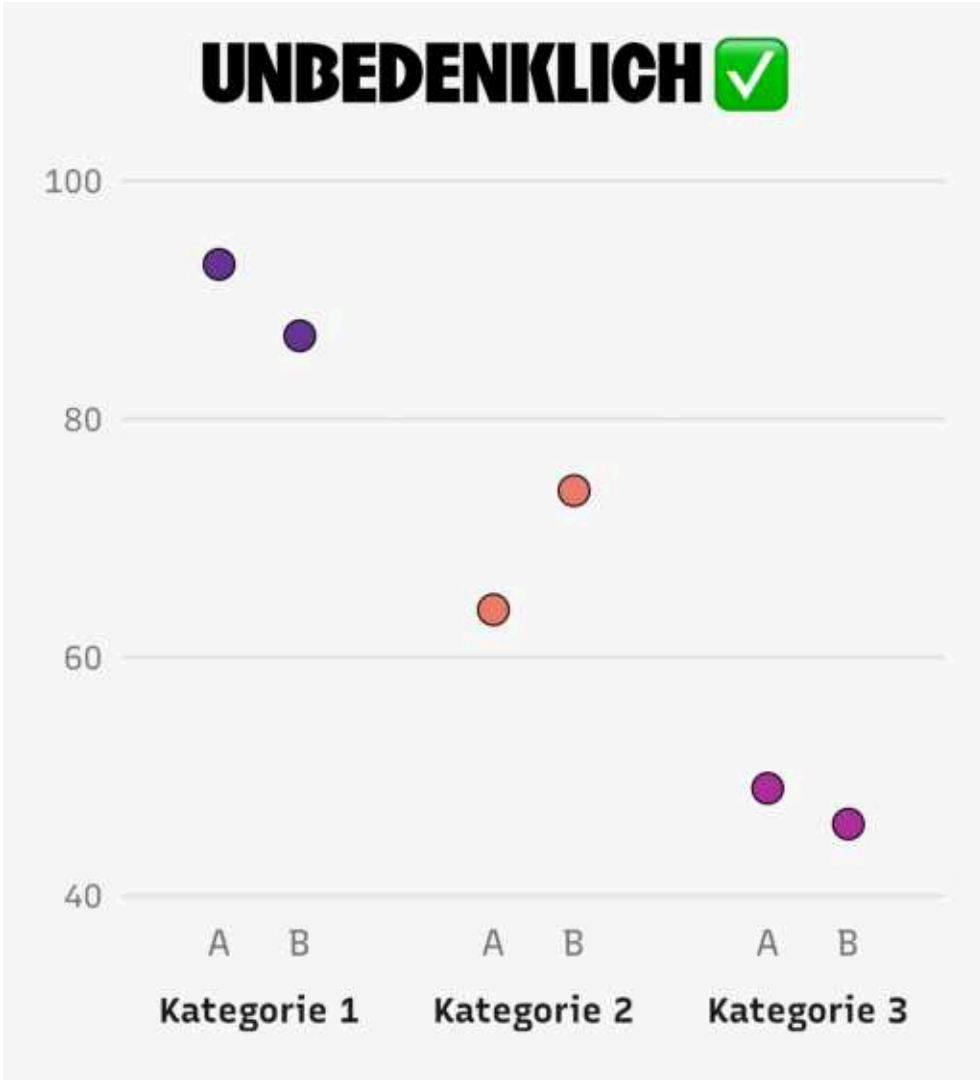
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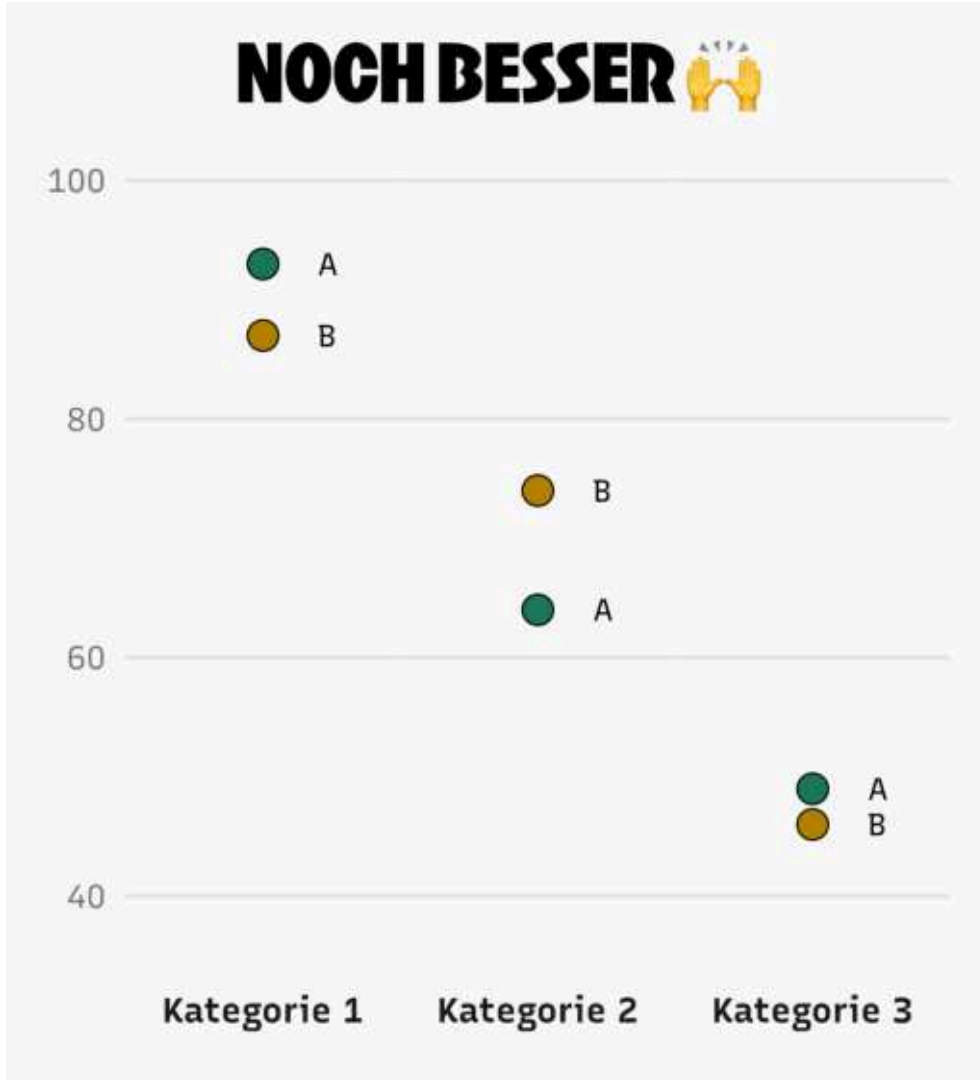
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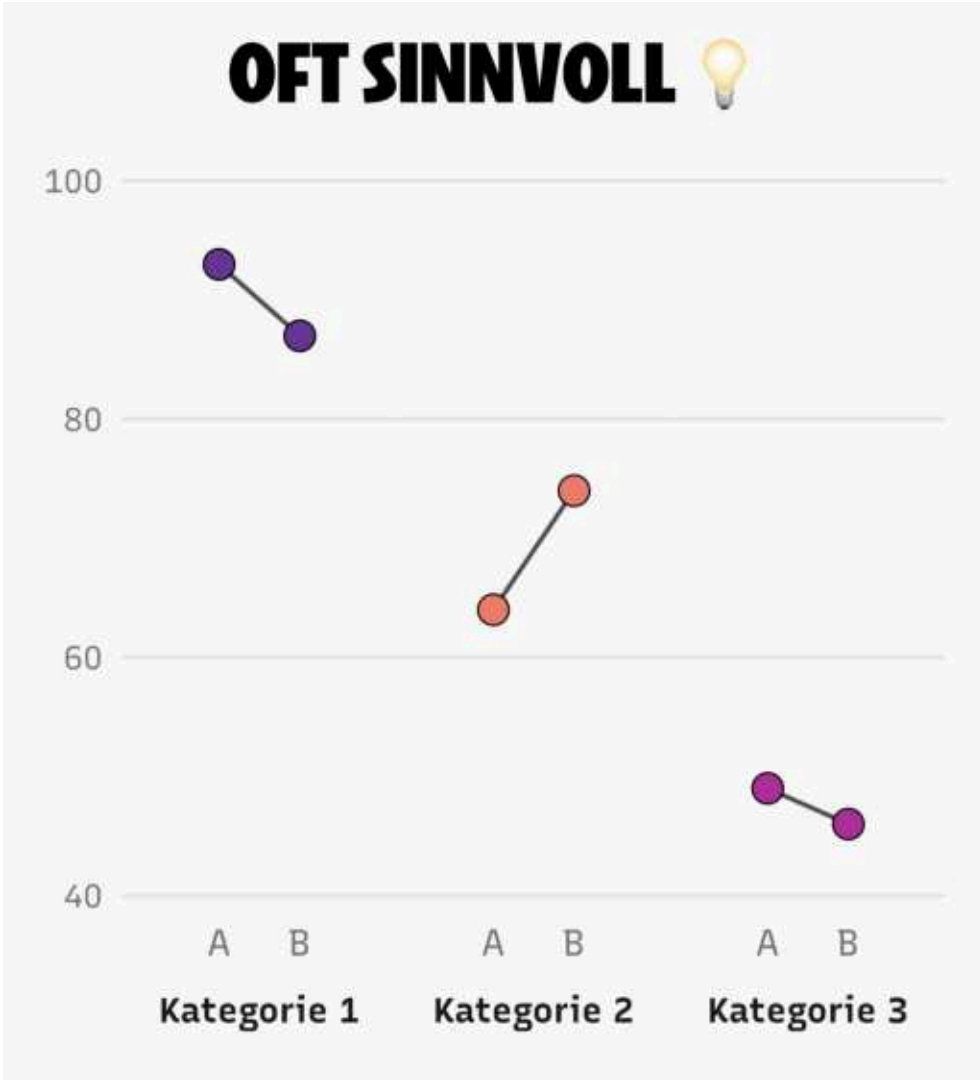
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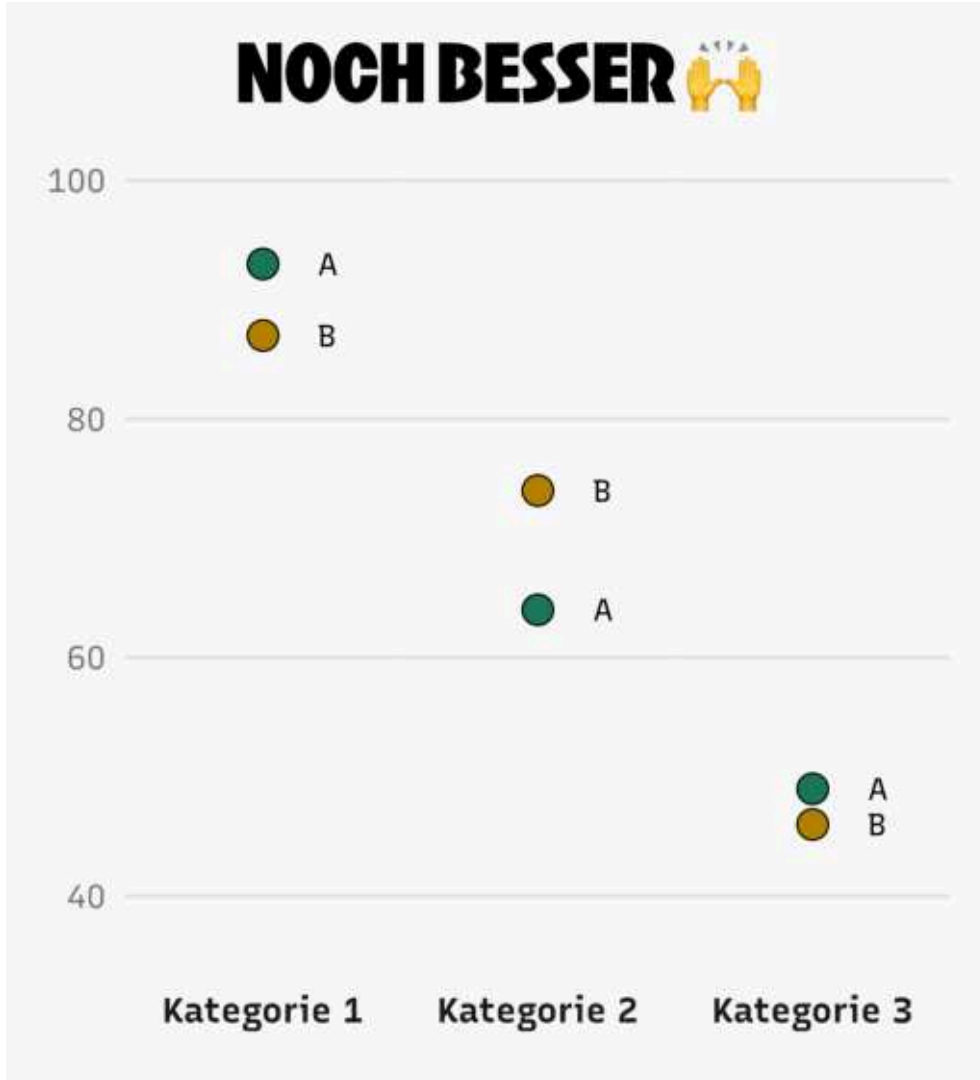
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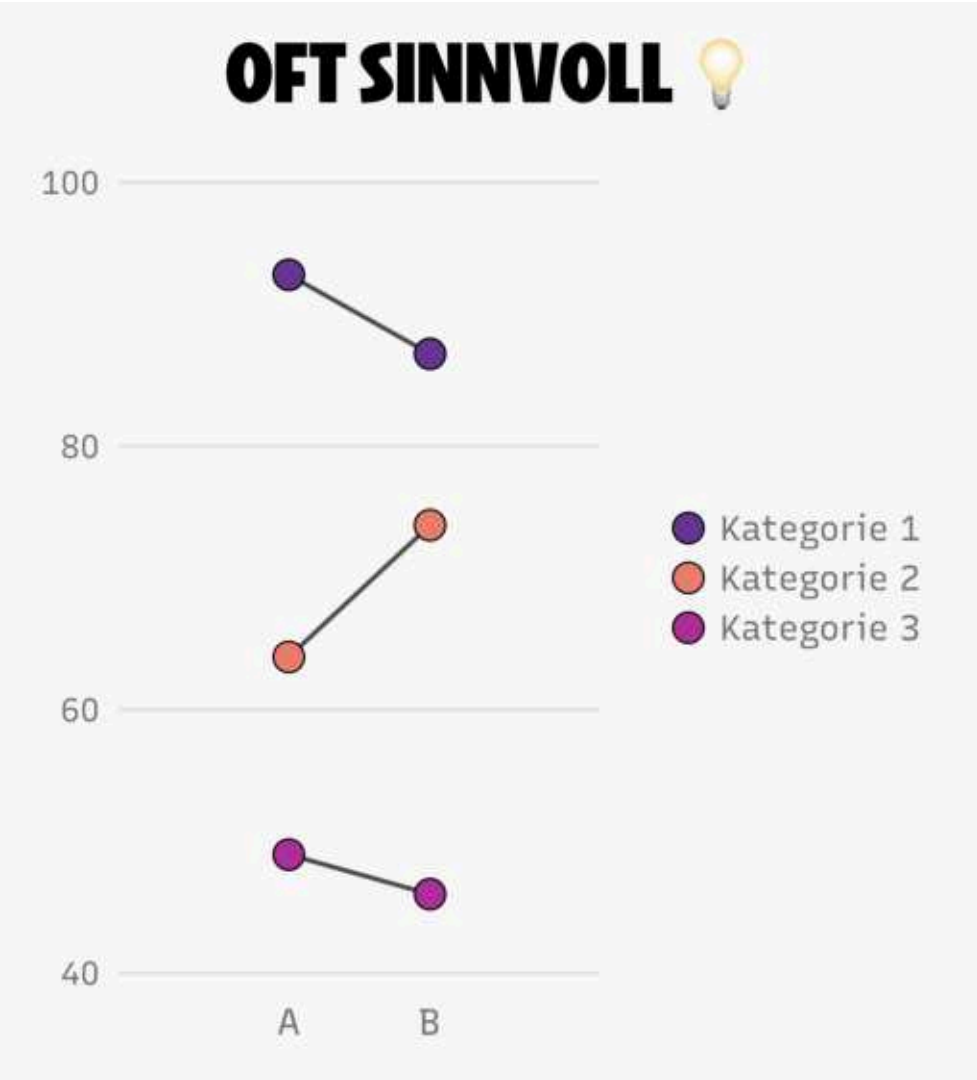
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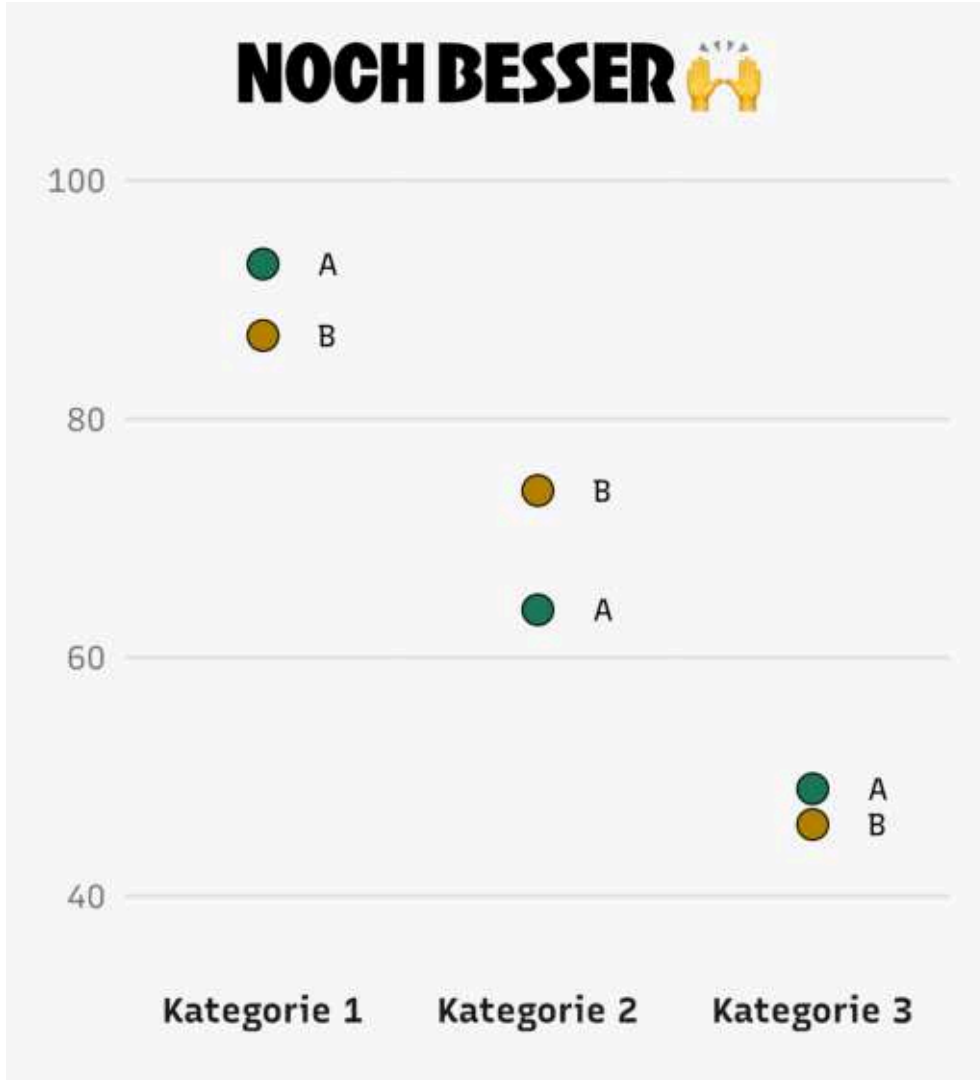
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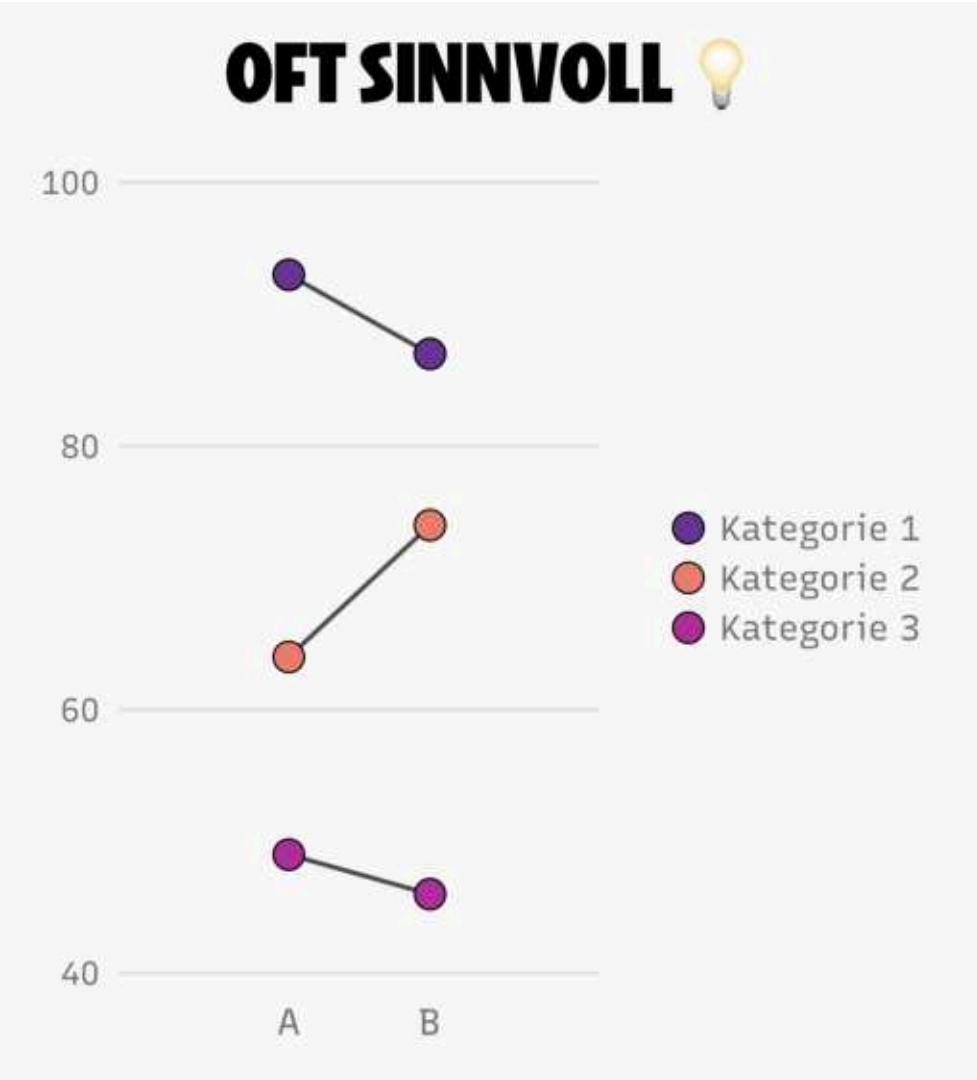
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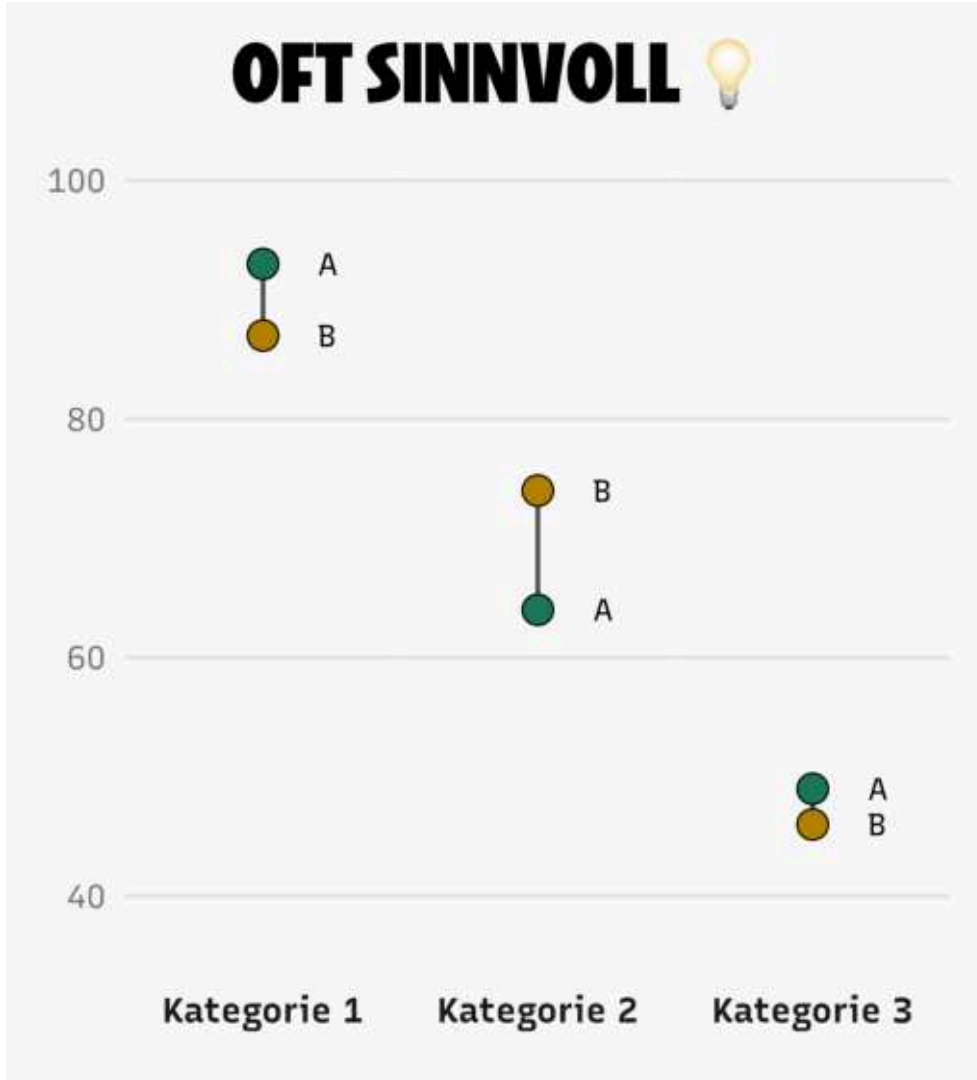
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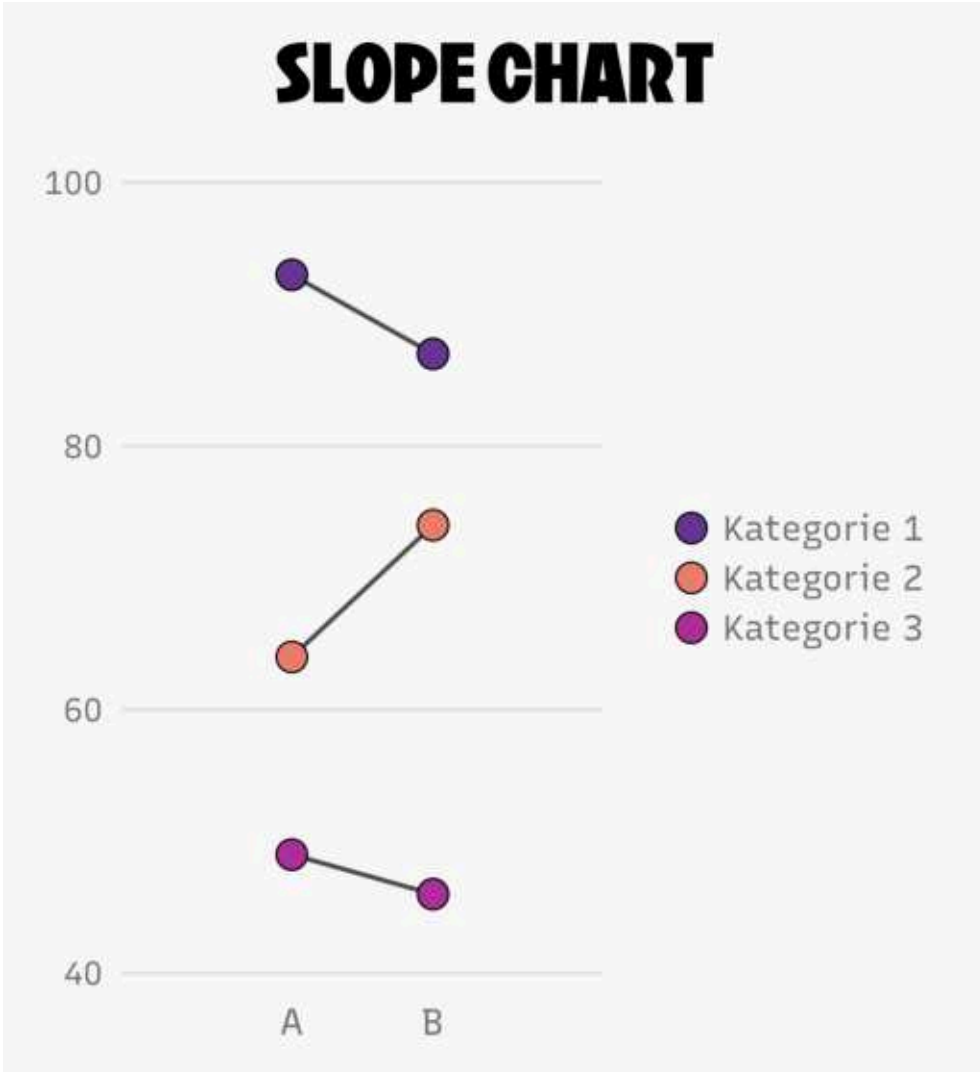
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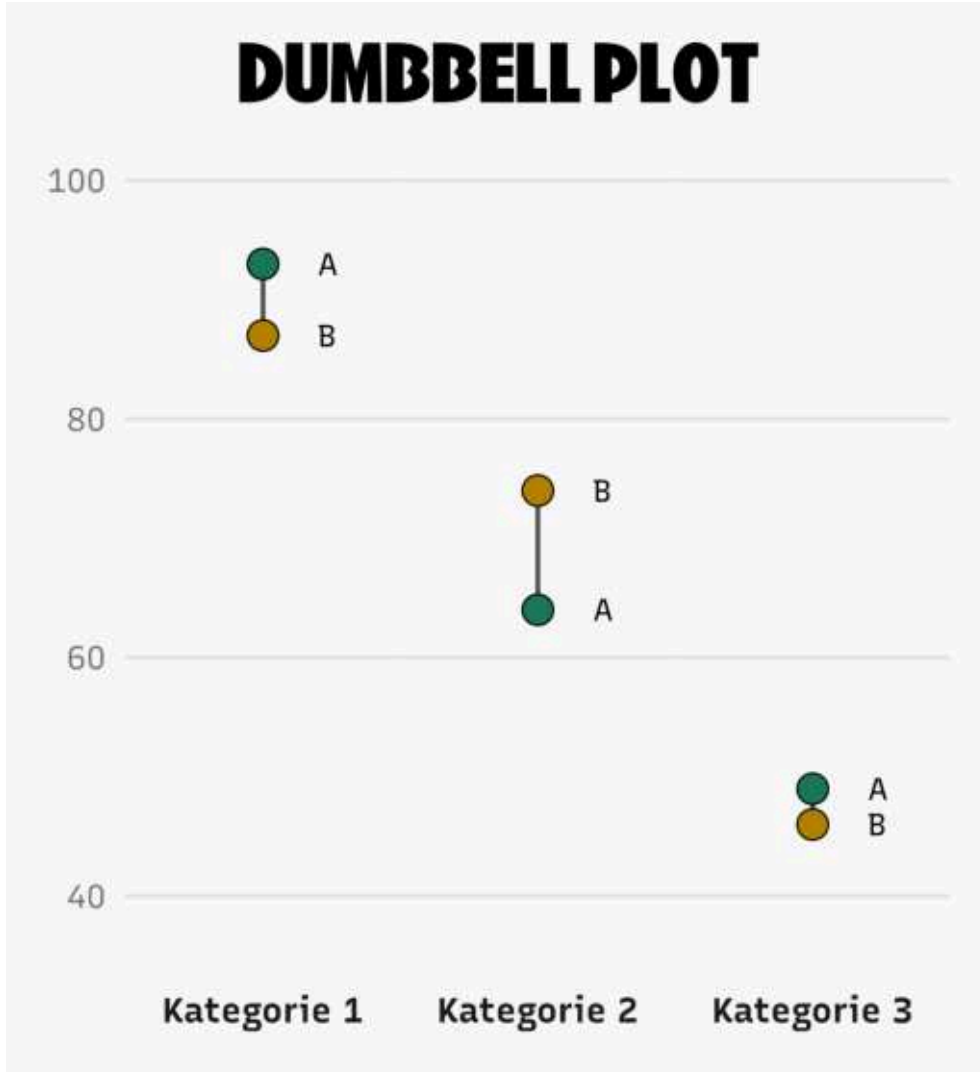
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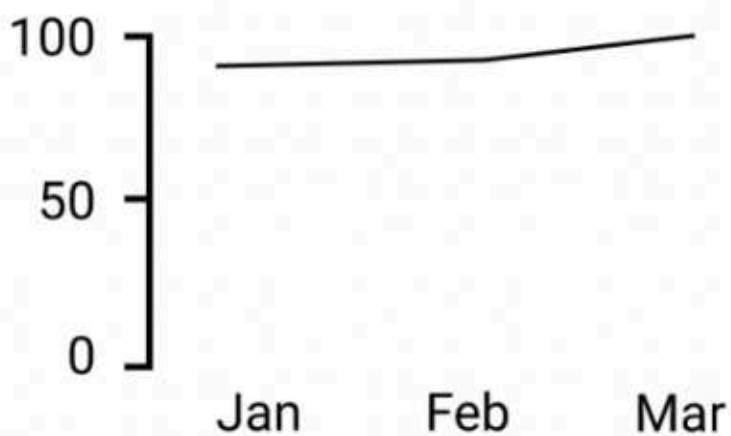
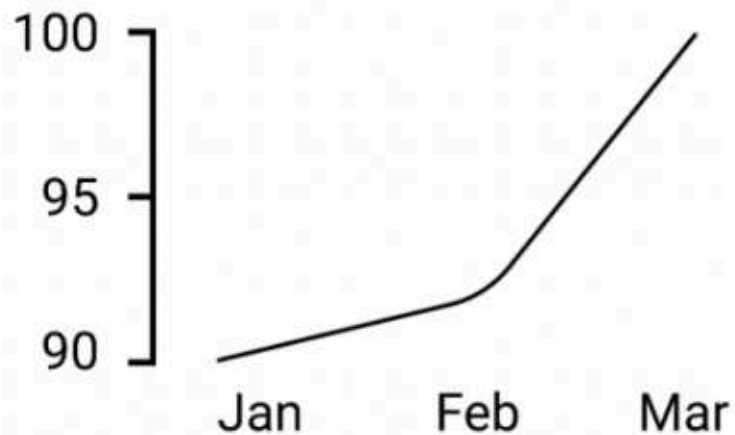
Kategorie 1
Kategorie 2
Kategorie 3

Immer bei Null beginnen?



Acceptable, but starting the vertical axis at zero obscures changes in values



Better: By reducing the vertical axis to match the values, we see change more clearly

Quelle: „Hands-On Data Visualization" von Jack Dougherty & Ilya Ilyankou

Quelle: Francis Gagnon

DEFENCE BUDGETS: RUSSIA VS UKRAINE (2020)

The national balance of forces is overwhelmingly in Russia's favour. Russian military spending in 2020 amounted to US$60.6 billion in 2020. Ukraine's was less than a 10th of that amount.

„Russia attacks Ukraine" von SCMP Graphic (South China Morning Post)

DEFENCE BUDGETS: RUSSIA VS UKRAINE (2020)

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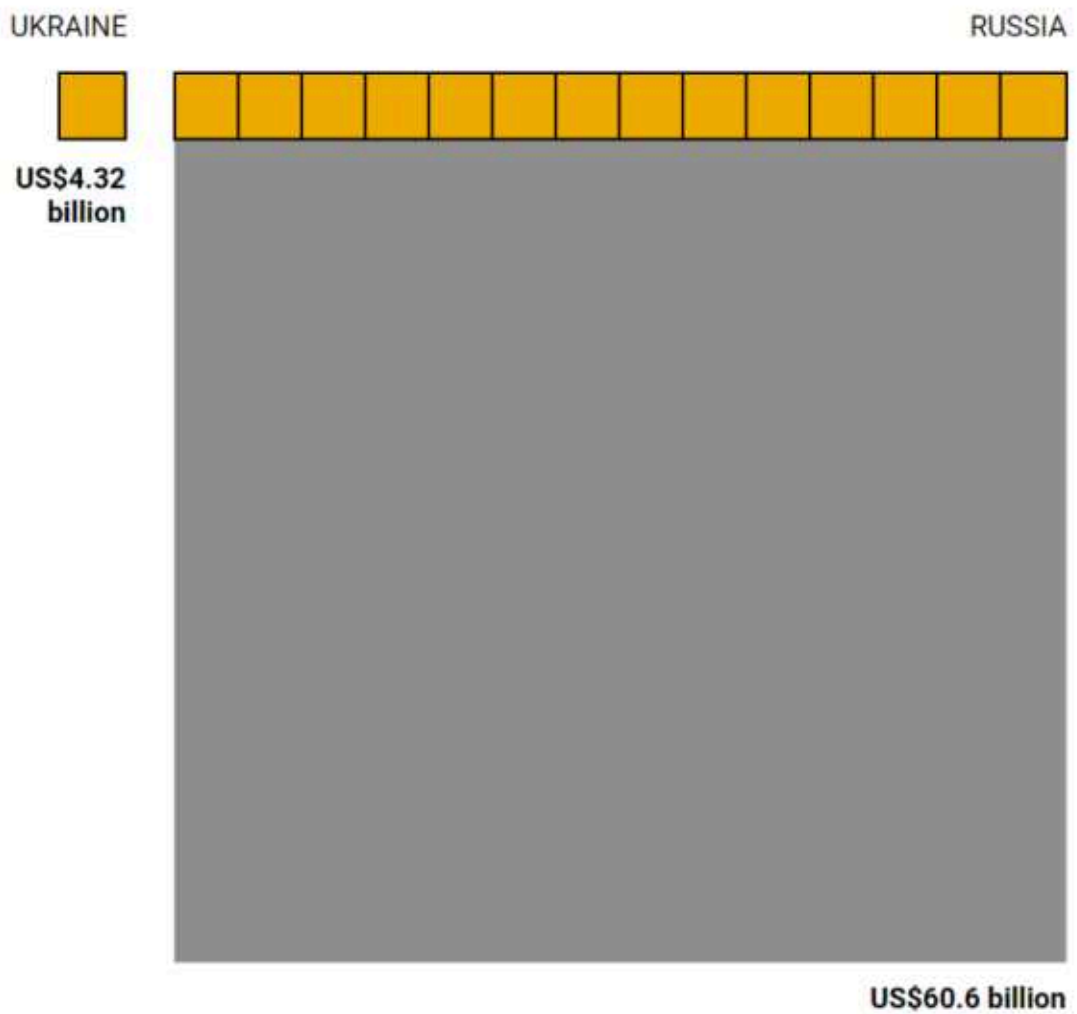
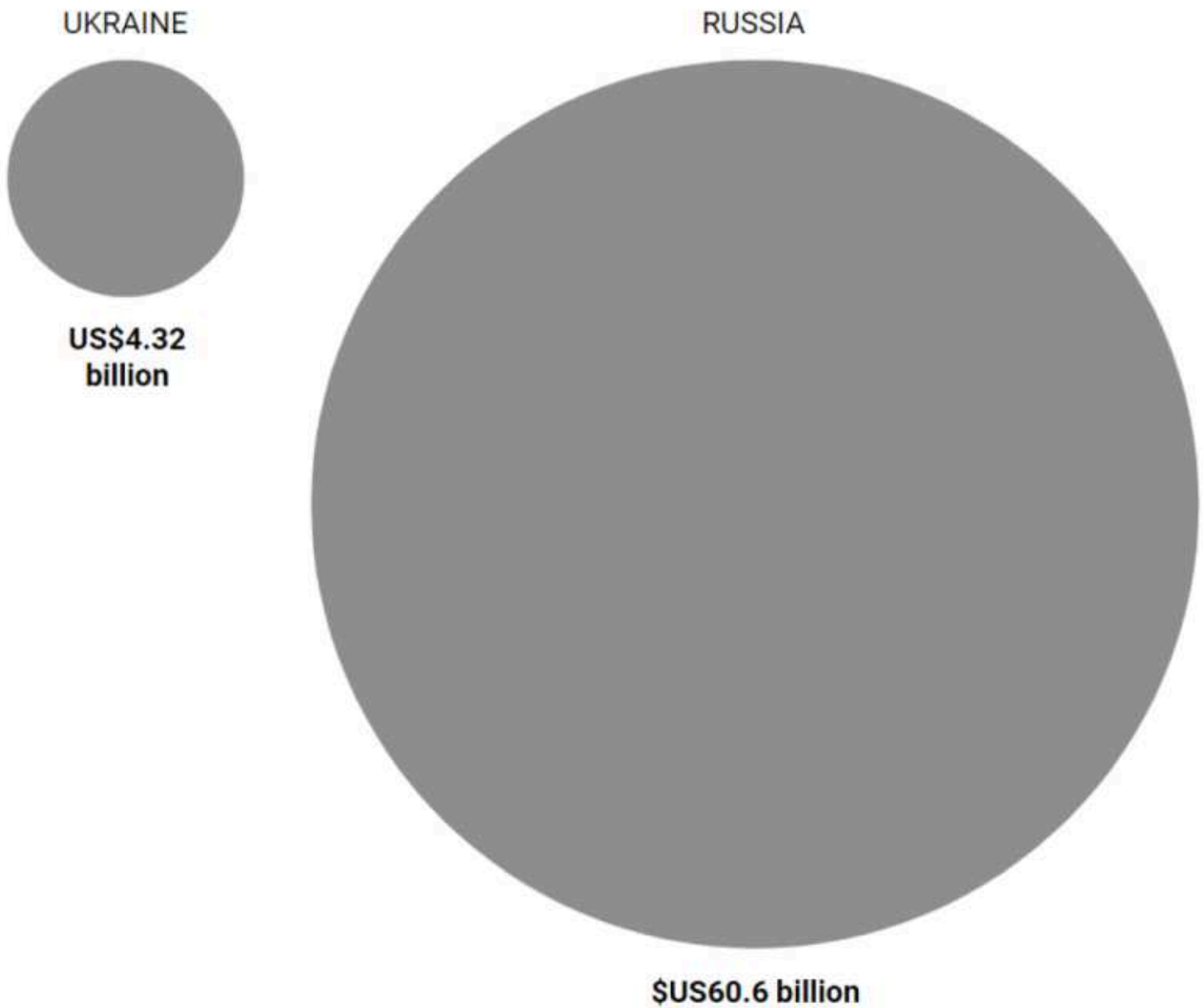
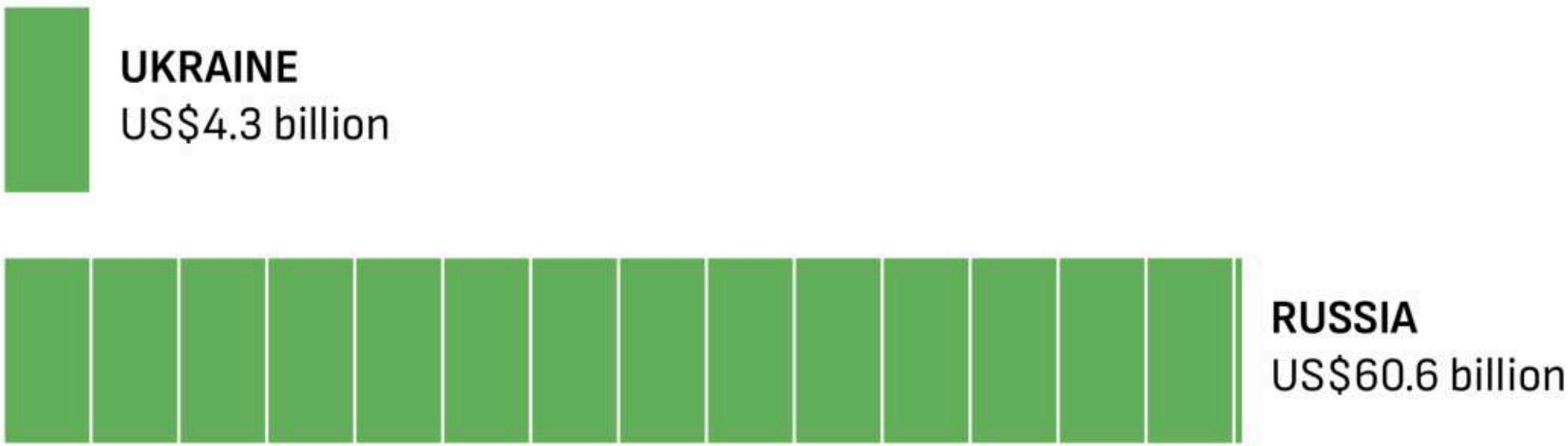


„Russia attacks Ukraine" von SCMP Graphic (South China Morning Post)



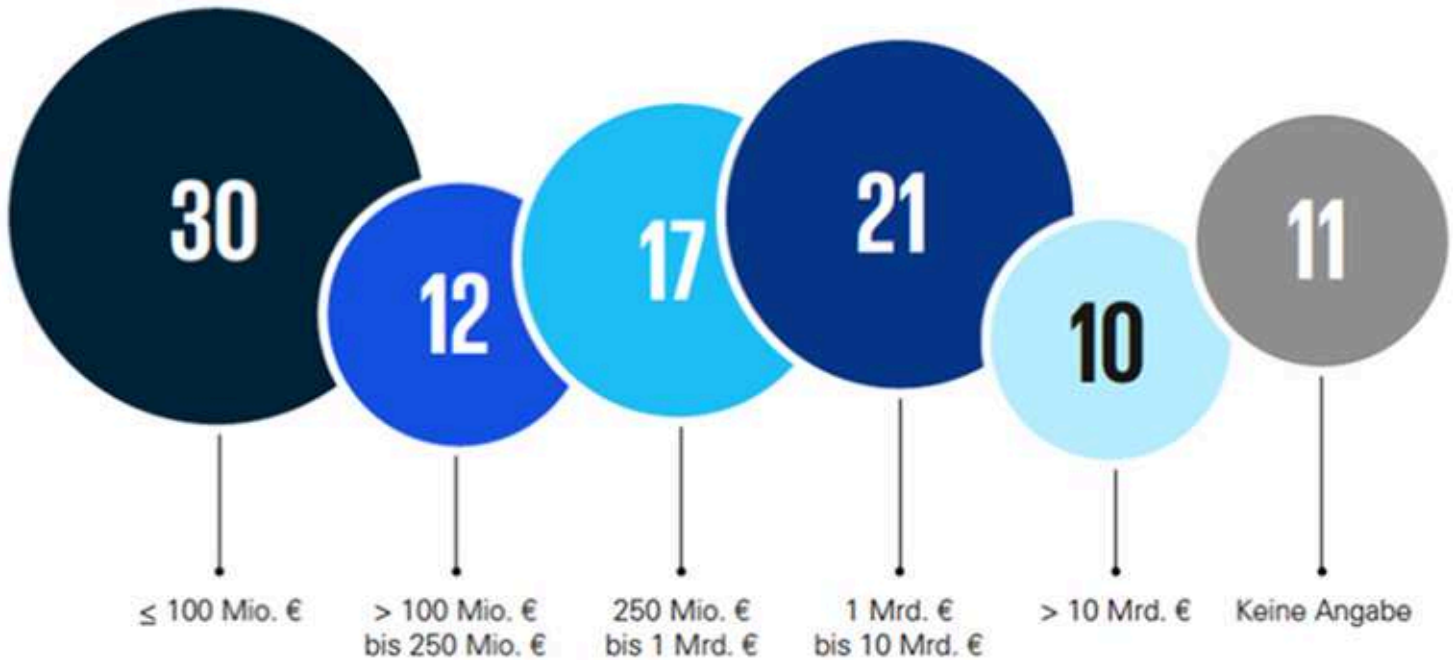
„Russia attacks Ukraine" von SCMP Graphic (South China Morning Post)

Ukraine's military spending was less than a 14th of Russia's in 2020



Ukraine's military spending was less than a 14th of Russia's in 2020.

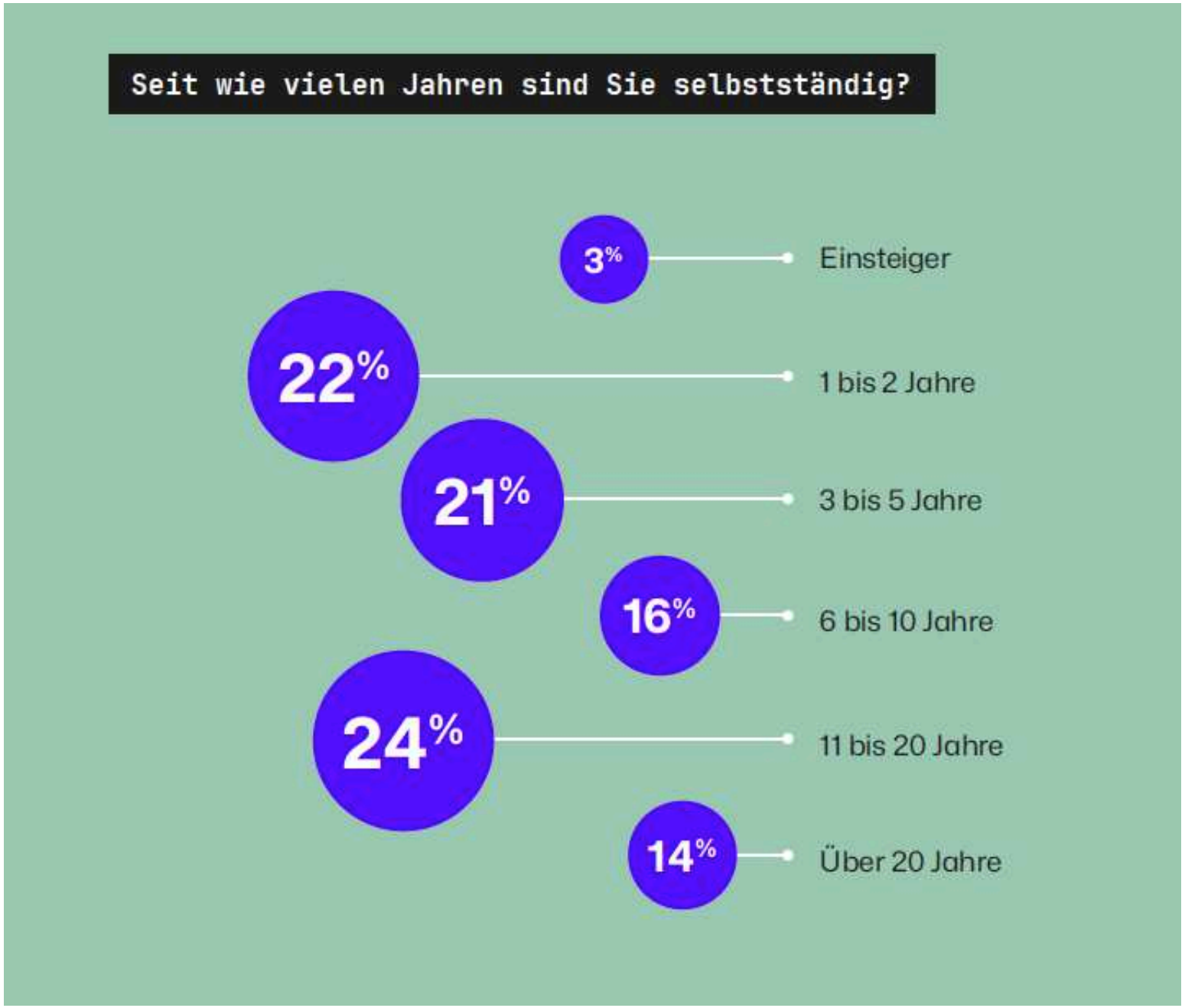
Abbildung 19: Umsatz der jeweiligen Unternehmensgruppe in Deutschland im letzten Geschäftsjahr



Angaben in Prozent. Differenz zu 100% aufgrund von Rundungsdifferenzen. Quelle: KPMG in Deutschland, 2025.

... 31 Prozent kommen aus Unternehmen mit einem Umsatz (in Deutschland) von mehr als einer Milliarde Euro im letzten Geschäftsjahr.

KPMG-Bericht „Generative KI in der deutschen Wirtschaft 2025"



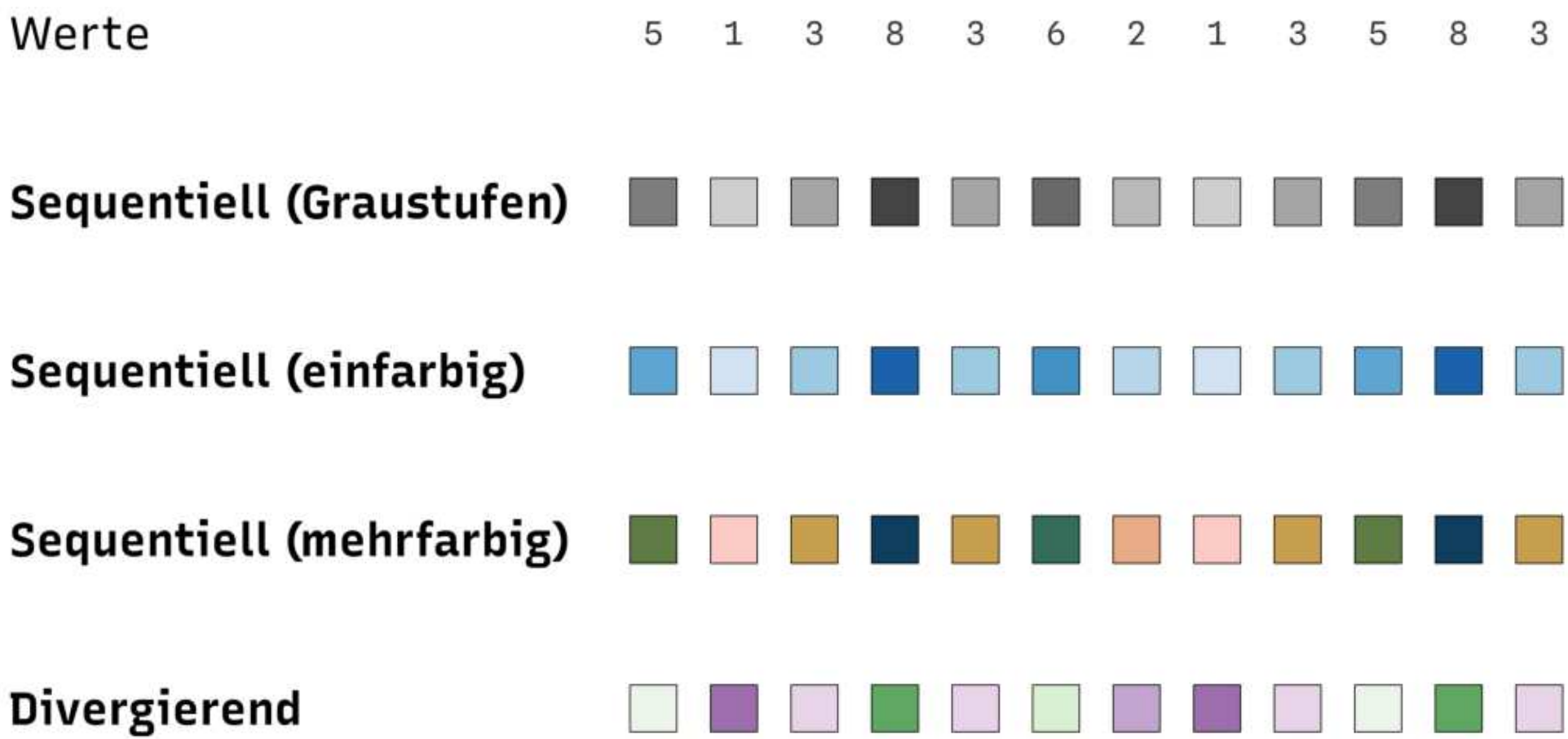
Quelle: Freelancer-Kompass 2024

Kodieren mit Farben

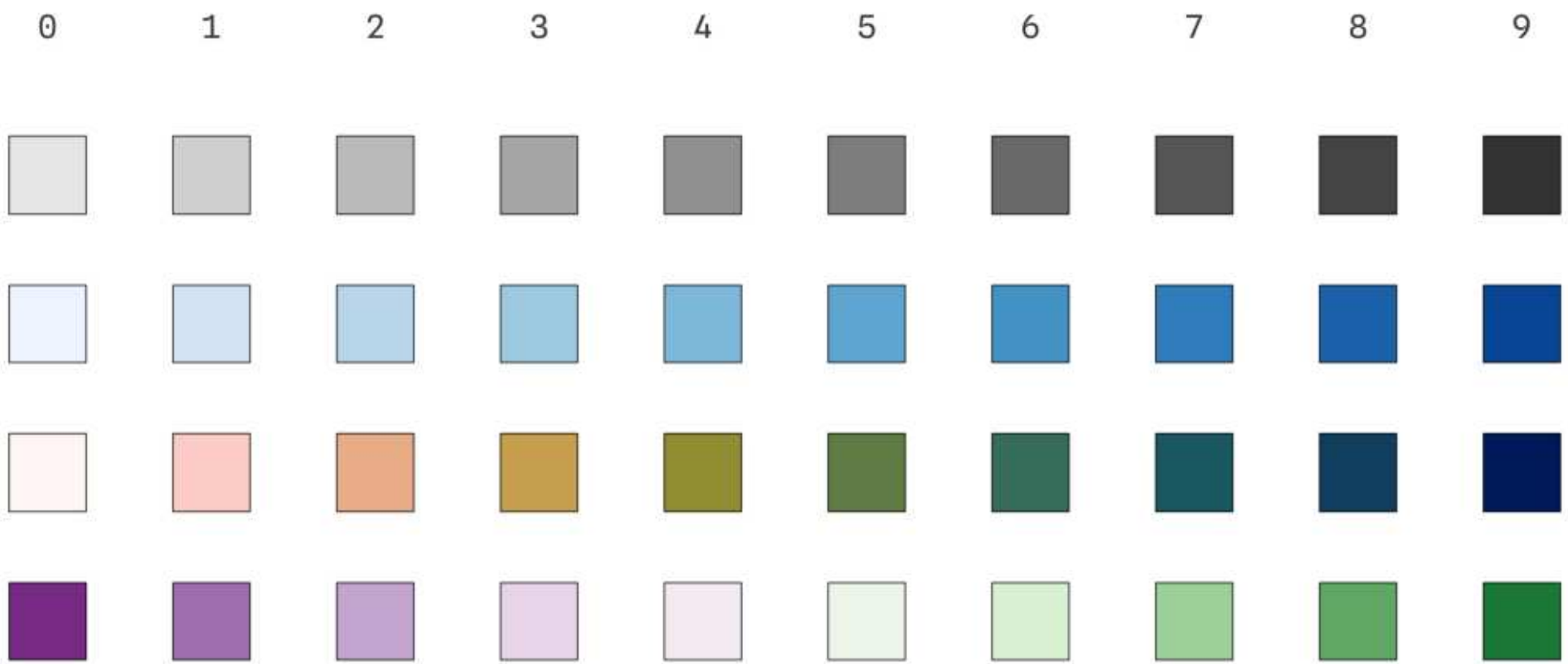
Informative und leicht lesbare Farbschlüssel nutzen (und gestalten)

Cédric Scherer Data Visualization & Information Design

Gleiche Werte, andere Farben



Gleiche Werte, andere Farben



Typen von Farbpaletten

Sequentiell

Beispiel

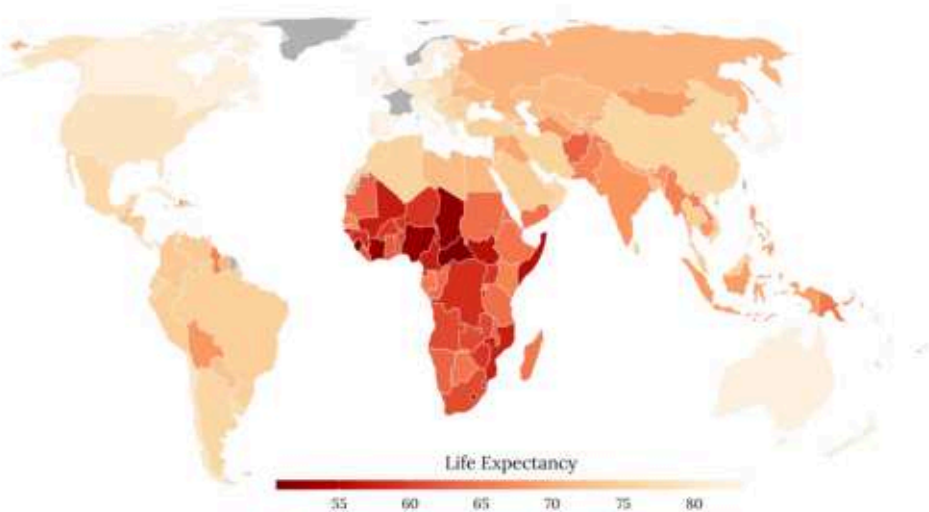
Grautöne

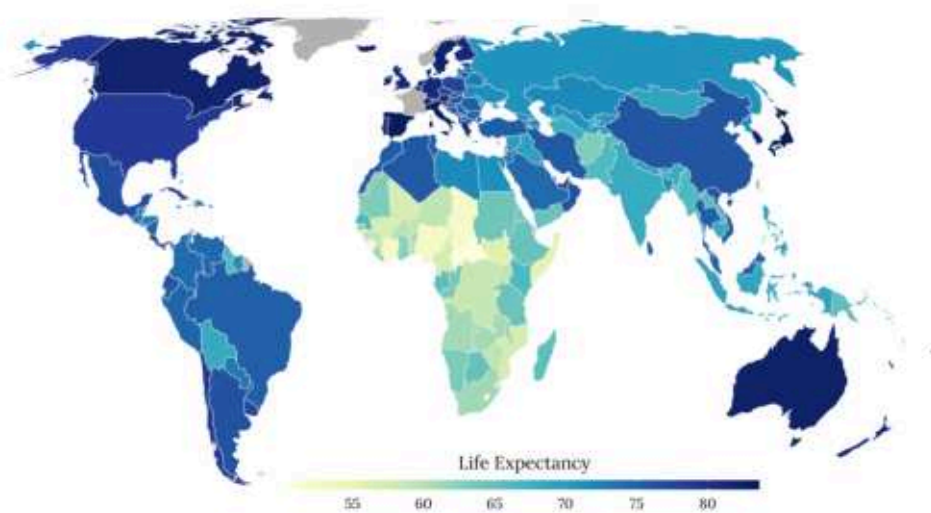
numerische Informationen mit geordneter Skala

verwende den höchsten Kontrast für die wichtigsten Informationen

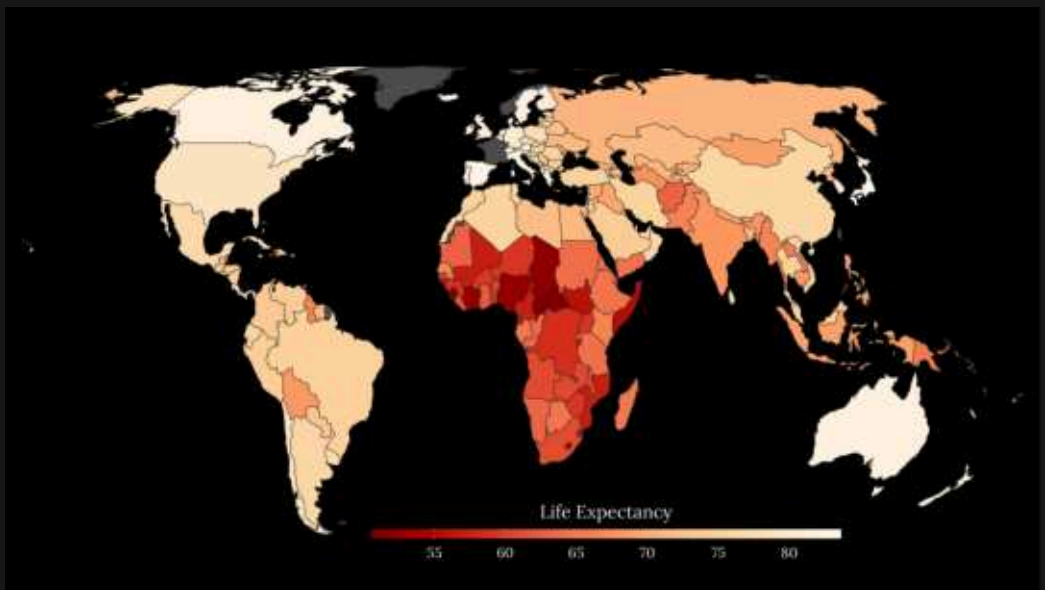
entweder einfarbige oder mehrfarbige Farbpaletten

Sequentiell: Dunkel ist mehr (?)





Sequentiell: Dunkel ist mehr (?)



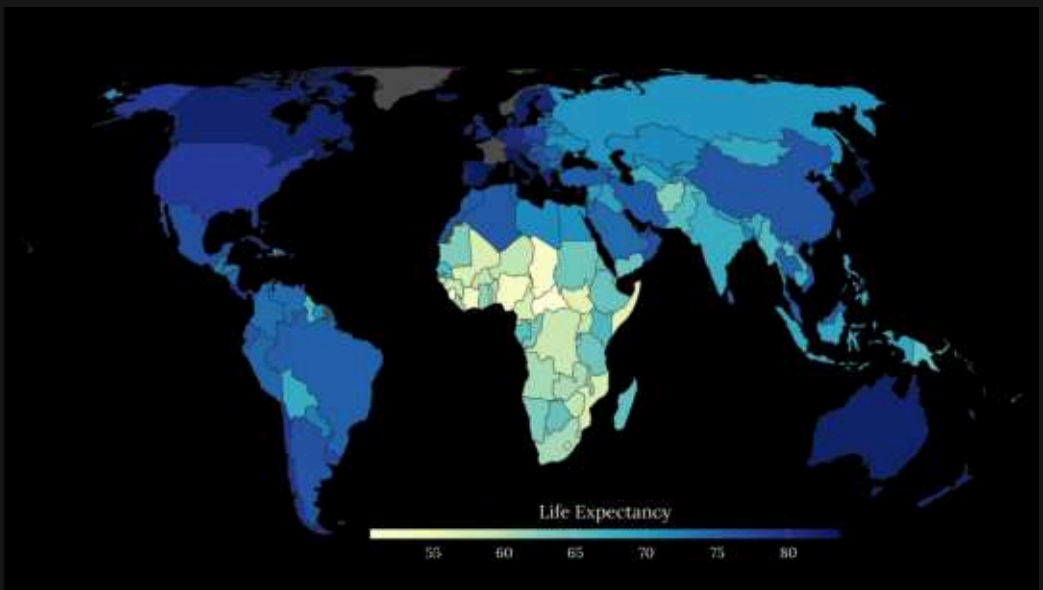
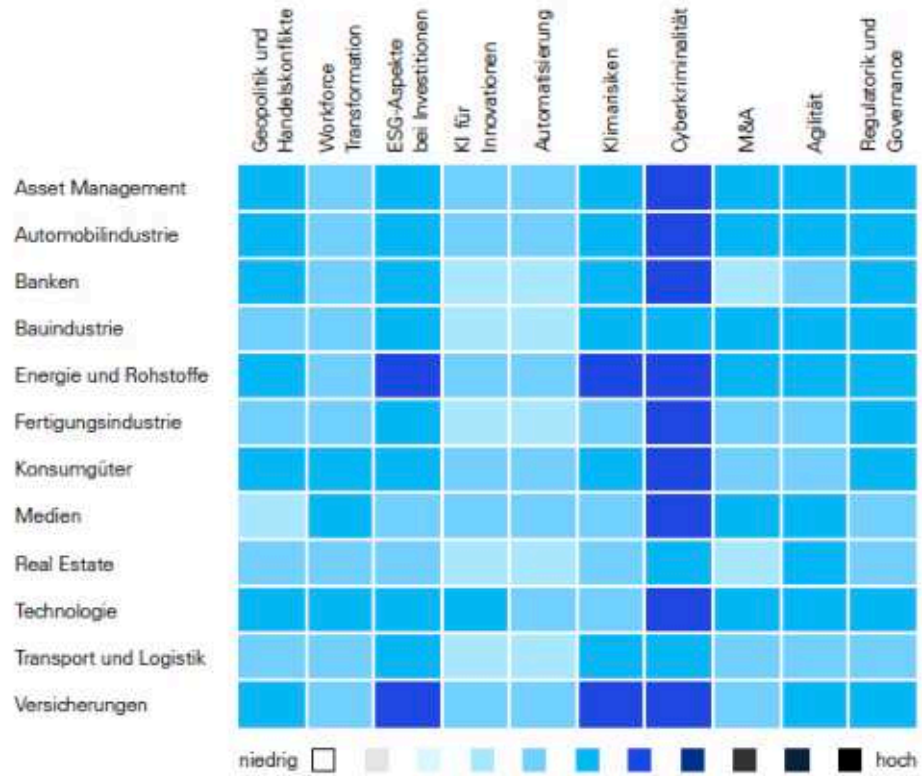


Abbildung 4: Bewertungsmatrix für den Reifegrad je Sektor und Thema – Branchen, die eine Stichprobengröße von mindestens 15 Teilnehmenden erreicht haben, im Vergleich



Quelle: KPMG in Deutschland, 2025

Aufschlüsselung auf einen Blick

8 Skalenwerte 6 bis 10 auf einer Skala von 0 bis 10
9 Skalenwerte 0 bis 4 auf einer Skala von 0 bis 10
10 Skalenwerte 8 bis 10 auf einer Skala von 0 bis 10
11 Skalenwerte 0 bis 2 auf einer Skala von 0 bis 10

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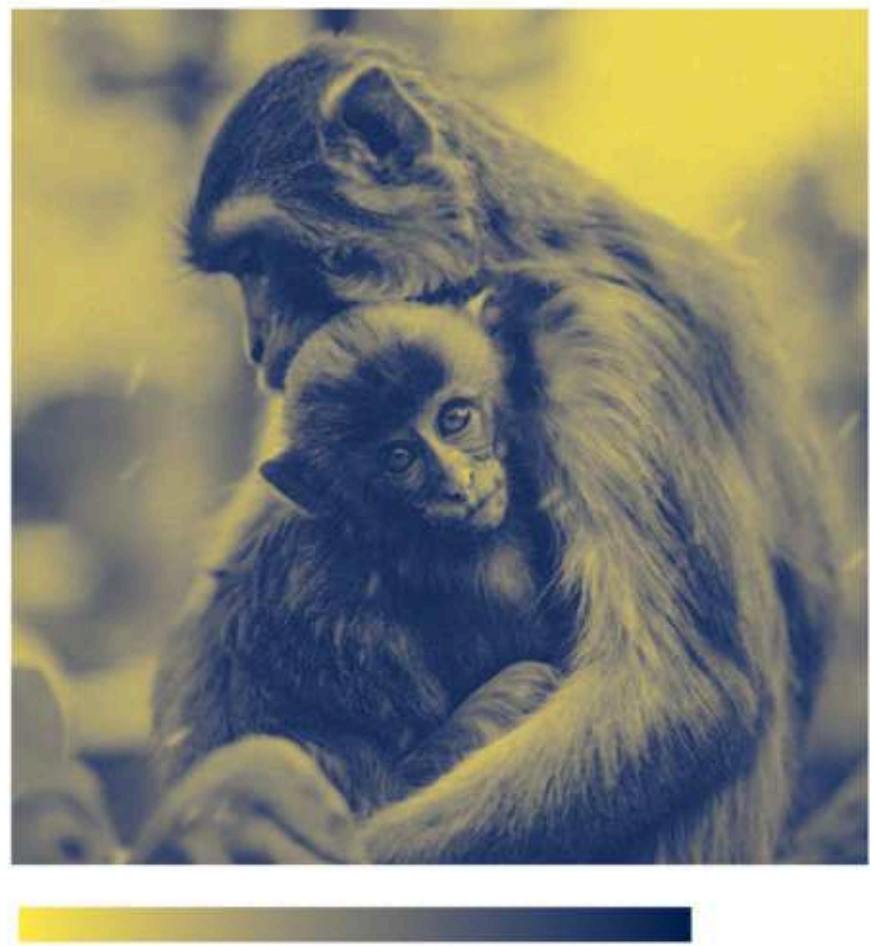
KPMG-Bericht „Future Readiness Monitor 2025"

Cédric Scherer Data Visualization & Information Design



Originalfoto: Richard Strozynski

Typen von Farbpaletten

Sequentiell

Beispiel

Grautöne

Werte mit geordneter Skala
(numerisch oder ordinal)

verwende den höchsten Kontrast für die wichtigsten Informationen

entweder einfarbige oder mehrfarbige Farbpaletten

Divergierend

Beispiel

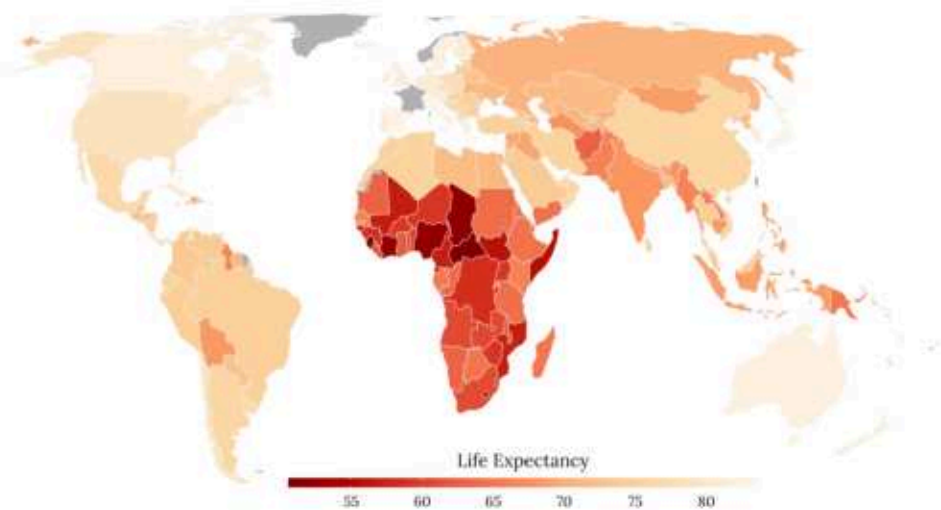
Grautöne

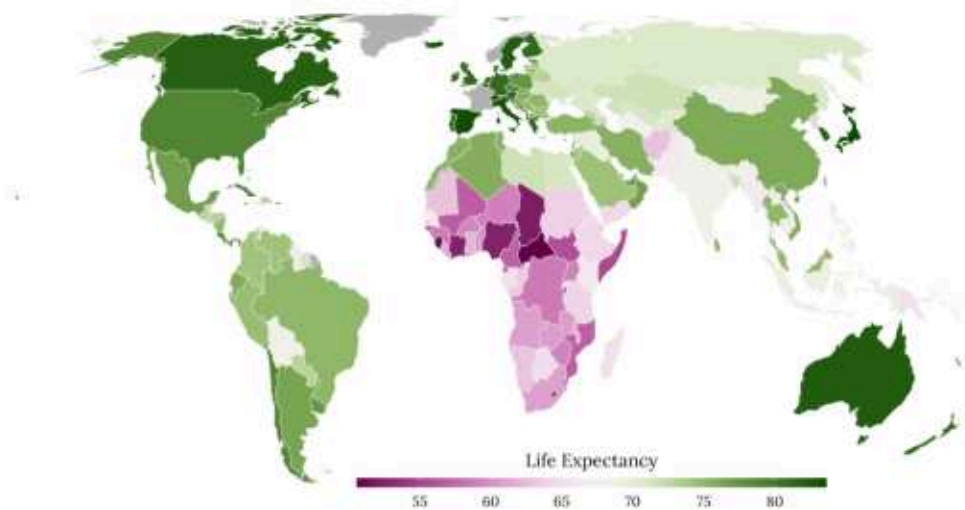
Werte mit bedeutsamen Mittelpunkt
(numerisch oder ordinal)

verwende einen bedeutsamen Mittelpunkt und nutze ausgewogene Extremwerte

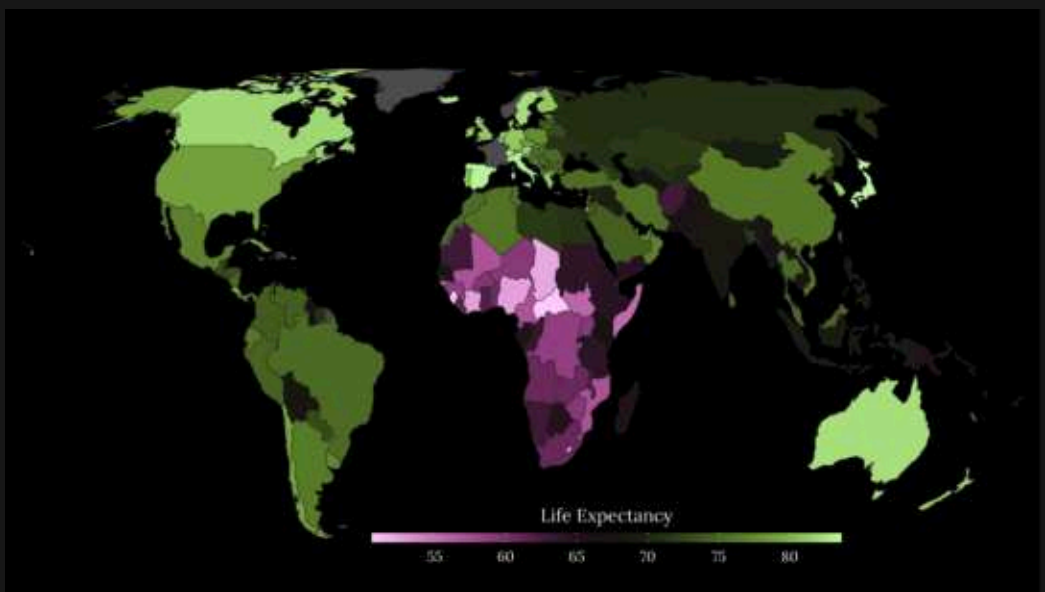
Kombination von zwei sequentiellen Farbpaletten

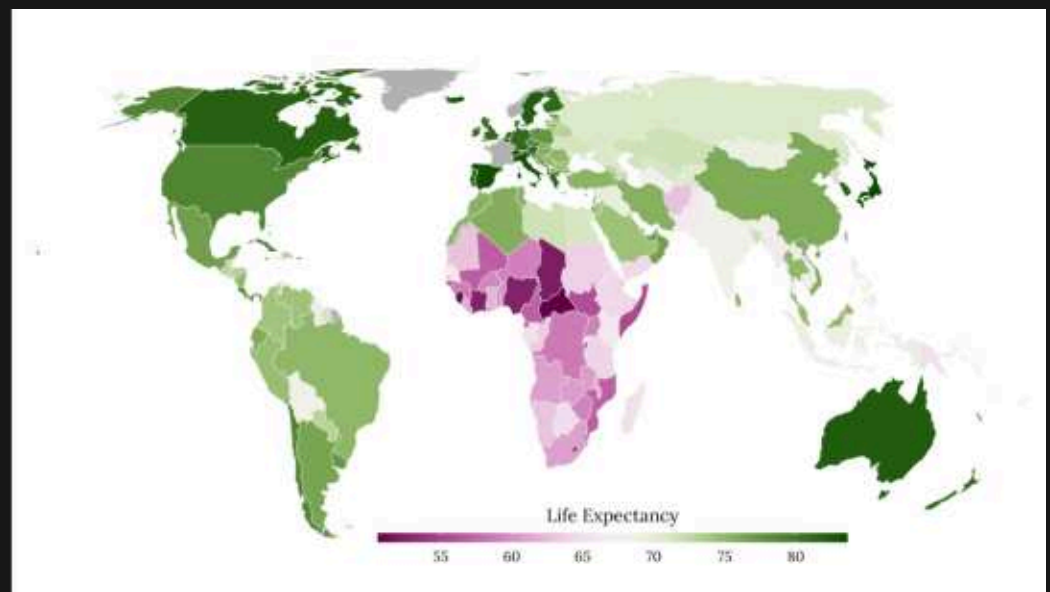
Sequentiell oder divergierend?



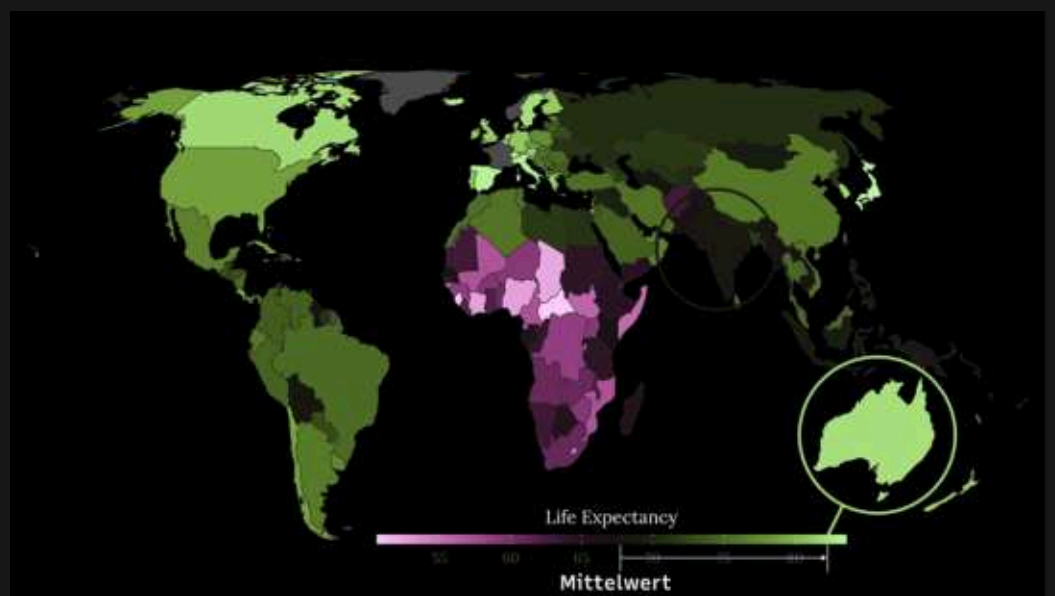


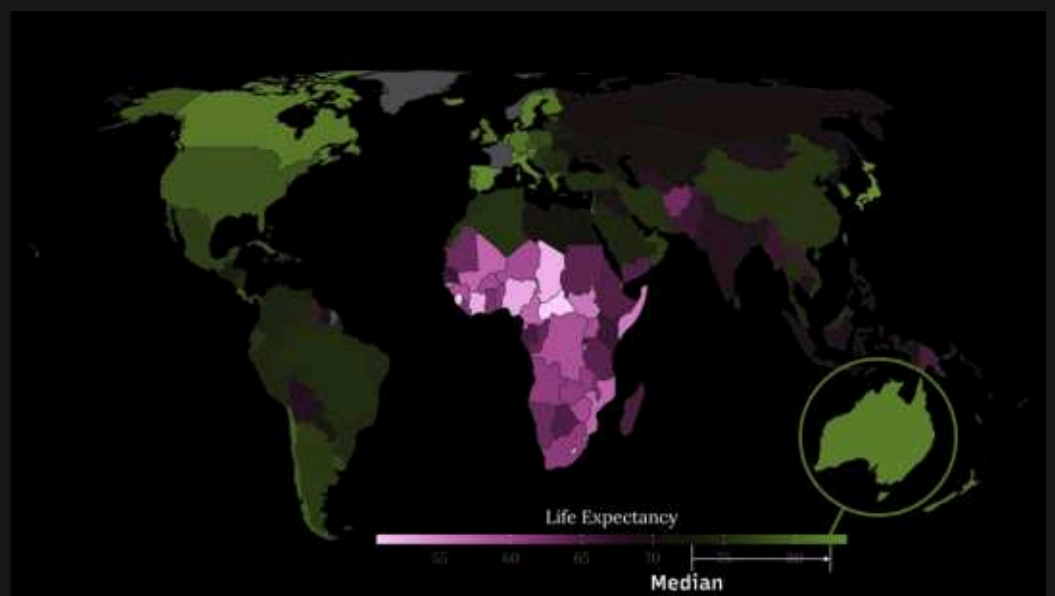
Divergierend: Dark Mode



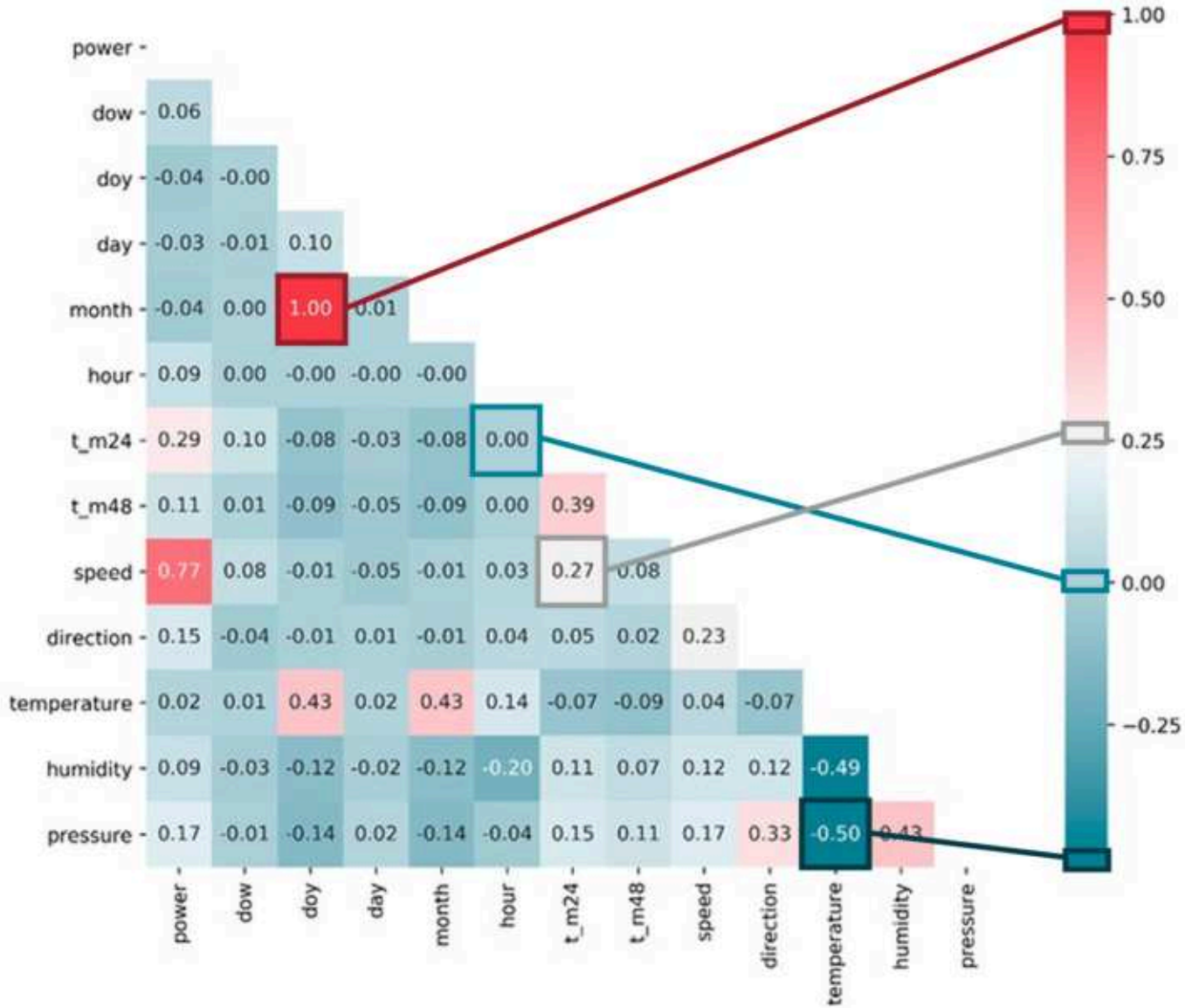


Der „richtige" Mittelpunkt





Der falsche Mittelpunkt



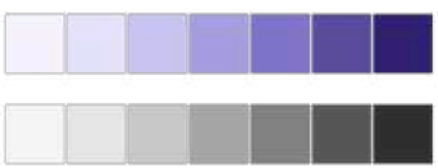
Zheng & Wu (2019) doi: 10.3390/app9153019

Typen von Farbpaletten

Sequentiell

Beispiel

Grautöne



Werte mit geordneter Skala
(numerisch oder ordinal)

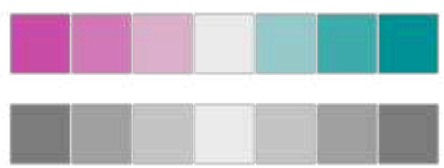
verwende den höchsten Kontrast für die wichtigsten Informationen

entweder einfarbige oder mehrfarbige Farbpaletten

Divergierend

Beispiel

Grautöne



Werte mit bedeutsamen Mittelpunkt
(numerisch oder ordinal)

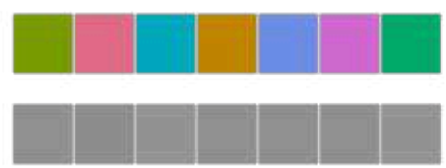
verwende einen bedeutsamen Mittelpunkt und nutze ausgewogene Extremwerte

Kombination von zwei sequentiellen Farbpaletten

Qualitativ

Beispiel

Grautöne



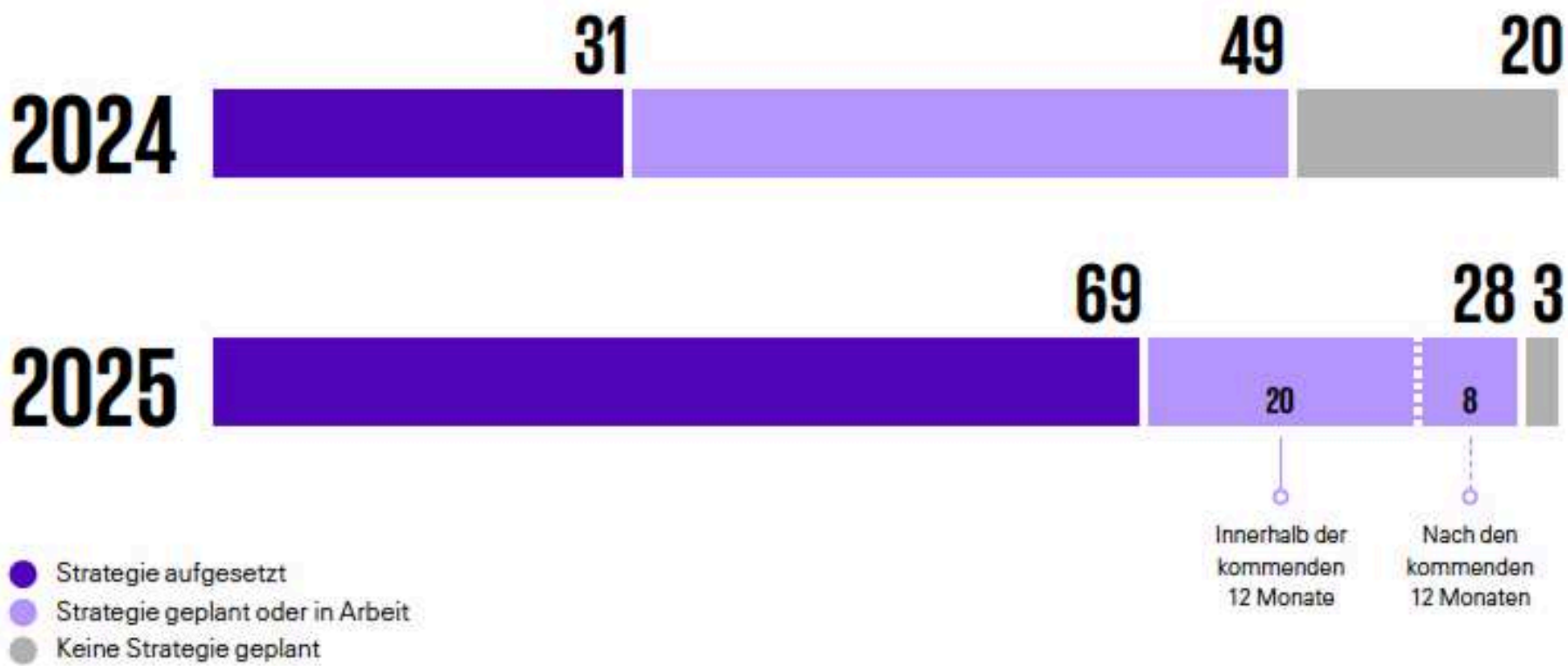
Gleichwertige Gruppen
(kategoriell)

verwende verschiedene Farben mit ähnlichem "Wahrnehmungsgewicht"

Anzahl auf 5 bis 8 Kategorien begrenzen

Abbildung 1: Verteilung der Antworten auf die Frage, ob im Unternehmen bereits eine Strategie für generative KI aufgesetzt worden ist

Angaben in Prozent



Quelle: KPMG in Deutschland, 2025

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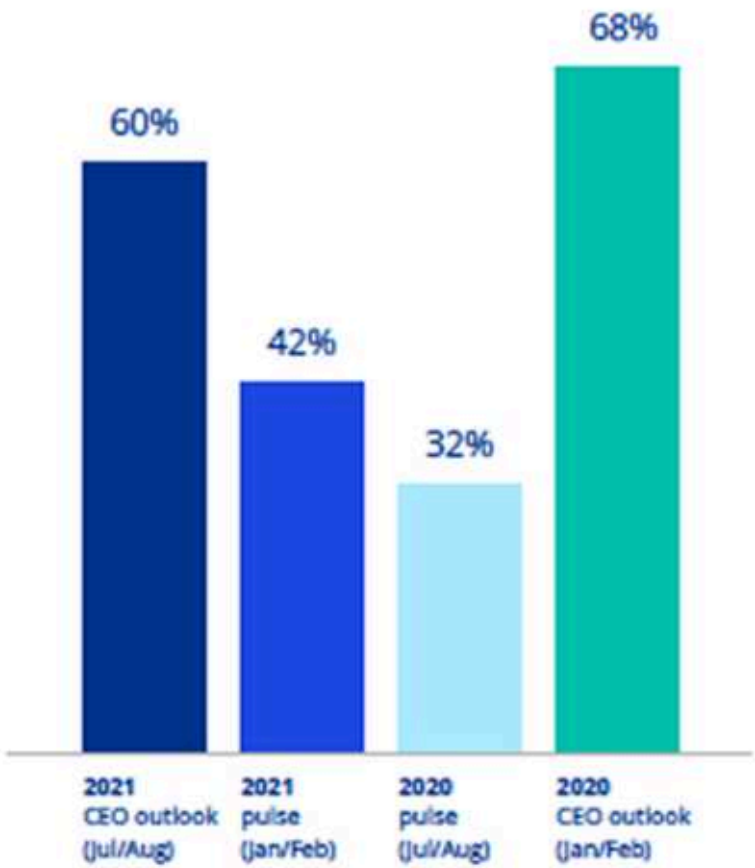
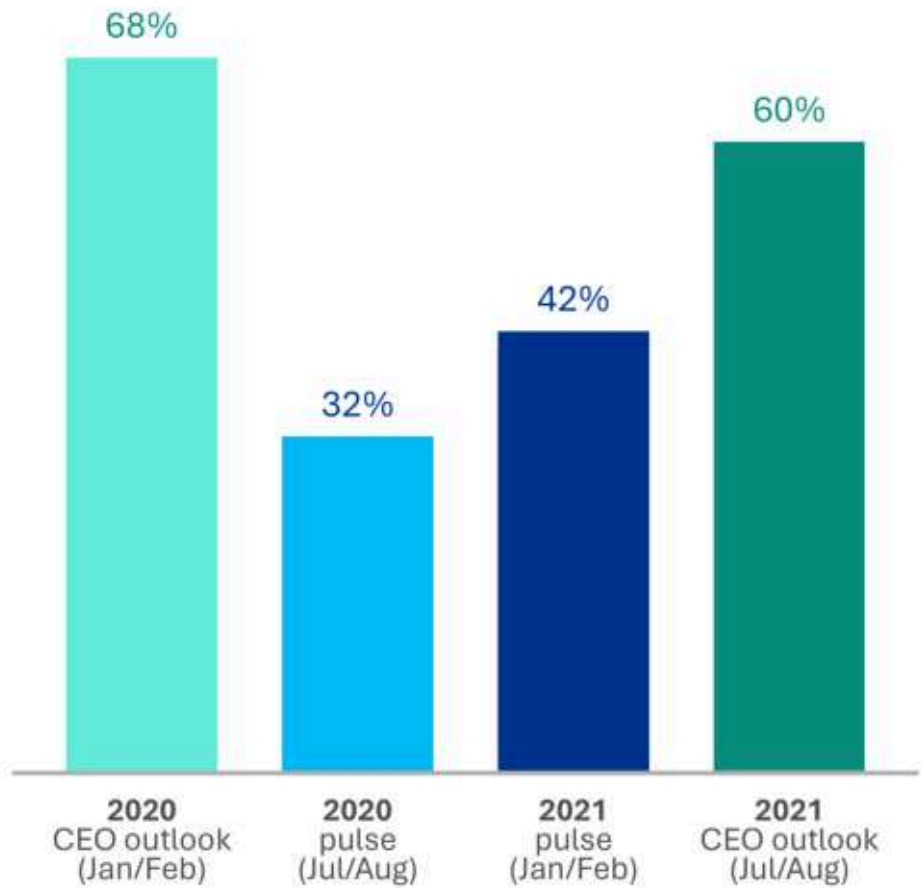
KPMG-Bericht „Generative KI in der deutschen Wirtschaft 2025"

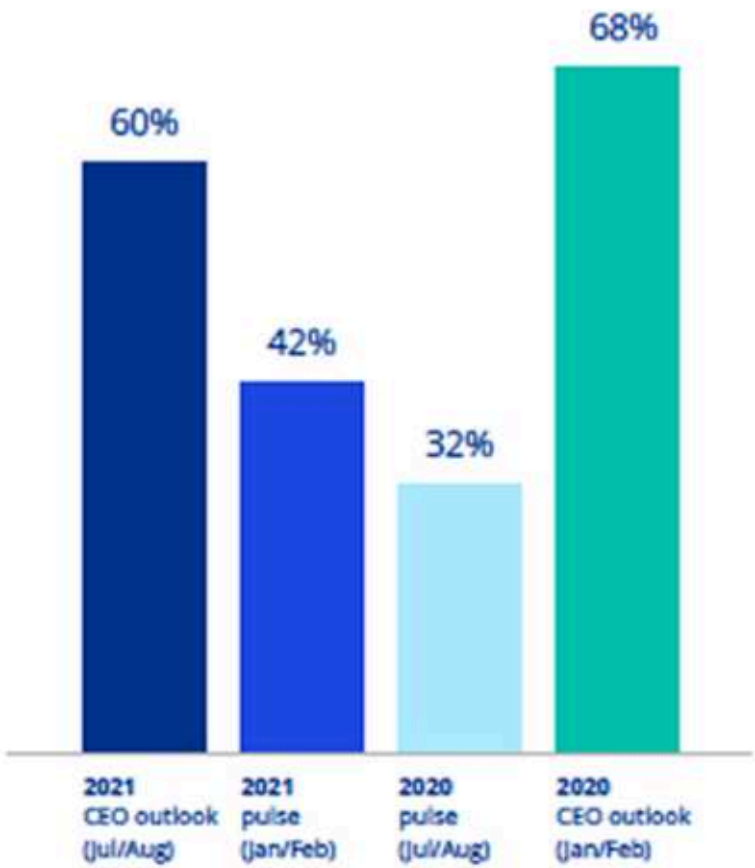
Cédric Scherer Data Visualization & Information Design

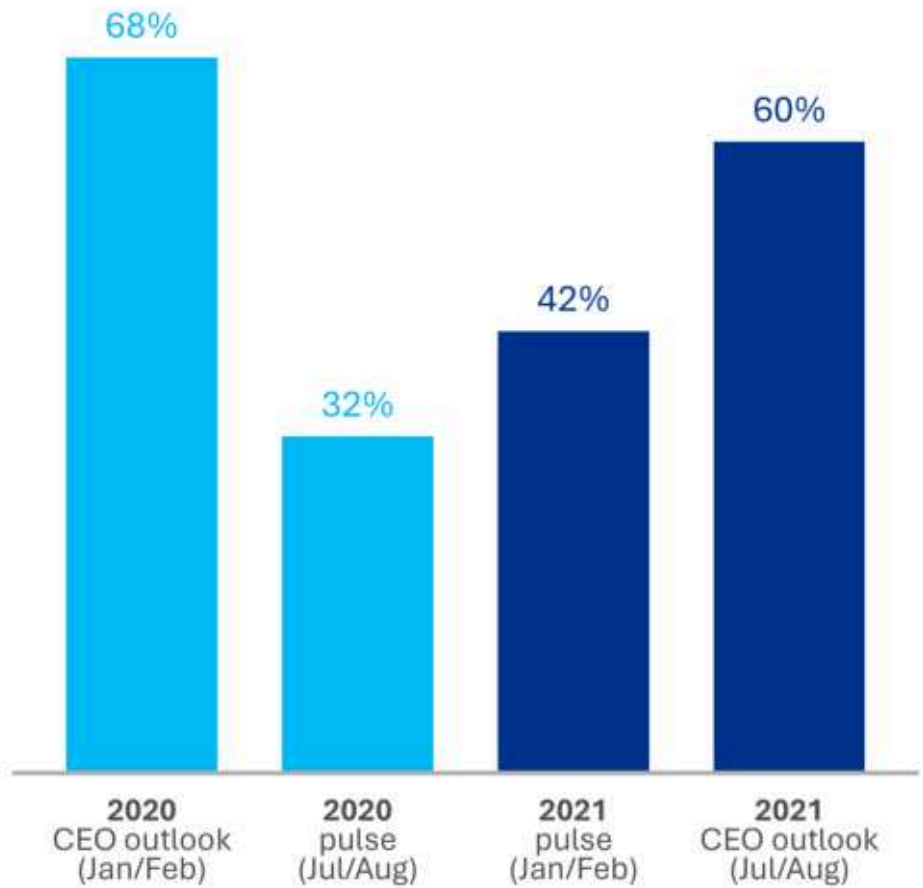
Quelle: Qualtrics





KPMG Brand Guidelines

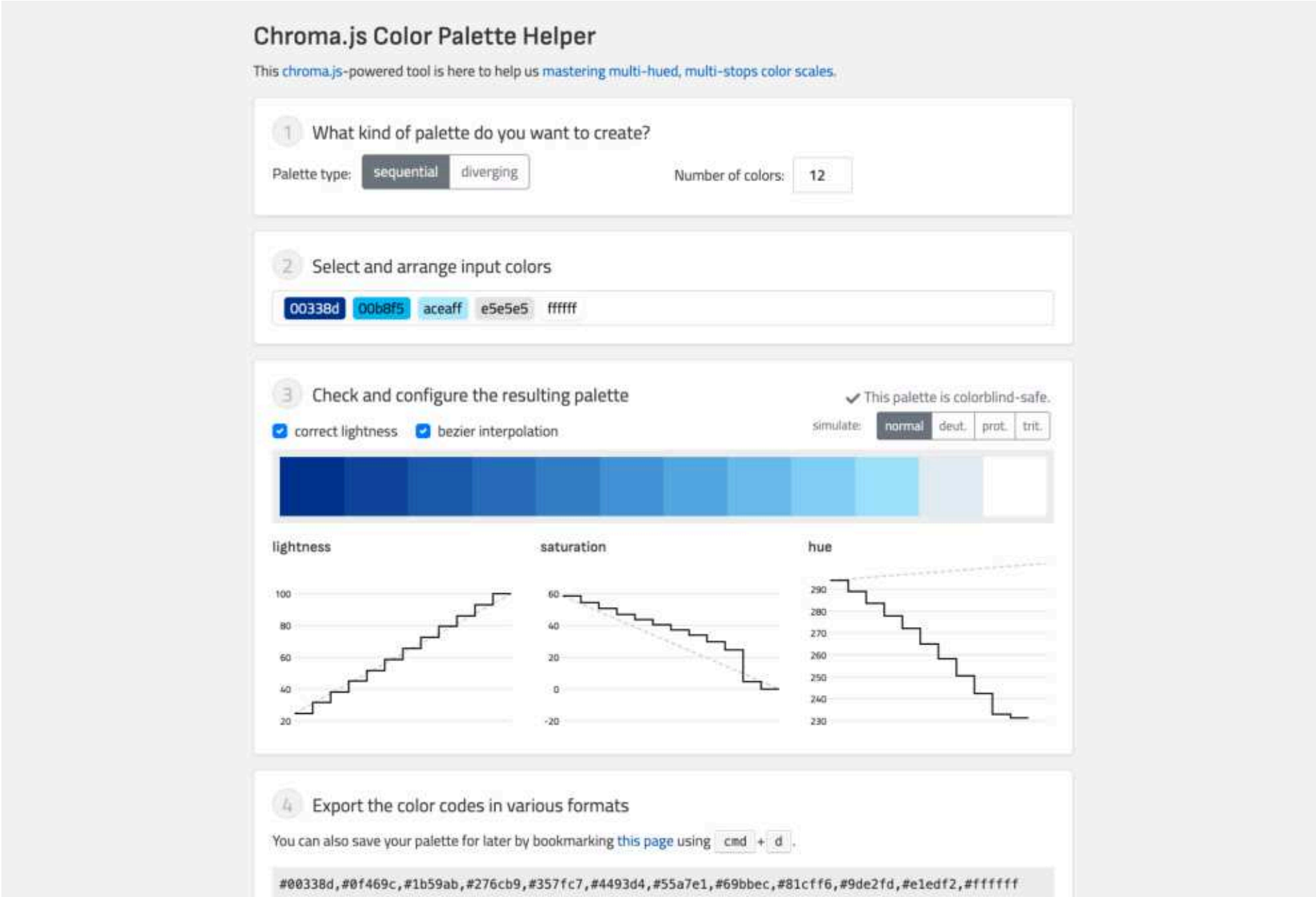




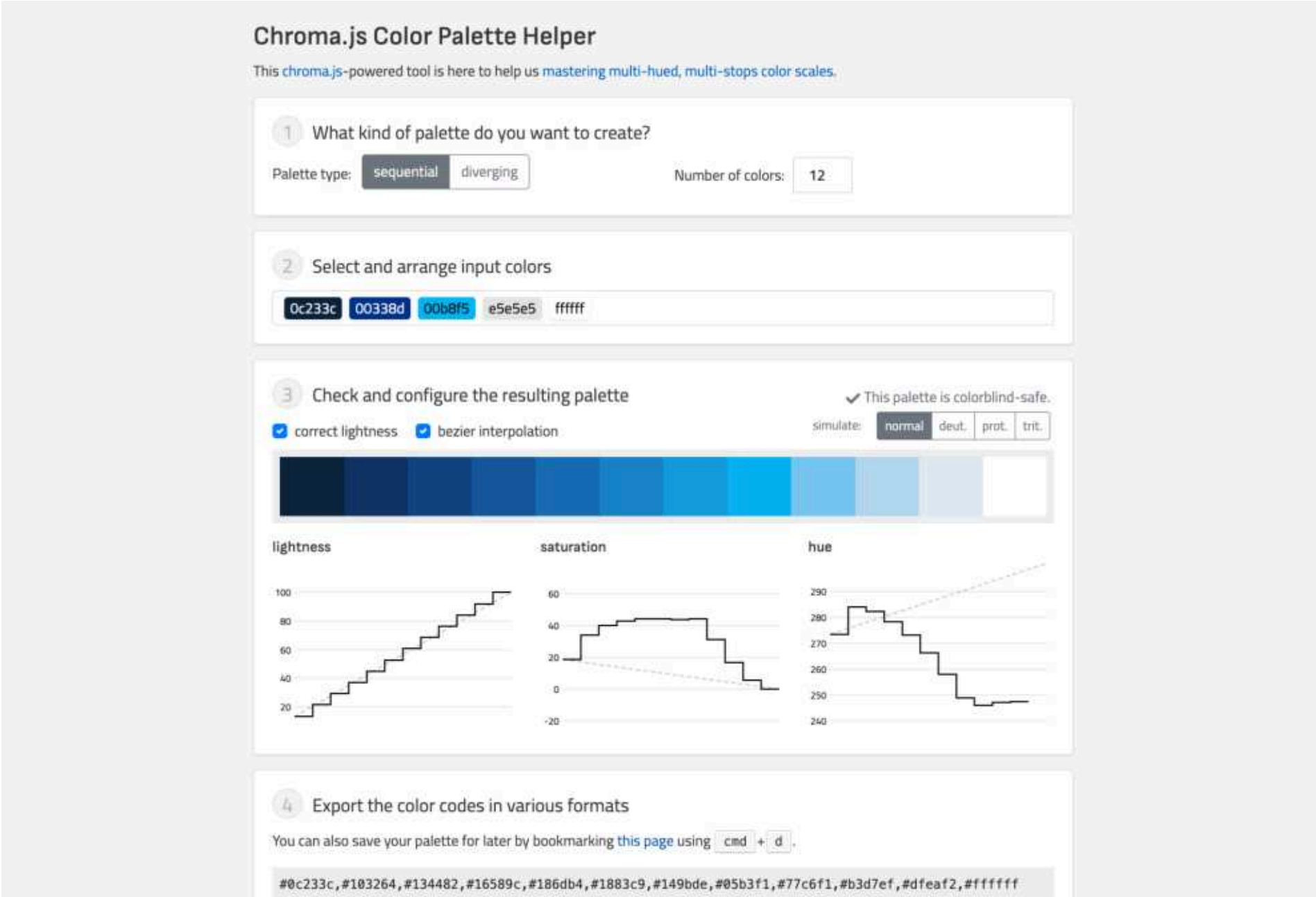
KPMG Brand Guidelines

Farbwahl

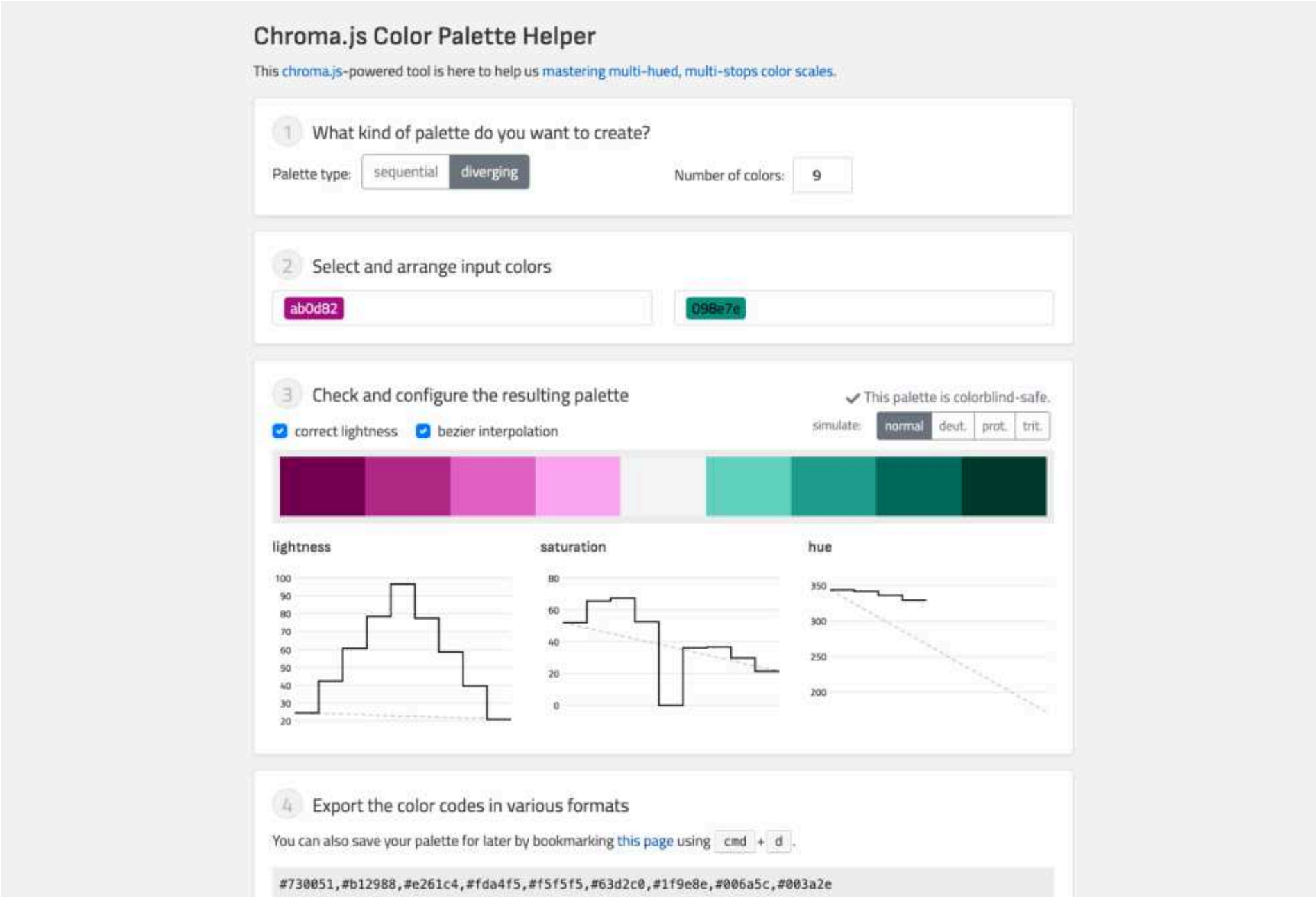
Originalfoto: Richard Strozynski


Chroma.js Color Palette Helper
This chroma.js-powered tool is here to help us mastering multi-hued, multi-stops color scales.
1 What kind of palette do you want to create?
Palette type: sequential diverging
Number of colors: 12
2 Select and arrange input colors
00338d 00b8f5 aceaff e5e5e5 ffffff
3 Check and configure the resulting palette
This palette is colorblind-safe.
correct lightness
bezier interpolation
simulate: normal deut. prot. trit.
lightness
saturation
hue
4 Export the color codes in various formats
You can also save your palette for later by bookmarking this page using cmd + d .
#00338d,#0f469c,#1b59ab,#276cb9,#357fc7,#4493d4,#55a7e1,#69bbec,#81cff6,#9de2fd,#e1edf2,#ffffff

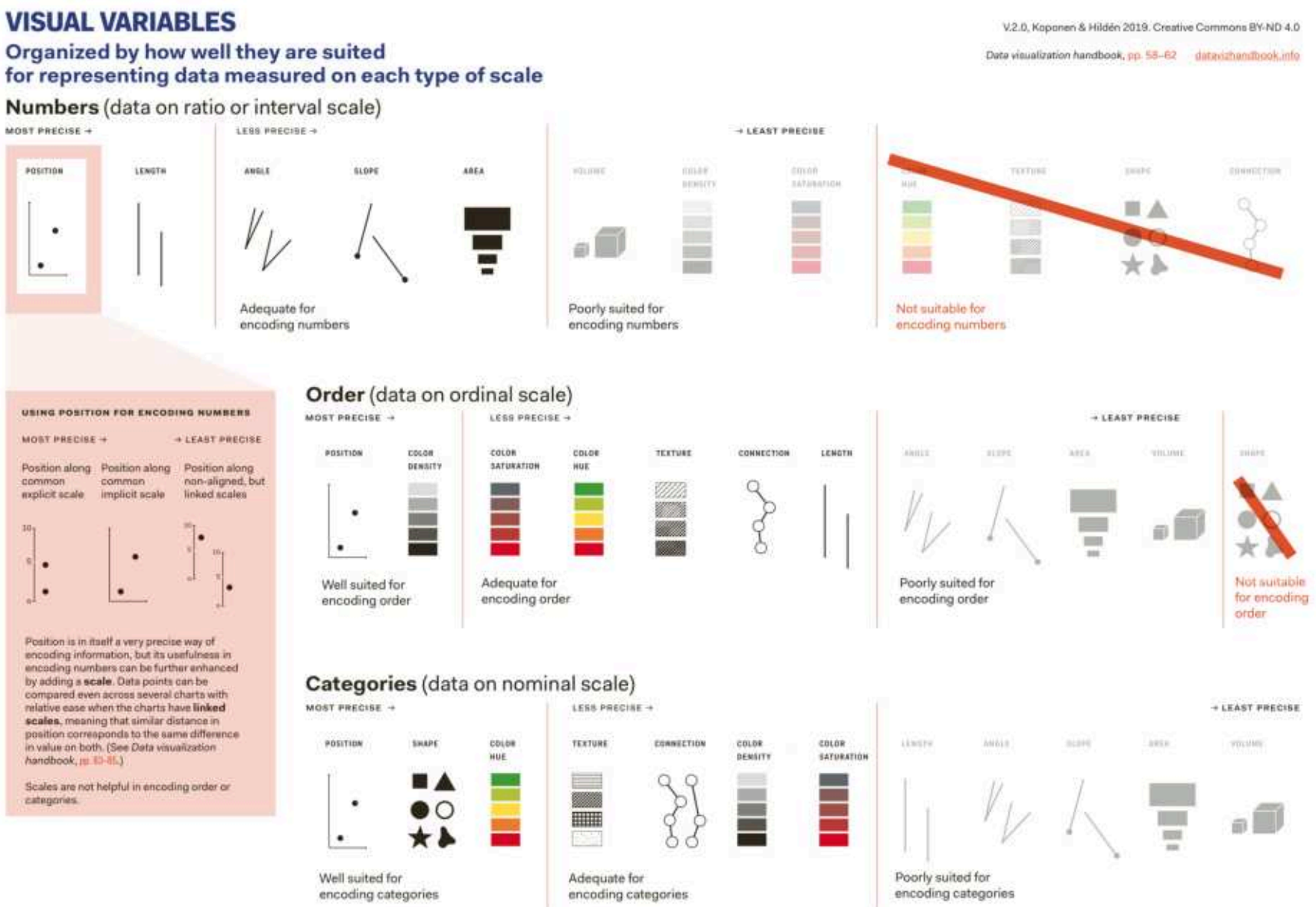
chroma.js


Chroma.js Color Palette Helper
This chroma.js-powered tool is here to help us mastering multi-hued, multi-stops color scales.
1 What kind of palette do you want to create?
Palette type: sequential diverging
Number of colors: 12
2 Select and arrange input colors
0c233c 00338d 00b8f5 e5e5e5 ffffff
3 Check and configure the resulting palette
This palette is colorblind-safe.
correct lightness
bezier interpolation
simulate: normal deut. prot. trit.
lightness
saturation
hue
4 Export the color codes in various formats
You can also save your palette for later by bookmarking this page using cmd + d.
#0c233c,#103264,#134482,#16589c,#186db4,#1883c9,#149bde,#05b3f1,#77c6f1,#b3d7ef,#dfeaf2,#ffffff

chroma.js


Chroma.js Color Palette Helper
This chroma.js-powered tool is here to help us mastering multi-hued, multi-stops color scales.
1 What kind of palette do you want to create?
Palette type: sequential diverging
Number of colors: 9
2 Select and arrange input colors
ab0d82
098e7e
3 Check and configure the resulting palette
This palette is colorblind-safe.
correct lightness
bezier interpolation
simulate: normal deut. prot. trit.
lightness
saturation
hue
4 Export the color codes in various formats
You can also save your palette for later by bookmarking this page using cmd + d .
#730051,#b12988,#e261c4,#fda4f5,#f5f5f5,#63d2c0,#1f9e8e,#006a5c,#003a2e

chroma.js



Quelle: „Data Visualization Handbook" von Juuso Koponen & Jonatan Hildén (2020), Seite 58–62 (verfügbar als Poster)

Diagrammwahl

Chart Suggestions—A Thought-Starter

www.ExtremePresentation.com
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What would you like to show?

Comparison

- Two Variables per Item → Variable Width Column Chart
- Many Categories → Table or Table with Embedded Charts
- One Variable per Item → Among Items
- Many Items → Bar Chart
- Few Items → Column Chart
- Few Categories
- Cyclical Data → Circular Area Chart
- Non-Cyclical Data → Line Chart
- Many Periods
- Single or Few Categories → Column Chart
- Many Categories → Line Chart
- Few Periods
- Over Time

Relationship

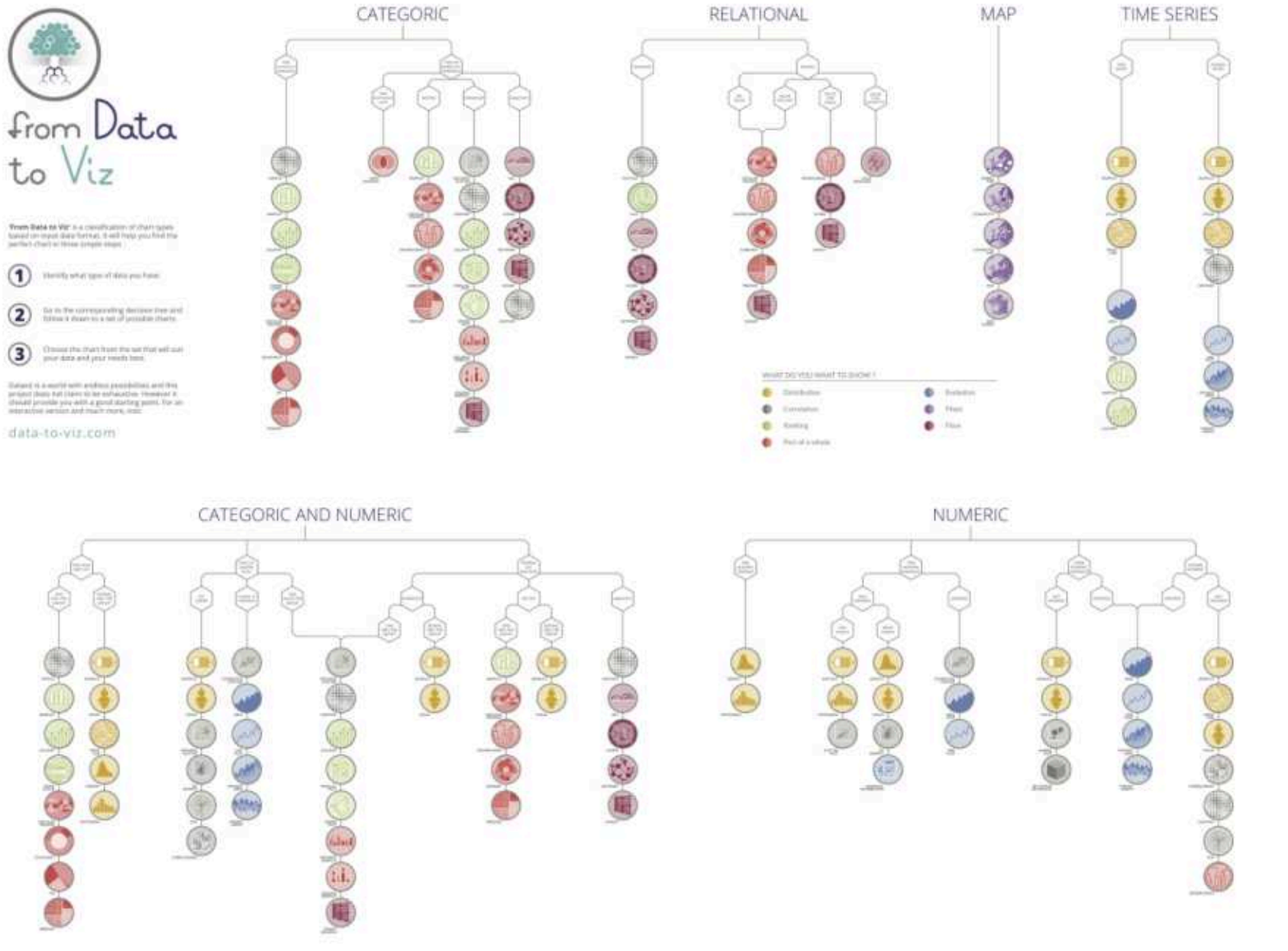
- Two Variables → Scatter Chart
- Three Variables → Bubble Chart

Distribution

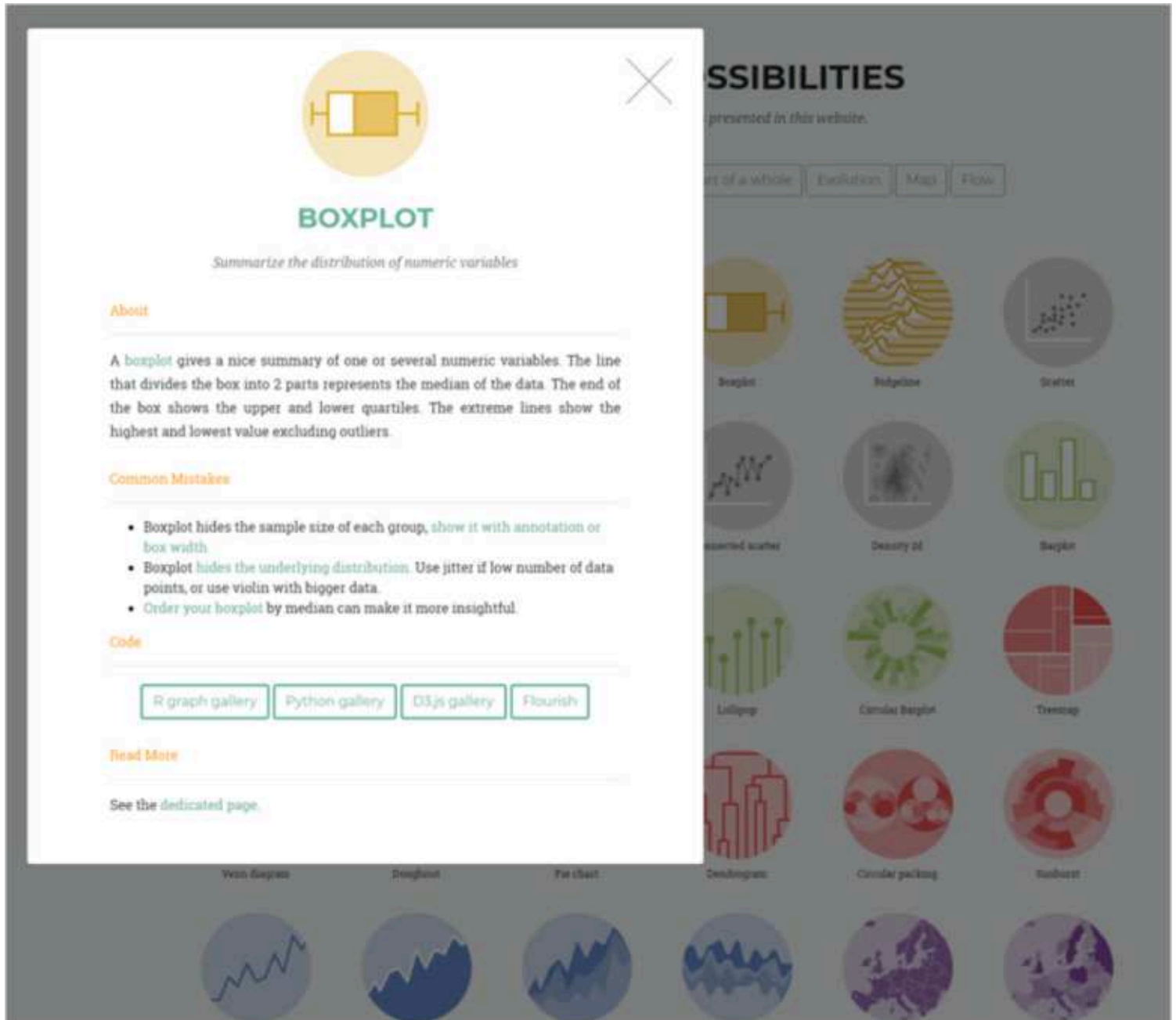
- Single Variable
  - Few Data Points → Column Histogram
  - Many Data Points → Line Histogram
- Two Variables → Scatter Chart
- Three Variables → 3D Area Chart

Composition

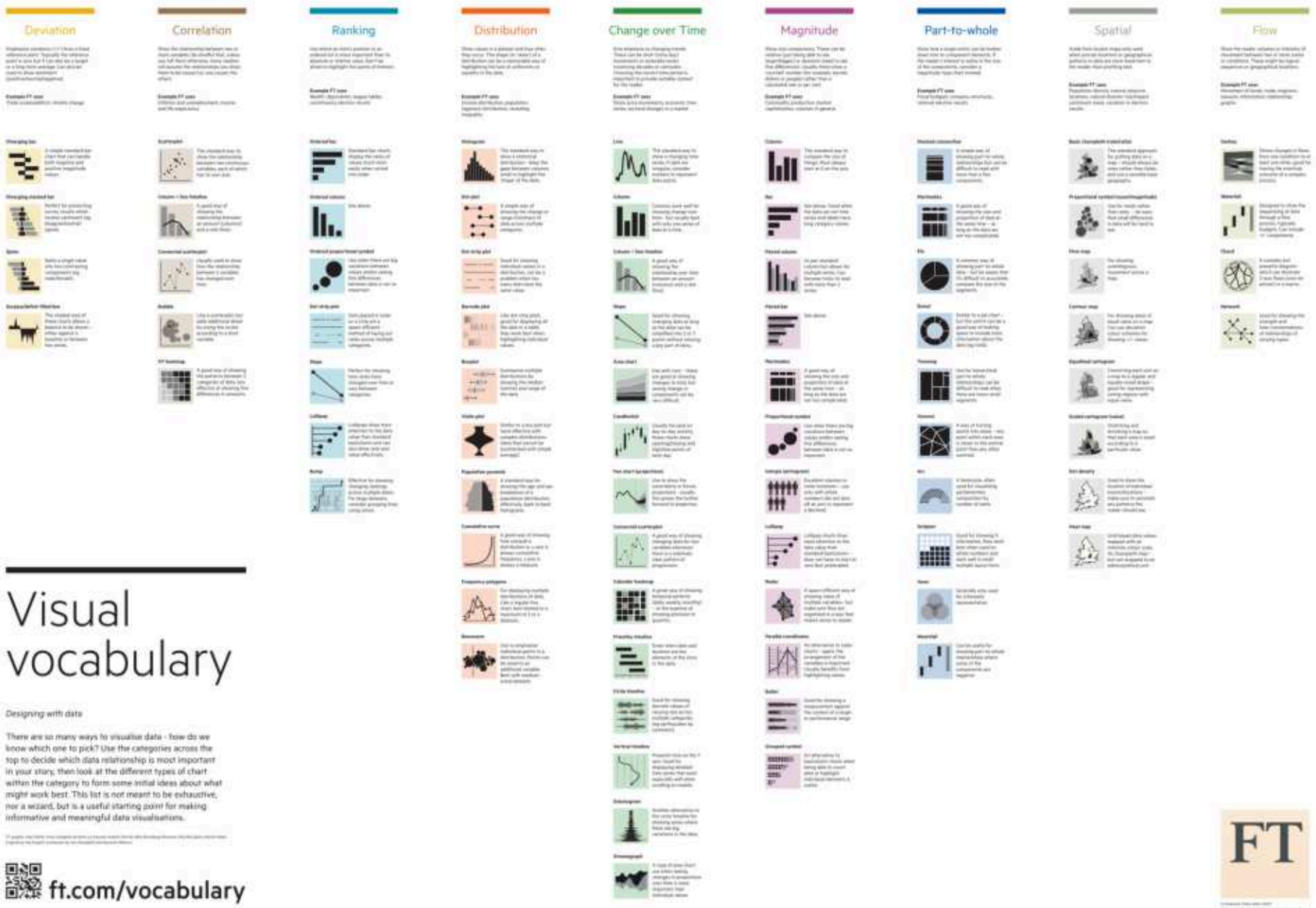
- Changing Over Time
  - Few Periods
    - Only Relative Differences Matter → Stacked 100% Column Chart
    - Relative and Absolute Differences Matter → Stacked Column Chart
  - Many Periods
    - Only Relative Differences Matter → Stacked 100% Area Chart
    - Relative and Absolute Differences Matter → Stacked Area Chart
- Static
  - Simple Share of Total → Pie Chart
  - Accumulation or Subtraction to Total → Waterfall Chart
  - Components of Components → Stacked 100% Column Chart with Subcomponents



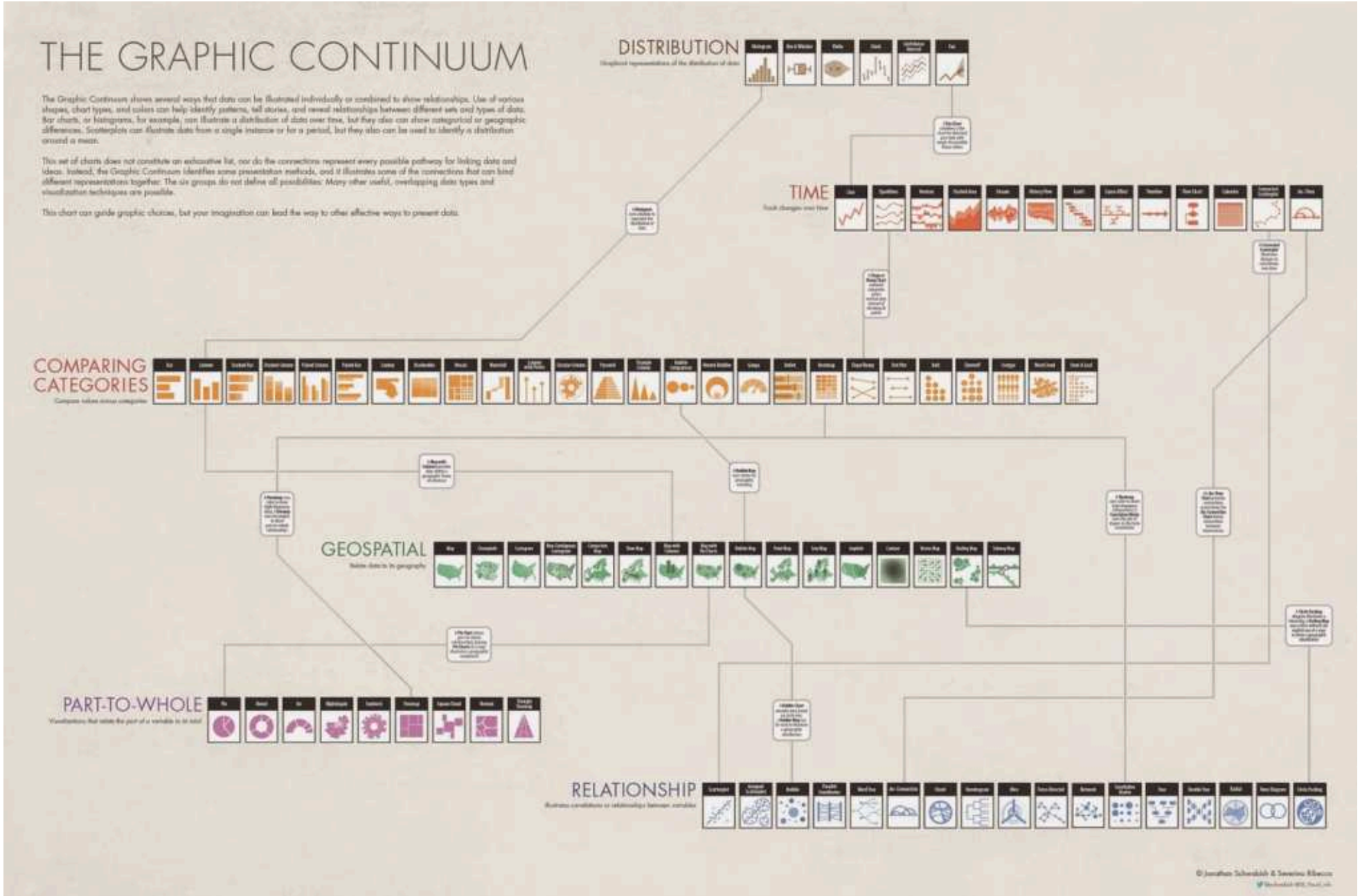
Quelle: From Data to Viz



Quelle: From Data to Viz

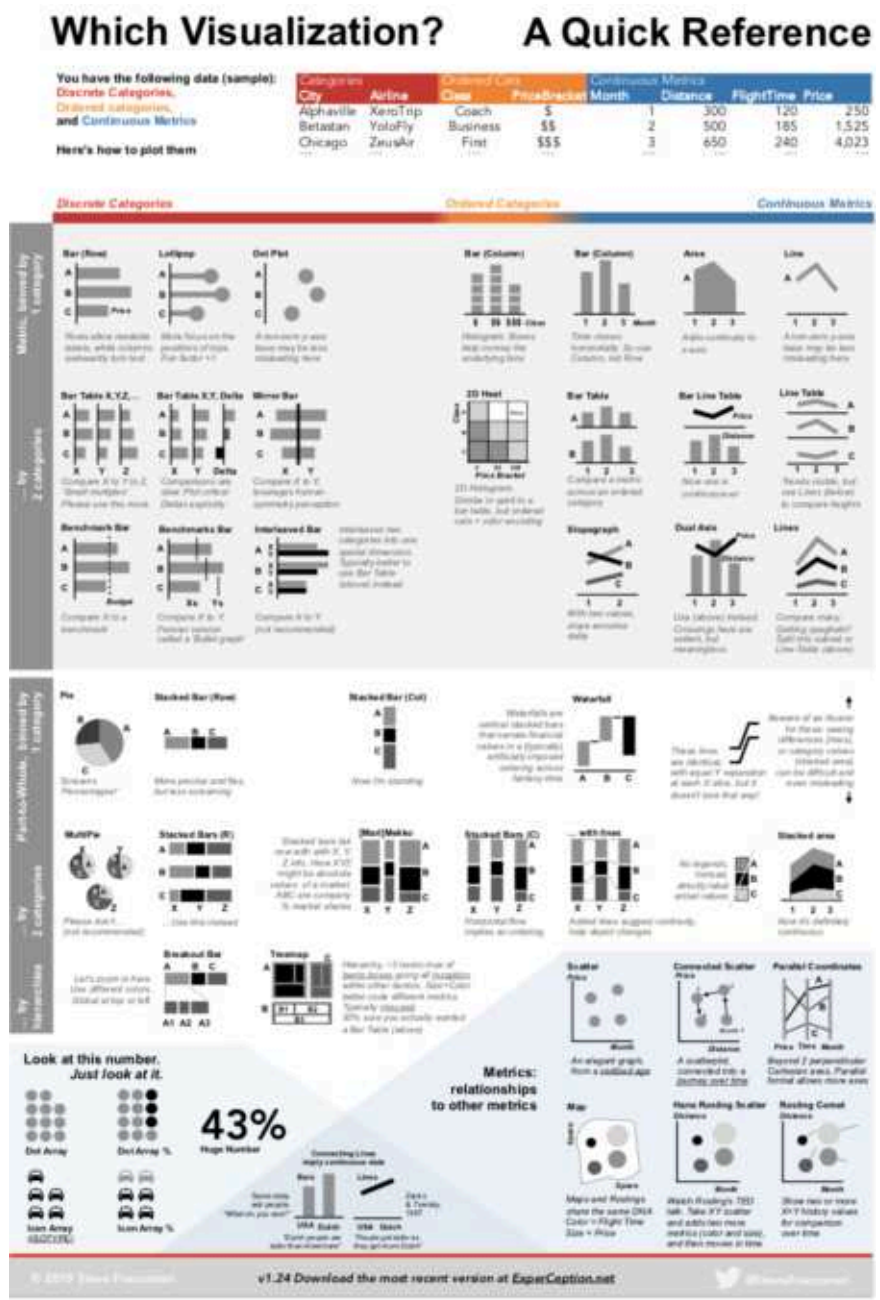


„FT Visual Vocabulary" von Alan Smith et al. (Poster)

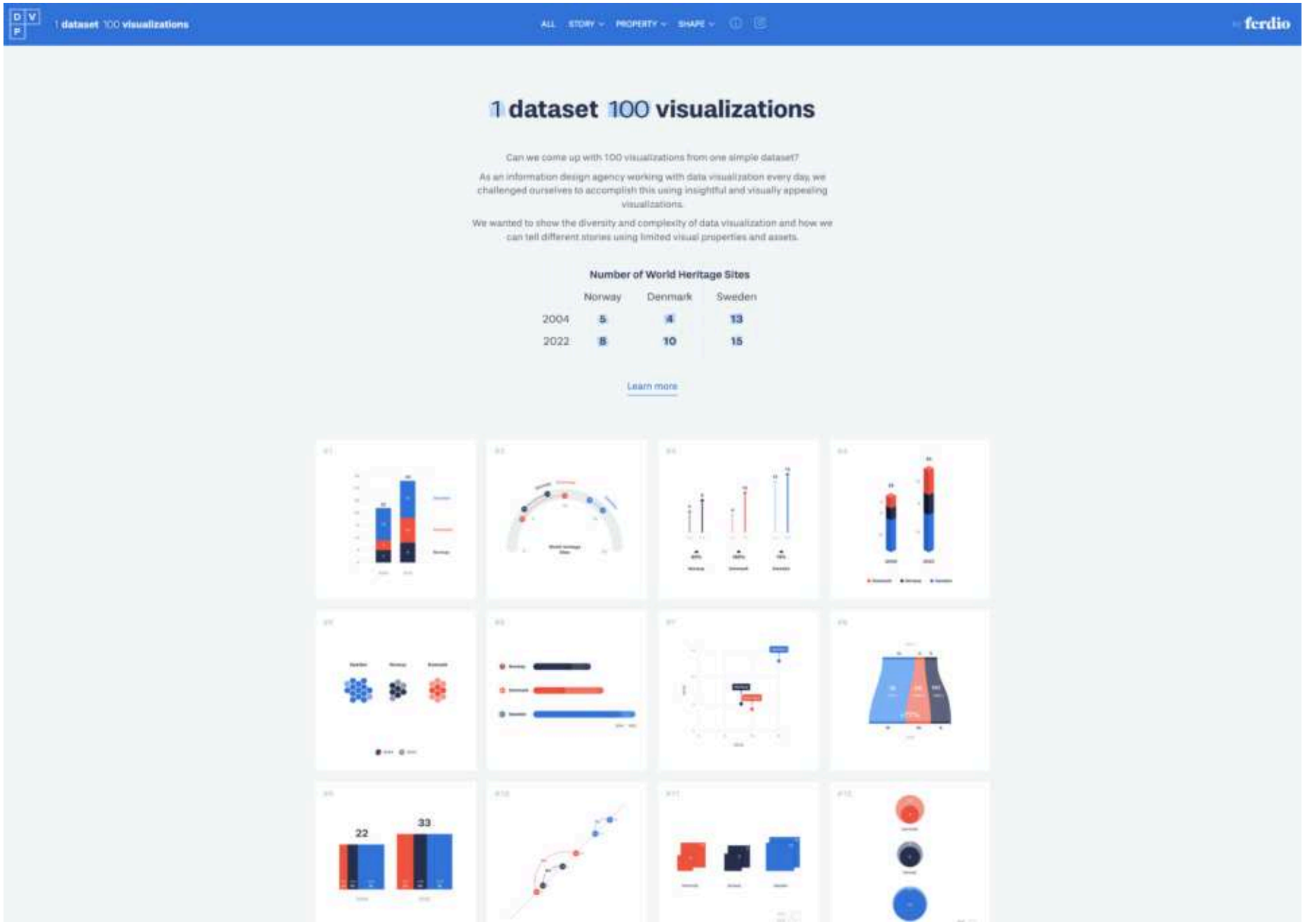


„The Graphic Continuum" von Jon Schwabish & Sverino Ribecca

Cédric Scherer Data Visualization & Information Design



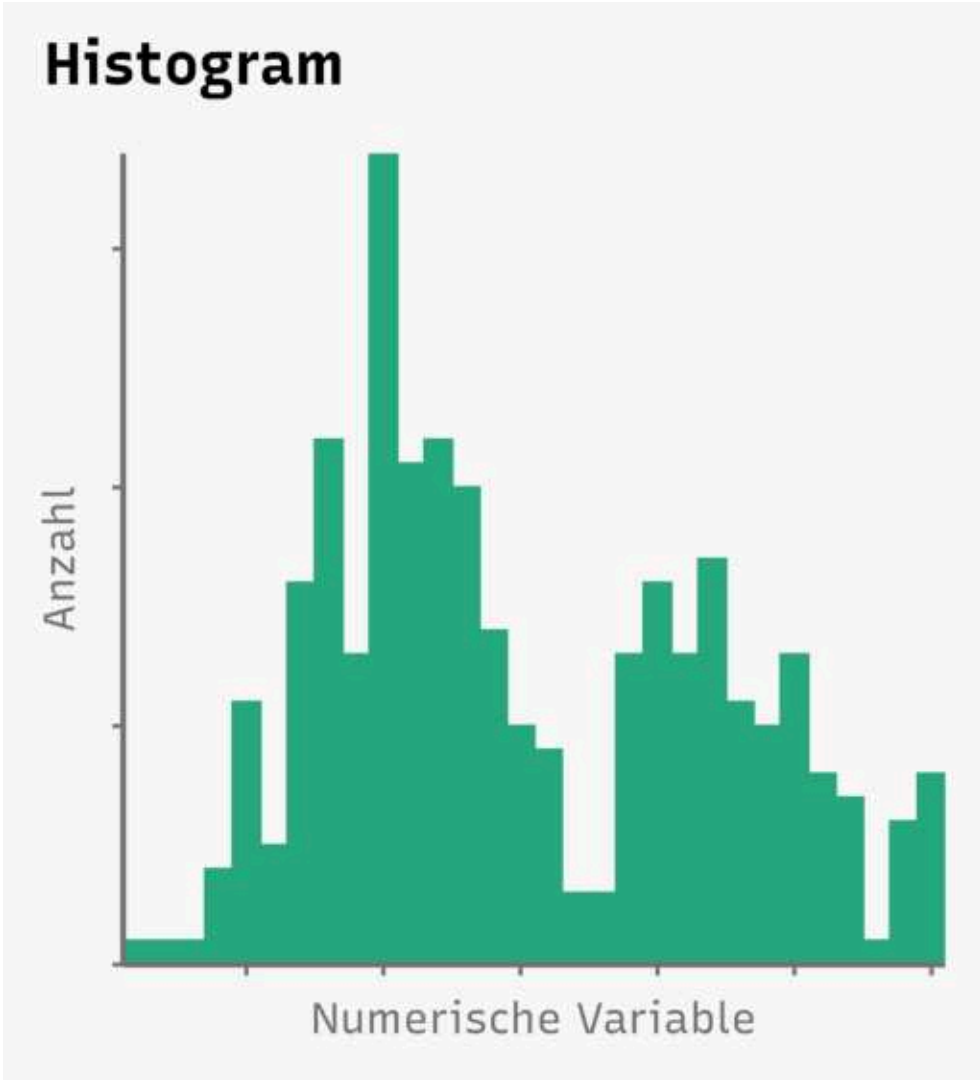
„Which Visualization? A Quick Reference" by Steven Franconeri

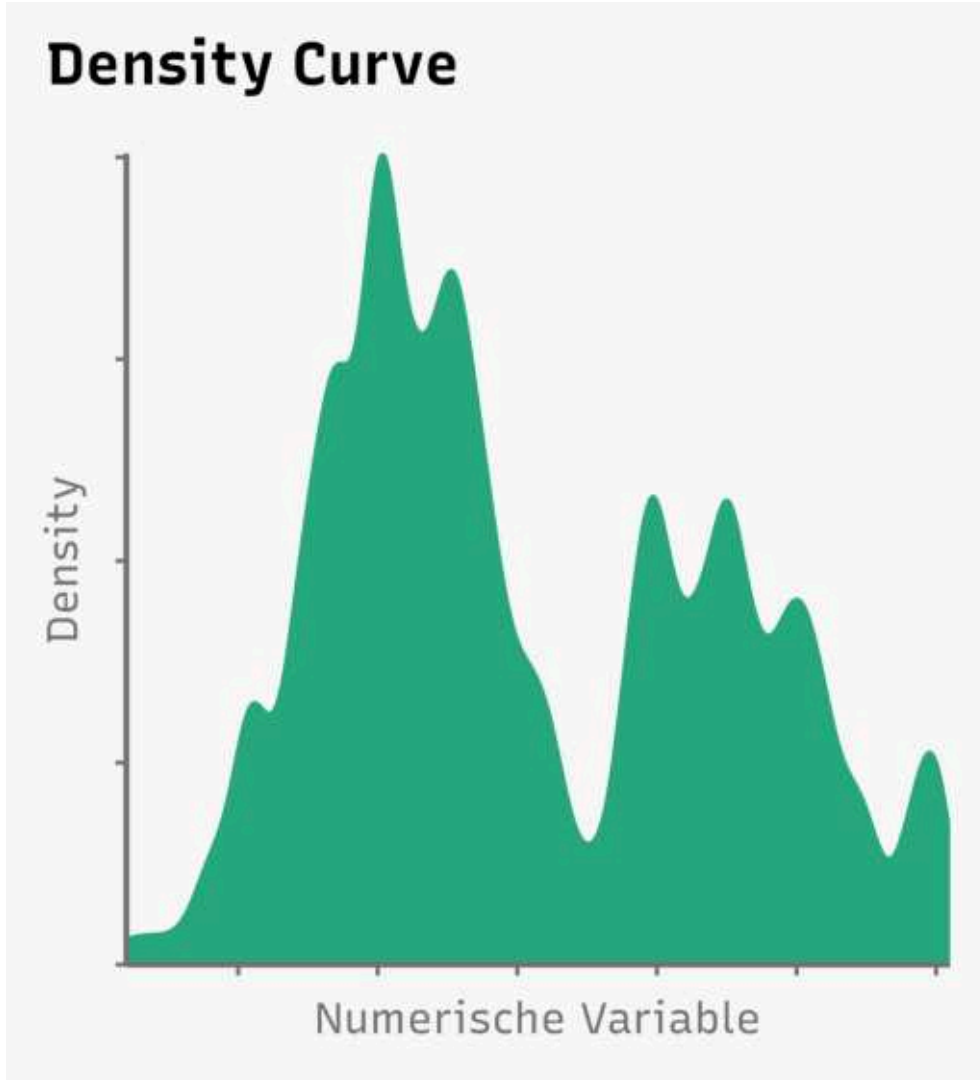


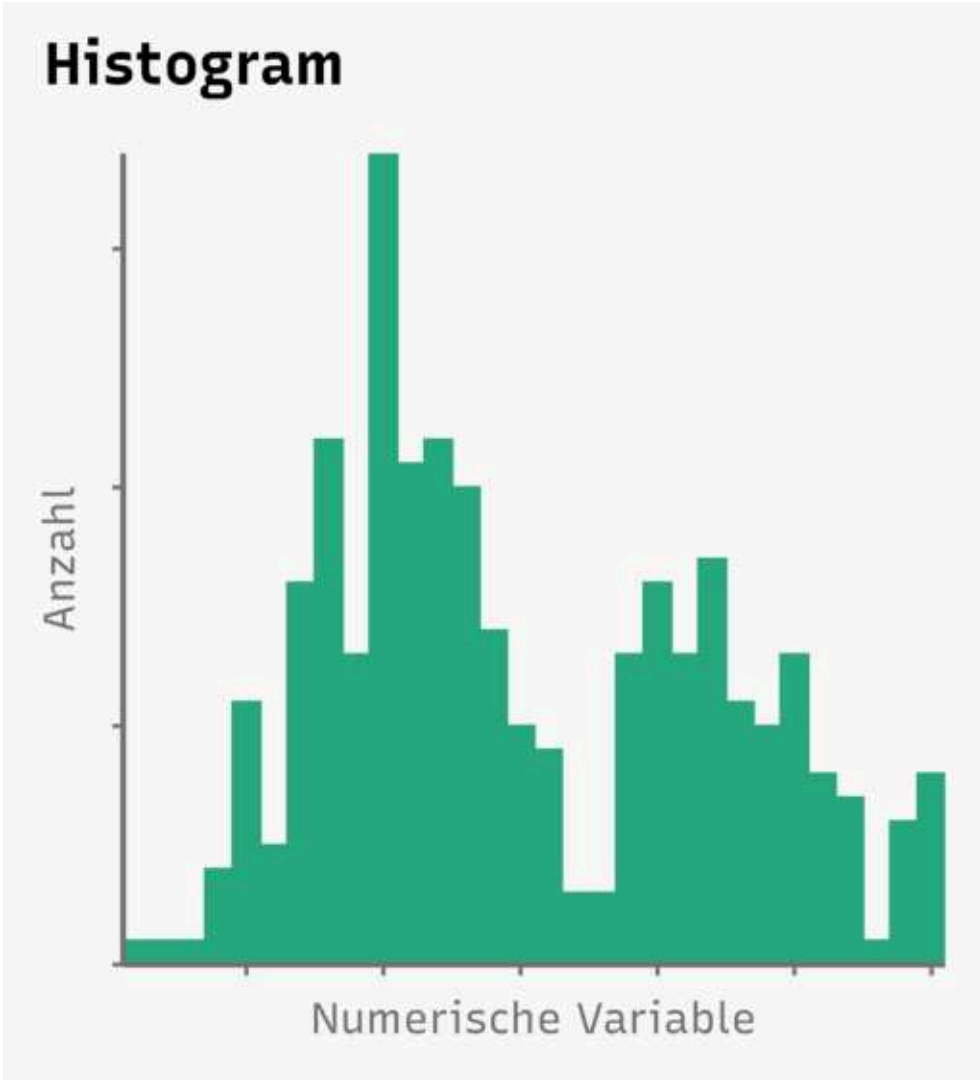
DataVizProject „1 Dataset 100 Visualizations"

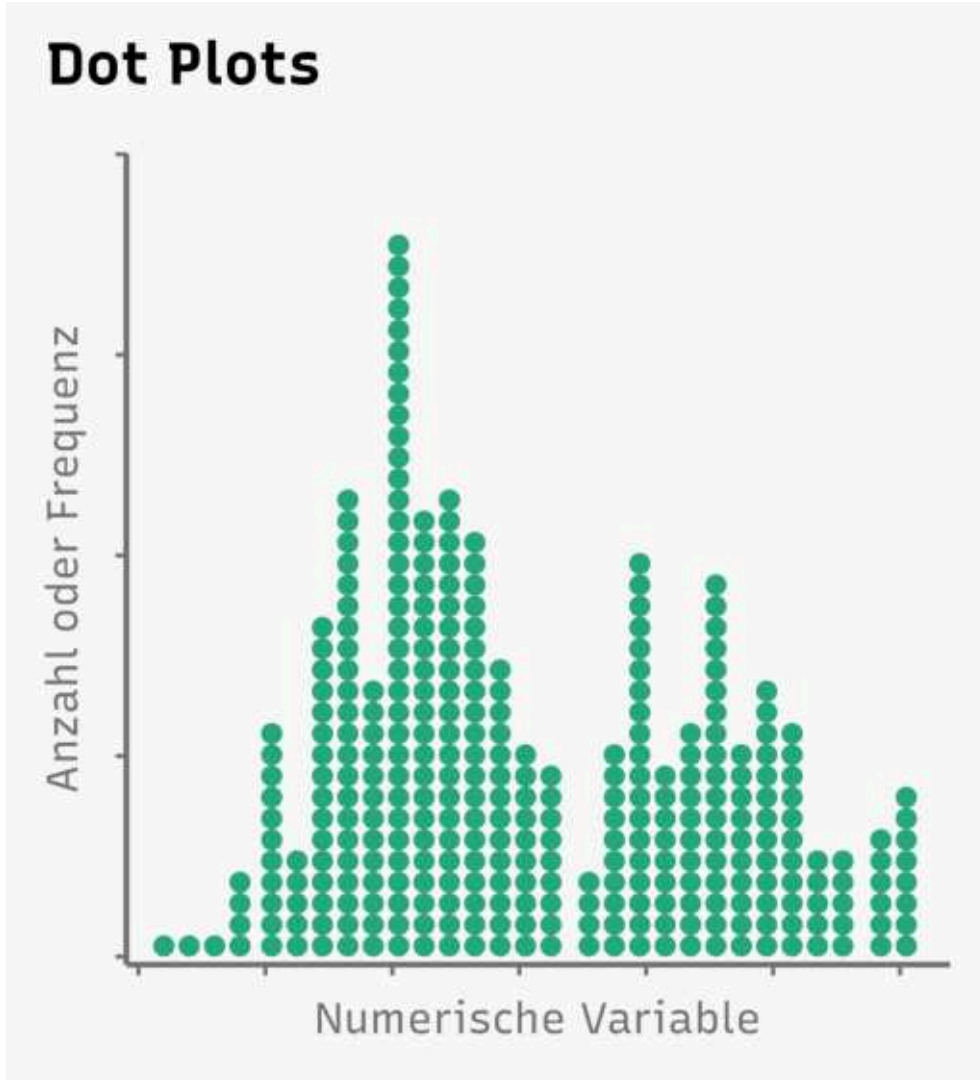
Diagrammtypen

Verteilungen zeigen

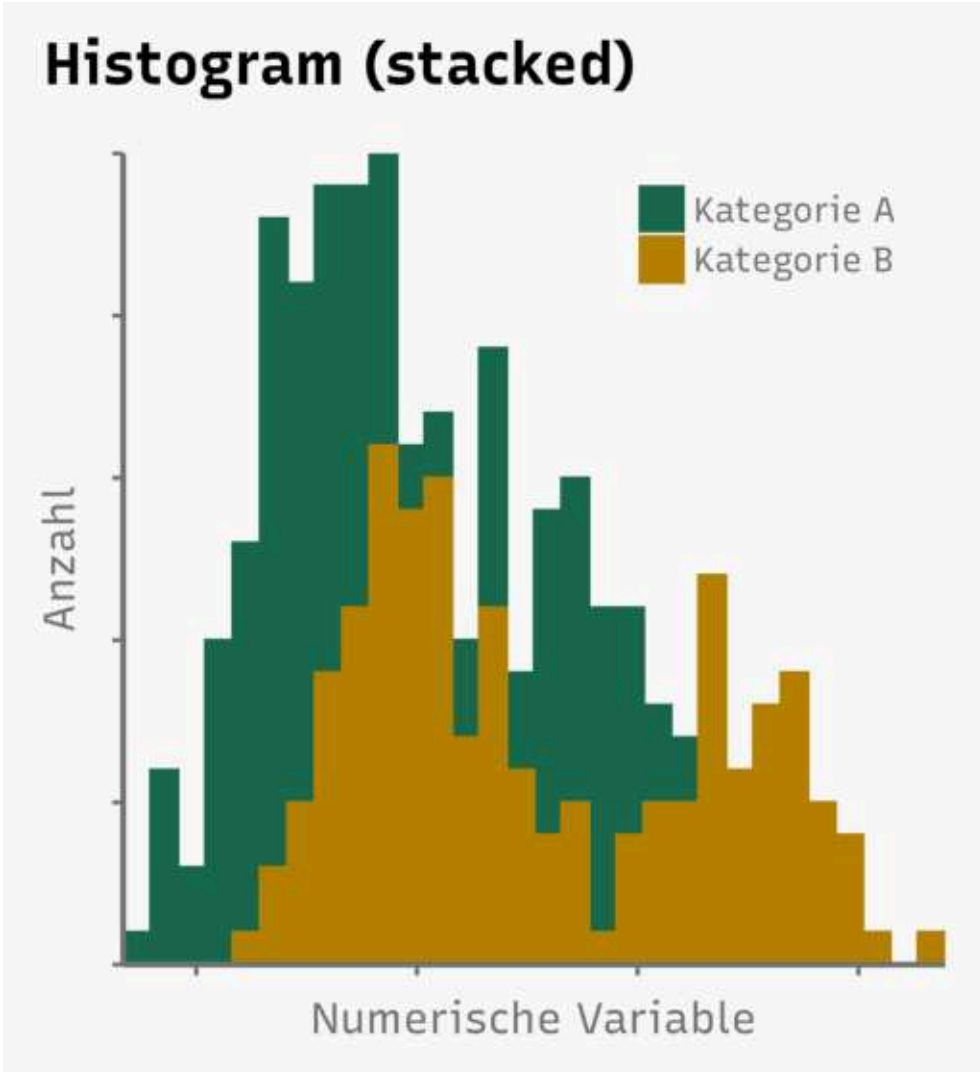

Histogram
Anzahl
Numerische Variable

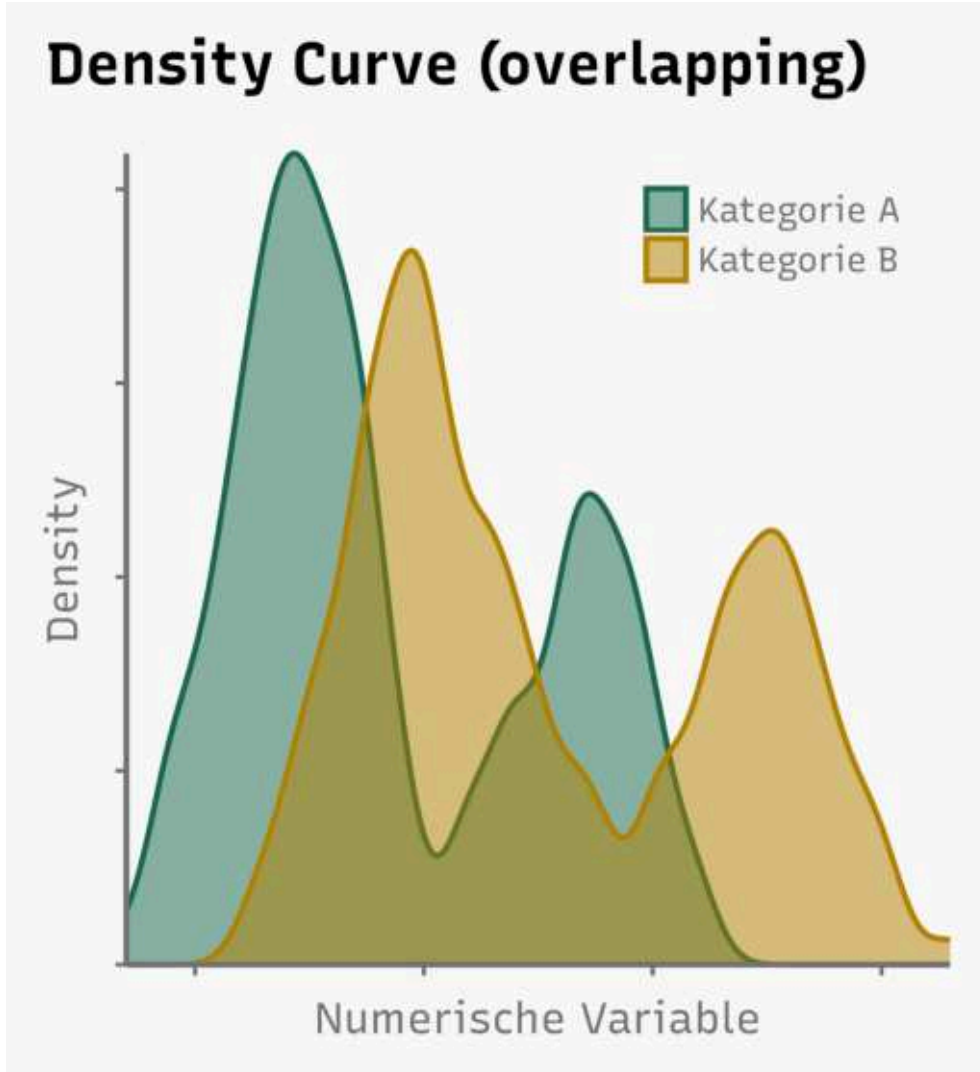

Density Curve
Density
Numerische Variable

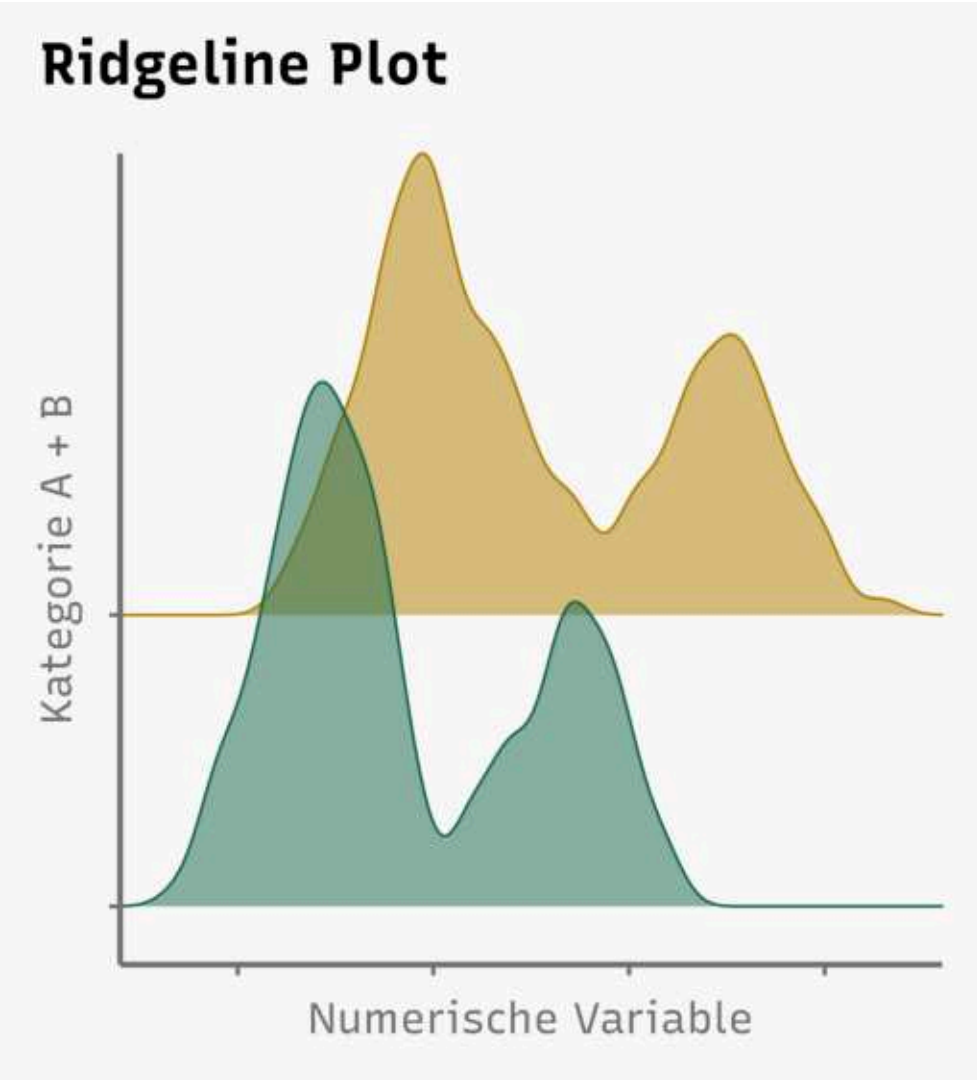

Histogram
Anzahl
Numerische Variable

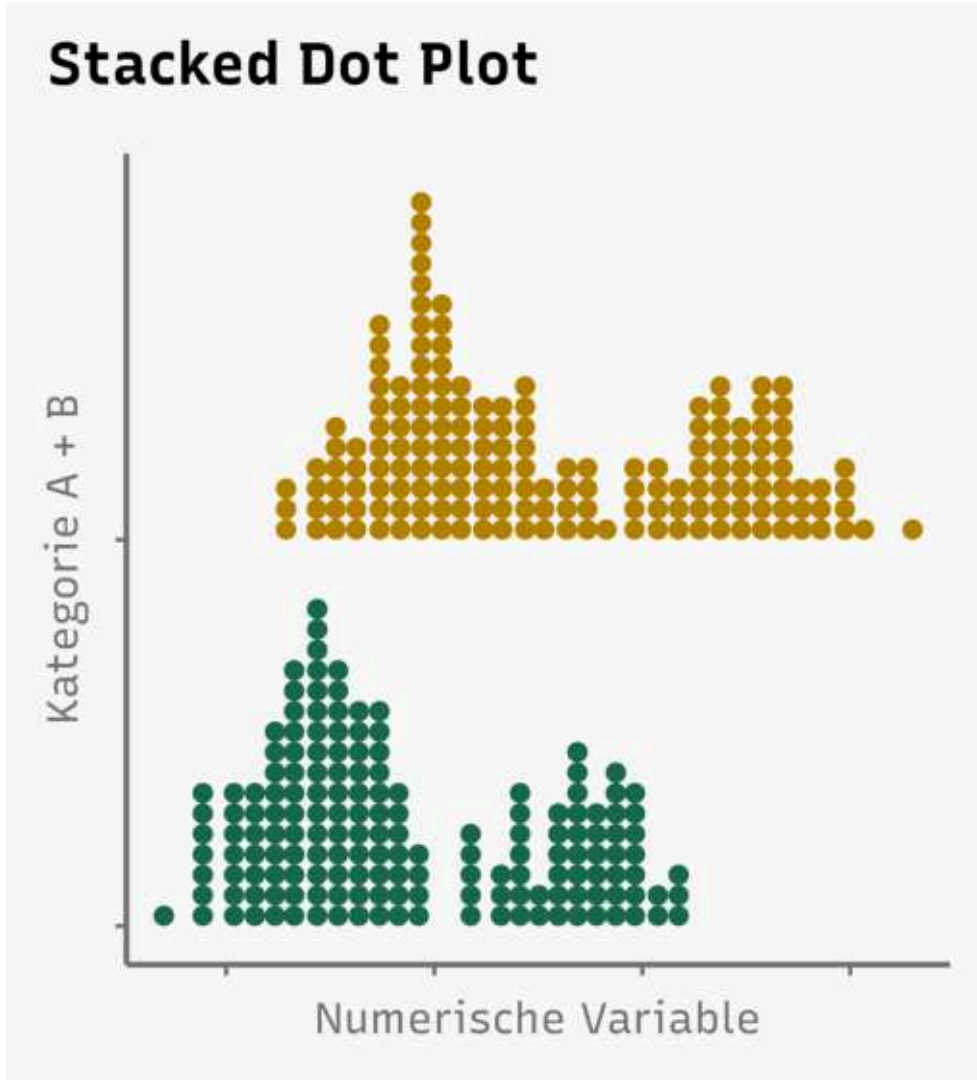

Dot Plots
Anzahl oder Frequenz
Numerische Variable

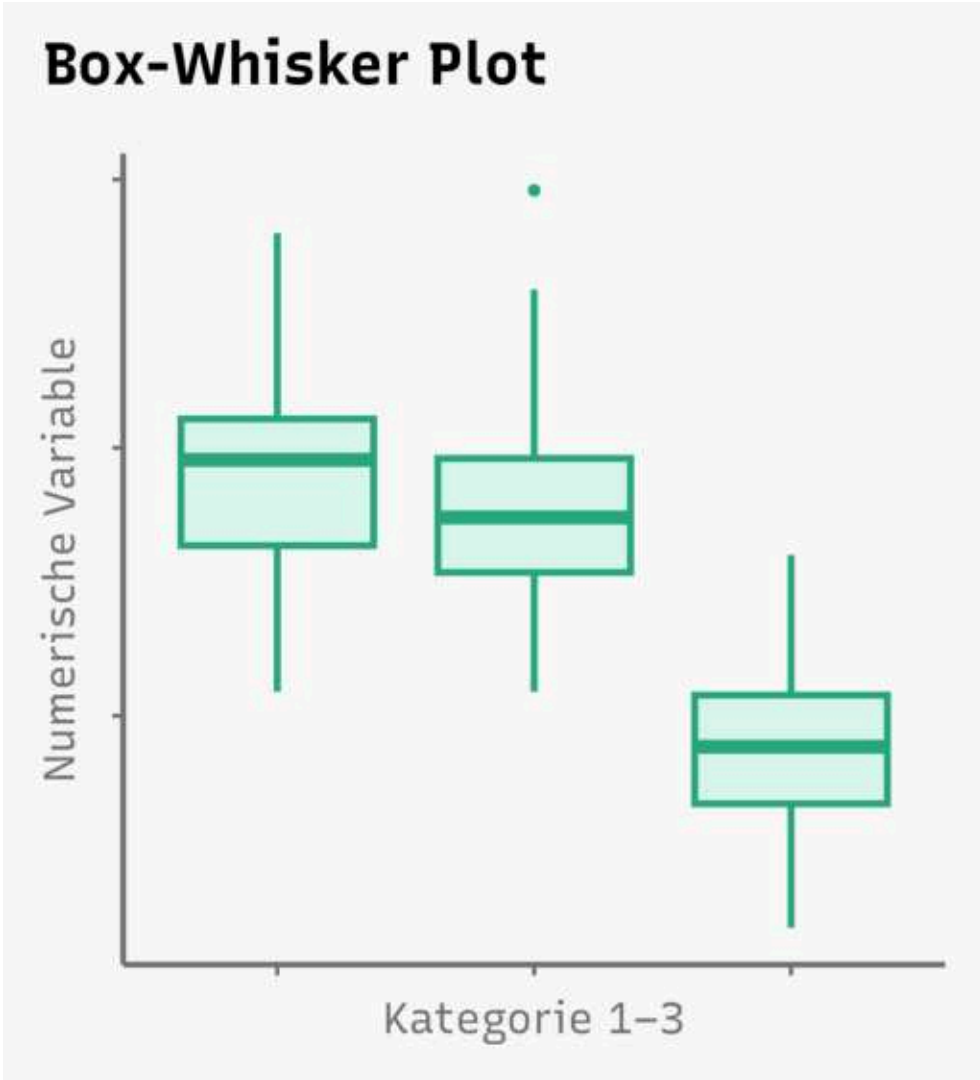
Verteilungen vergleichen

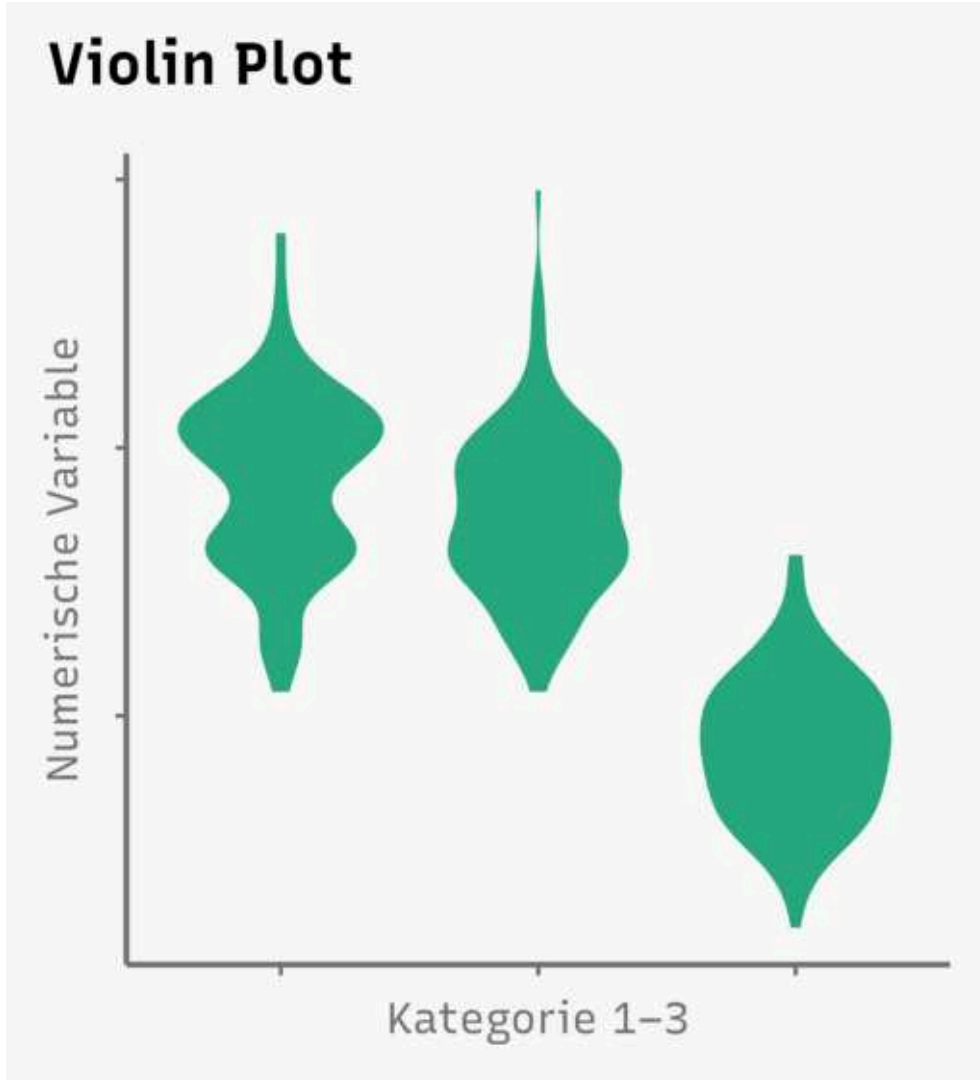

Histogram (stacked)
Kategorie A
Kategorie B
Anzahl
Numerische Variable

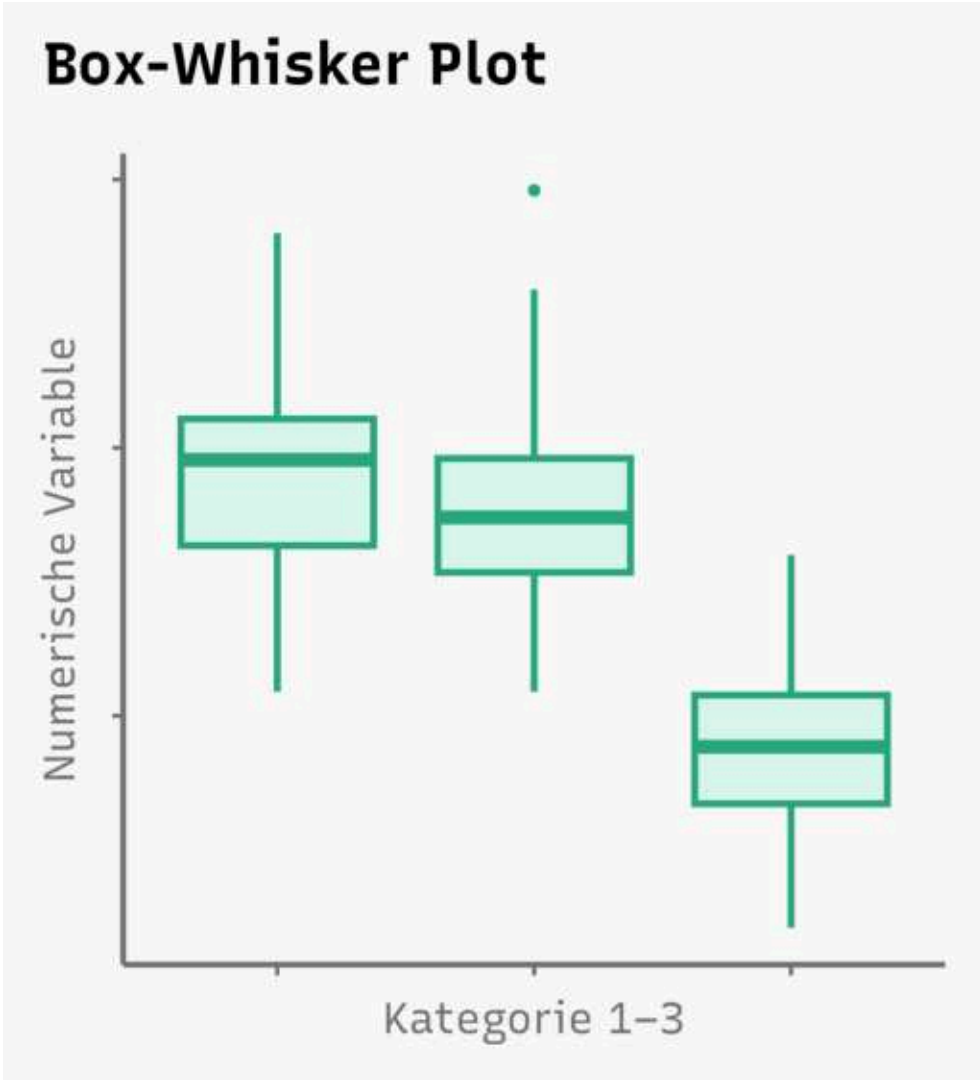

Density Curve (overlapping)
Kategorie A
Kategorie B
Density
Numerische Variable

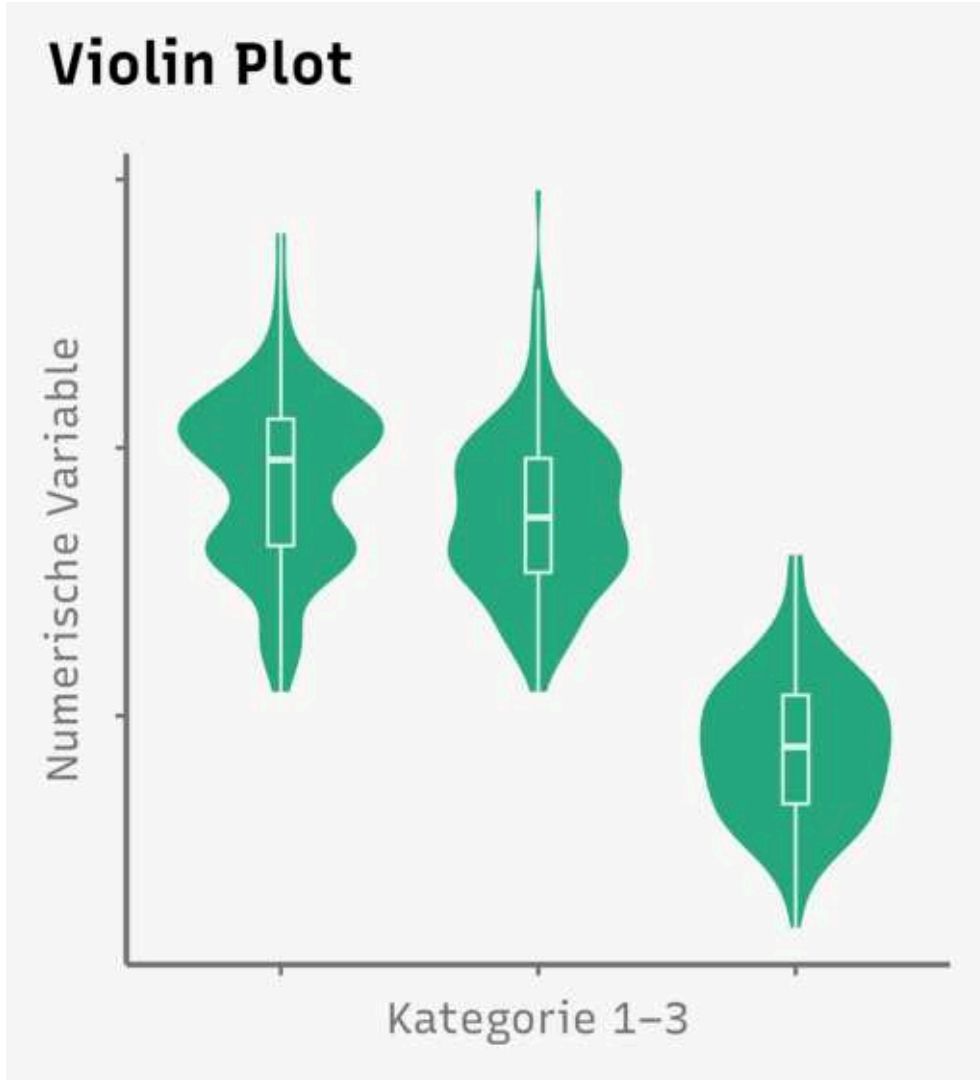

Ridgeline Plot
Kategorie A + B
Numerische Variable

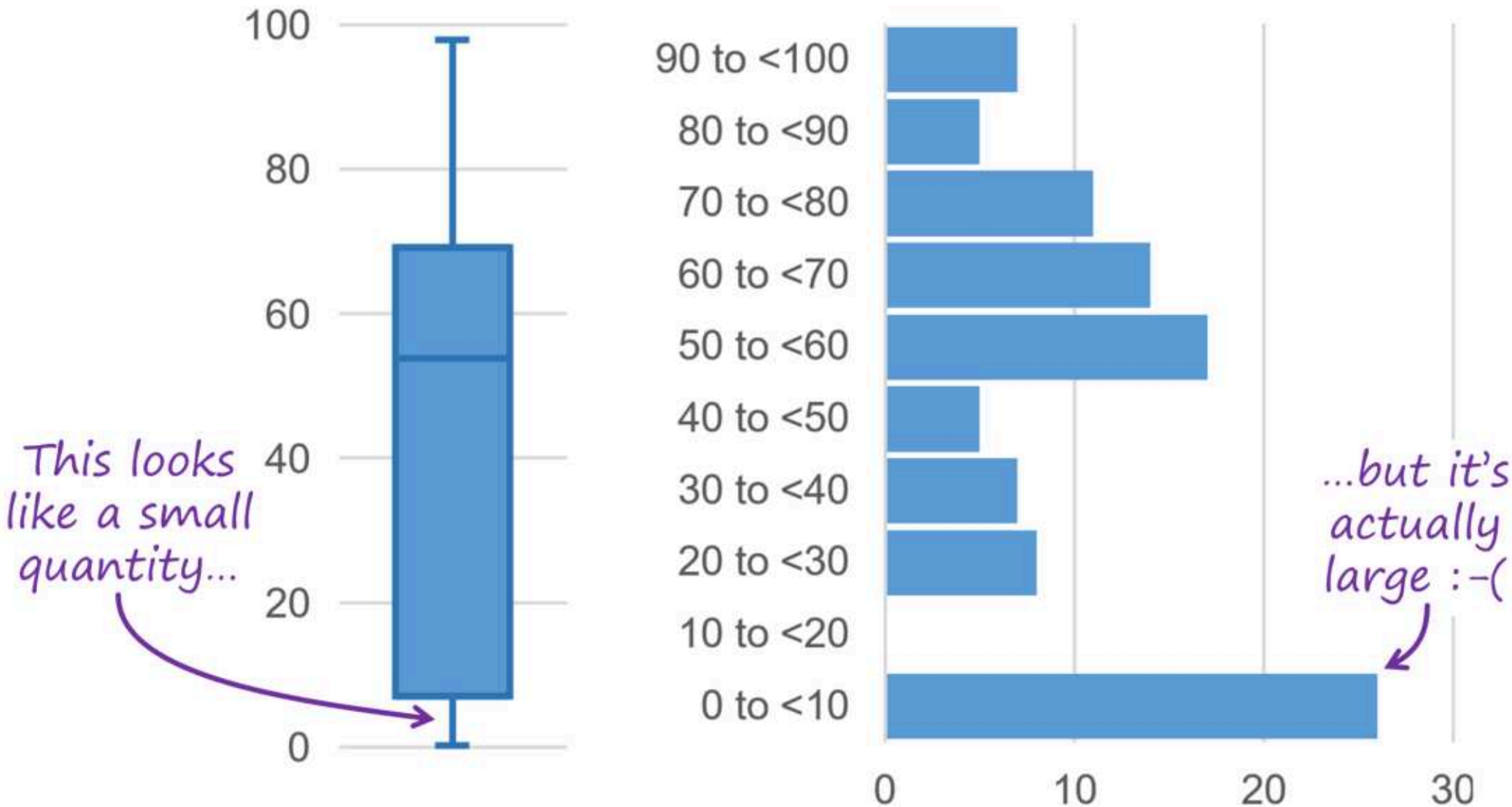

Stacked Dot Plot
Kategorie A + B
Numerische Variable


Box-Whisker Plot
Numerische Variable
Kategorie 1–3

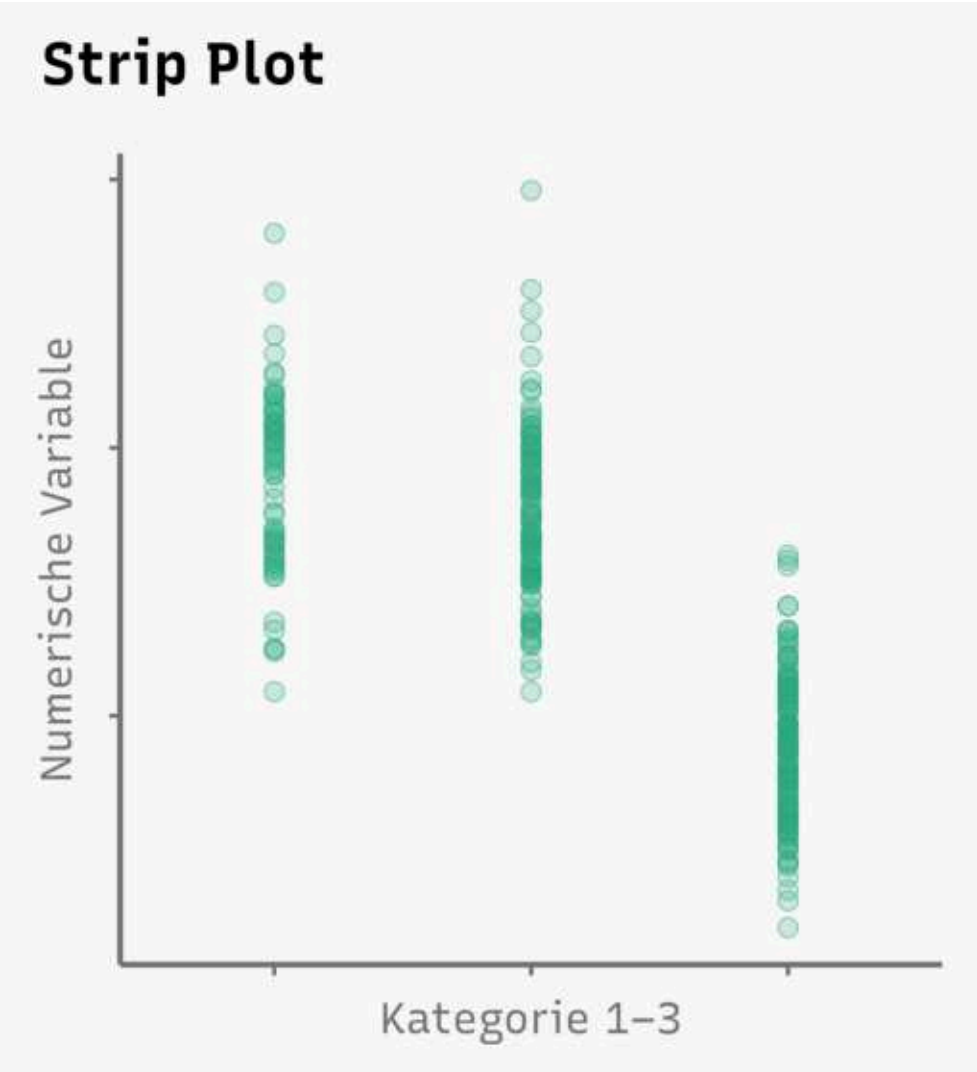

Violin Plot
Numerische Variable
Kategorie 1–3

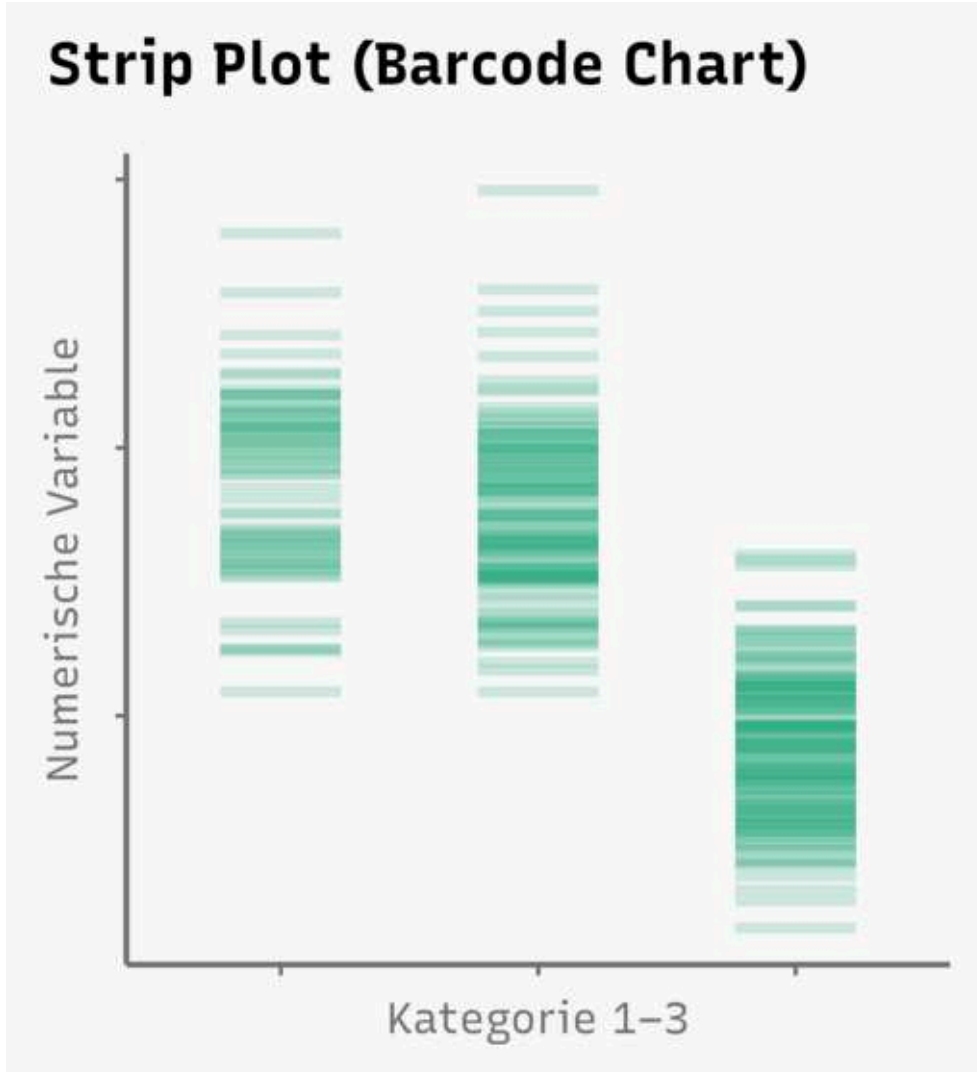

Box-Whisker Plot
Numerische Variable
Kategorie 1–3

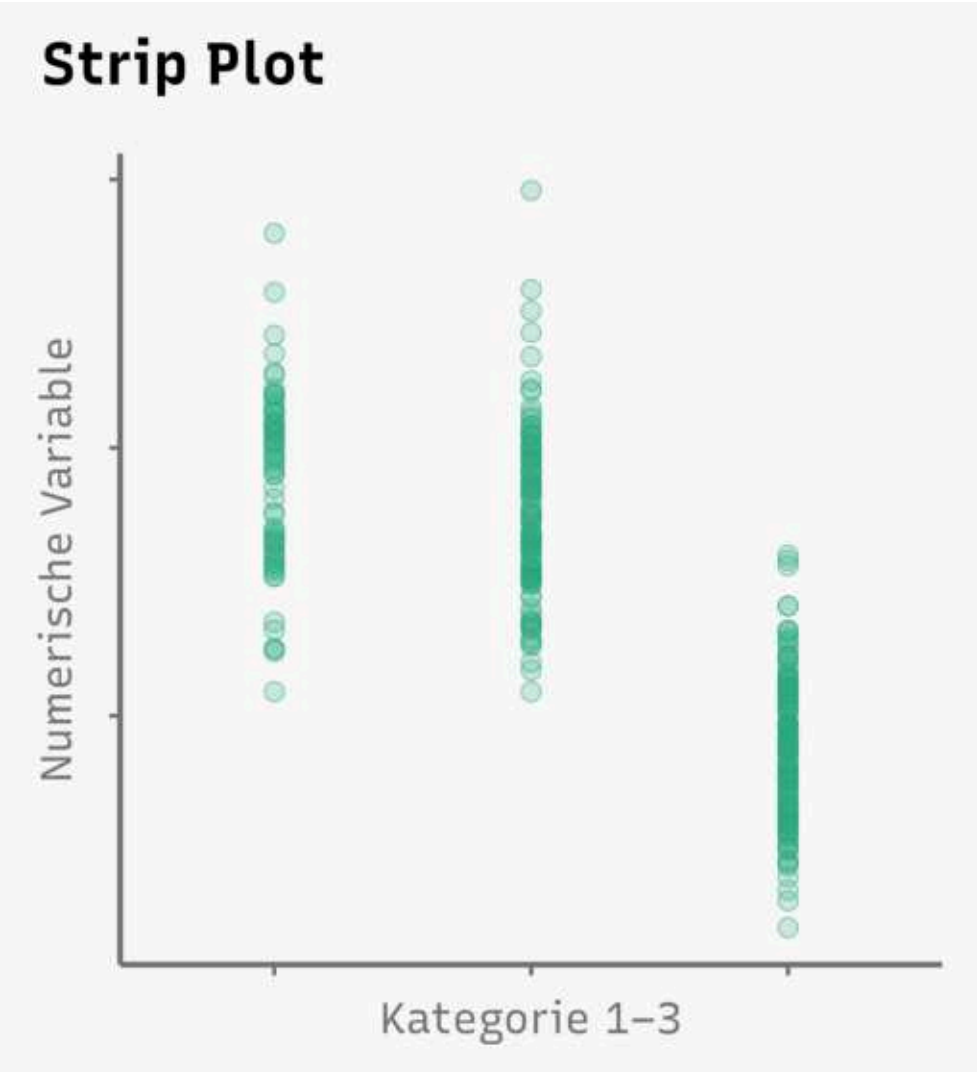

Violin Plot
Numerische Variable
Kategorie 1–3

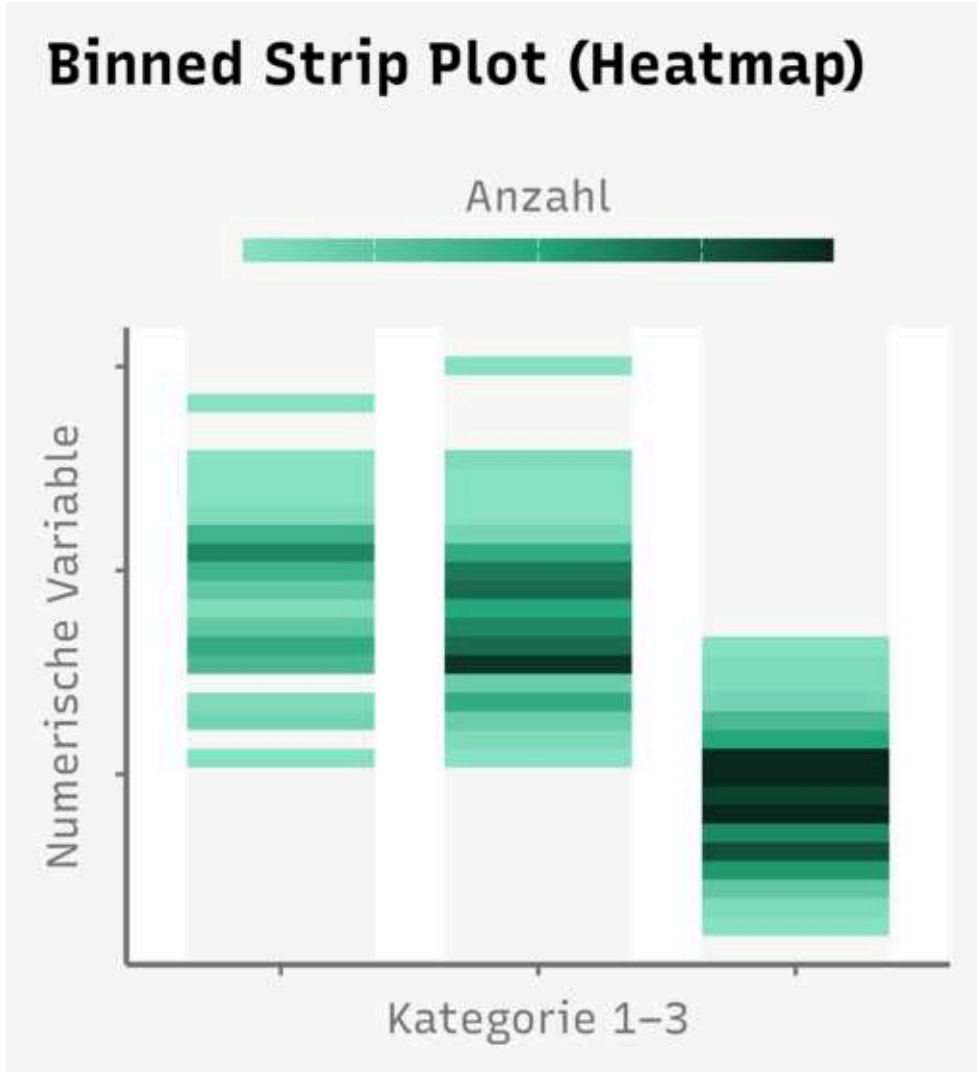


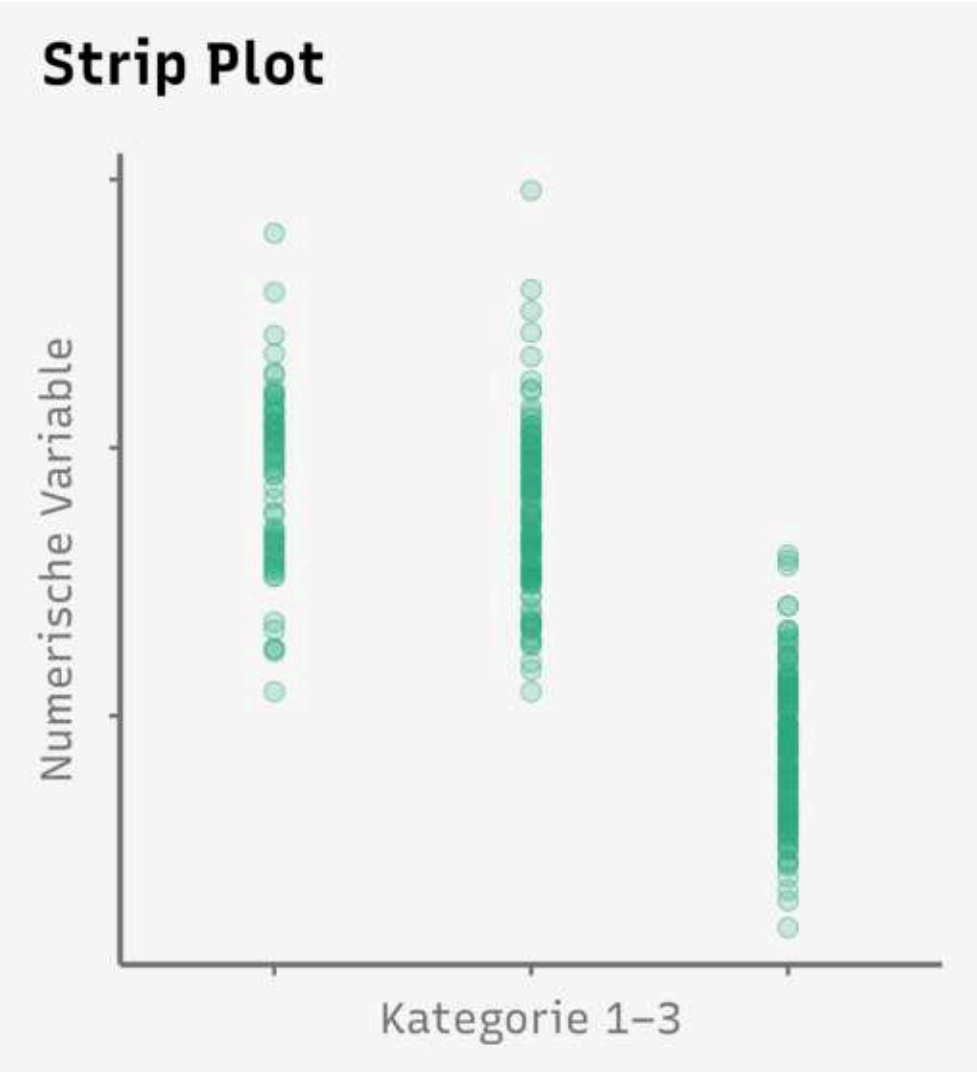
Quelle: „I've Stopped Using Box Plots. Should You?" von Nick Desbarats

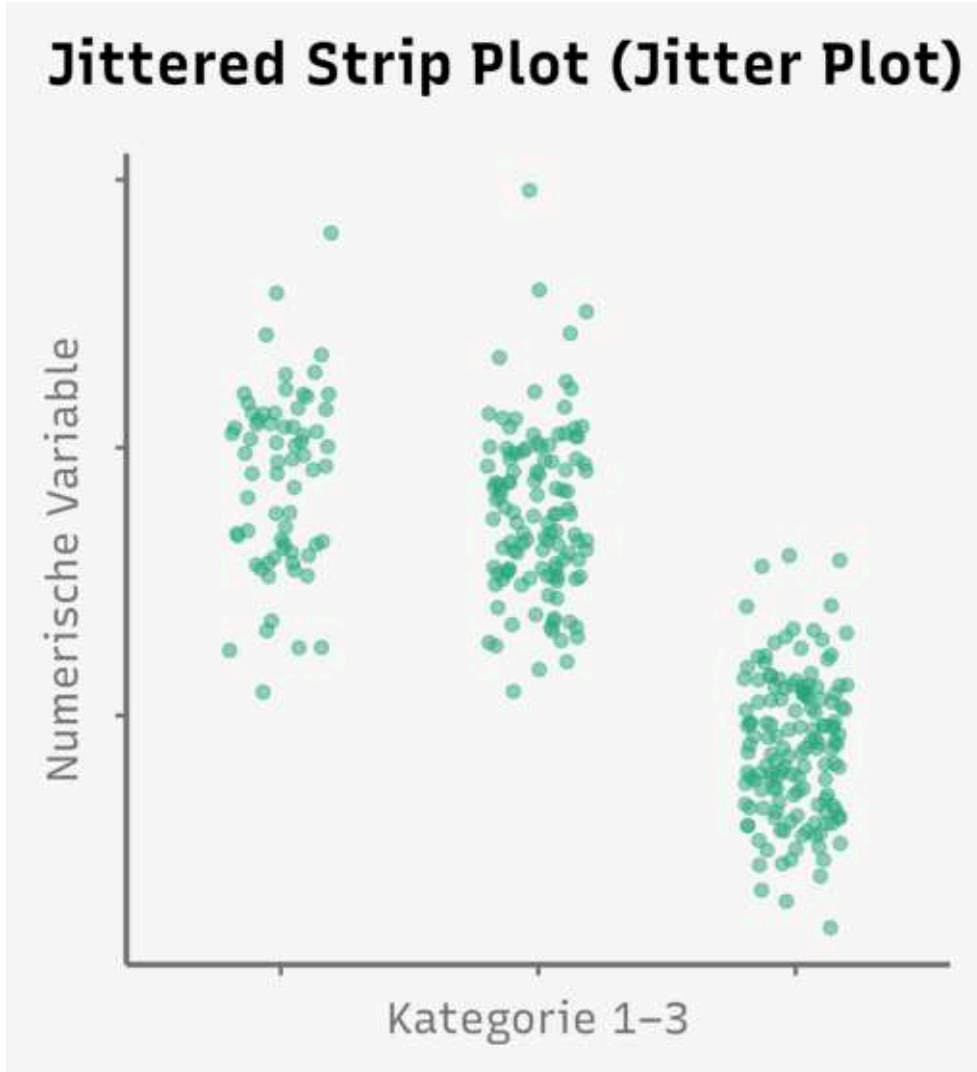

Strip Plot
Numerische Variable
Kategorie 1–3

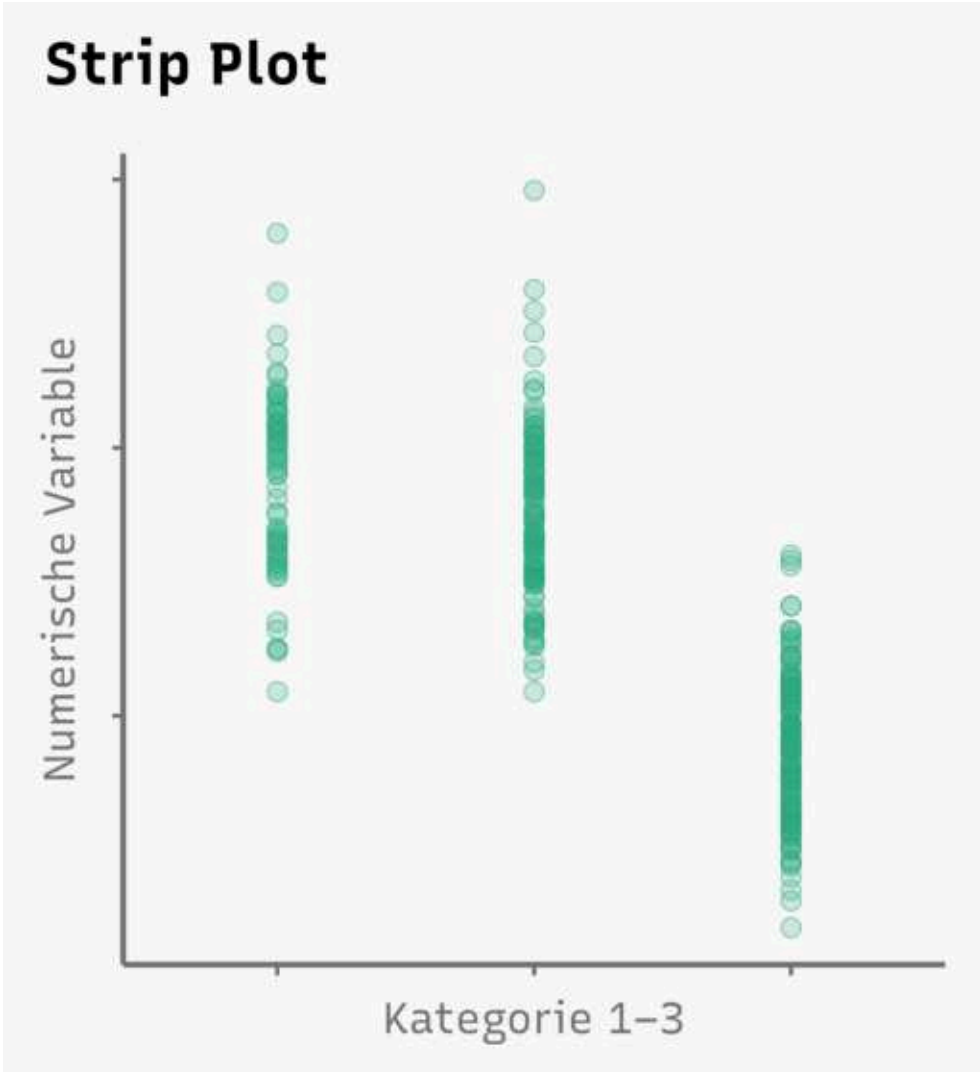

Strip Plot (Barcode Chart)
Numerische Variable
Kategorie 1–3

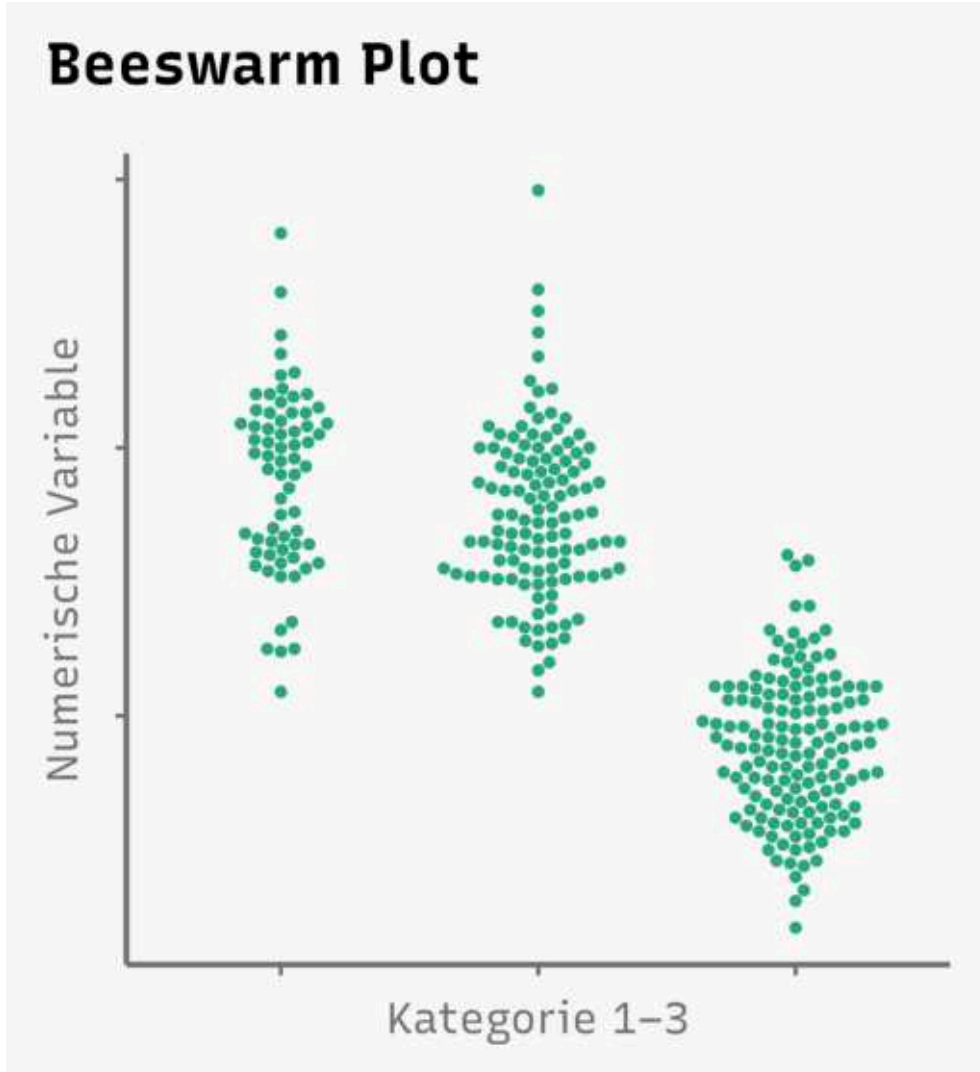

Strip Plot
Numerische Variable
Kategorie 1–3


Binned Strip Plot (Heatmap)
Anzahl
Numerische Variable
Kategorie 1–3

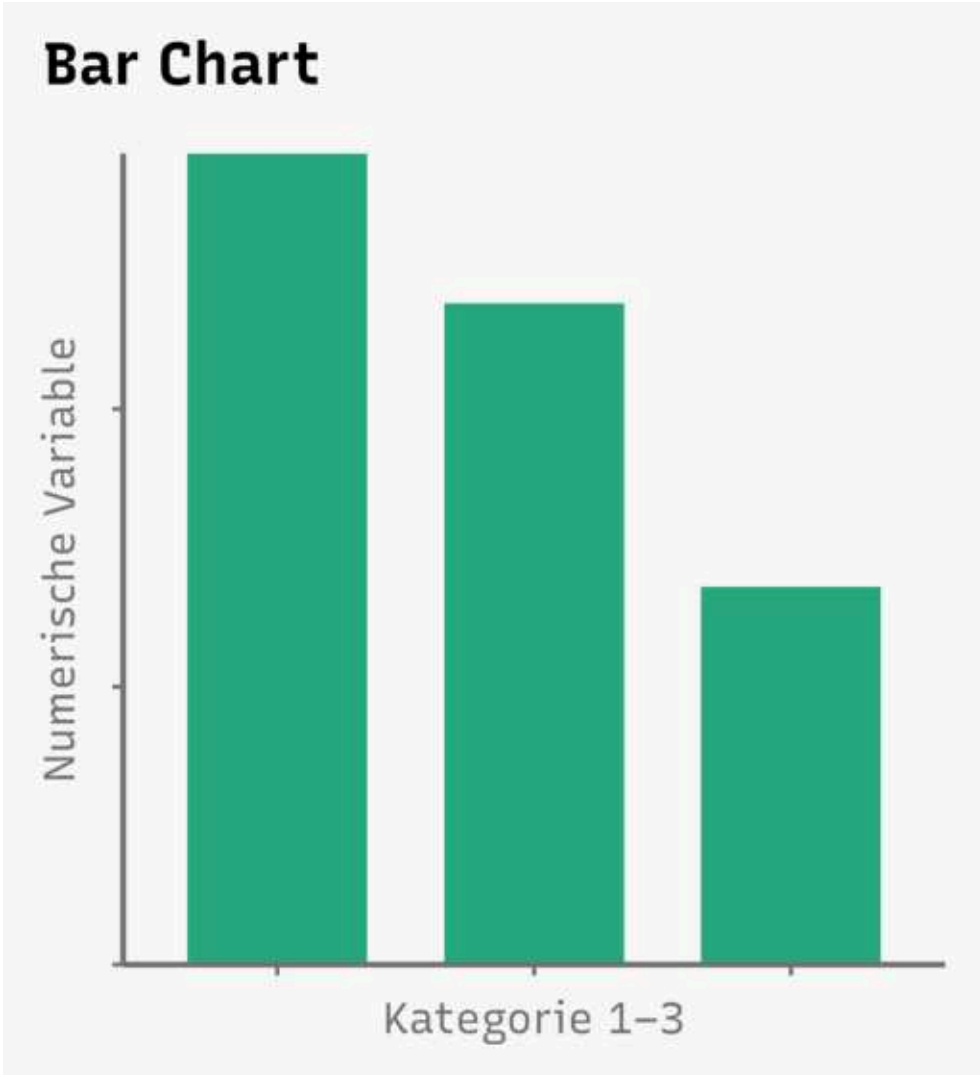

Strip Plot
Numerische Variable
Kategorie 1–3

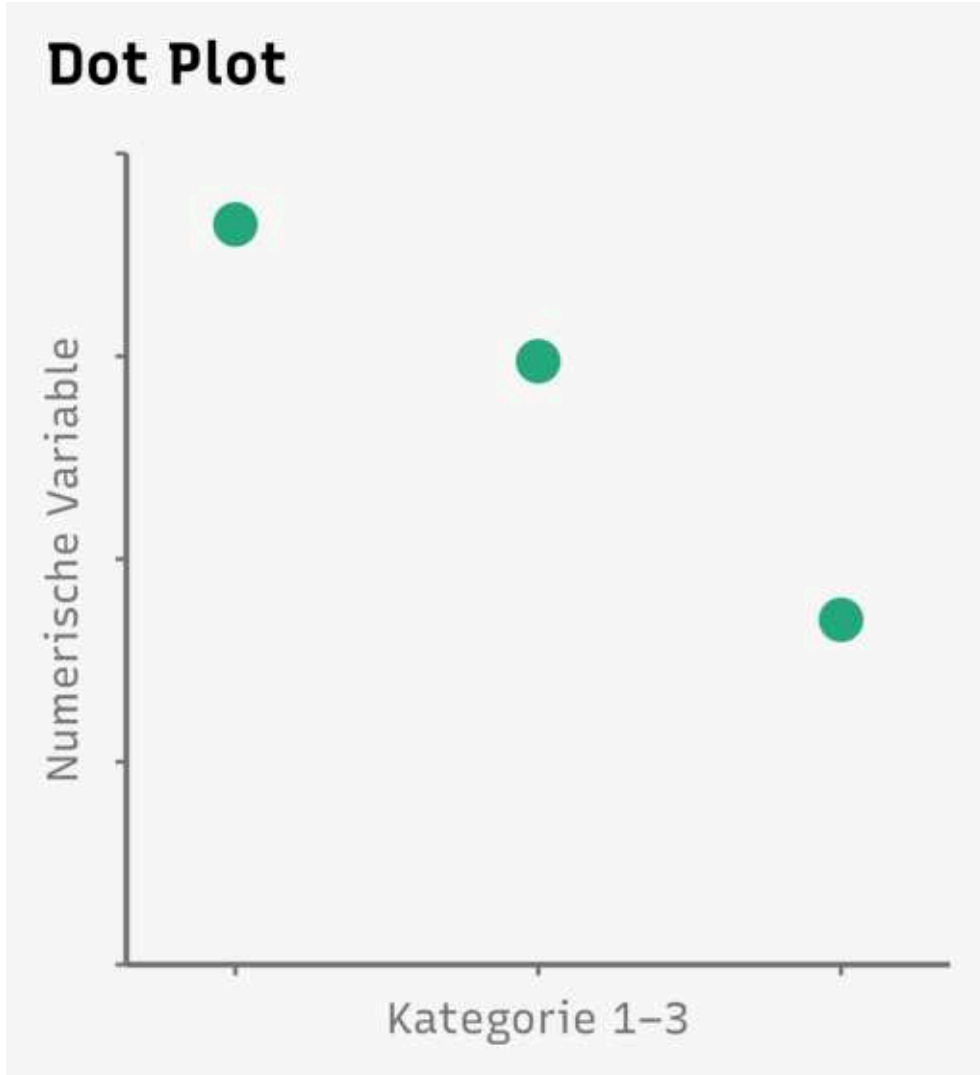

Jittered Strip Plot (Jitter Plot)
Numerische Variable
Kategorie 1–3

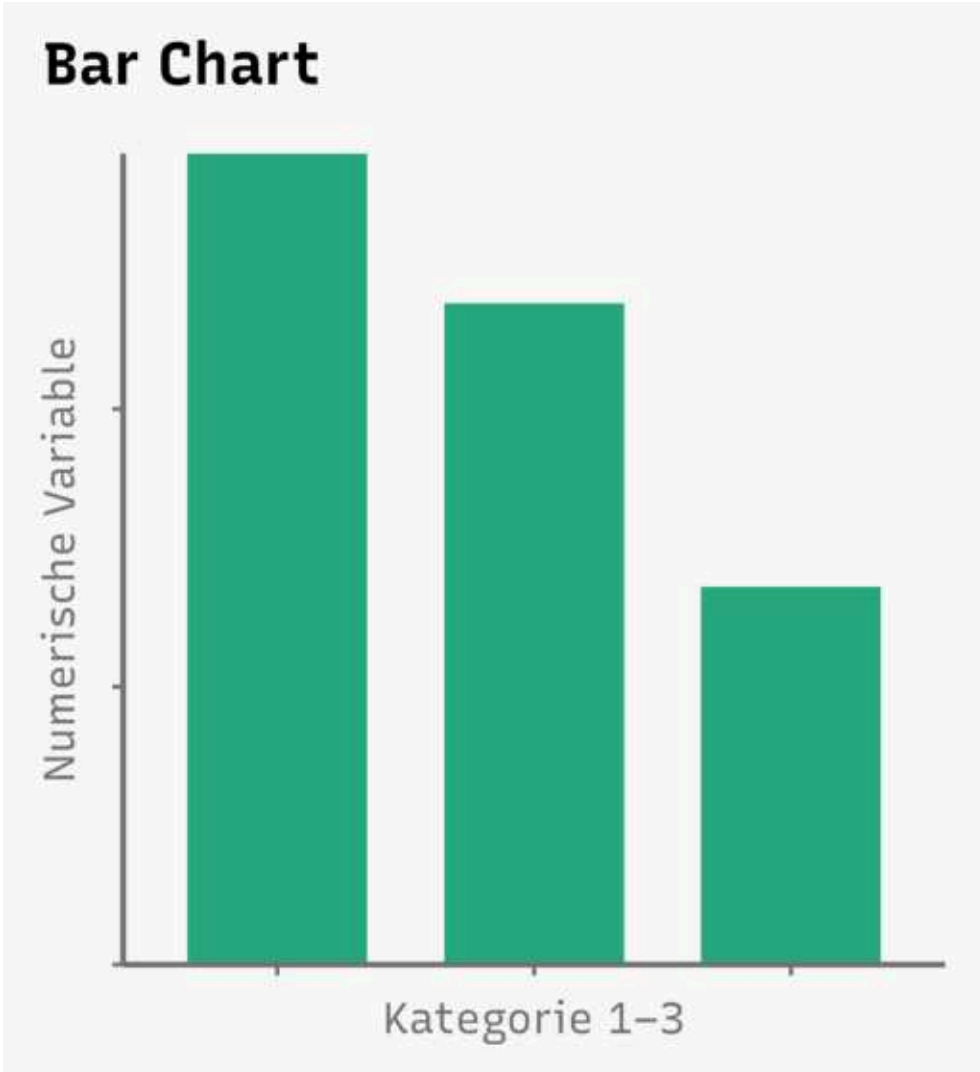

Strip Plot
Numerische Variable
Kategorie 1–3

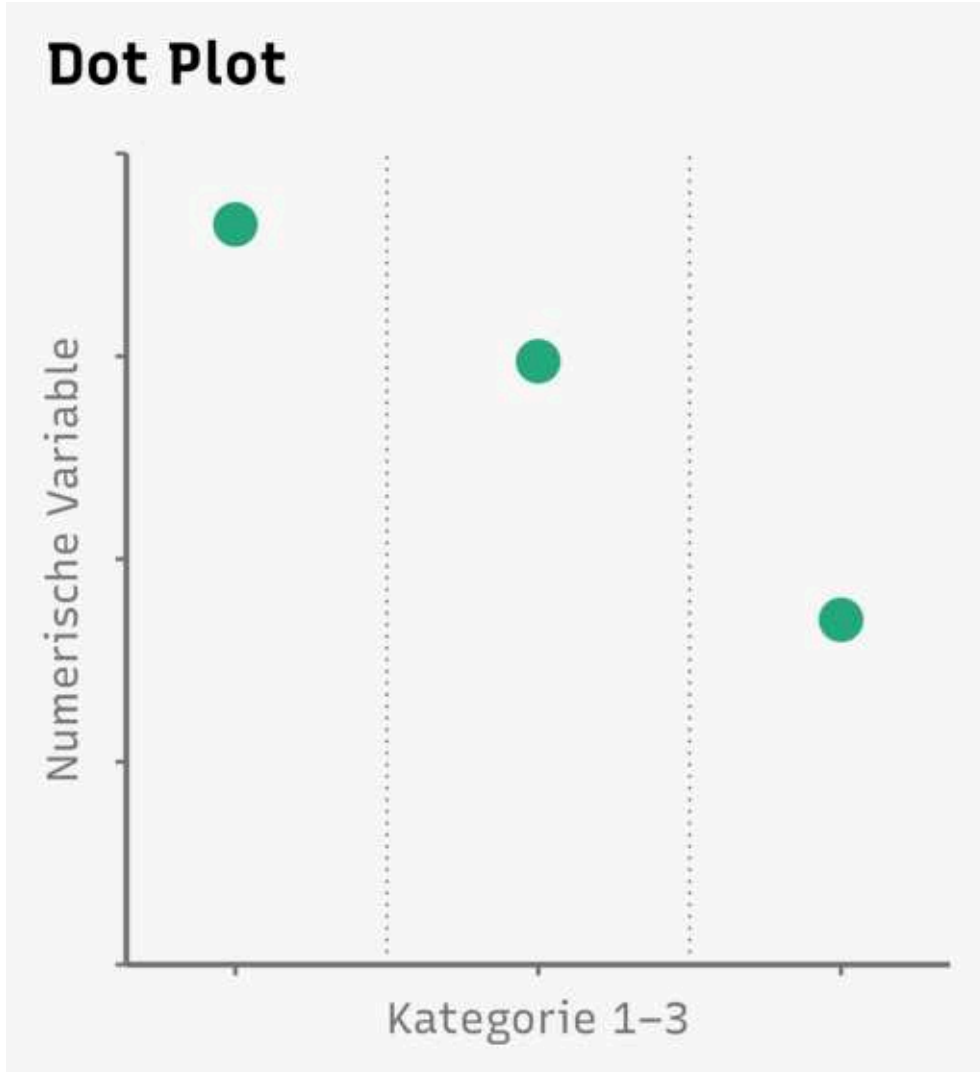

Beeswarm Plot
Numerische Variable
Kategorie 1–3

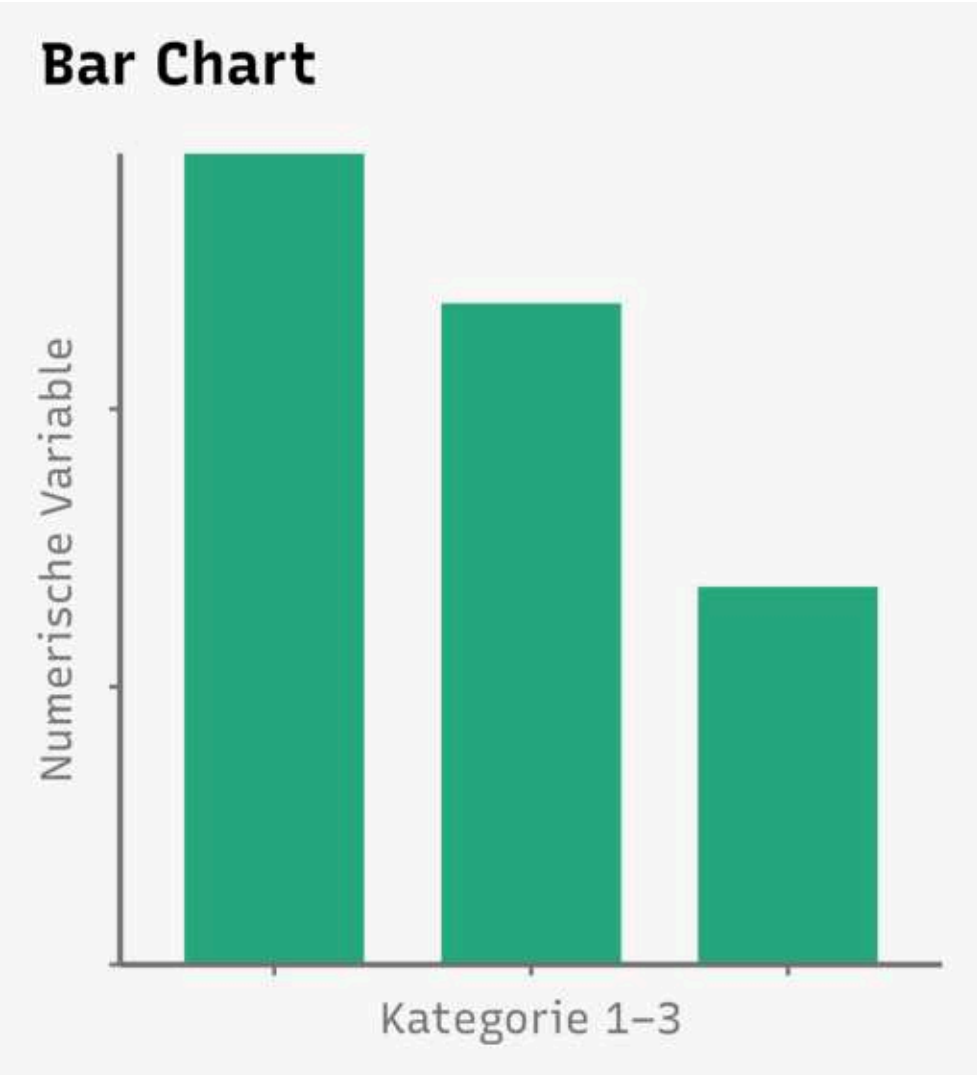
Mengen vergleichen

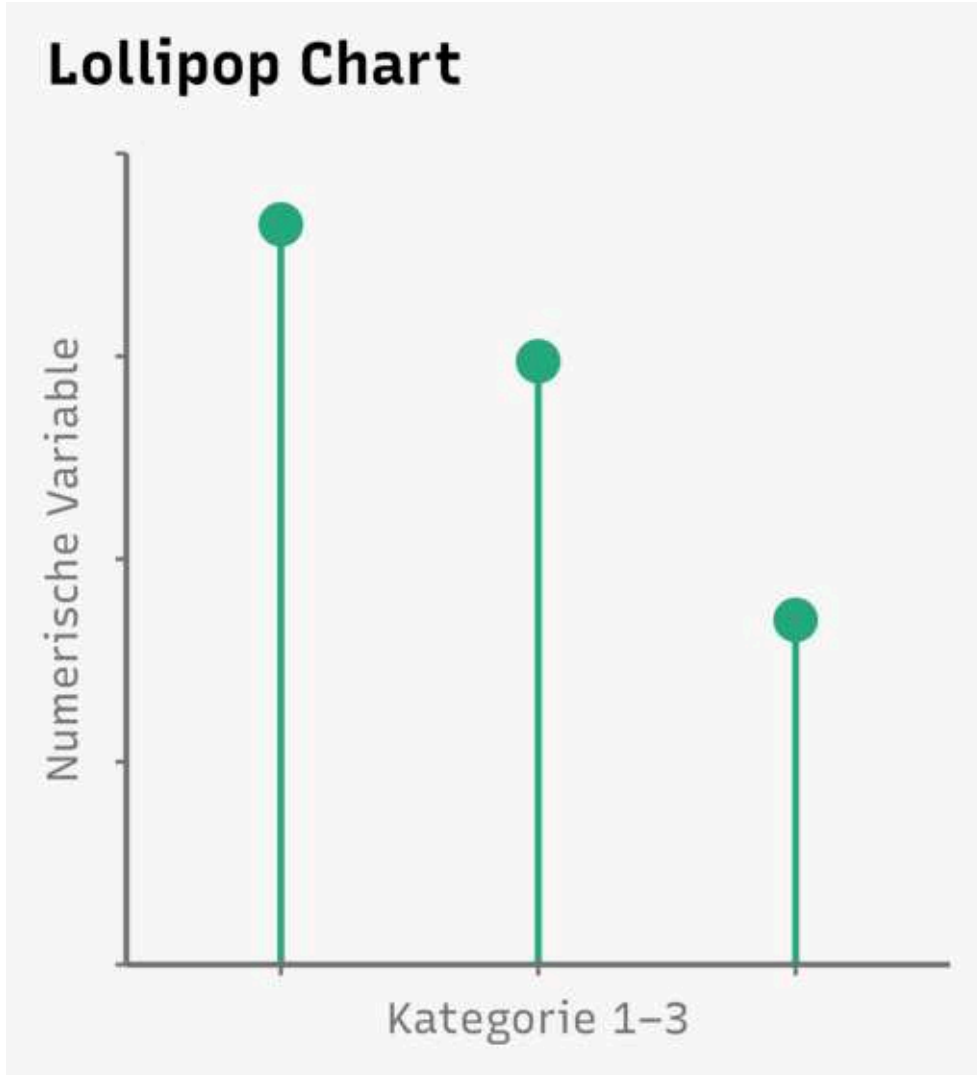

Bar Chart
Numerische Variable
Kategorie 1–3

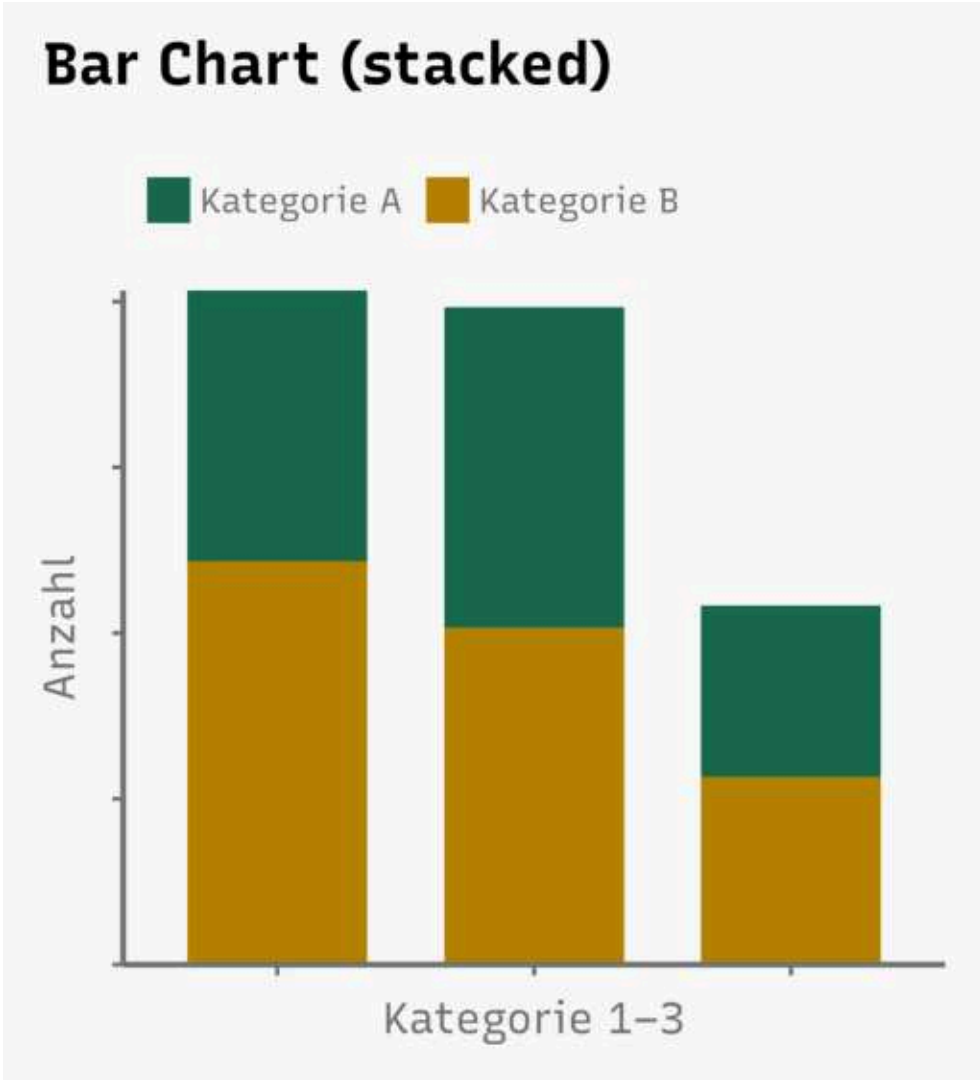

Dot Plot
Numerische Variable
Kategorie 1–3

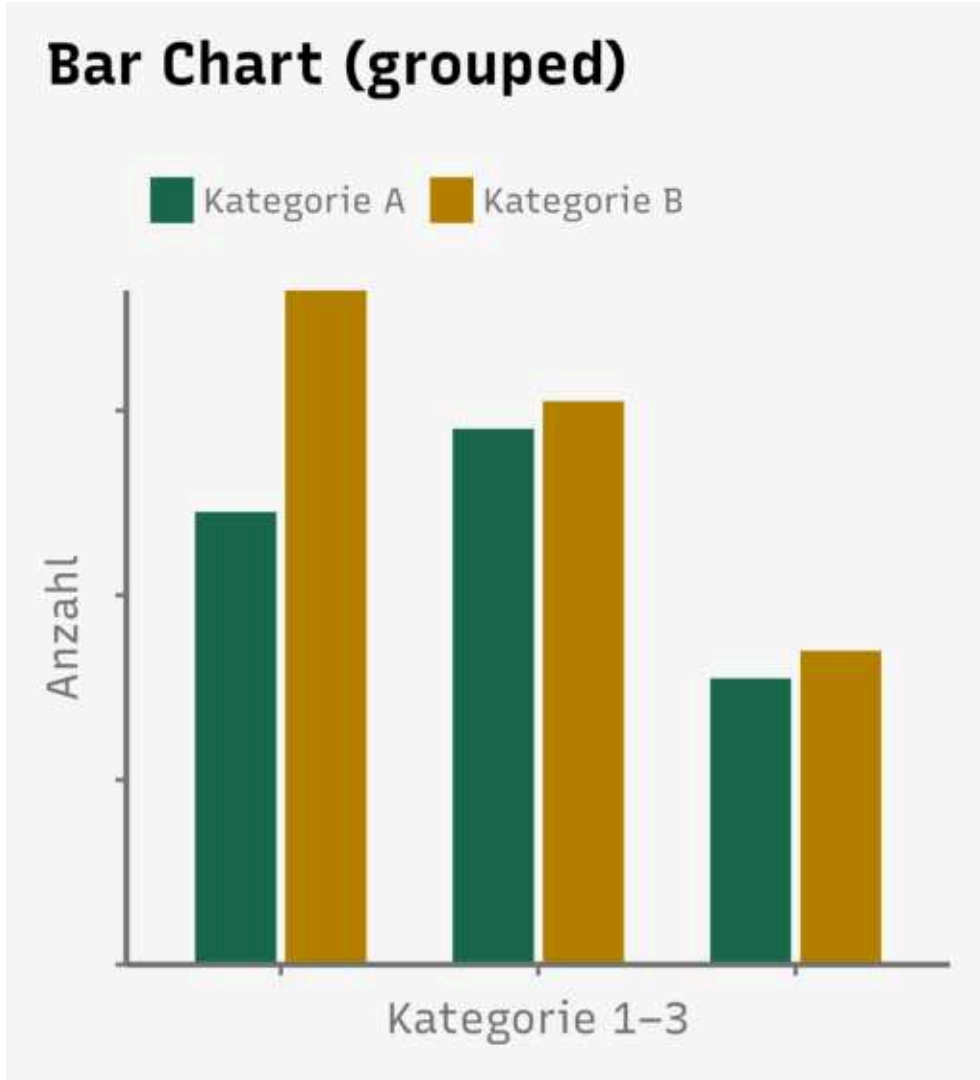

Bar Chart
Numerische Variable
Kategorie 1–3

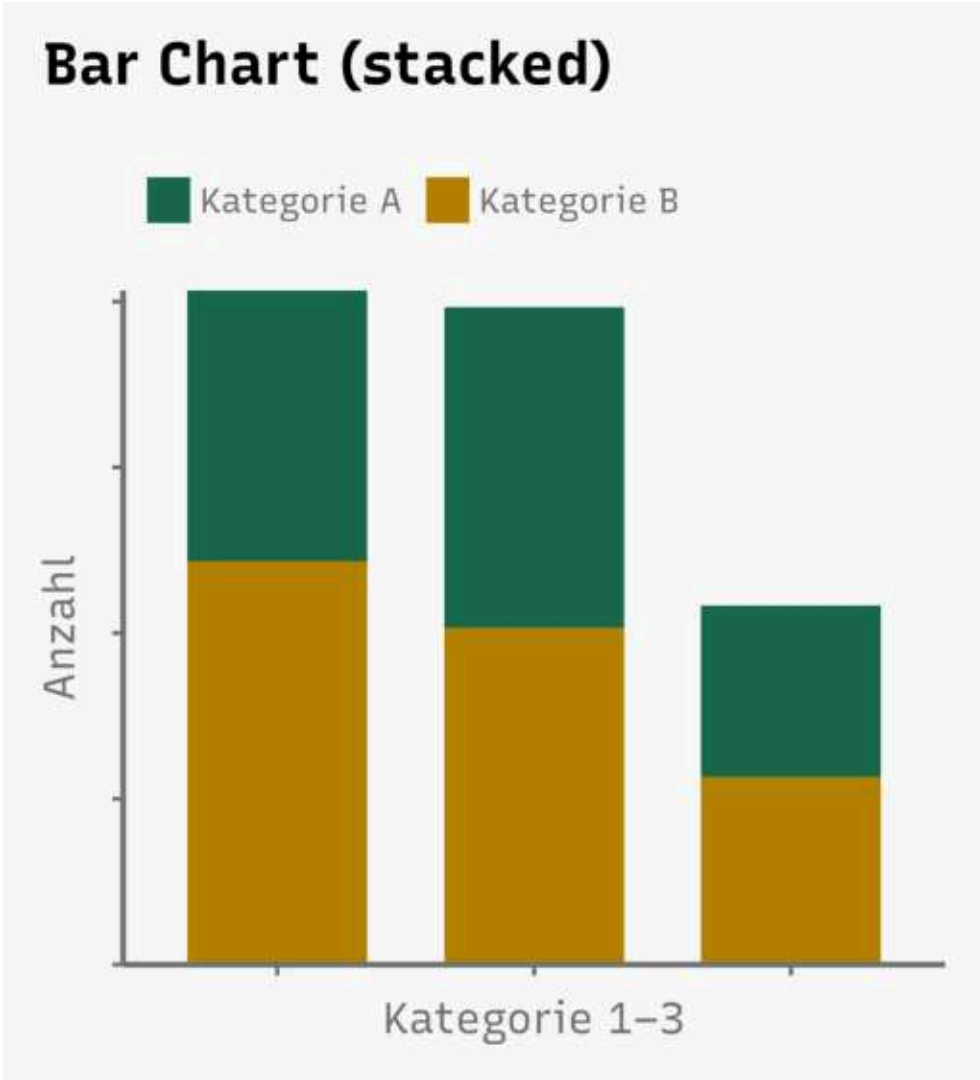

Dot Plot
Numerische Variable
Kategorie 1–3

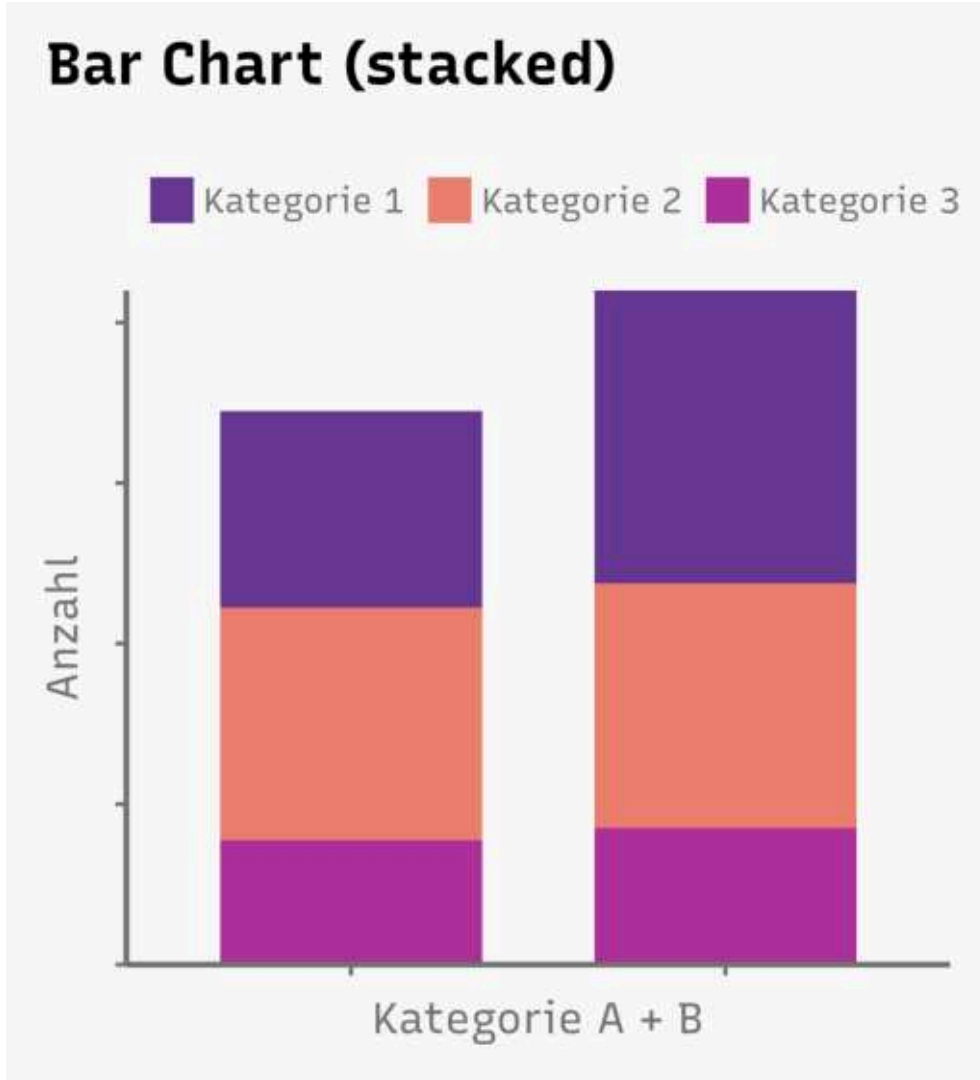

Bar Chart
Numerische Variable
Kategorie 1–3

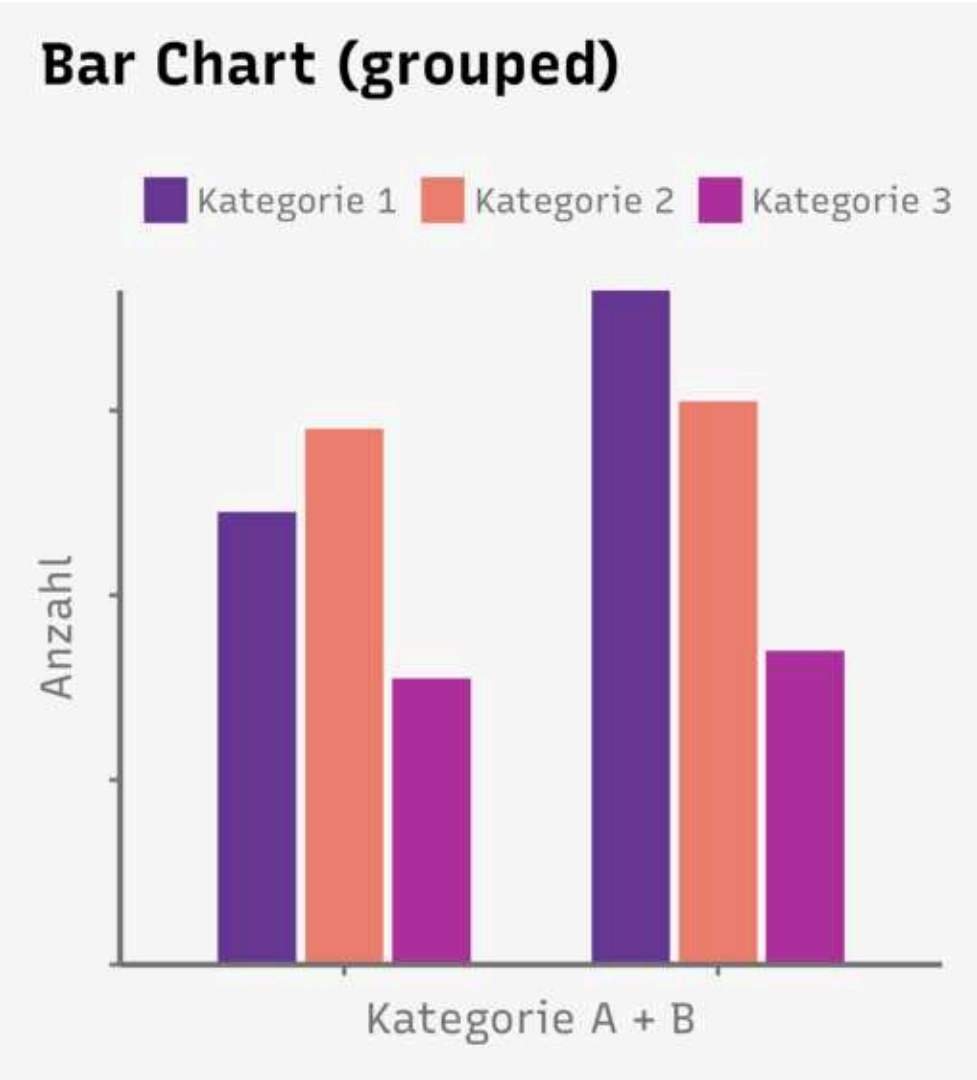

Lollipop Chart
Numerische Variable
Kategorie 1–3

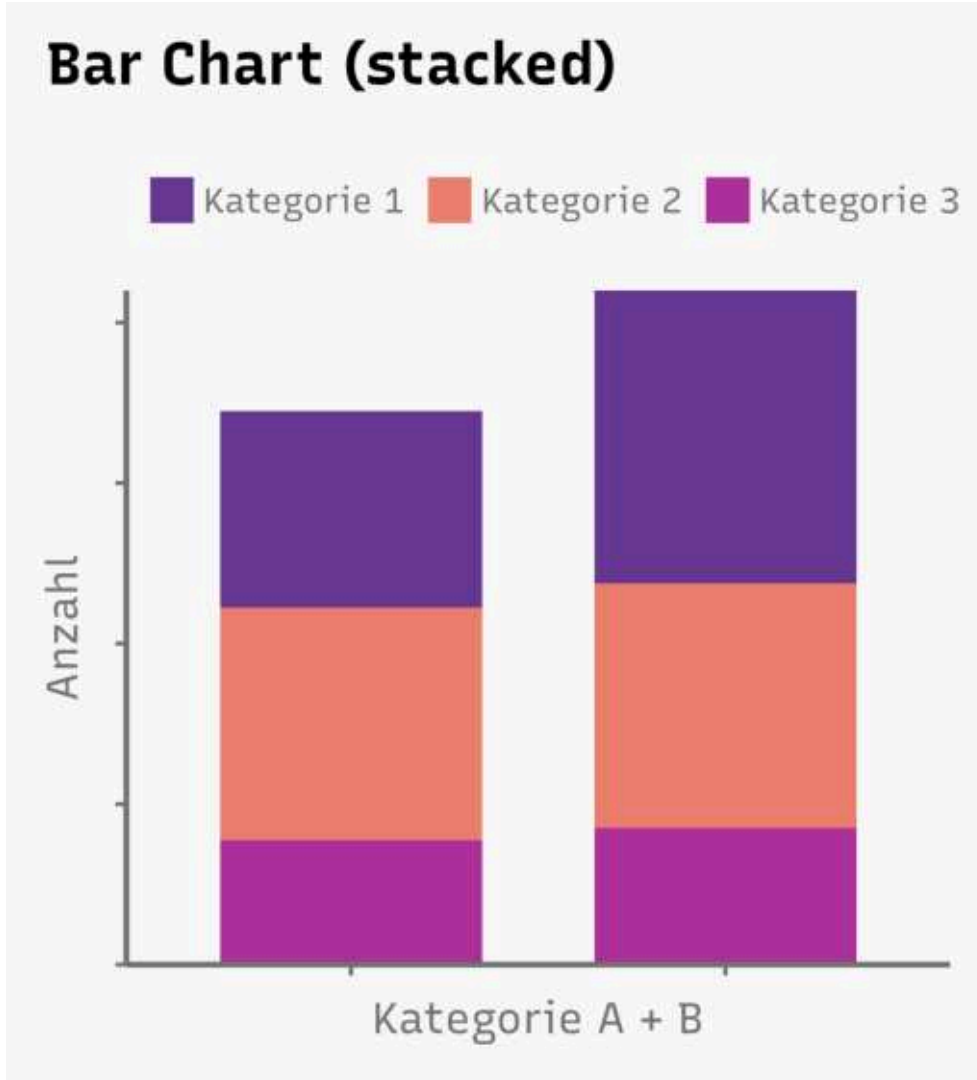

Bar Chart (stacked)
Kategorie A
Kategorie B
Anzahl
Kategorie 1–3

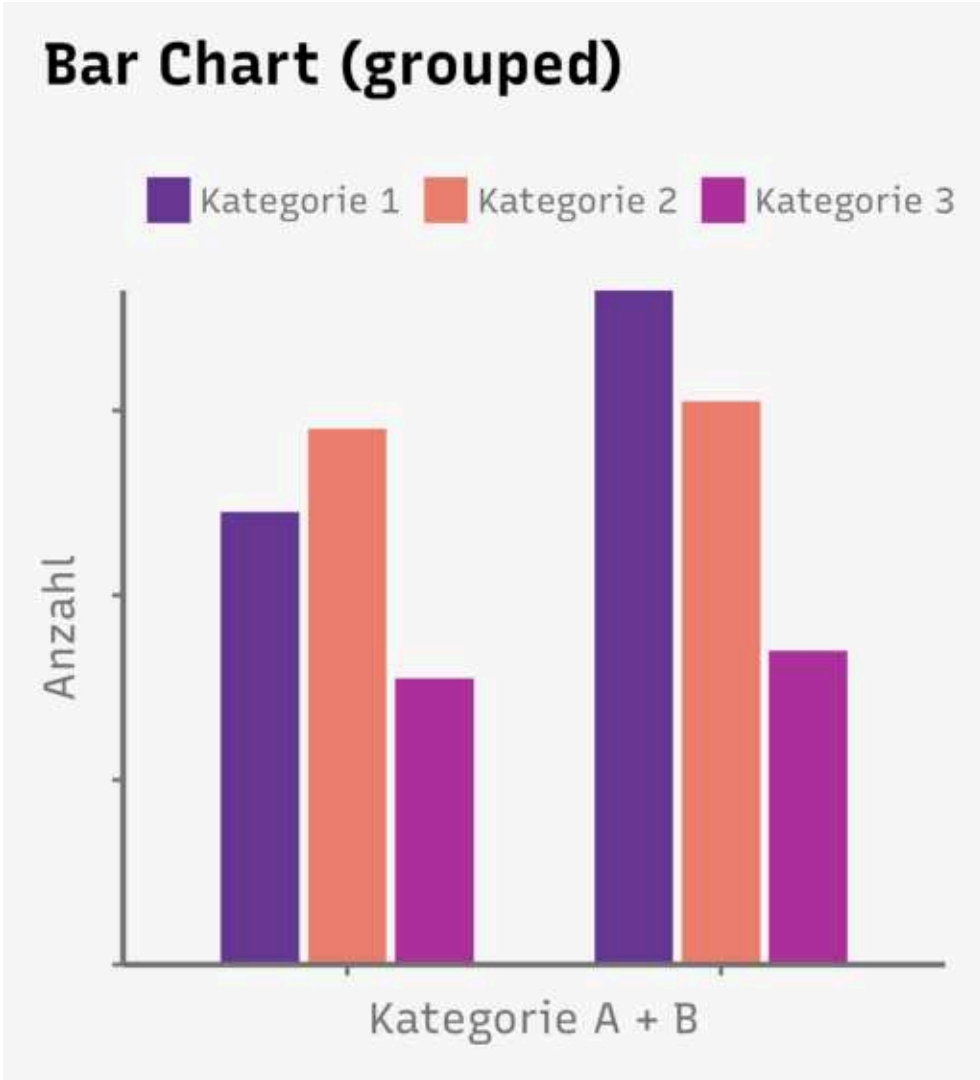

Bar Chart (grouped)
Kategorie A
Kategorie B
Anzahl
Kategorie 1–3

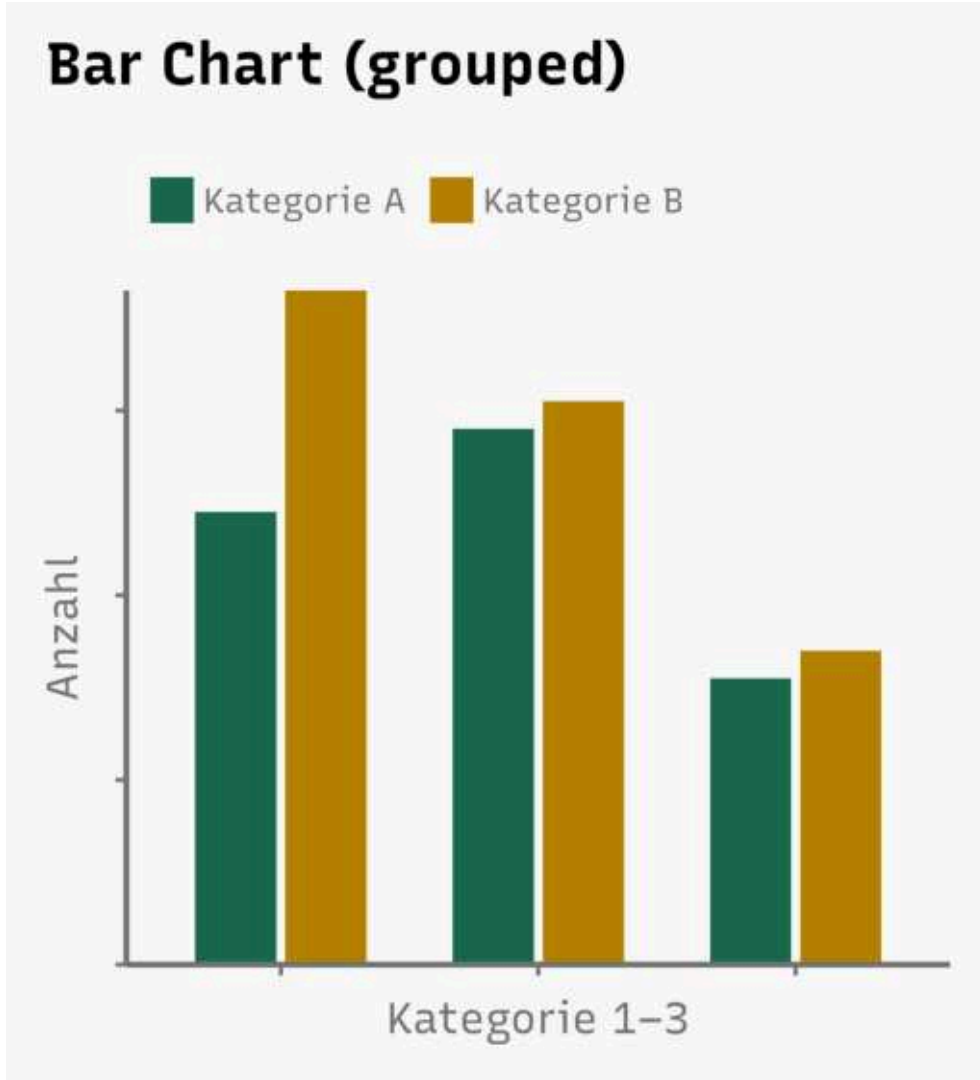

Bar Chart (stacked)
Kategorie A
Kategorie B
Anzahl
Kategorie 1–3

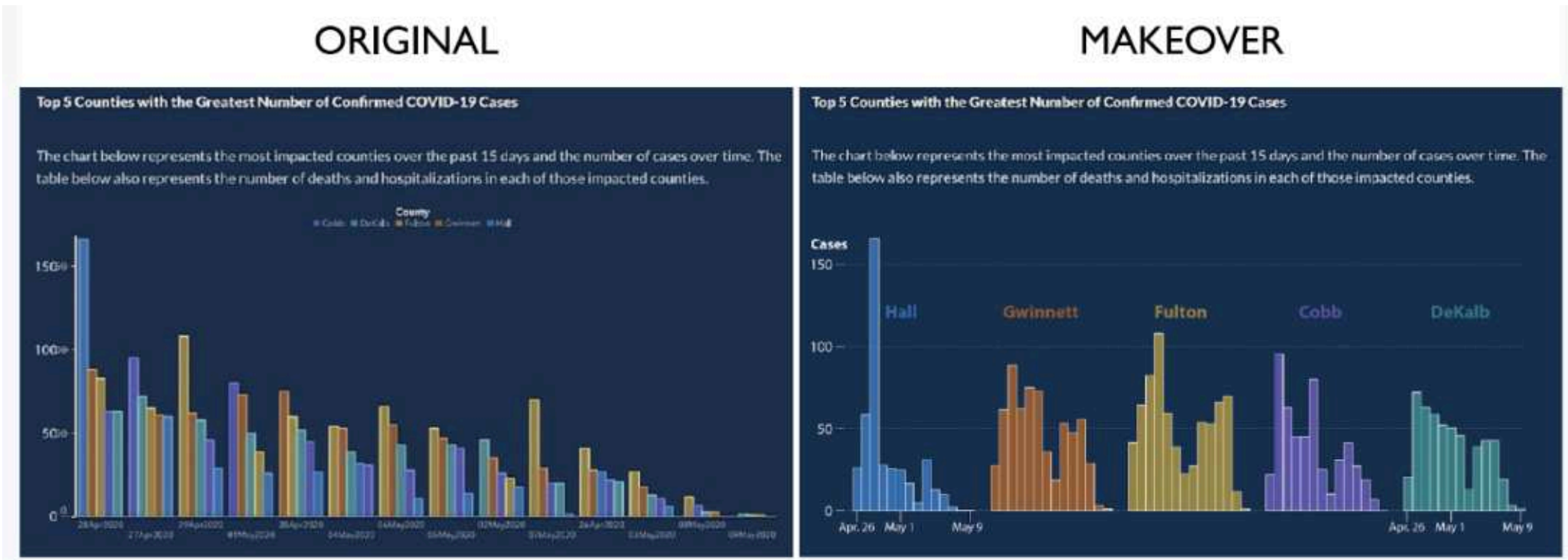

Bar Chart (stacked)
Kategorie 1
Kategorie 2
Kategorie 3
Anzahl
Kategorie A + B


Bar Chart (grouped)
Kategorie 1
Kategorie 2
Kategorie 3
Anzahl
Kategorie A + B

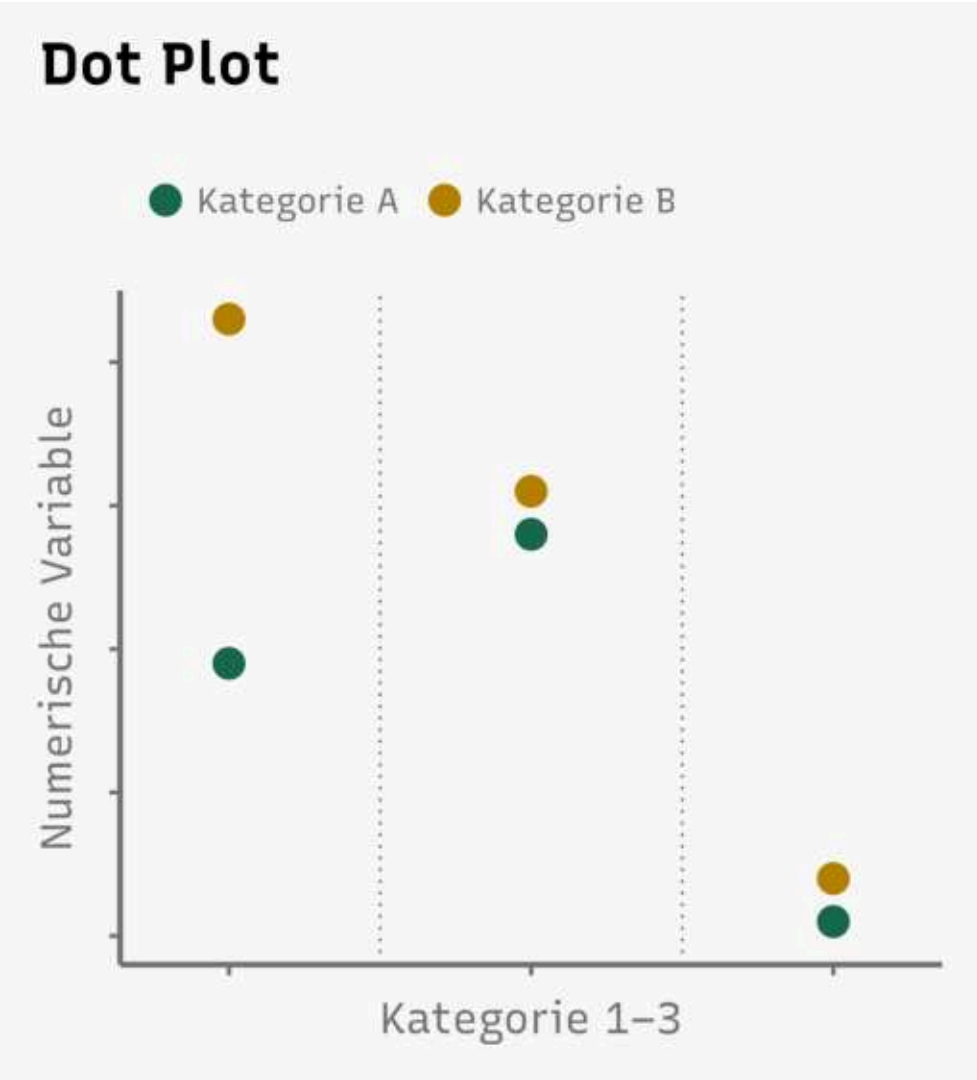

Bar Chart (stacked)
Kategorie 1
Kategorie 2
Kategorie 3
Anzahl
Kategorie A + B

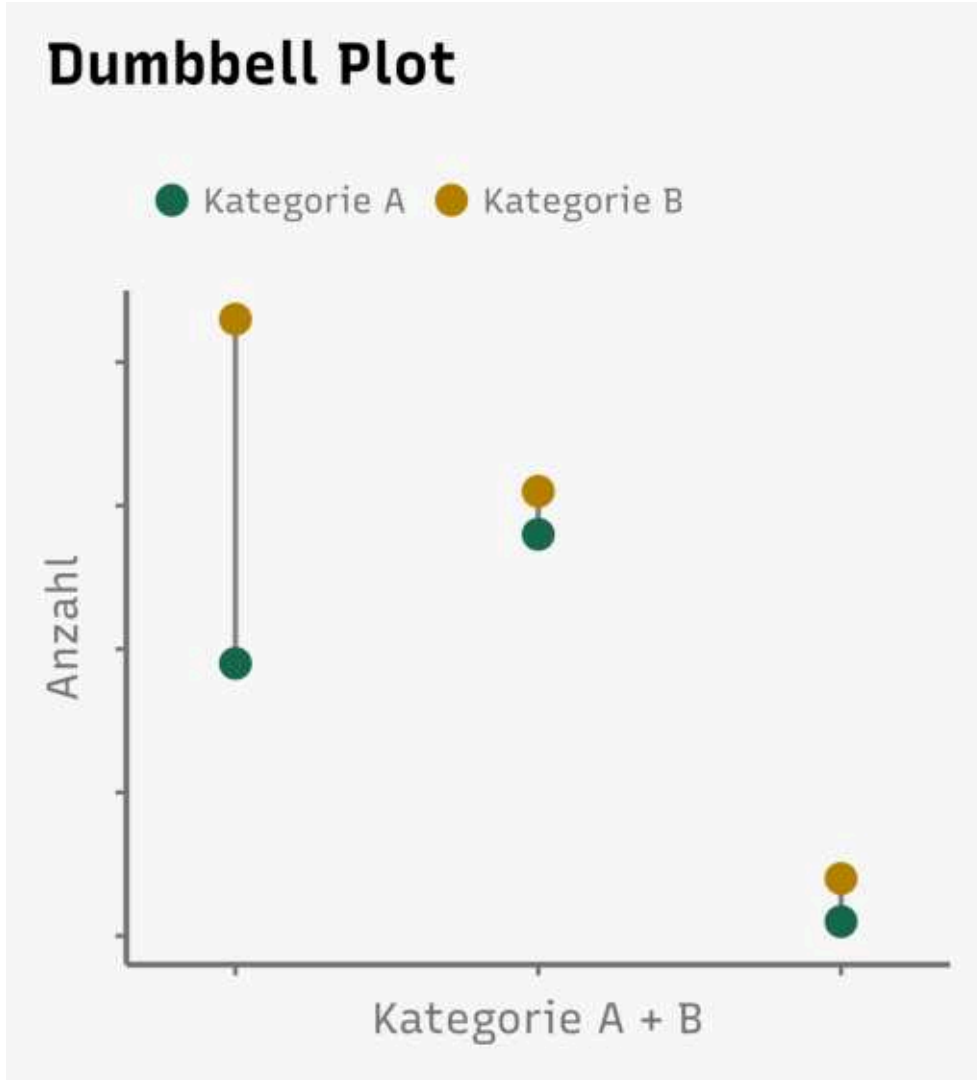

Bar Chart (grouped)
Kategorie 1
Kategorie 2
Kategorie 3
Anzahl
Kategorie A + B


Bar Chart (grouped)
Kategorie A
Kategorie B
Anzahl
Kategorie 1–3

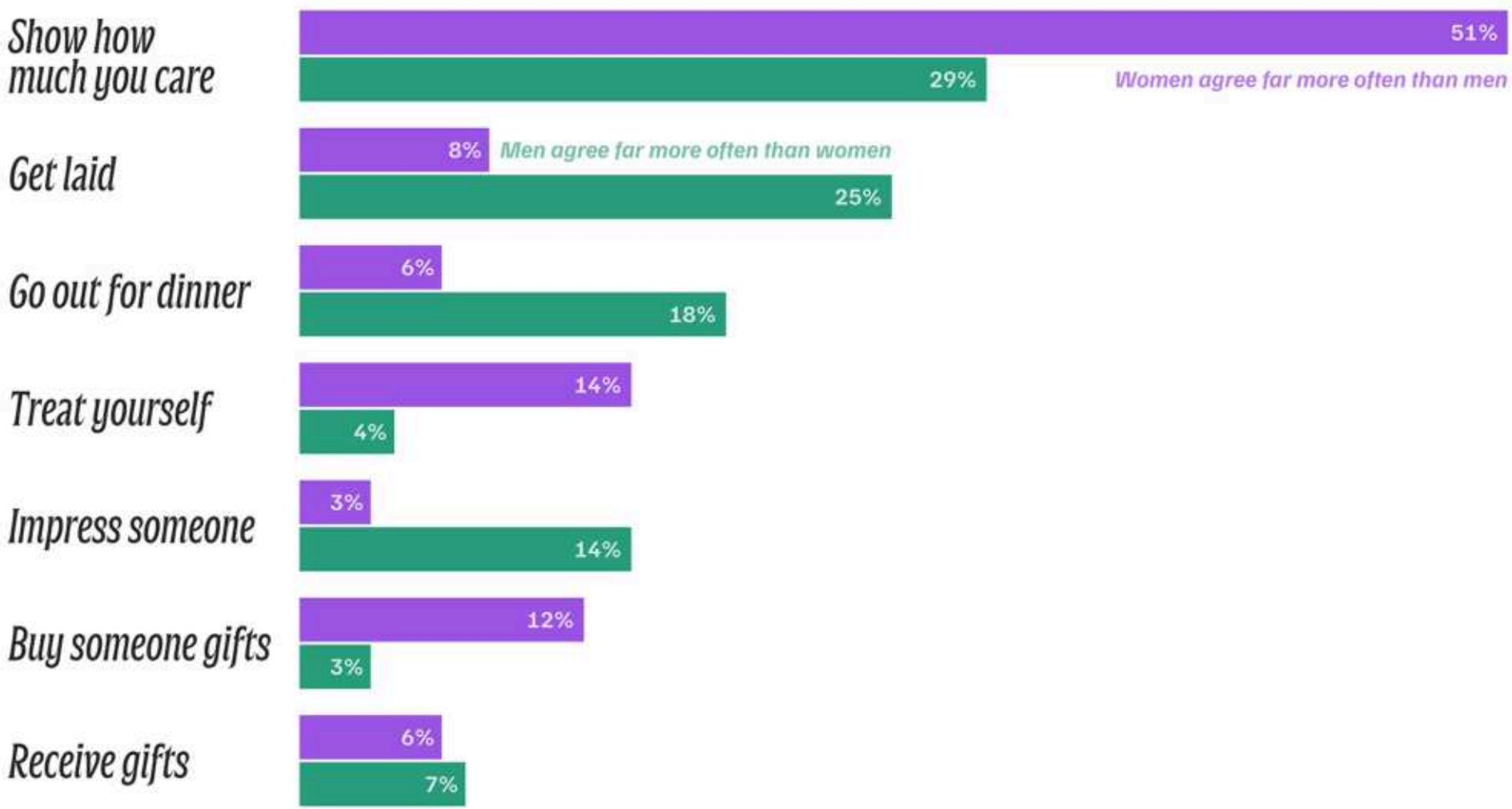


Ursprüngliches gruppiertes Balkendiagramm des Gesundheitsministeriums von Georgia (links) und neu geordnete Version von Alberto Cairo (rechts)


Dot Plot
Kategorie A
Kategorie B
Numerische Variable
Kategorie 1–3


Dumbbell Plot
Kategorie A
Kategorie B
Anzahl
Kategorie A + B

For 25% of surveyed men, the point of Valentine's Day is to *"get laid"* —more than the half of women responded *"show how much you care"*

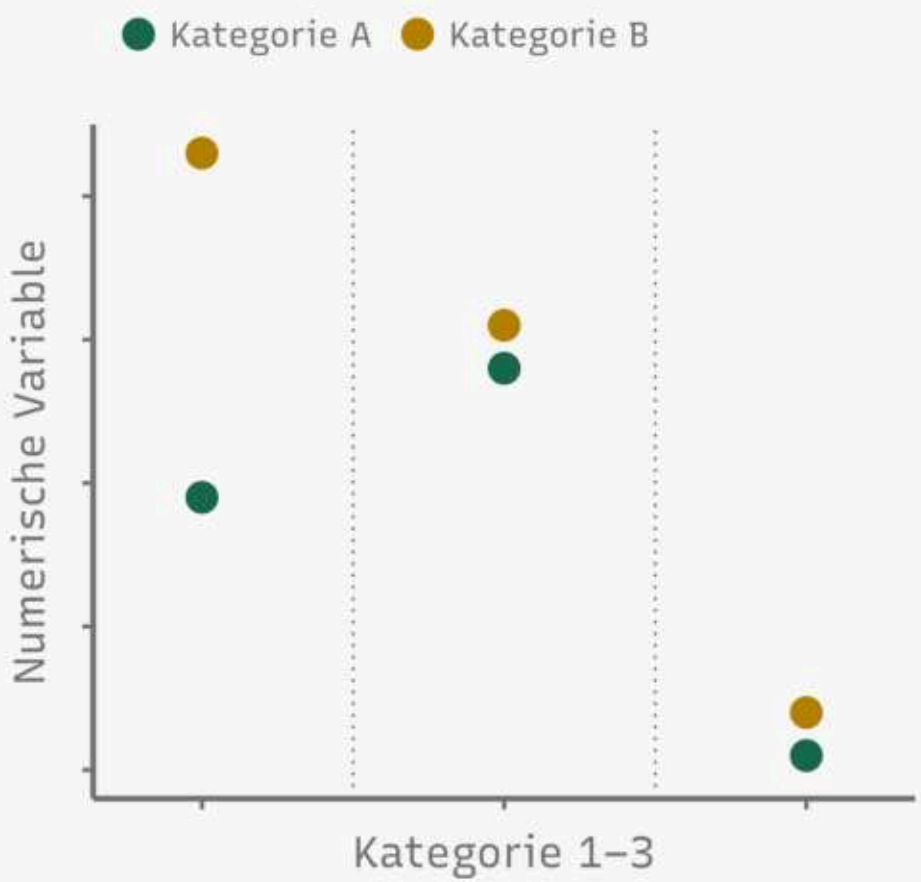


Visualization: Cédric Scherer • Data: UK survey in 2015 by chilisauce.co.uk

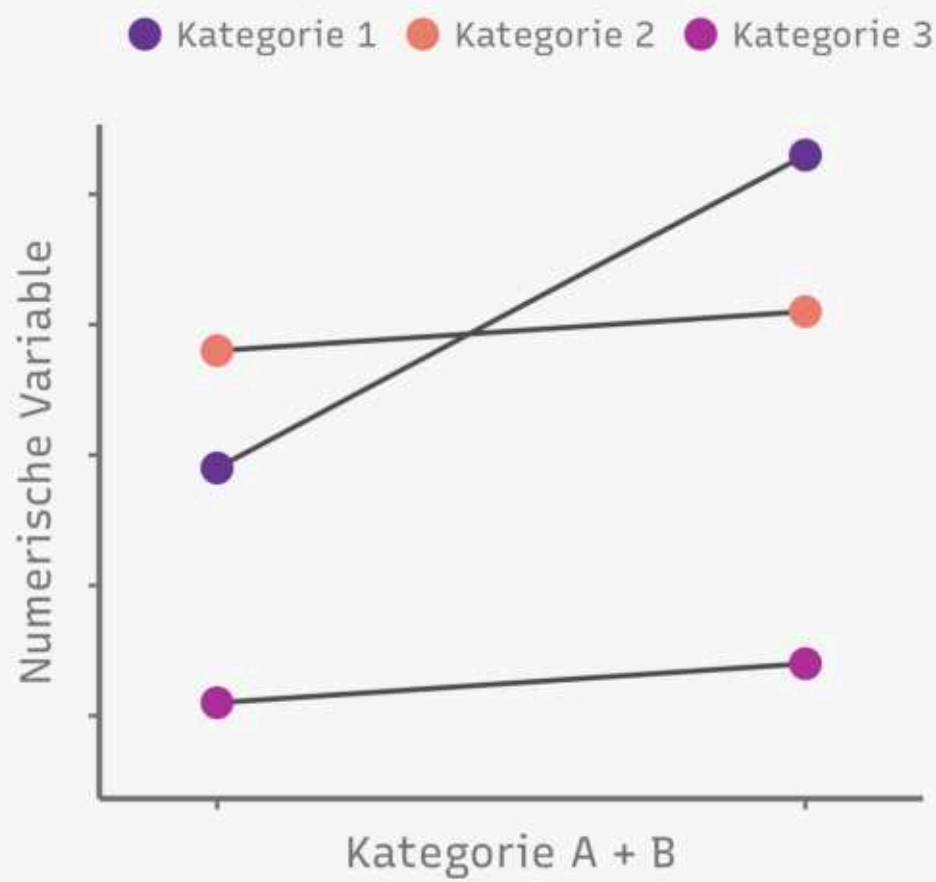
For 25% of surveyed men, the point of Valentine's Day is to *"get laid"* —more than the half of women responded *"show how much you care"*

Visualization: Cédric Scherer • Data: UK survey in 2015 by chilisauce.co.uk

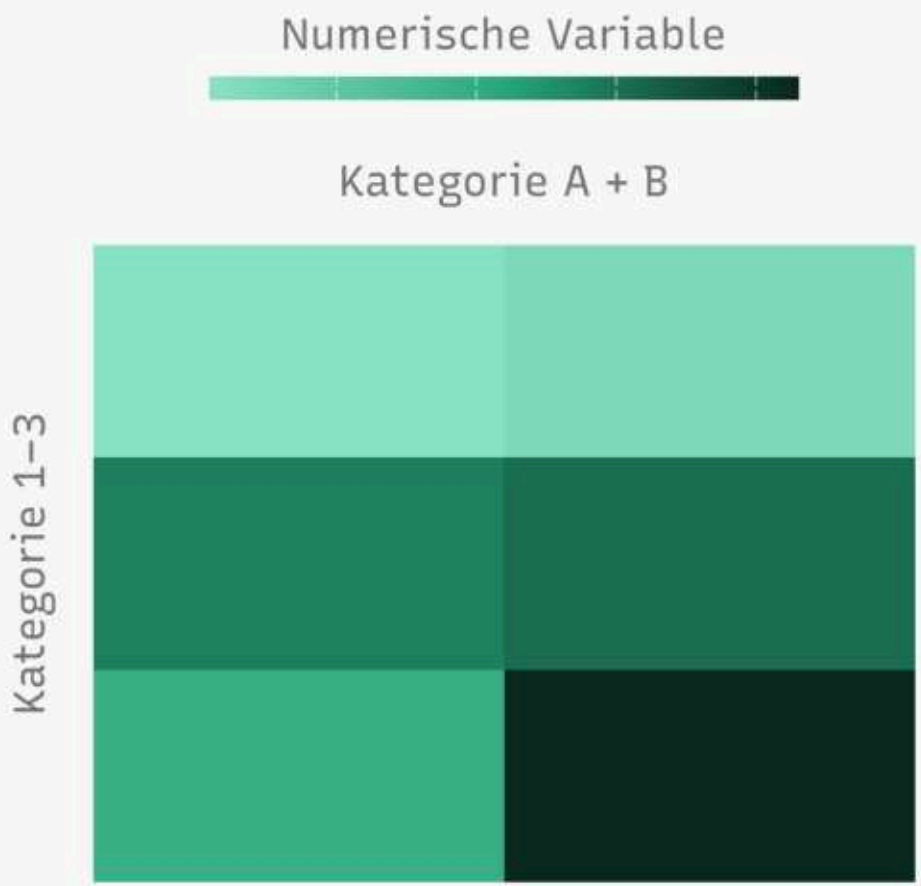
Dot Plot



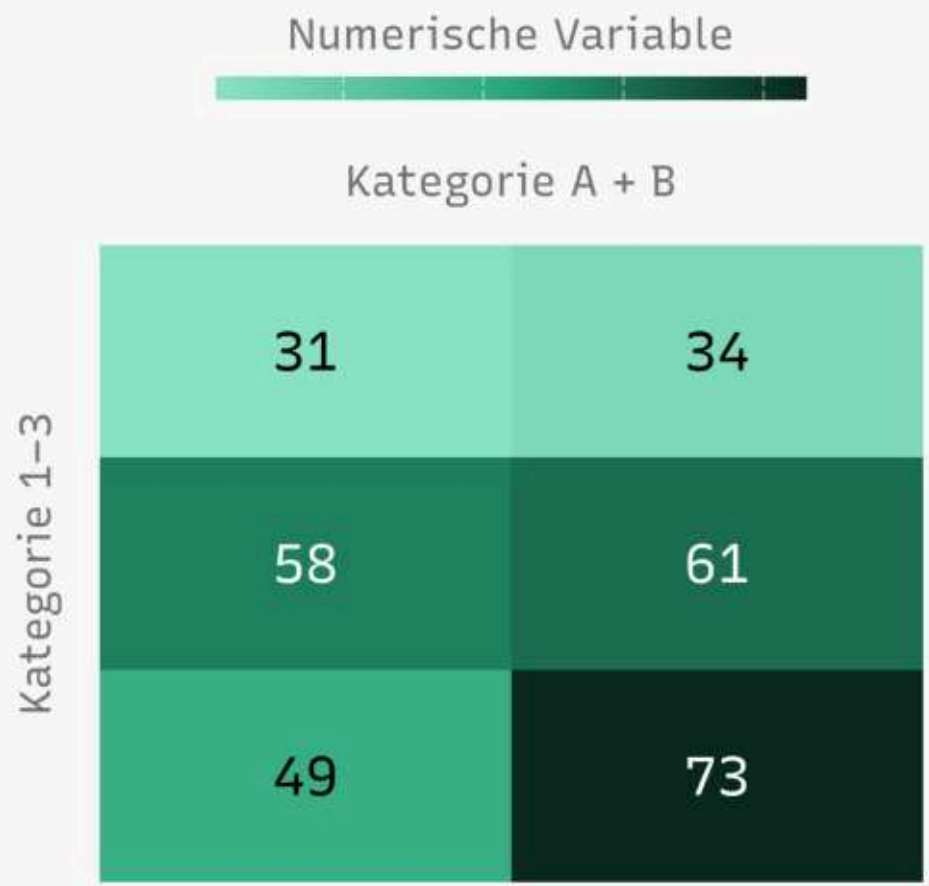
Slope Chart



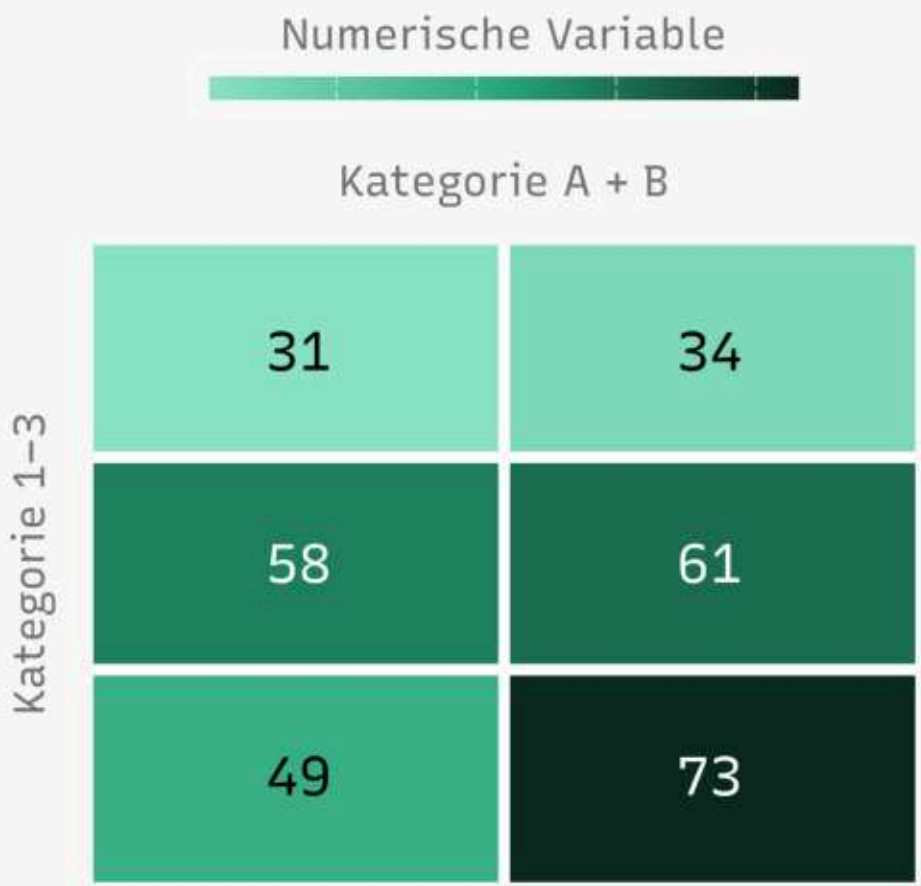
Heatmap



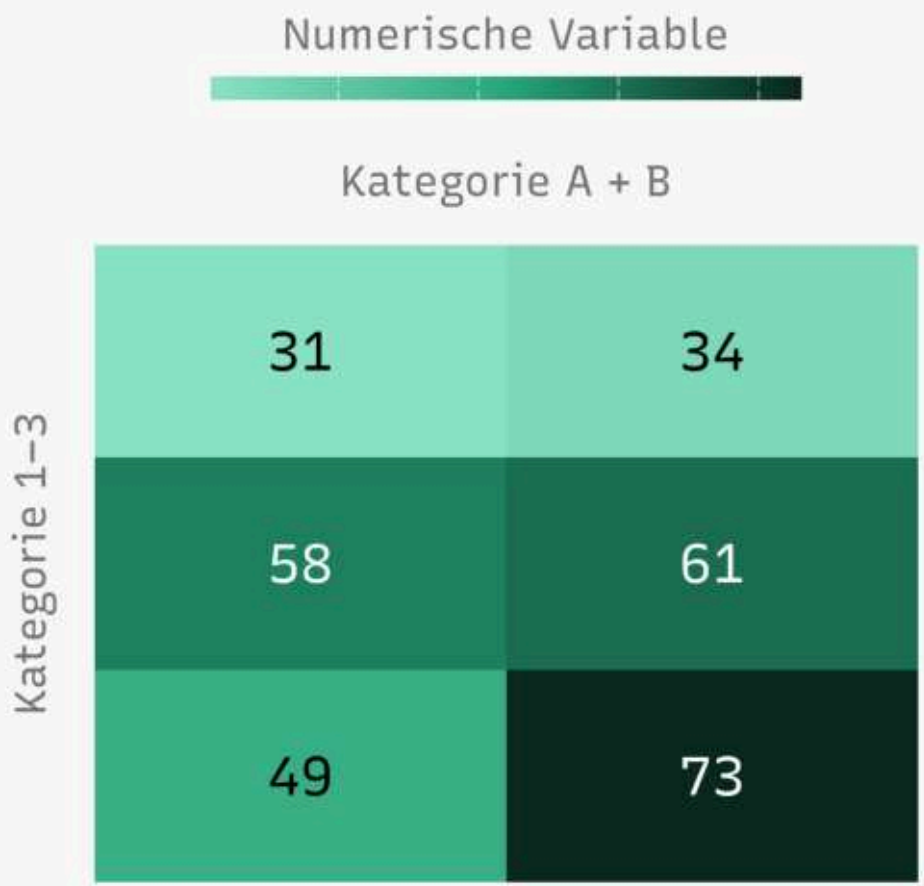
Heatmap Table



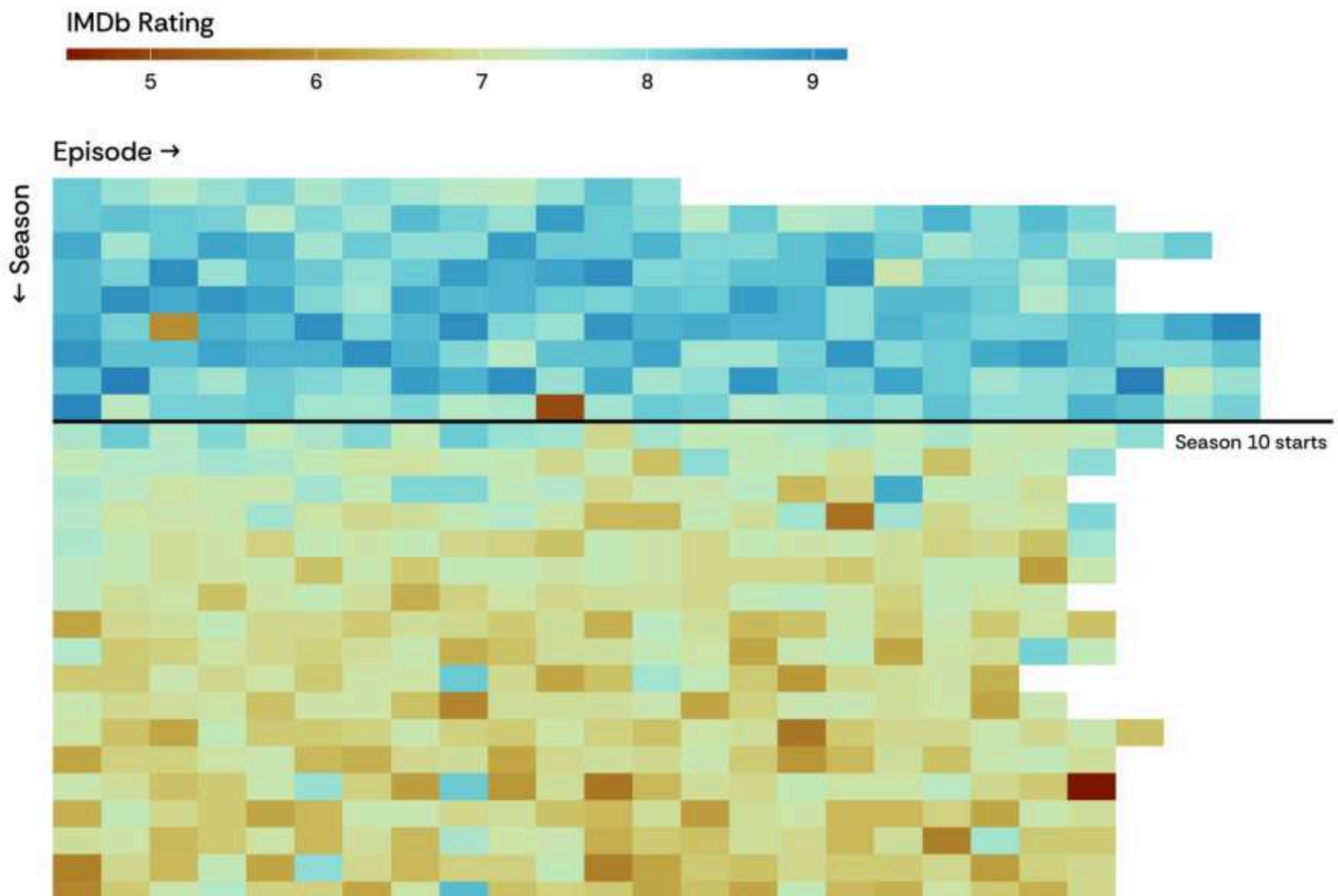
Heatmap Table



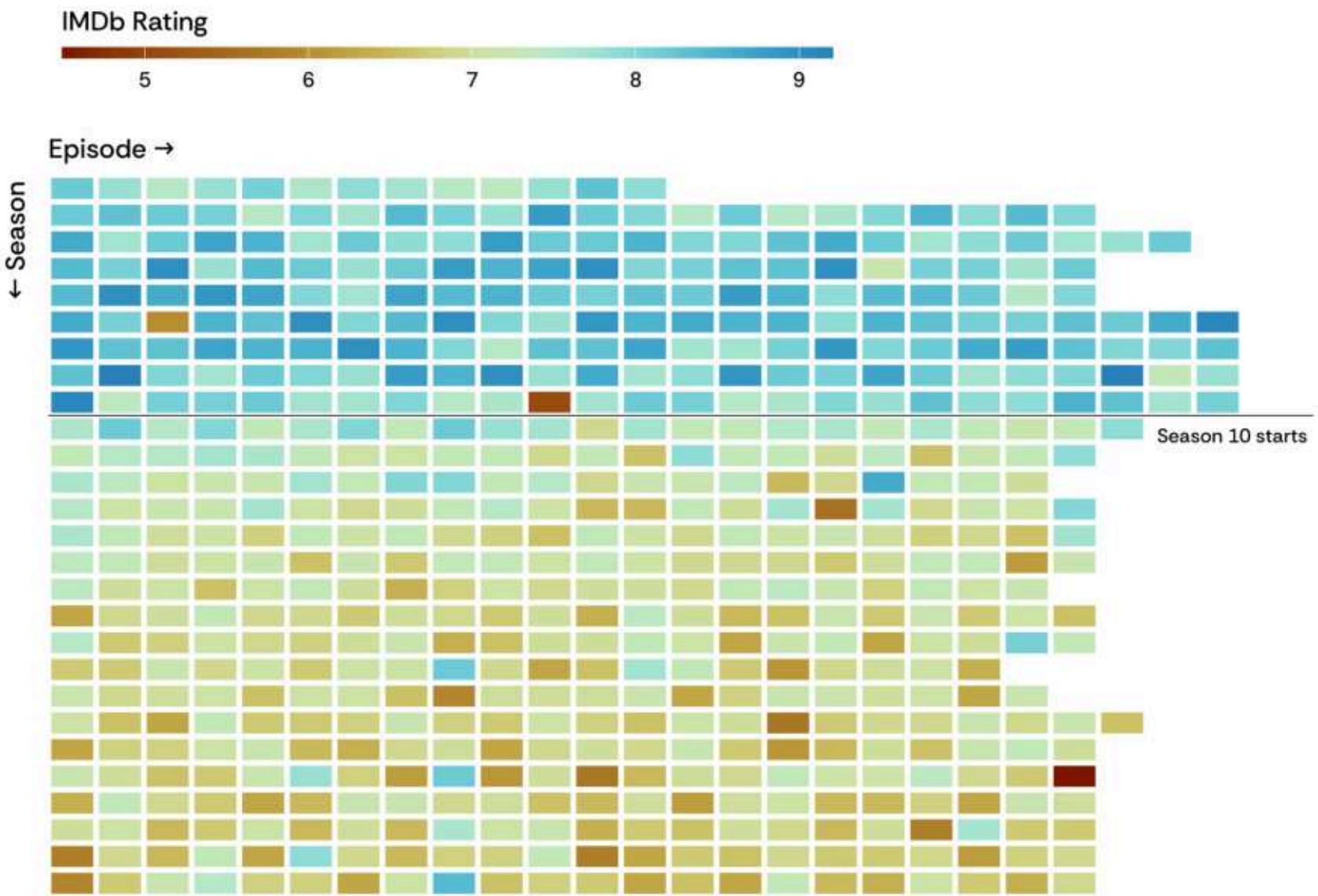
Heatmap Table



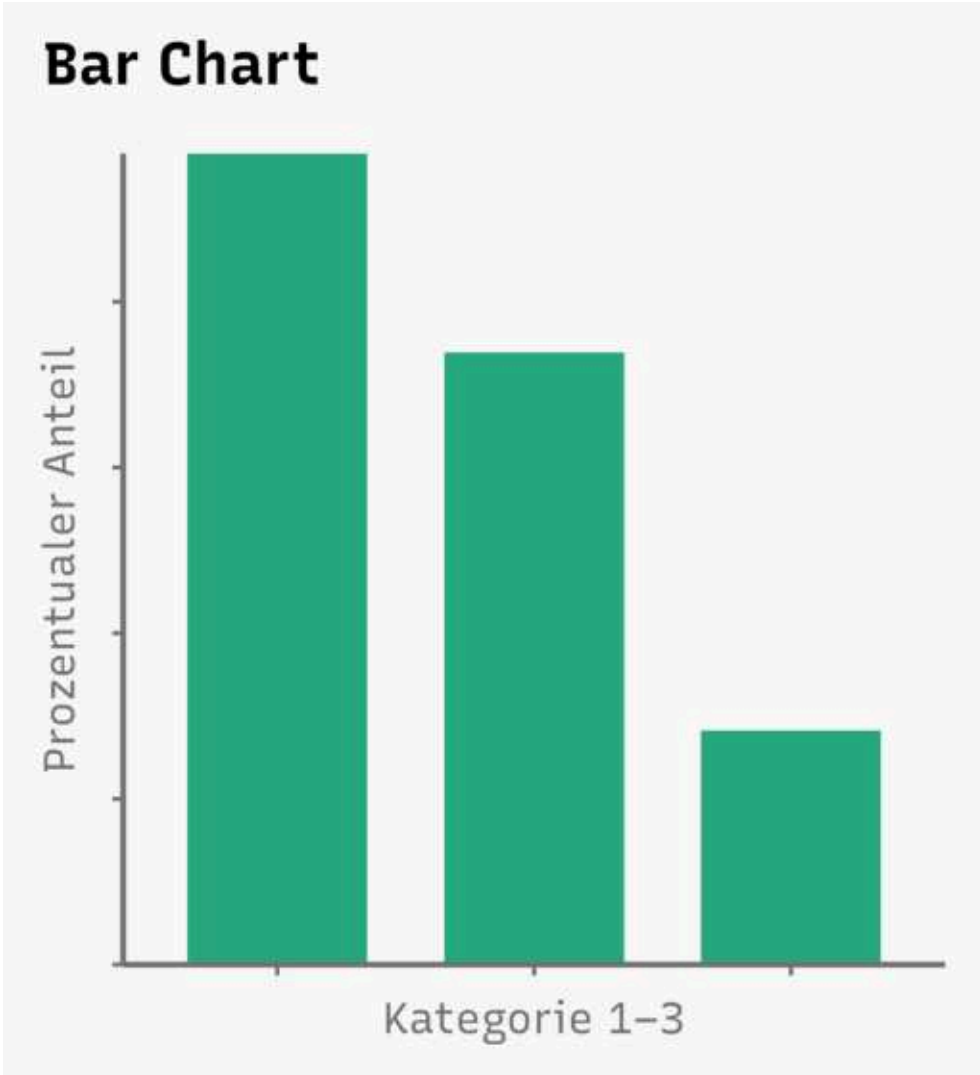
From season 10 onwards, IMDb ratings for "The Simpsons" dropped considerably

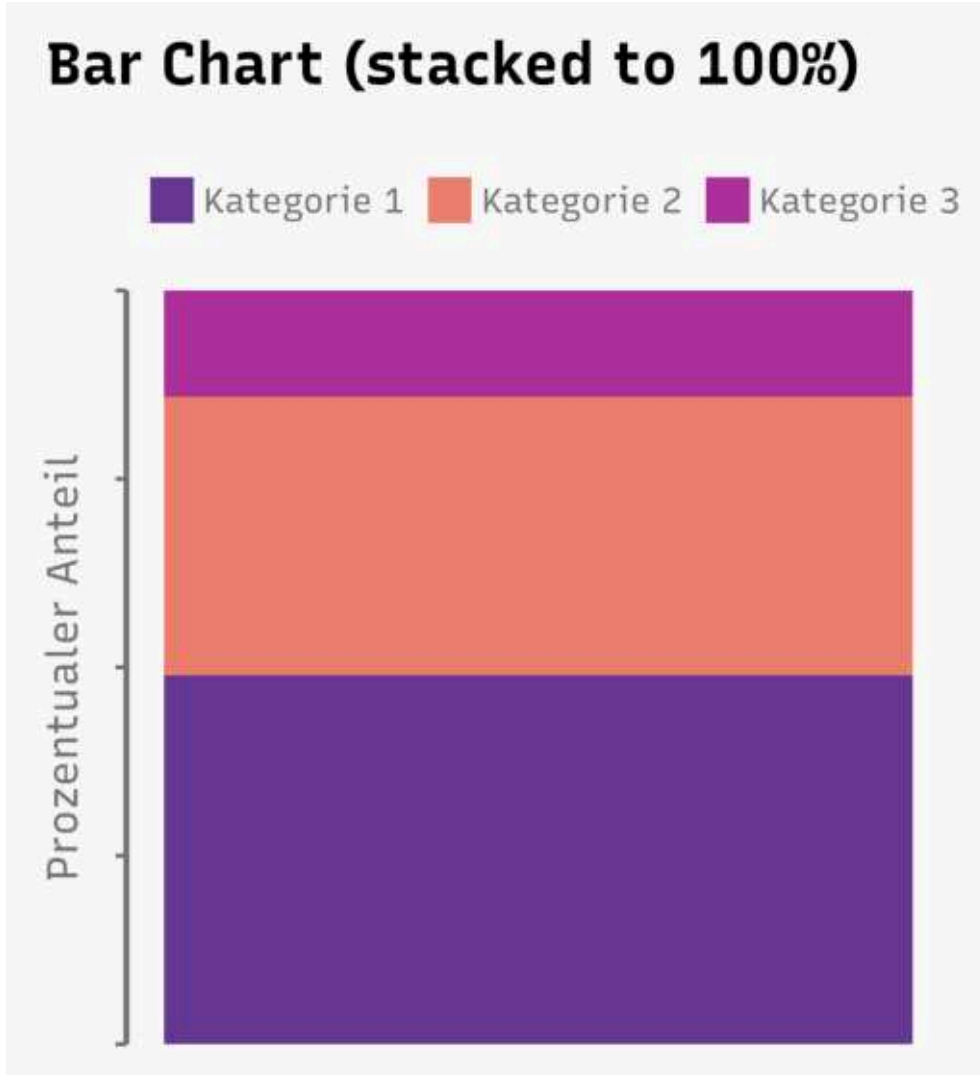


From season 10 onwards, IMDb ratings for "The Simpsons" dropped considerably

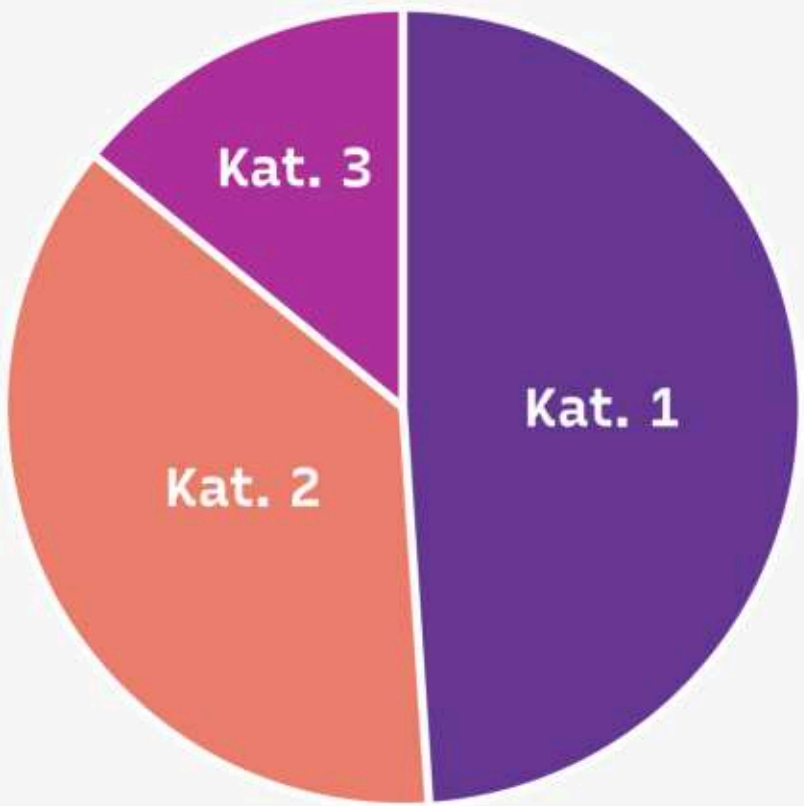


Proportionen vergleichen

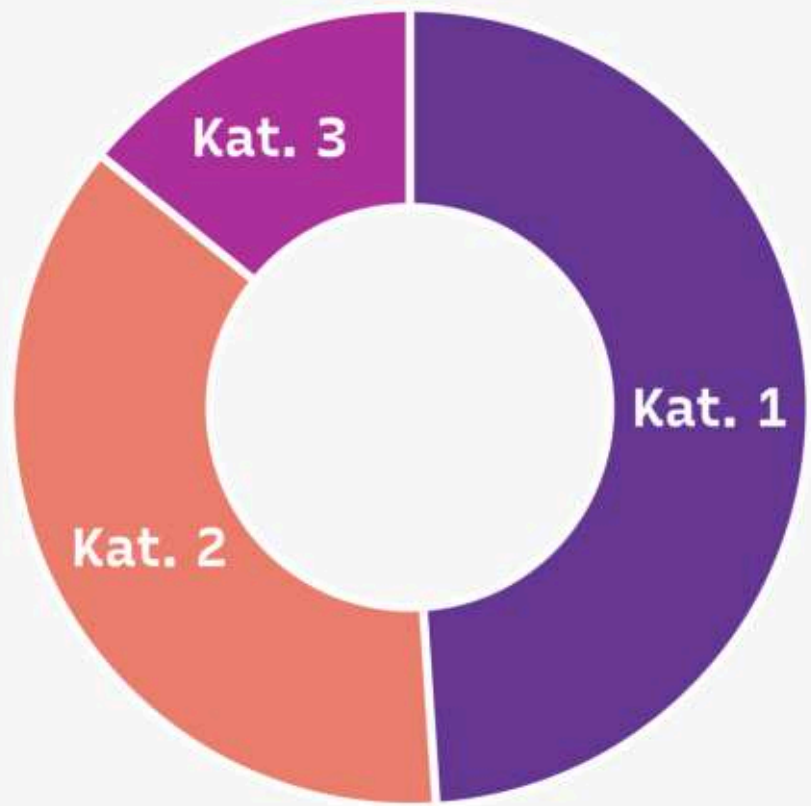

Bar Chart
Prozentualer Anteil
Kategorie 1–3


Bar Chart (stacked to 100%)
Kategorie 1
Kategorie 2
Kategorie 3
Prozentualer Anteil

Pie Chart

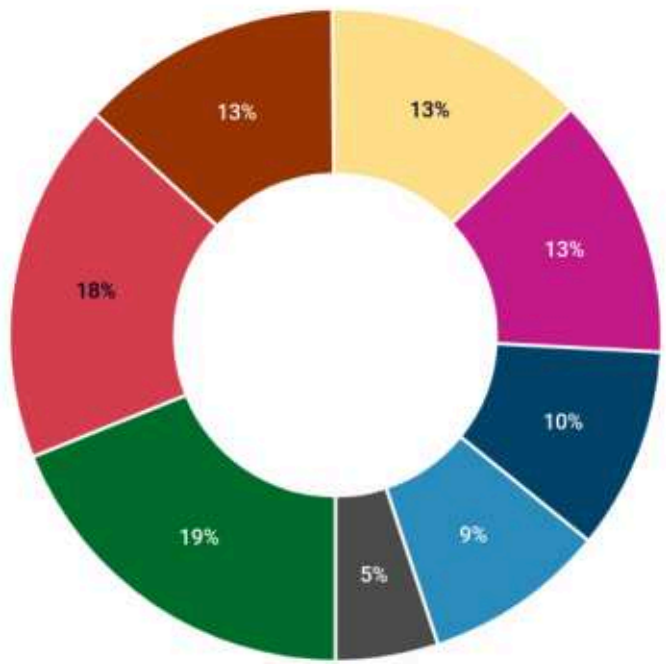


Donut Chart



Ausgaben privater Haushalte für Obst und Gemüse erstmals höher als für Fleisch und Fisch

Anteile an der Gesamtausgaben für Nahrungsmittel, Getränke und Tabakwaren privater Haushalte in Deutschland, 2018

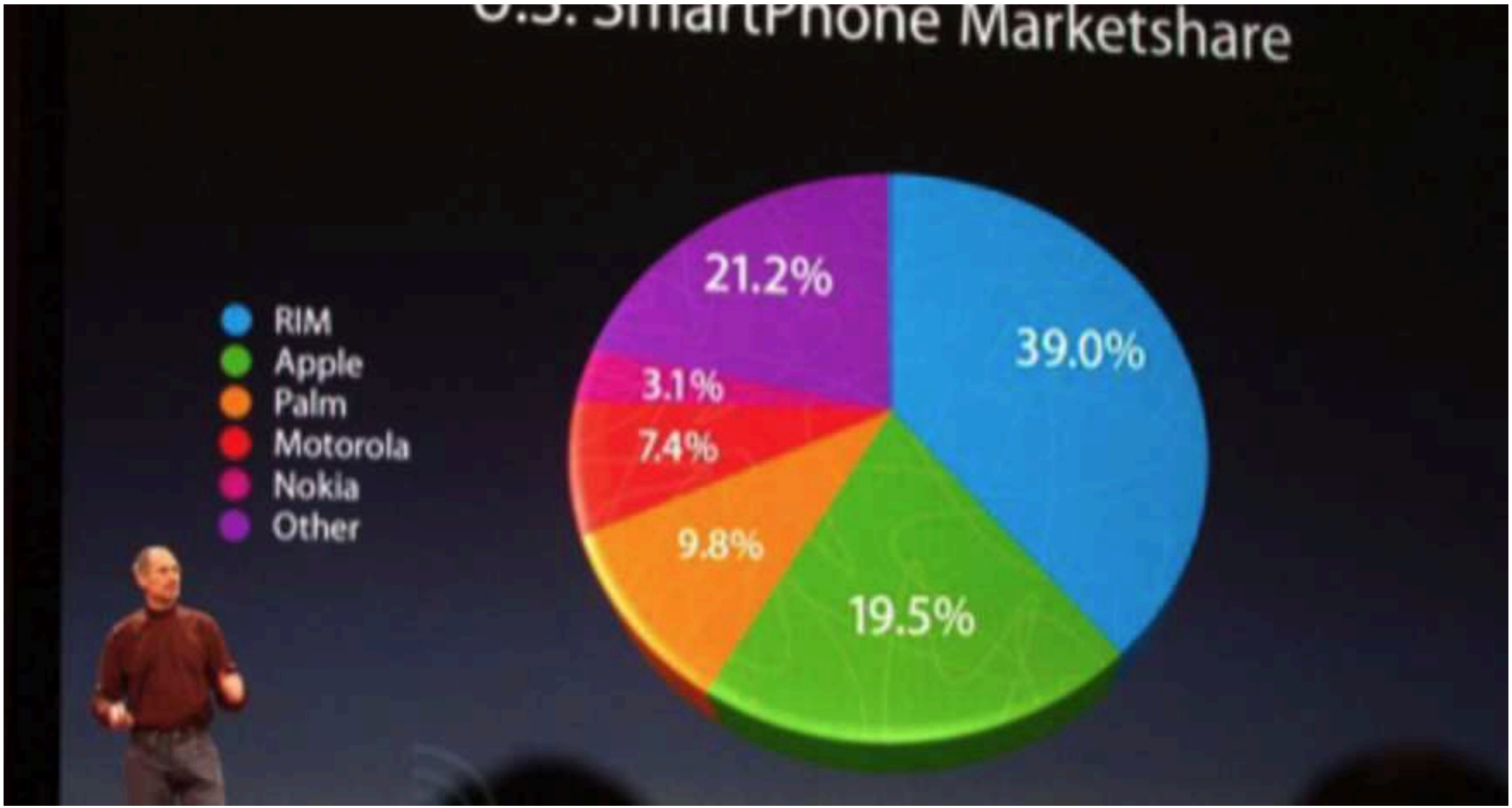


Obst, Gemüse und Kartoffeln
Fleisch und Fisch
Brot und Getreiedeerzeugnisse
Molkereiprodukte und Eier
Zucker, Konfitüren, Süßwaren und andere Nahrungsmittel
alkoholfreie Getränke
alkoholische Getränke
Tabakwaren

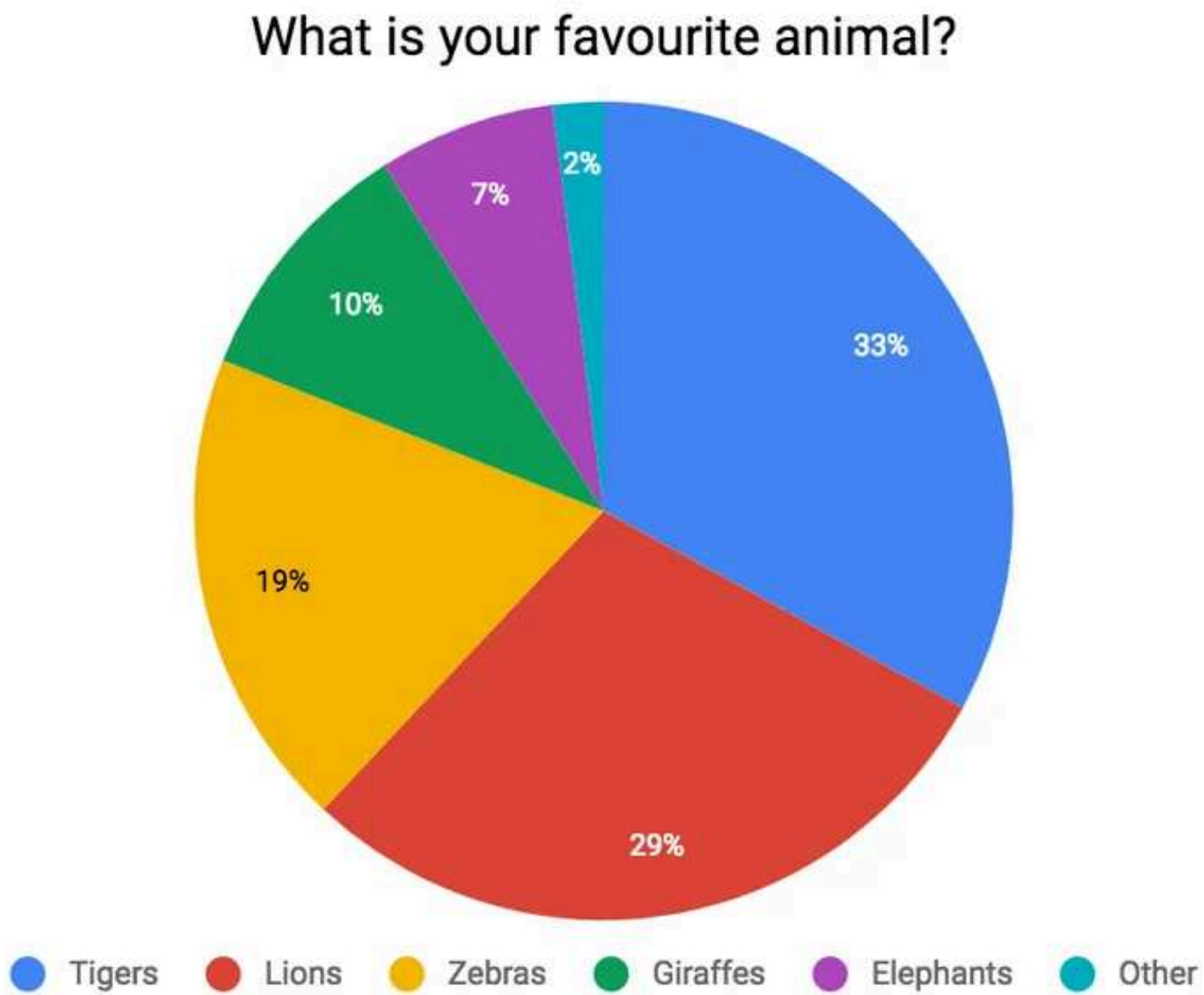
made with 23° | reuse

Quelle: Destatis

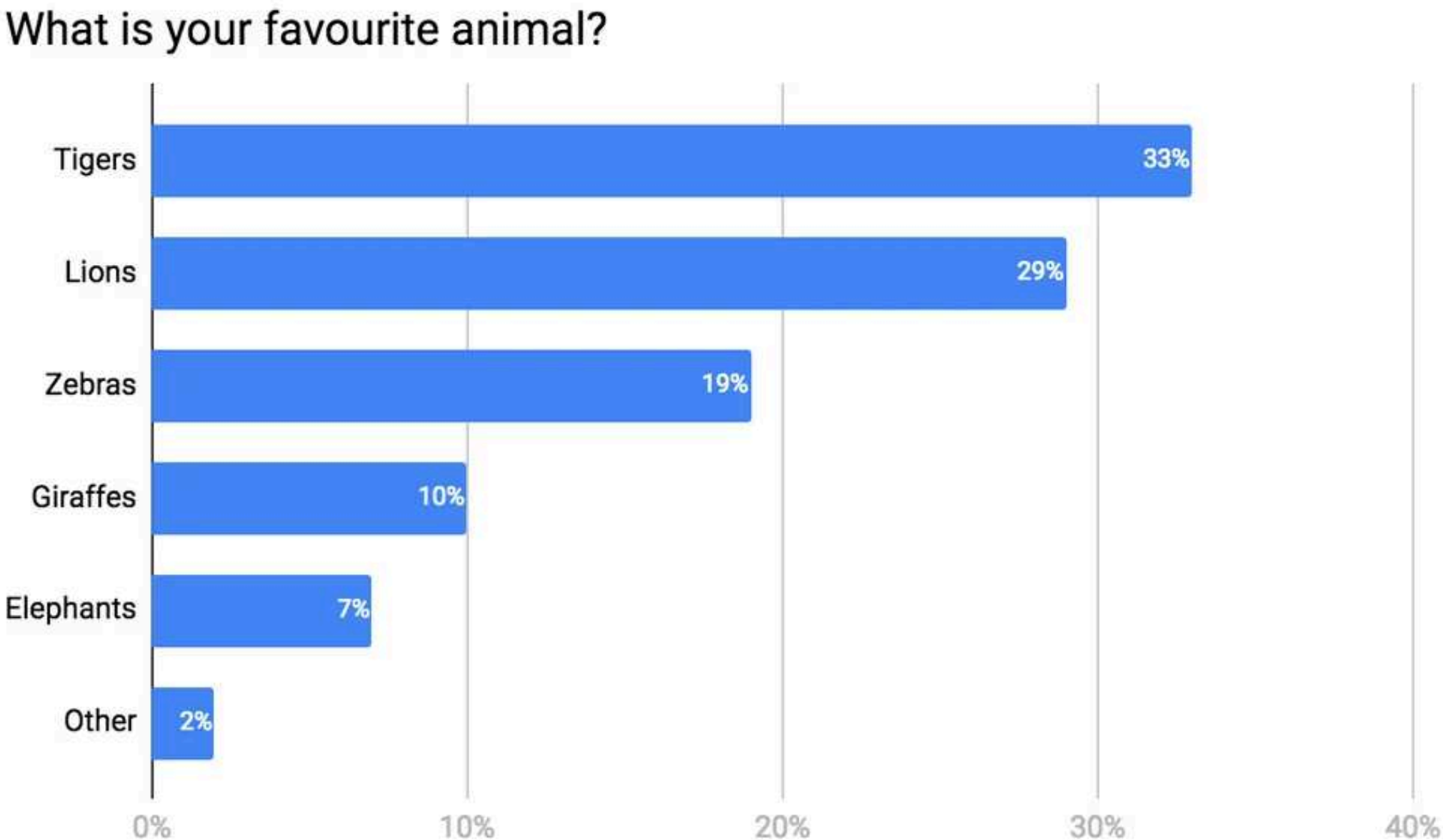
Quelle: 23 degrees



Steve Jobs stellt Marktanteile für Smartphones vor (9. Juni 2008)

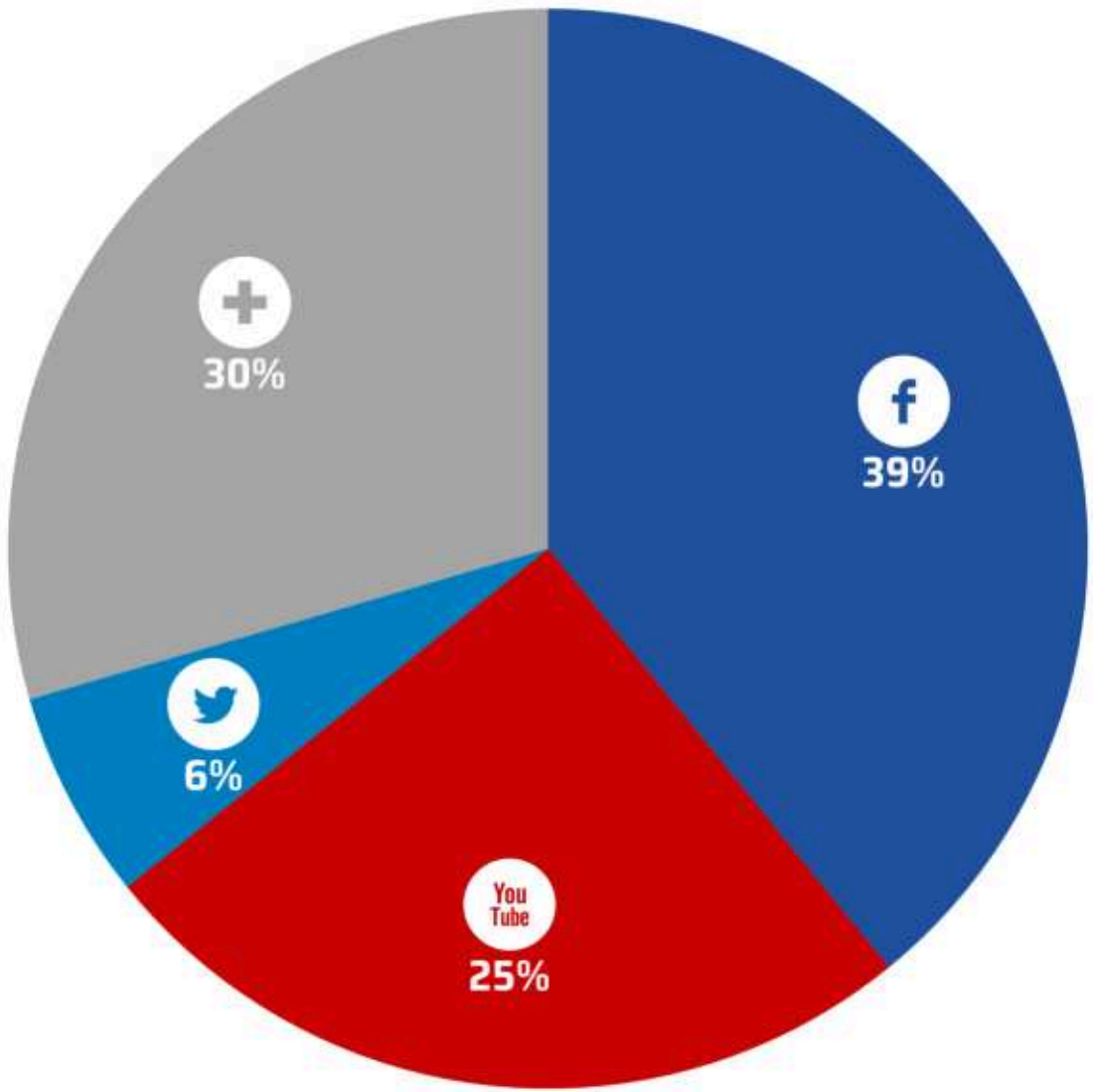


Quelle: Funnel.io



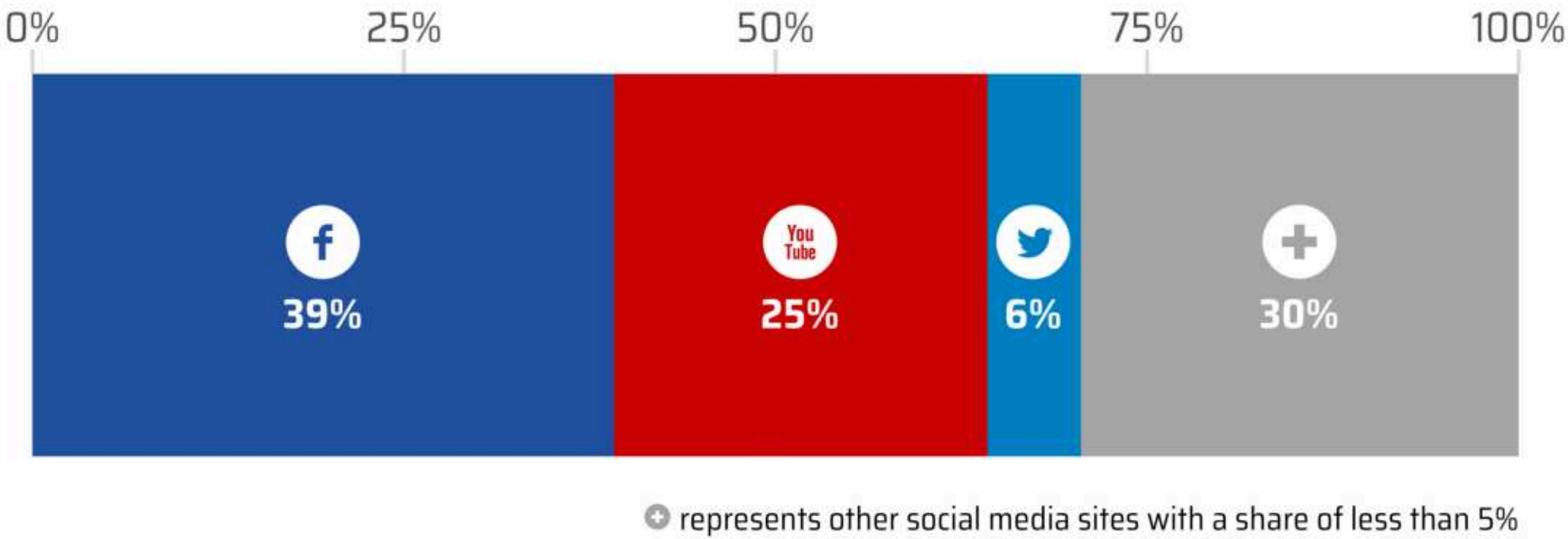
Quelle: Funnel.io

Facebook dominates social media market shares (Nov. 2017)

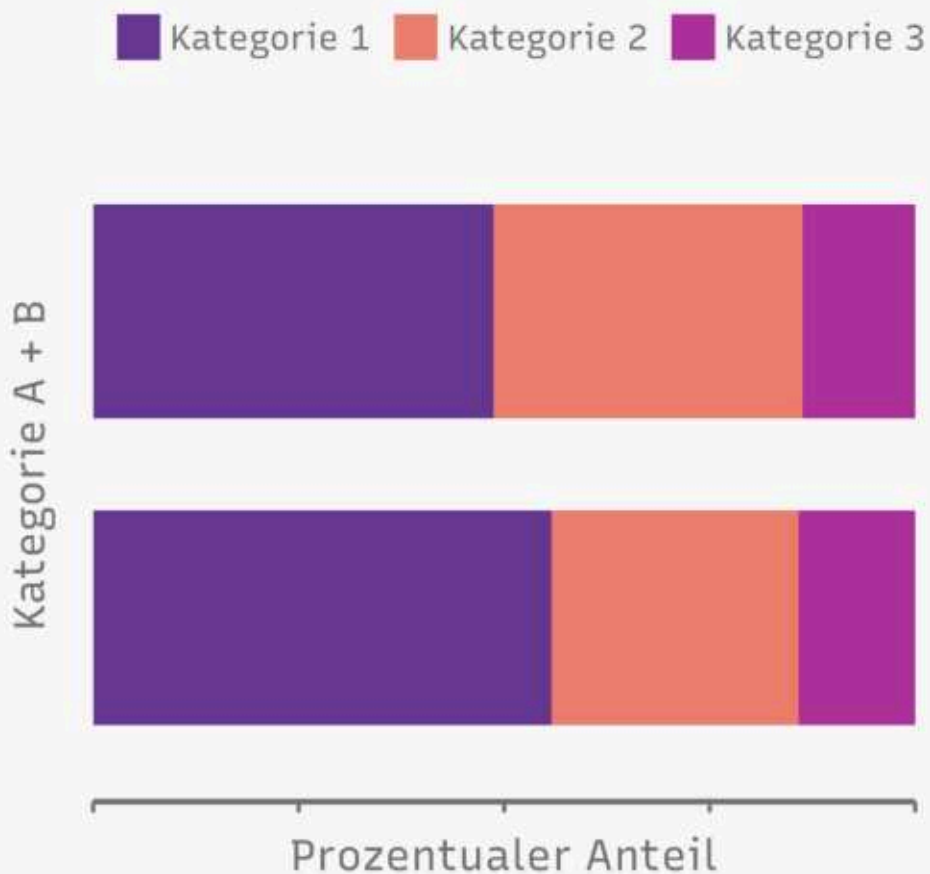


represents other social media sites with a share of less than 5%

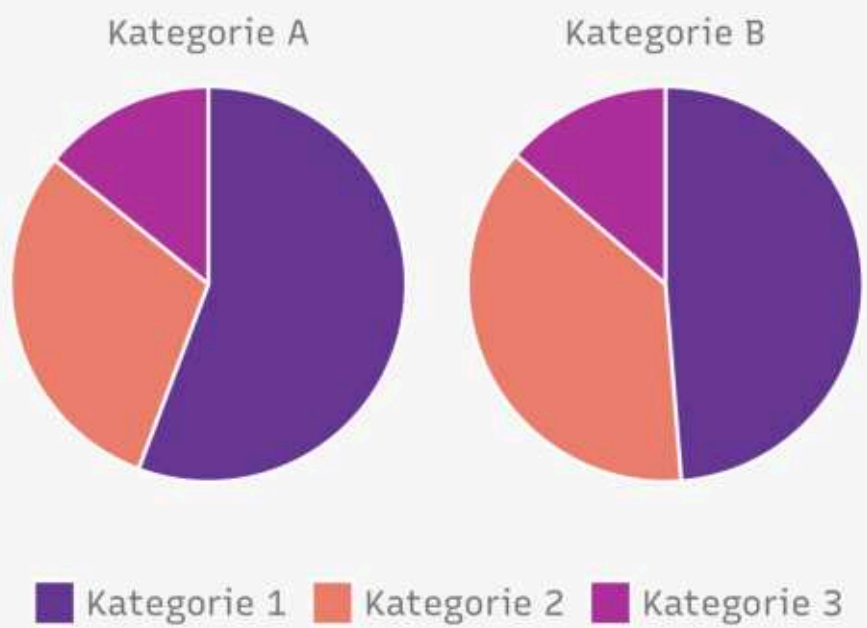
Facebook dominates social media market shares (Nov. 2017)

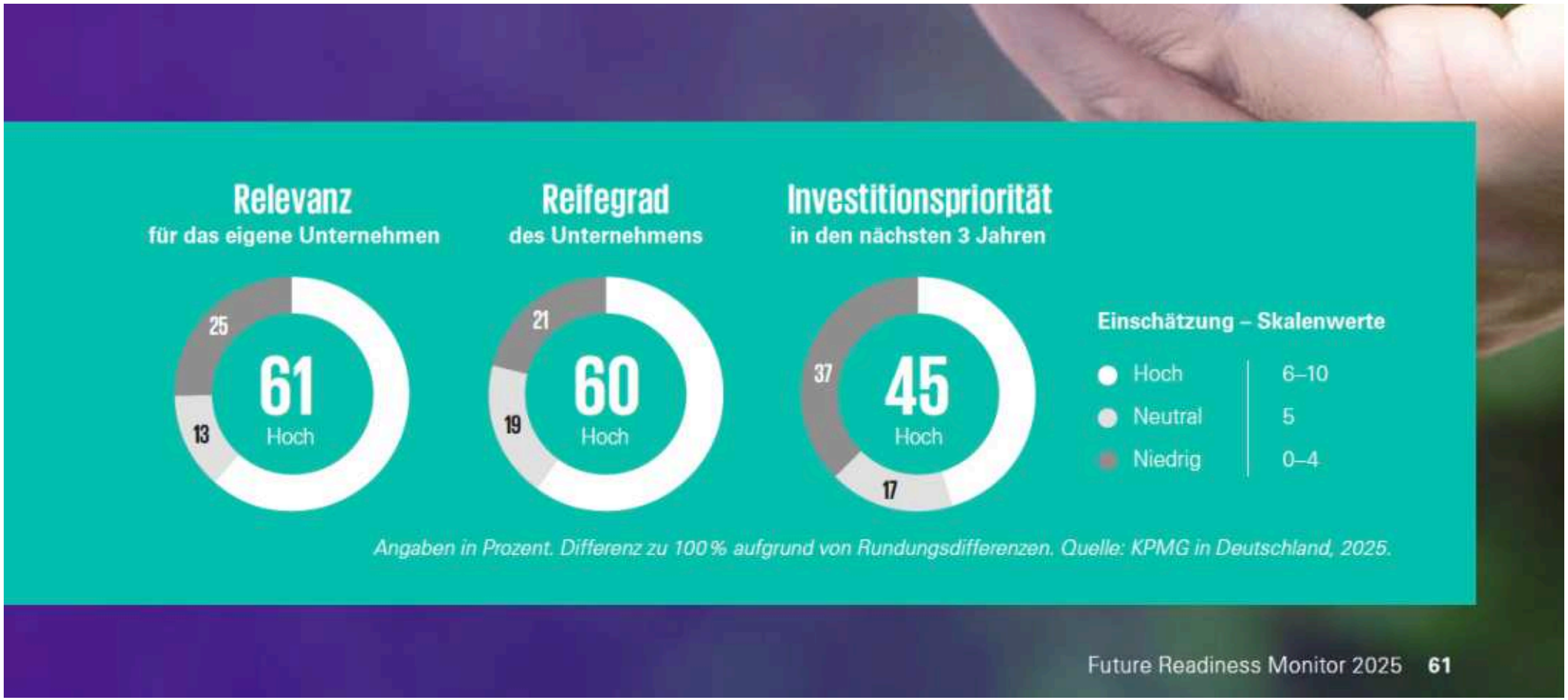


Bar Chart (stacked to 100%)



Pie Chart

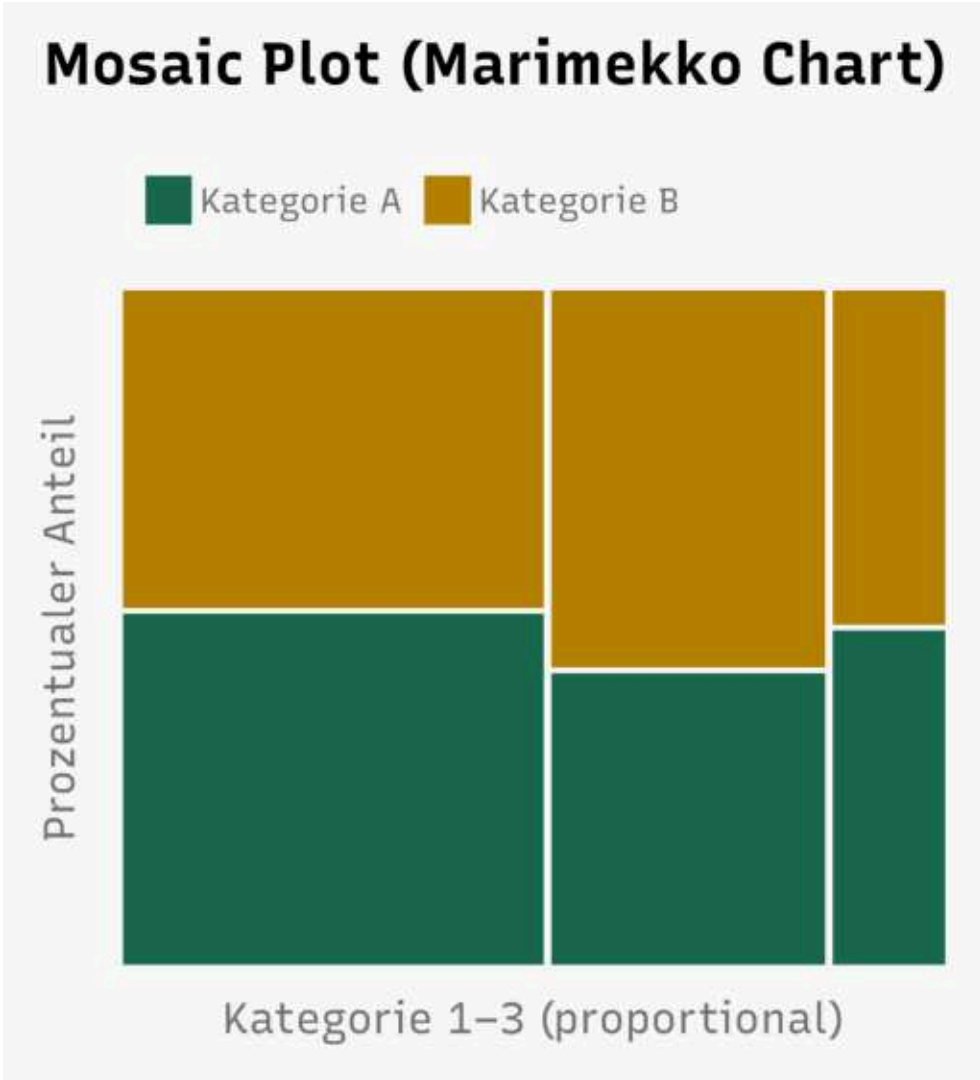




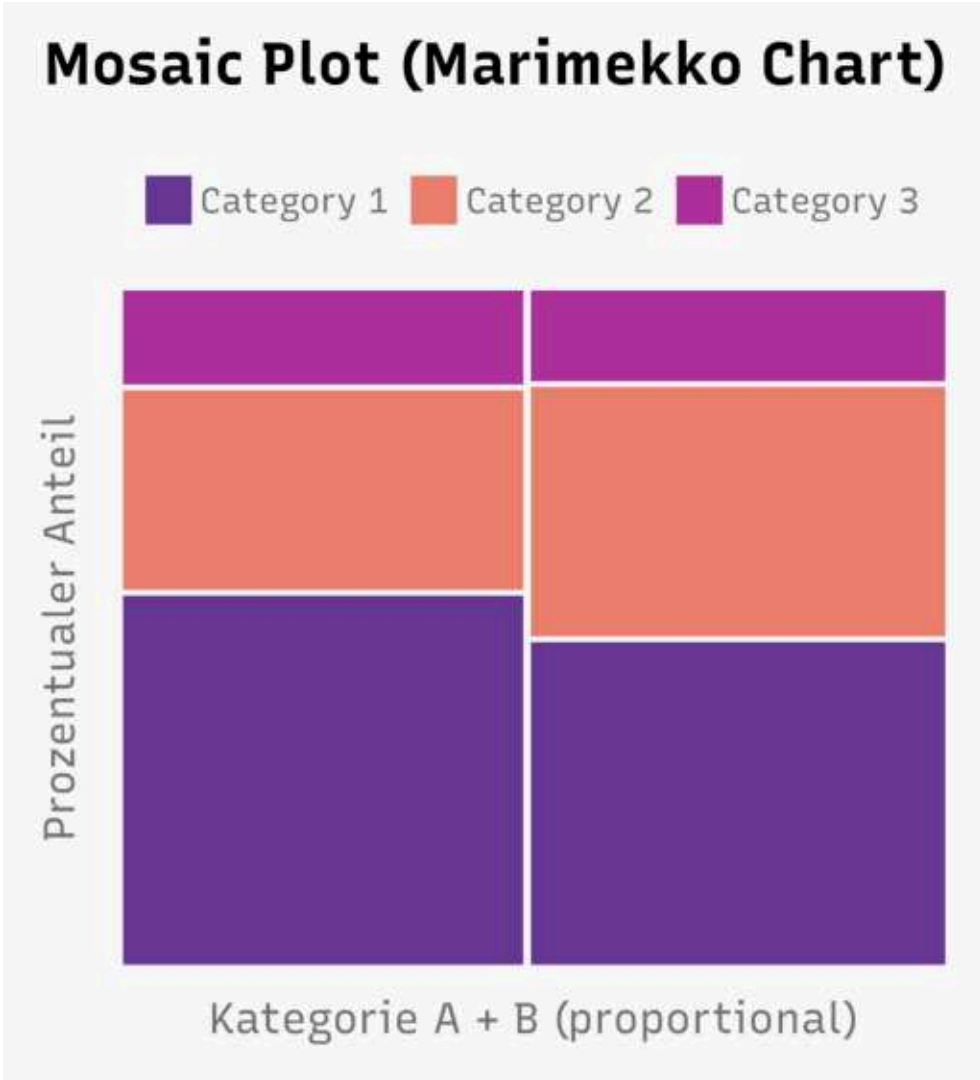
KPMG-Bericht „Future Readiness Monitor 2025"

Treemap

Nested Treemap


Mosaic Plot (Marimekko Chart)
Kategorie A
Kategorie B
Prozentualer Anteil
Kategorie 1–3 (proportional)

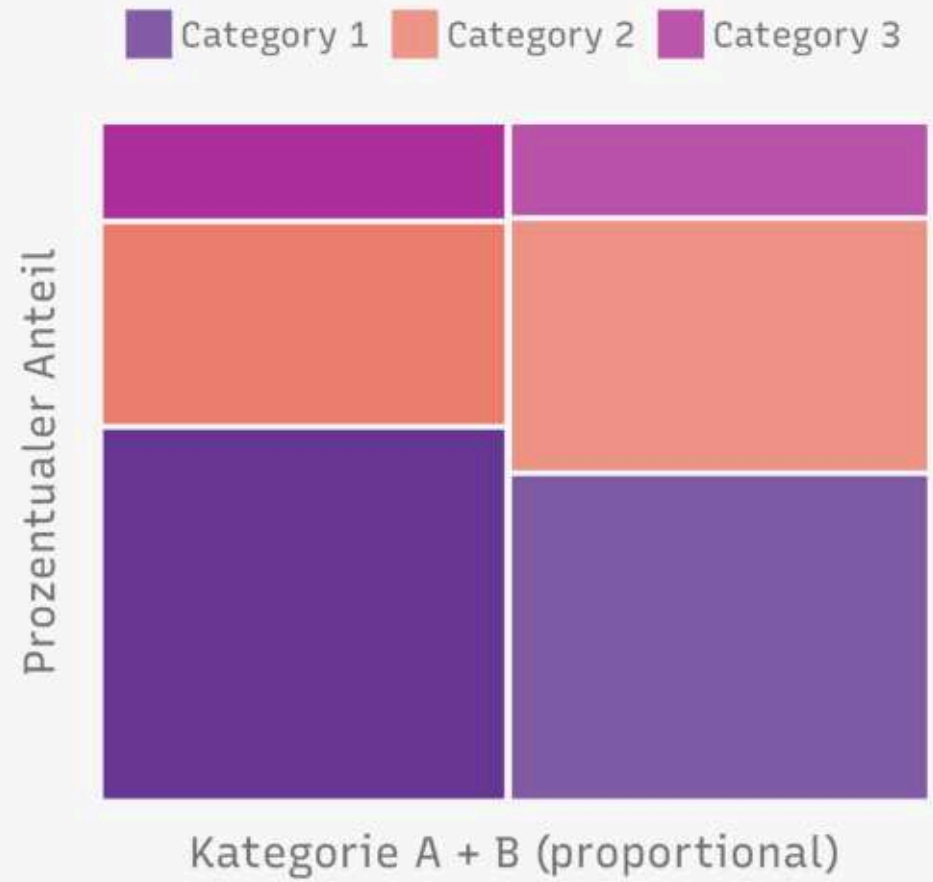
Nested Treemap
Kategorie A
Kategorie B
Kategorie 1
Kategorie 2
Kategorie 3


Mosaic Plot (Marimekko Chart)
Category 1
Category 2
Category 3
Prozentualer Anteil
Kategorie A + B (proportional)

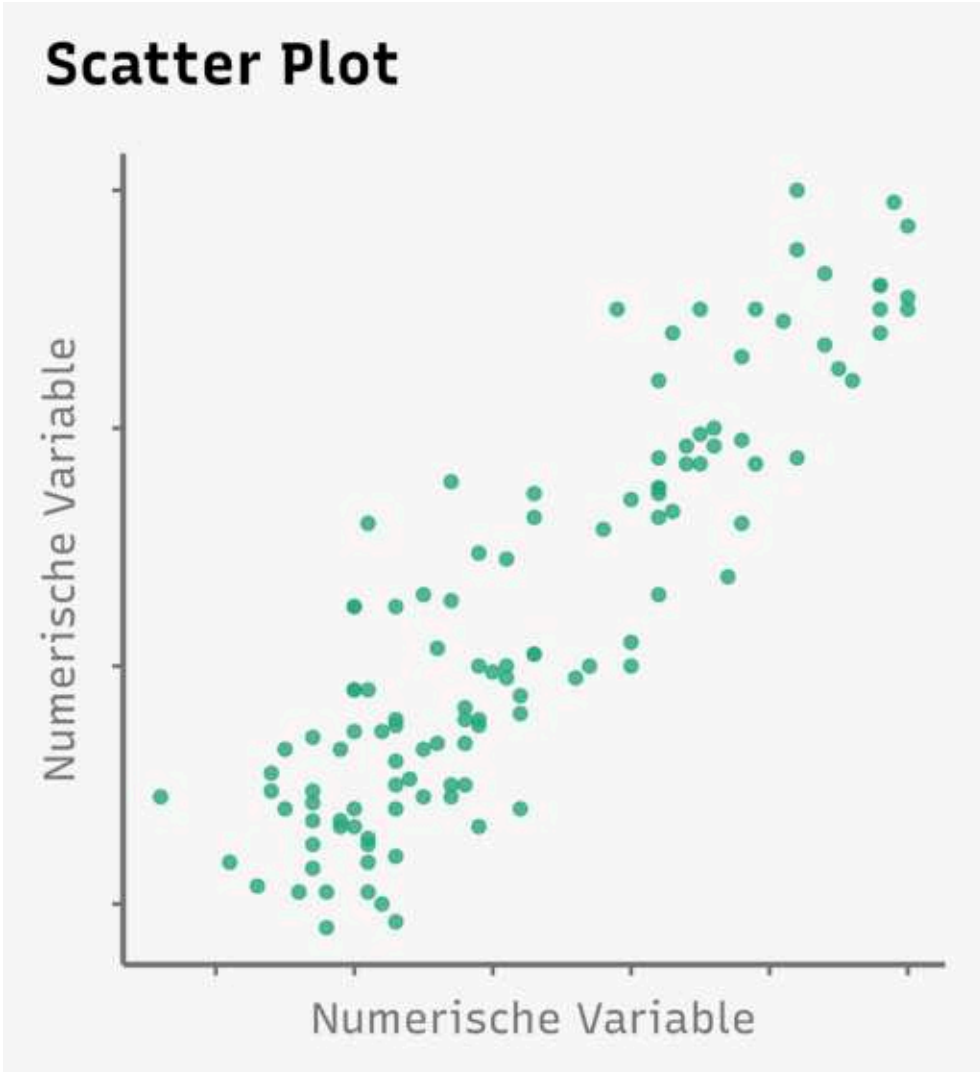
Nested Treemap
Kategorie A
Kategorie B
Kategorie 1
Kategorie 2
Kategorie 3

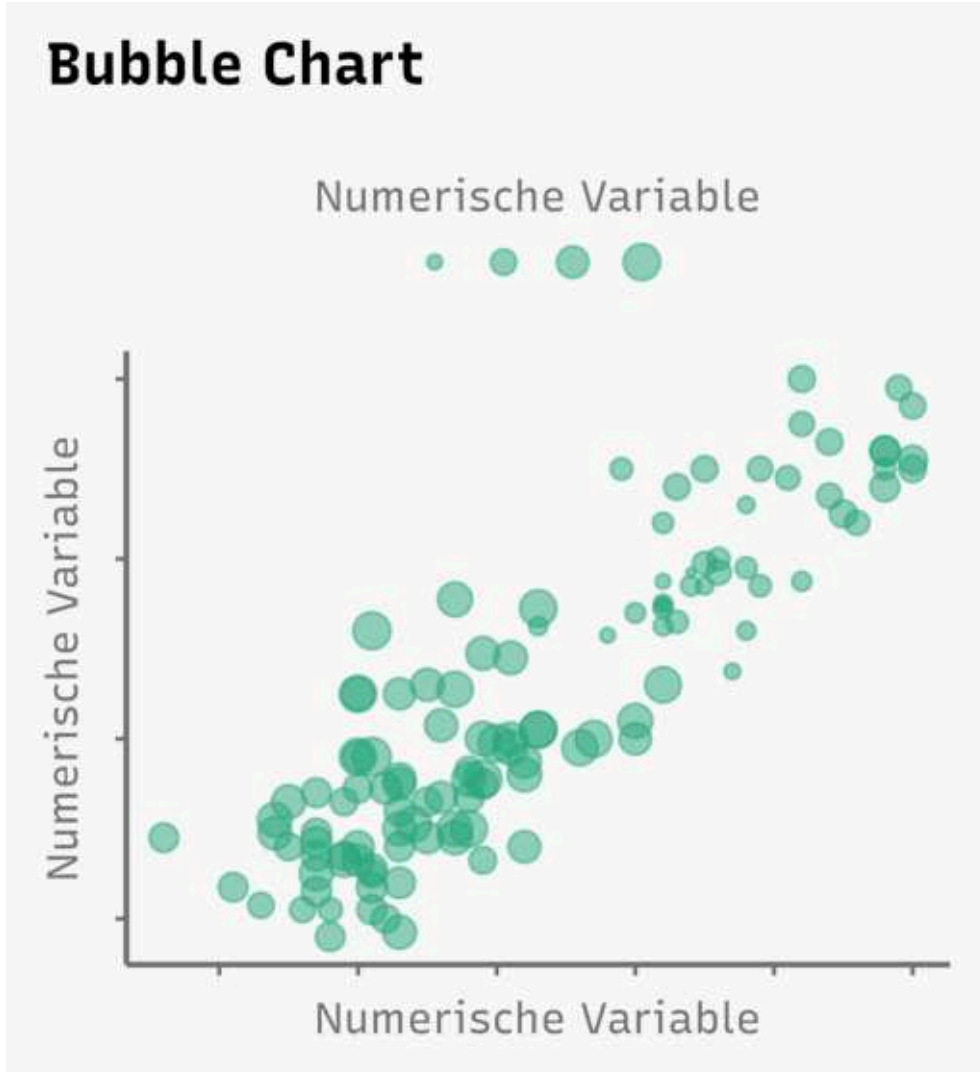
Nested Treemap

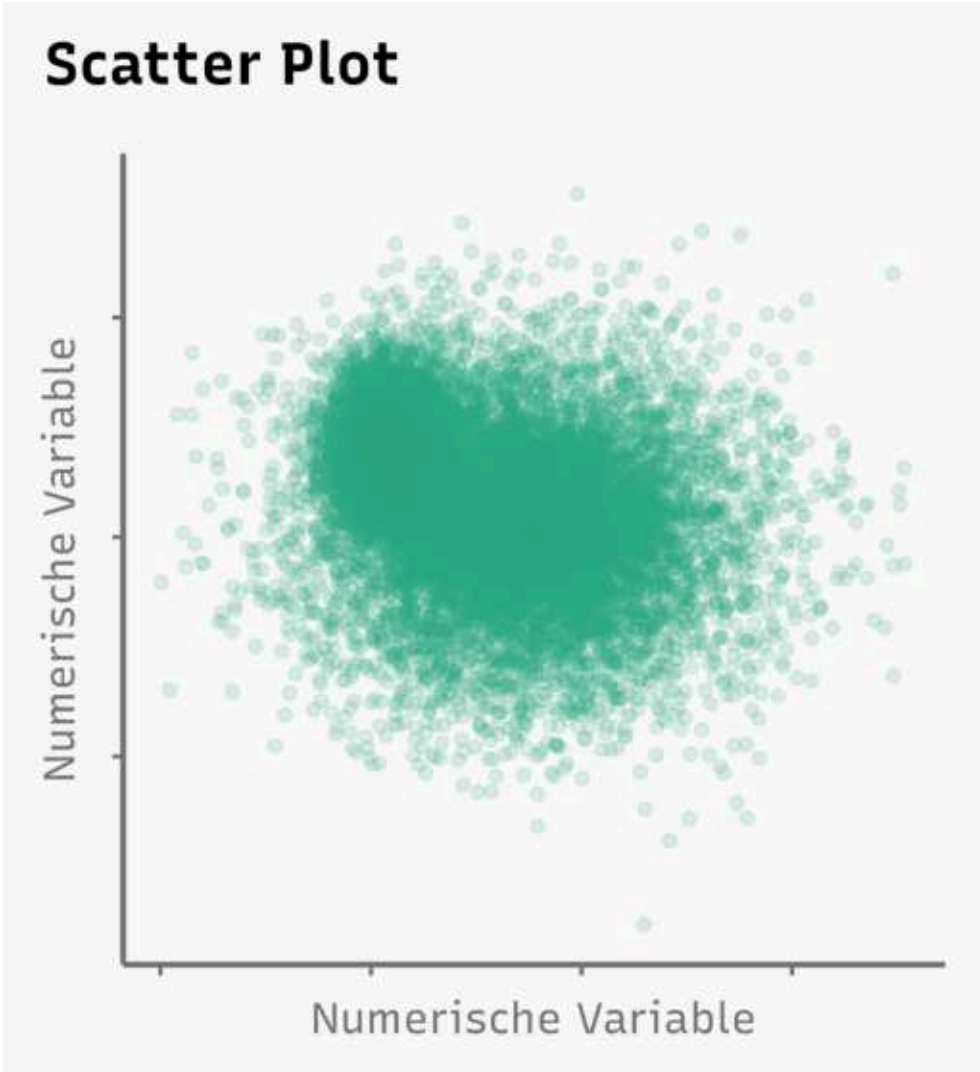
Mosaic Plot (Marimekko Chart)

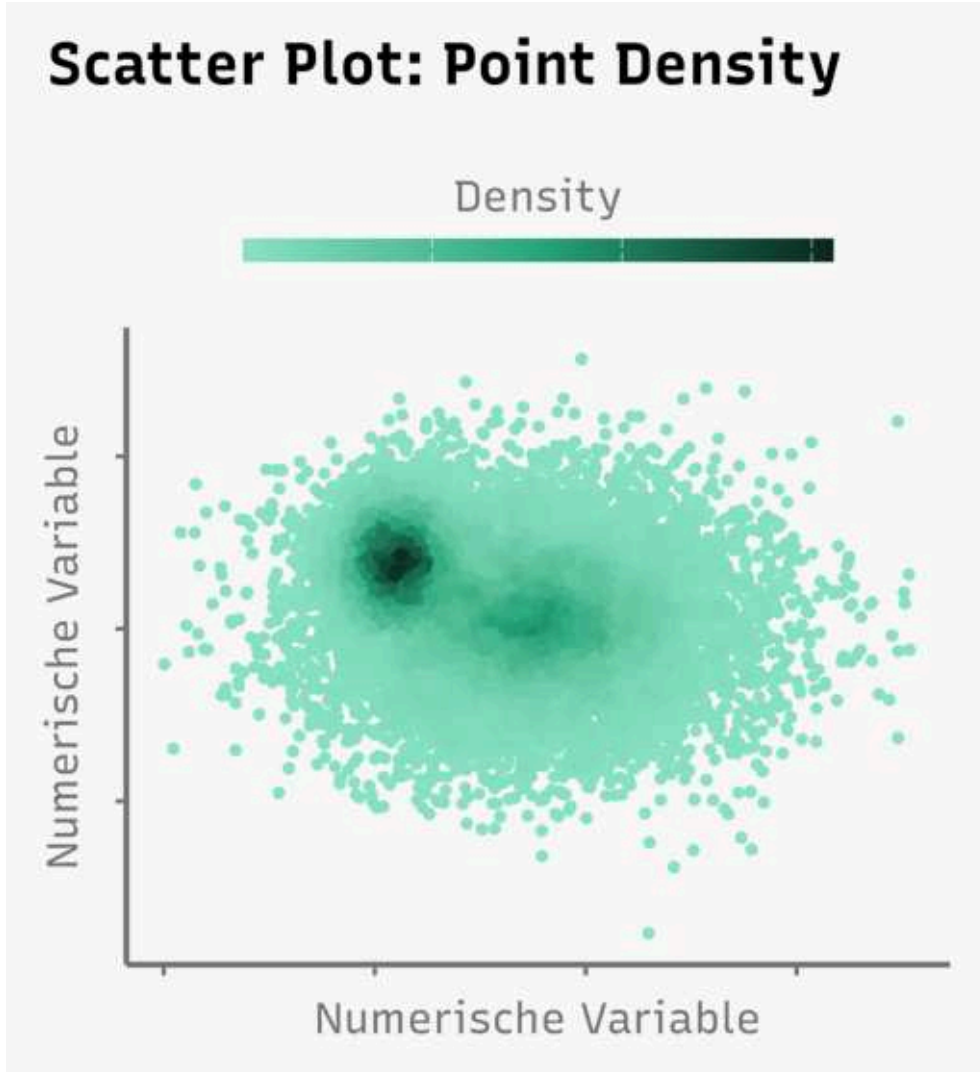


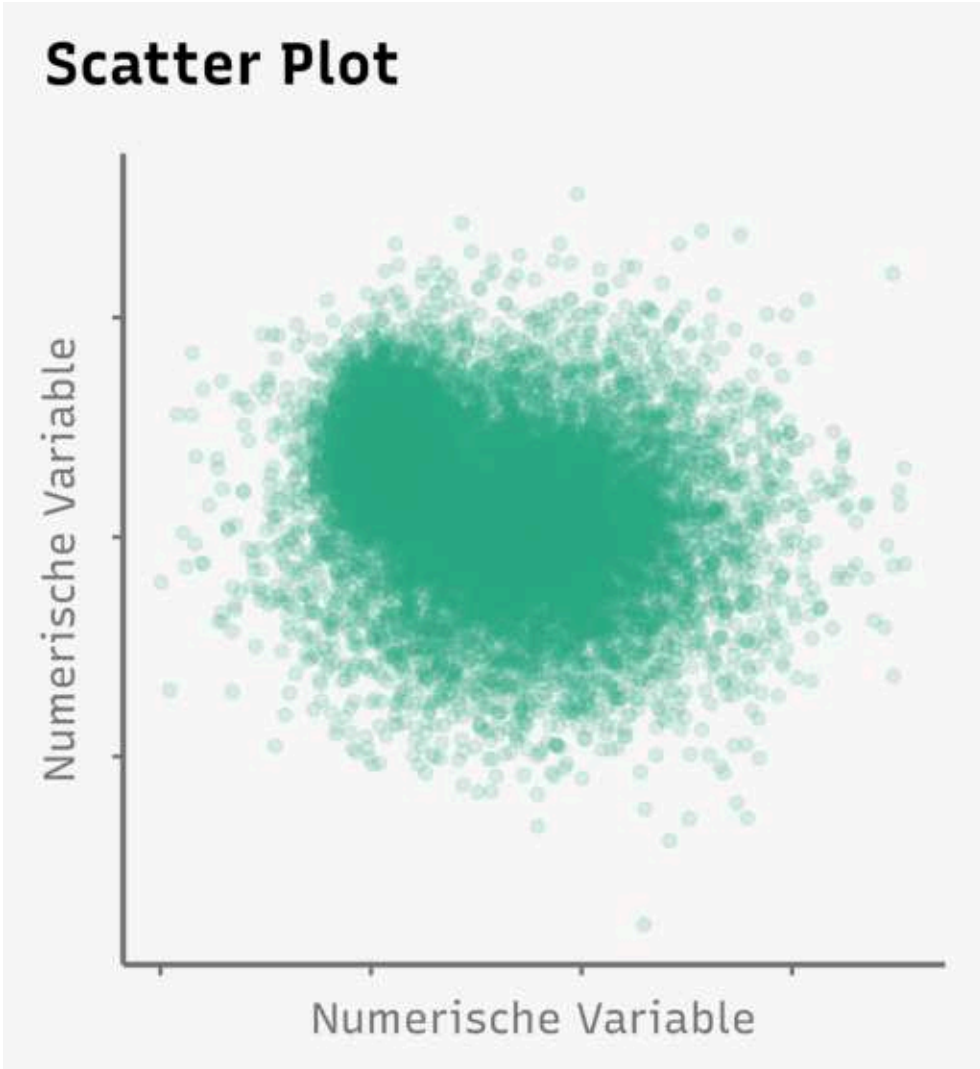
Beziehungen darstellen

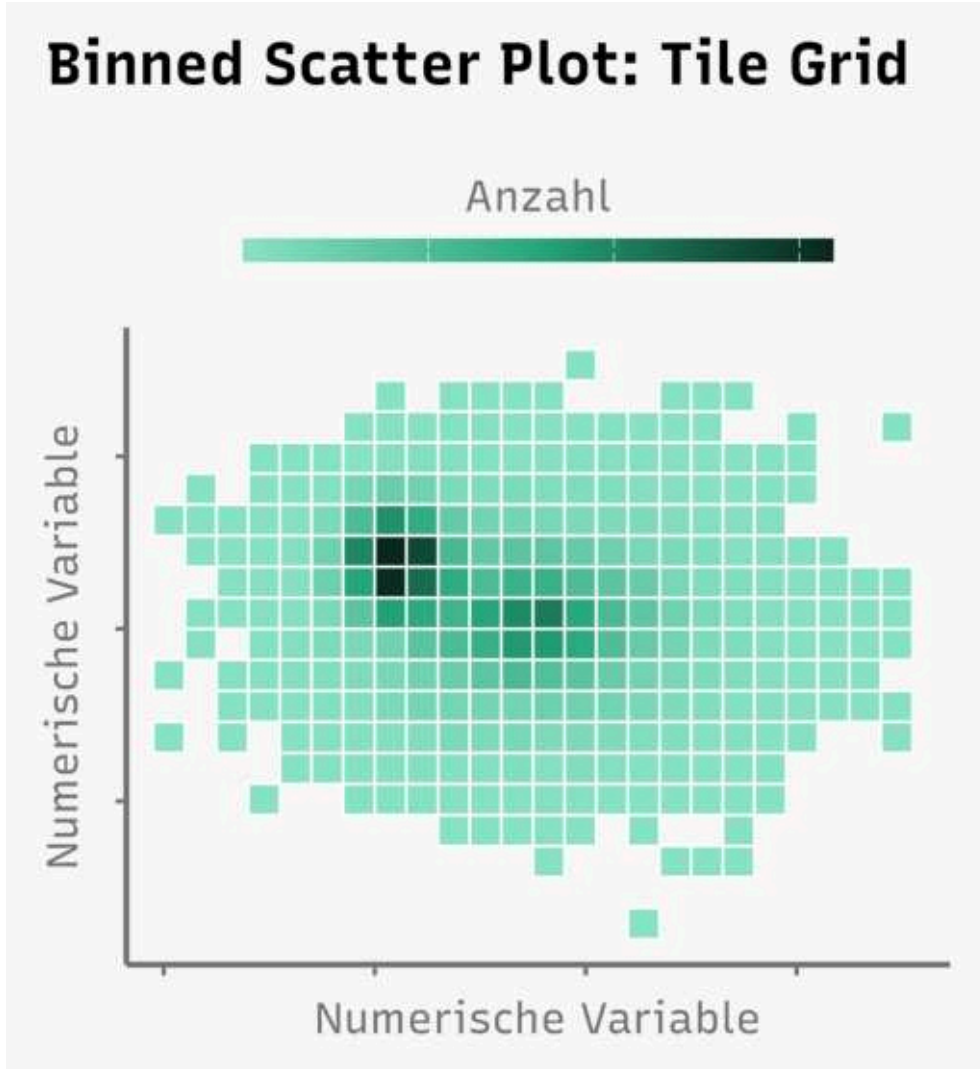

Scatter Plot
Numerische Variable
Numerische Variable

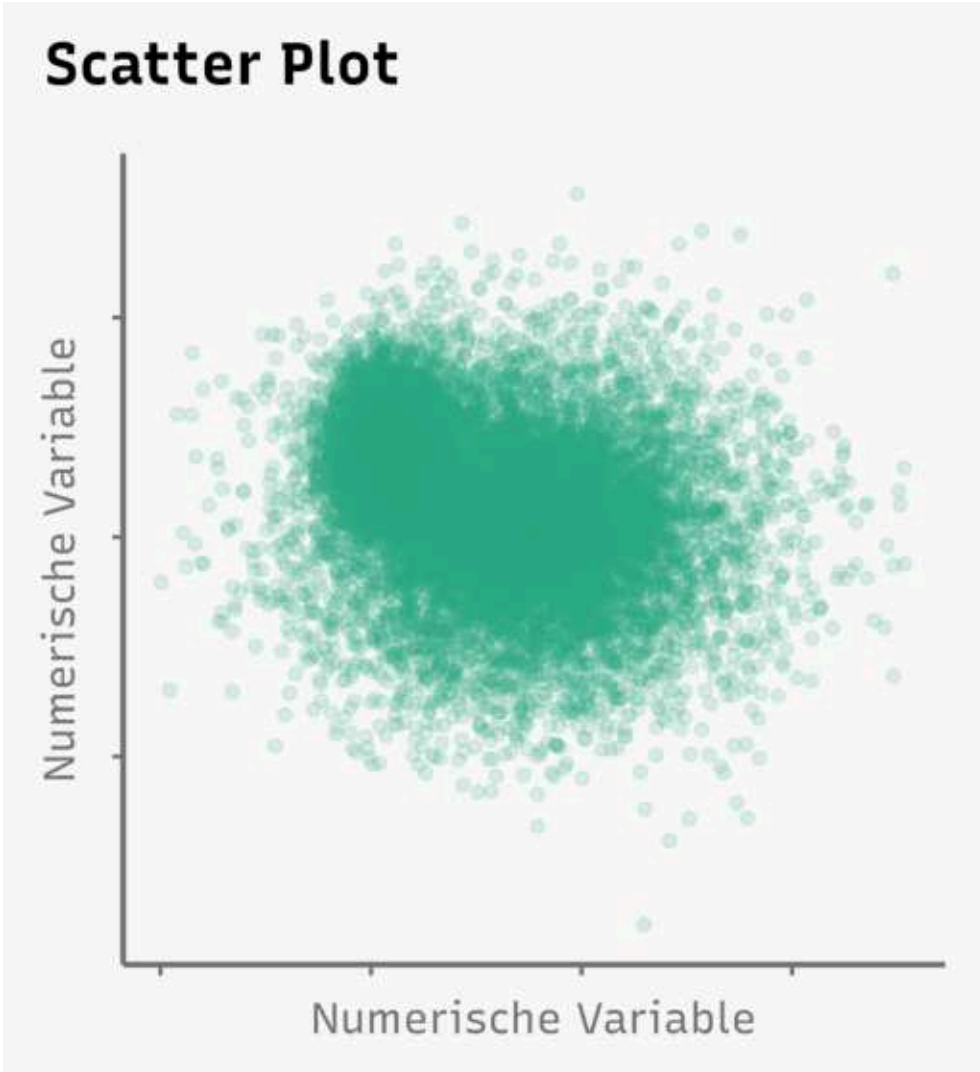

Bubble Chart
Numerische Variable
Numerische Variable
Numerische Variable

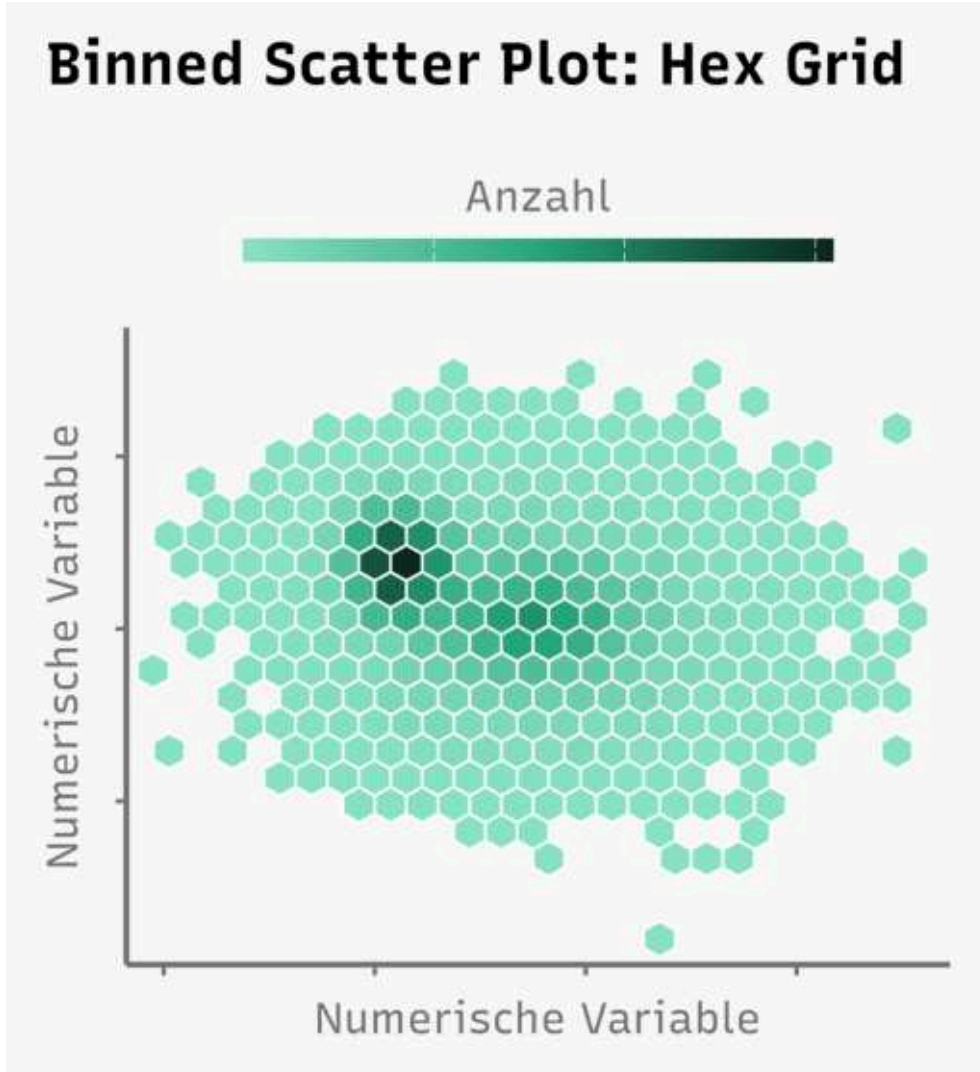

Scatter Plot
Numerische Variable
Numerische Variable

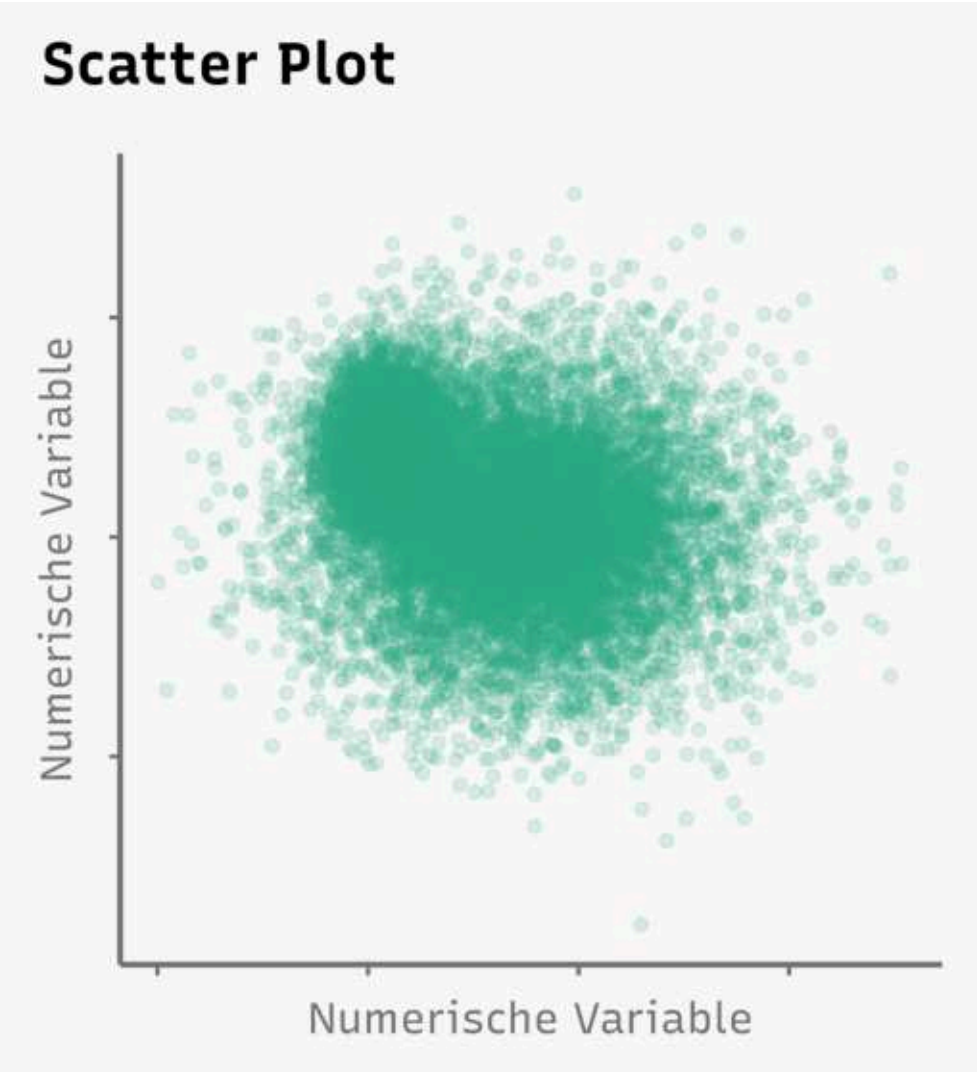

Scatter Plot: Point Density
Density
Numerische Variable
Numerische Variable

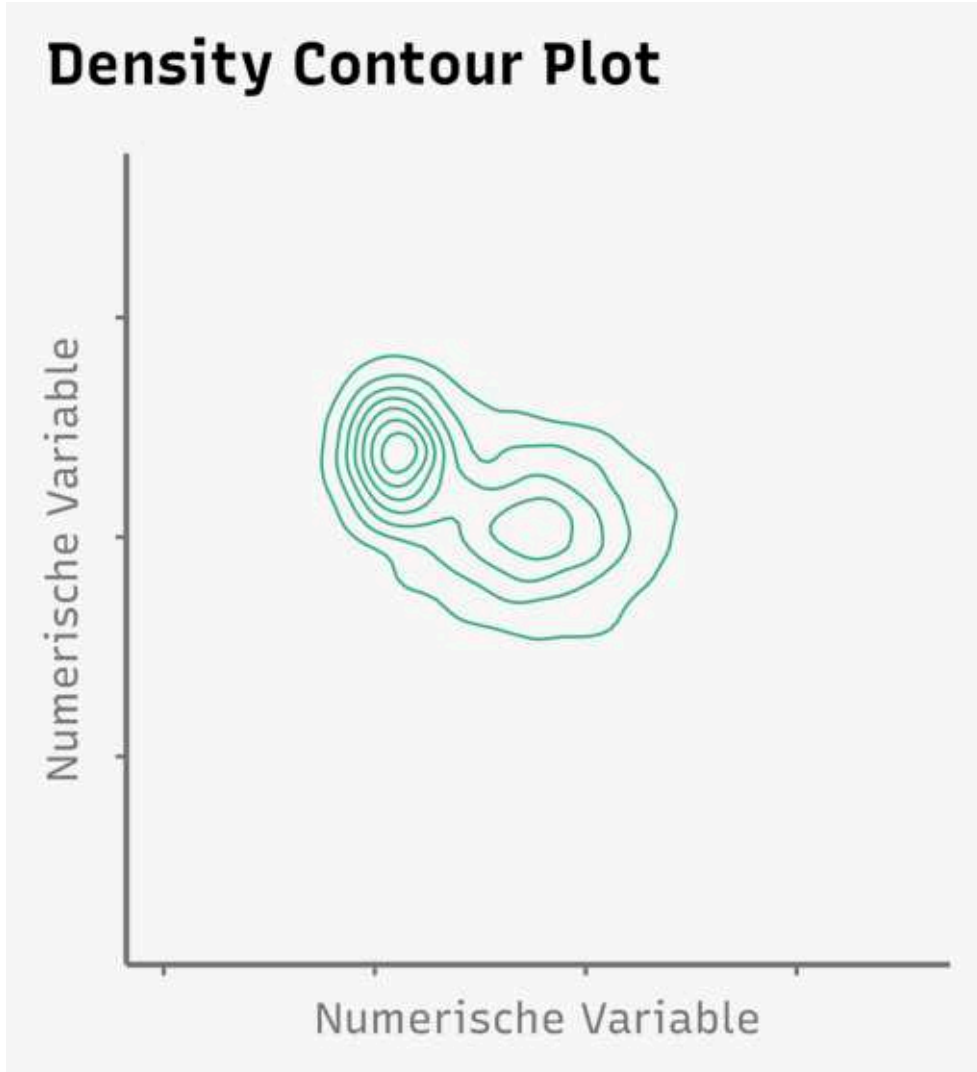

Scatter Plot
Numerische Variable
Numerische Variable

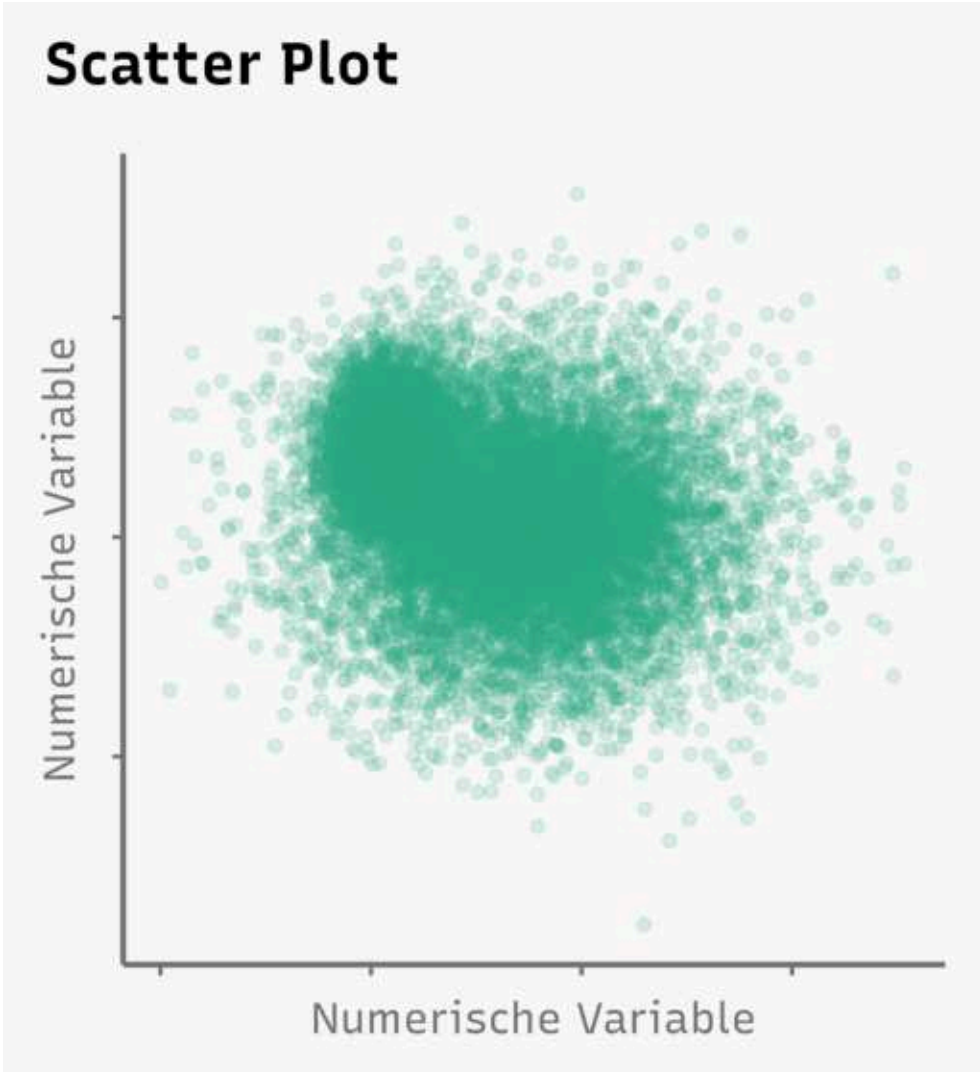

Binned Scatter Plot: Tile Grid
Anzahl
Numerische Variable
Numerische Variable

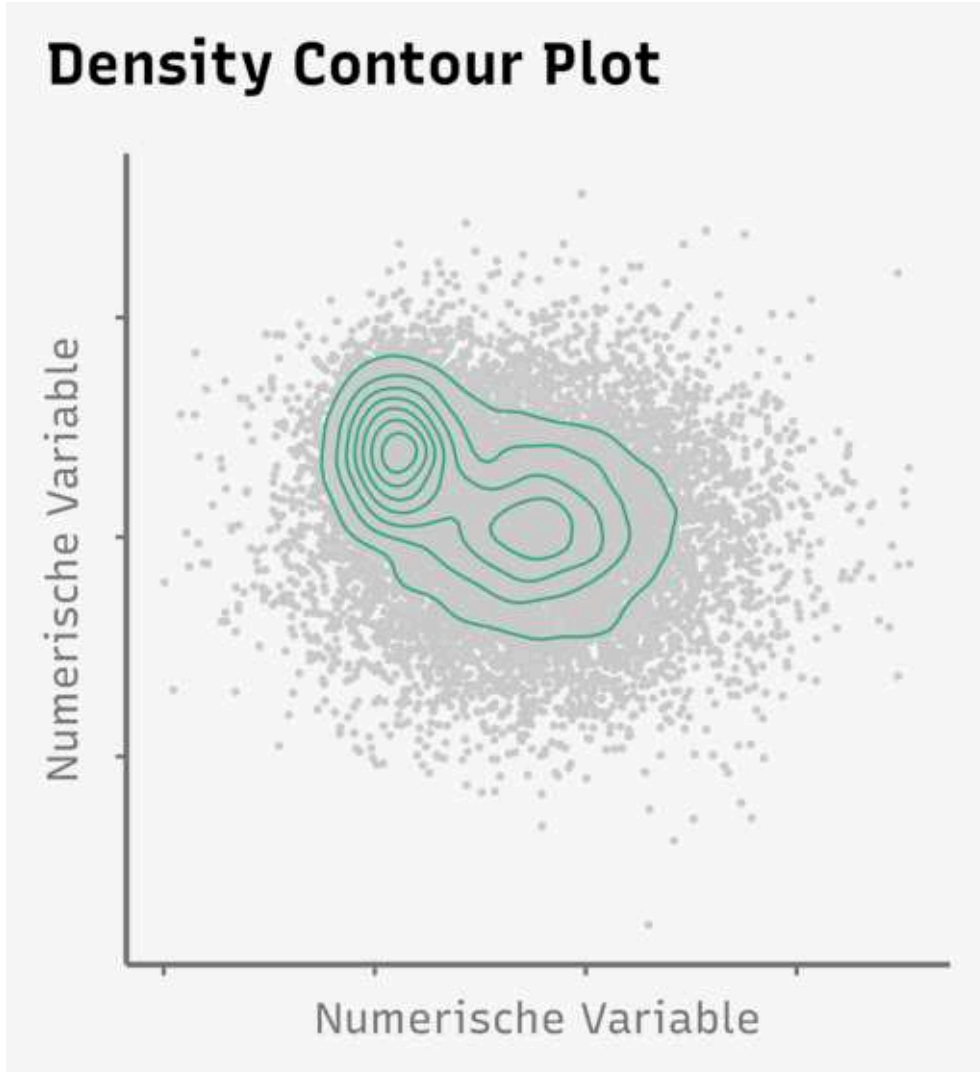

Scatter Plot
Numerische Variable
Numerische Variable

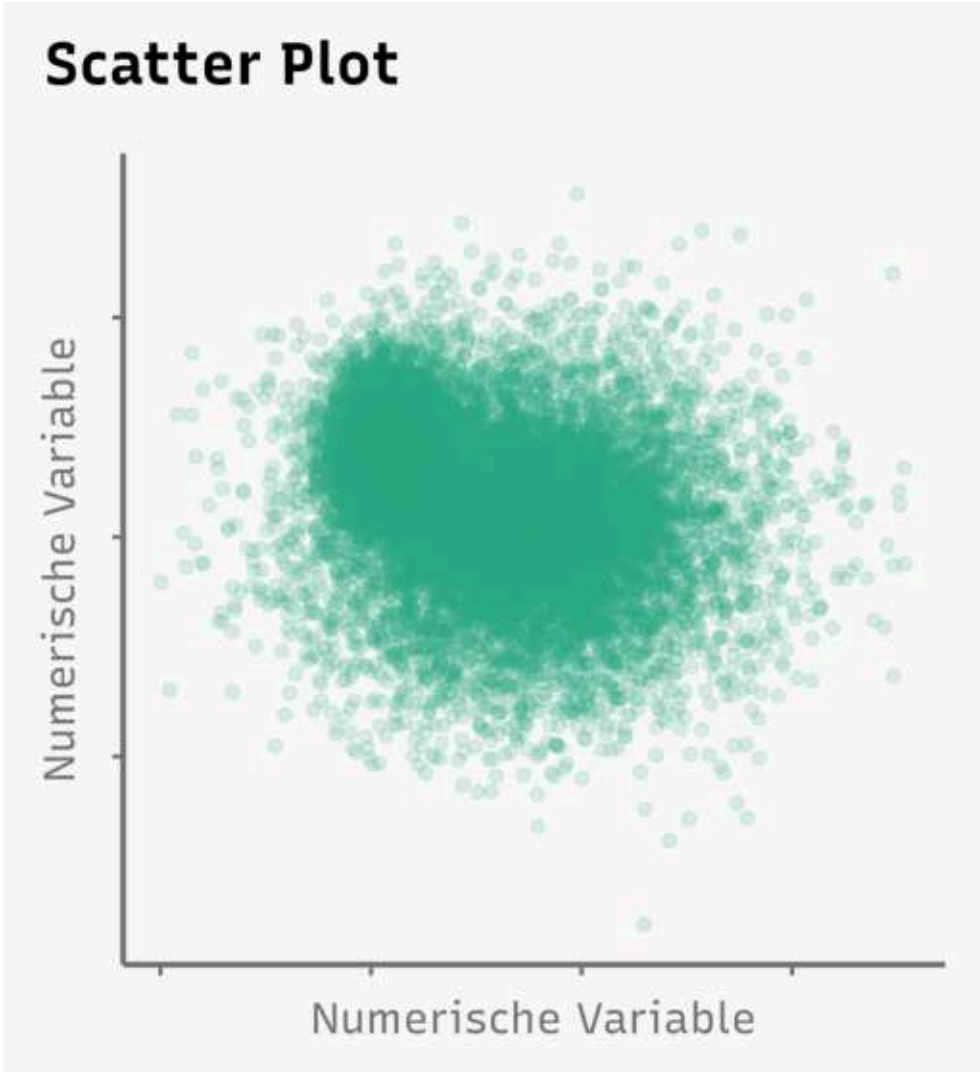

Binned Scatter Plot: Hex Grid
Anzahl
Numerische Variable
Numerische Variable

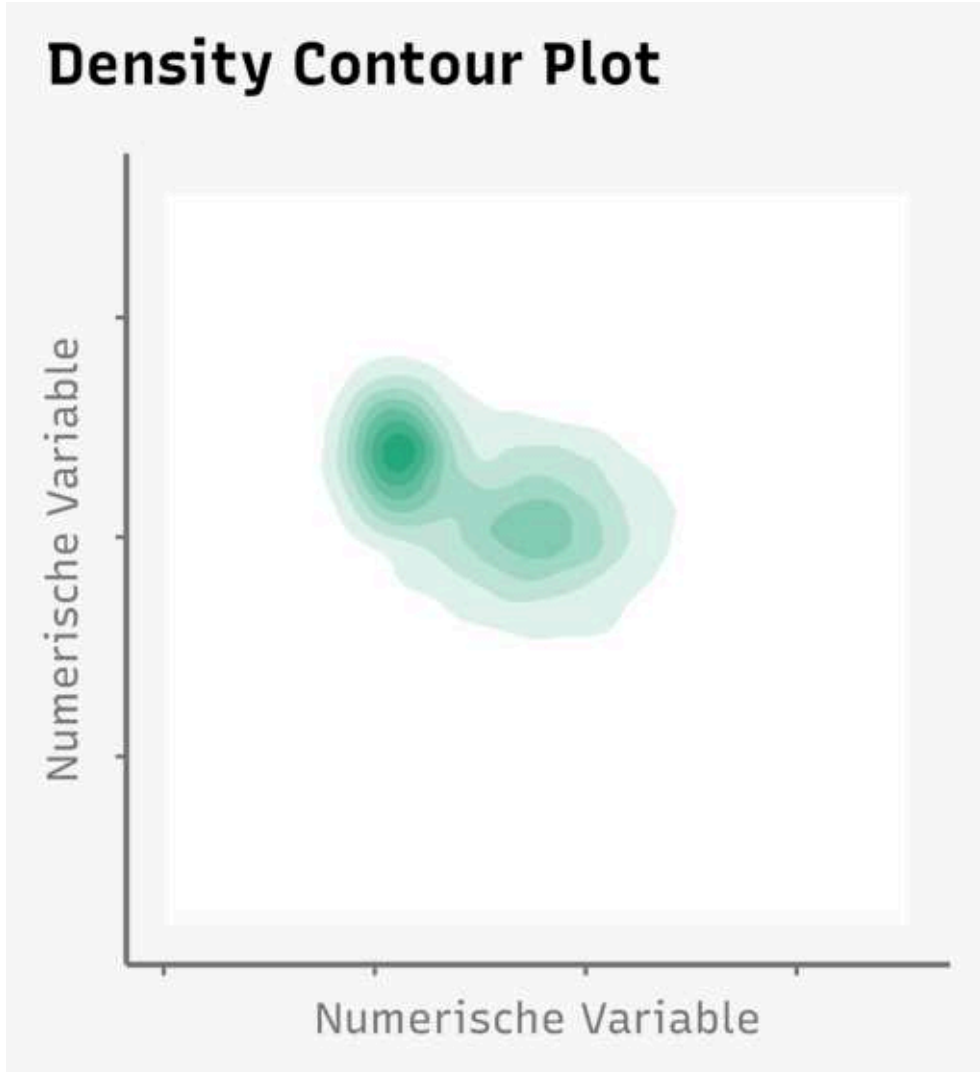

Scatter Plot
Numerische Variable
Numerische Variable

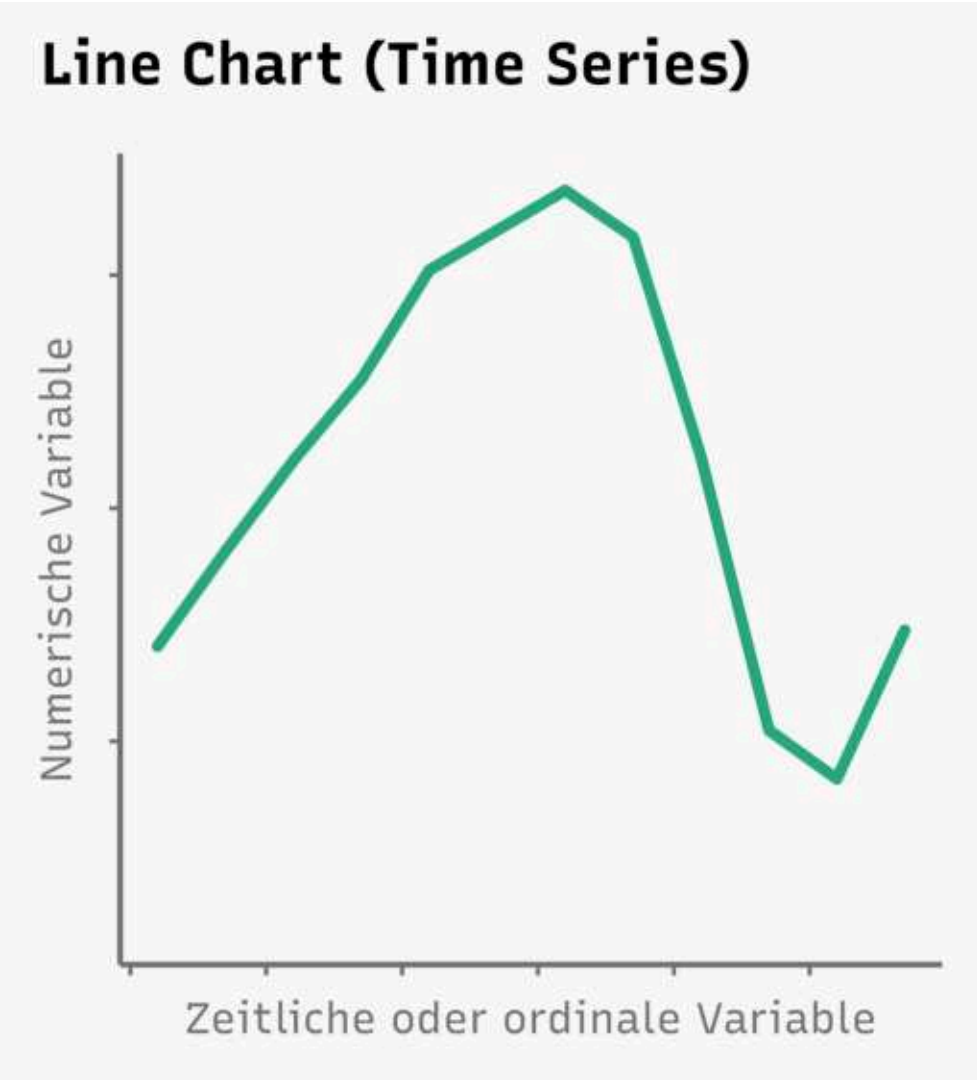

Density Contour Plot
Numerische Variable
Numerische Variable

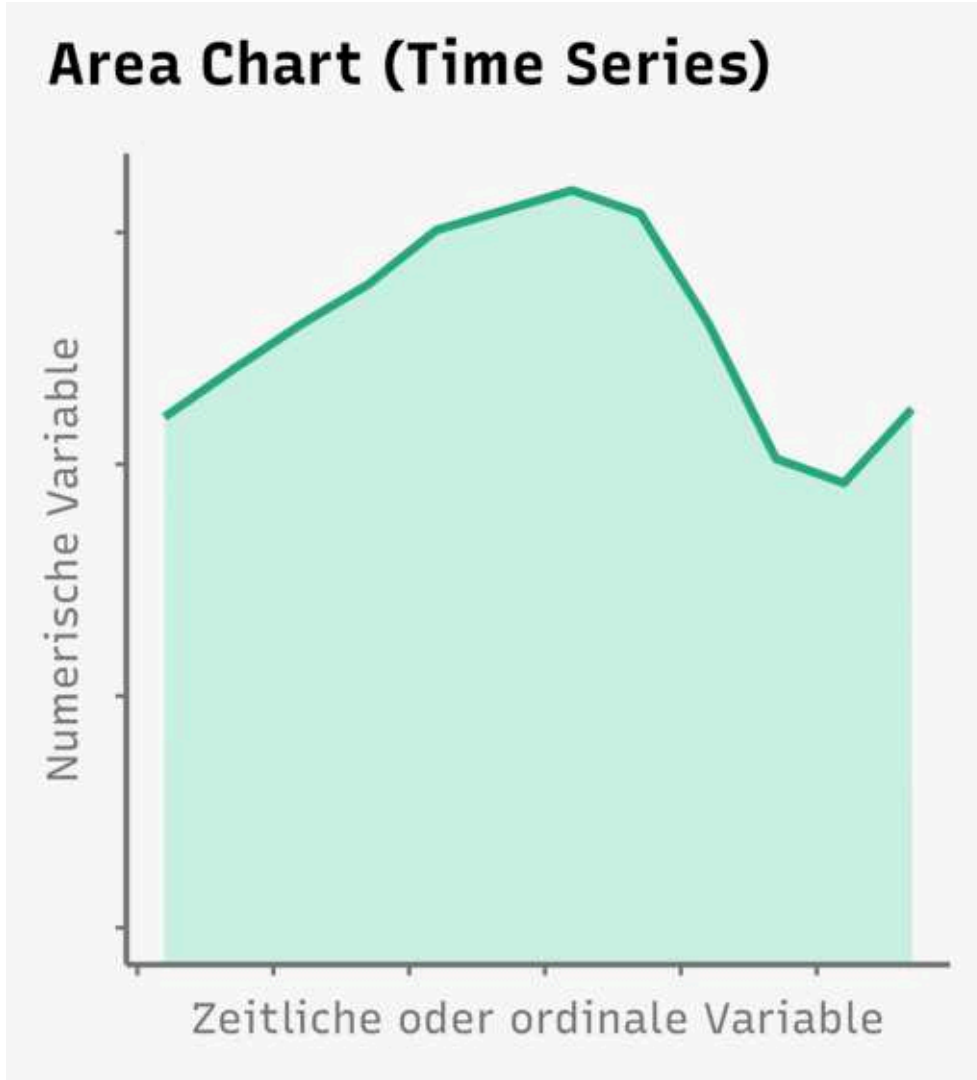

Scatter Plot
Numerische Variable
Numerische Variable

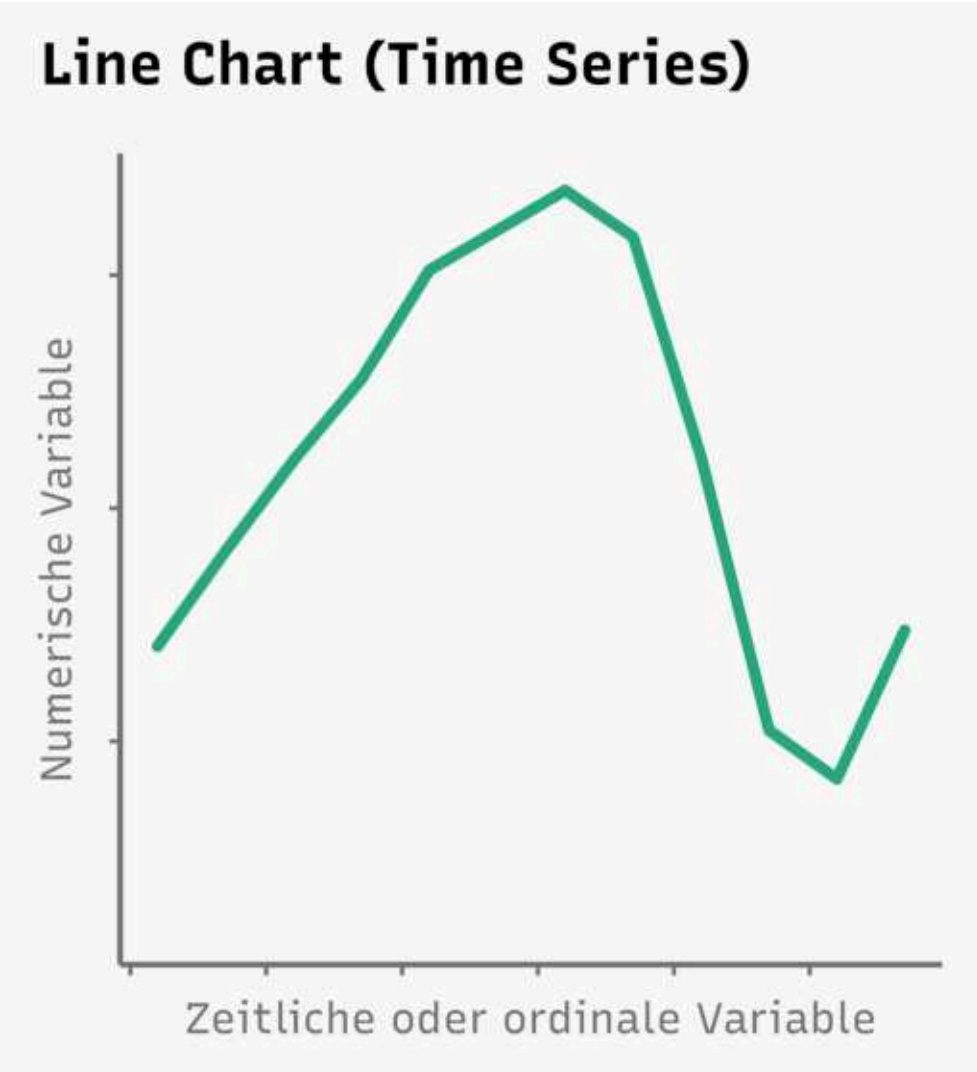

Density Contour Plot
Numerische Variable
Numerische Variable

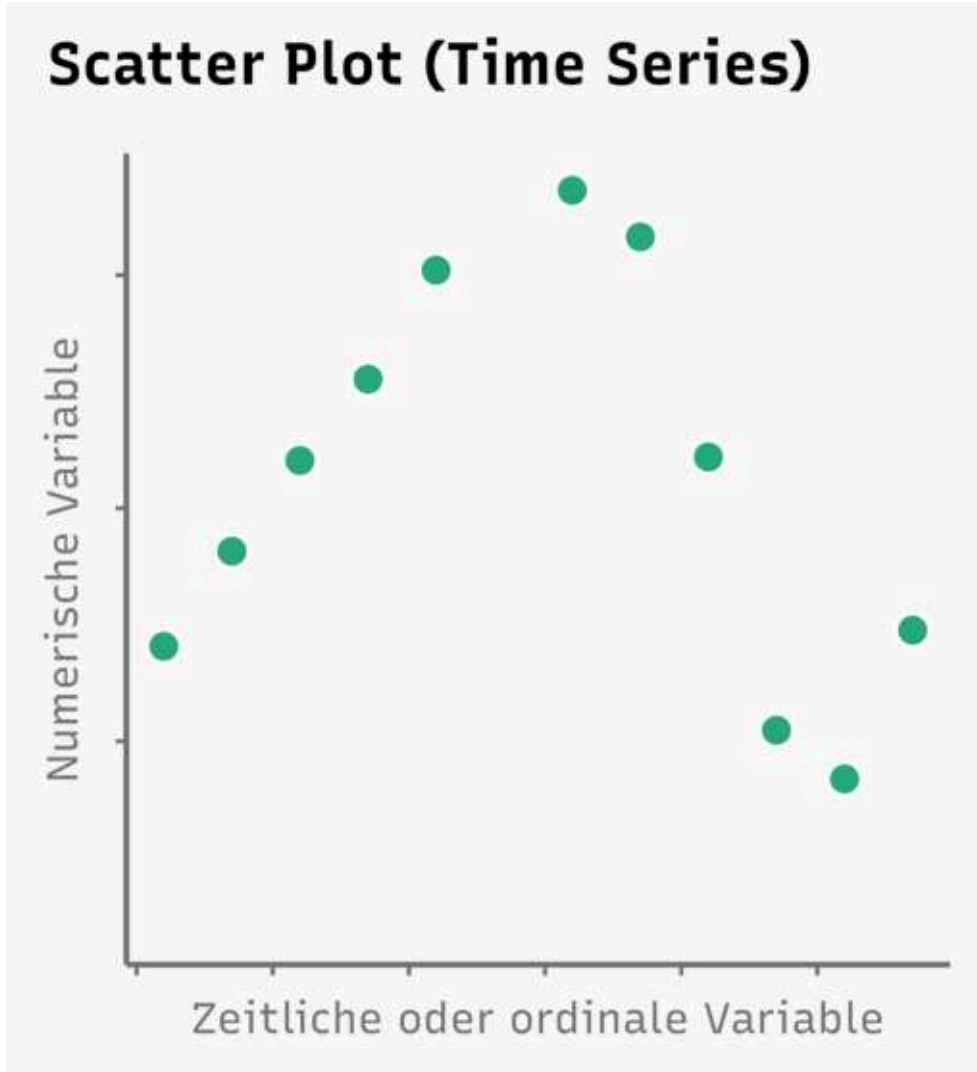

Scatter Plot
Numerische Variable
Numerische Variable

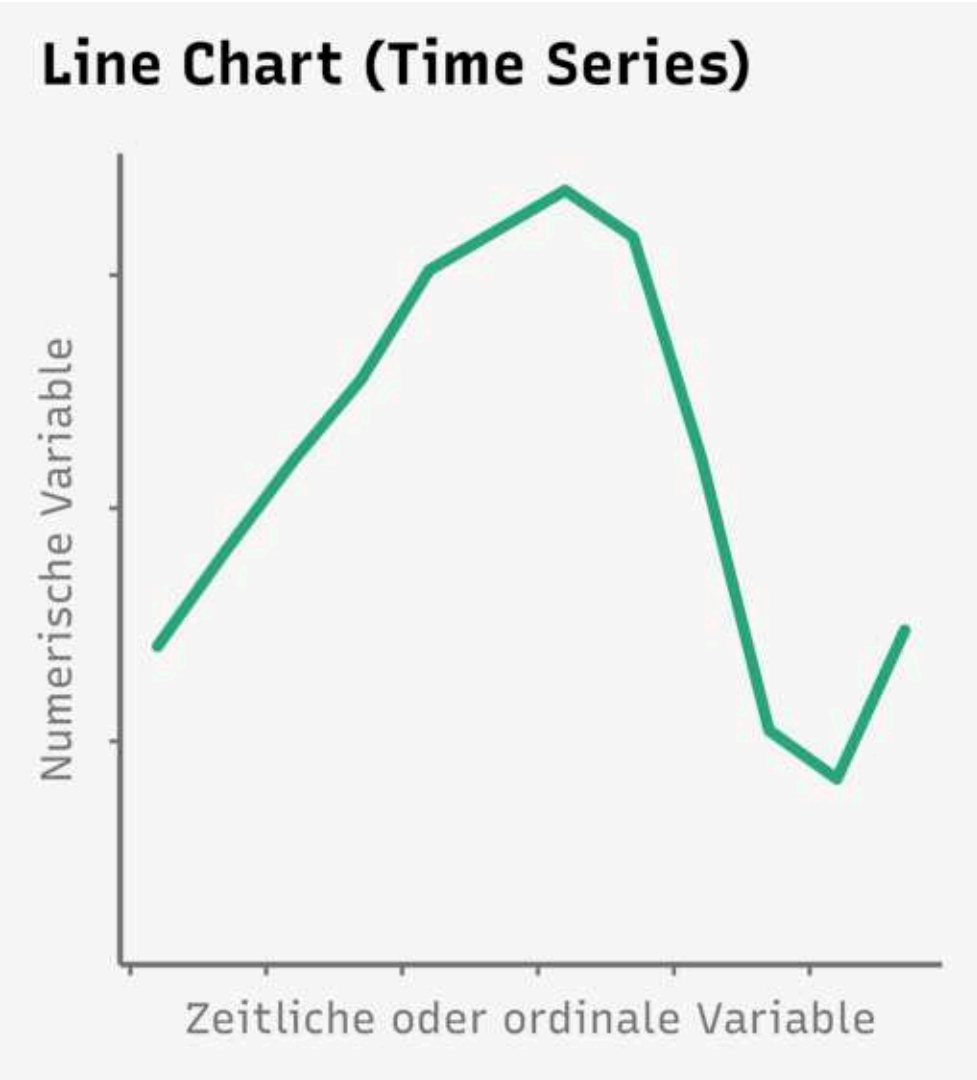

Density Contour Plot
Numerische Variable
Numerische Variable

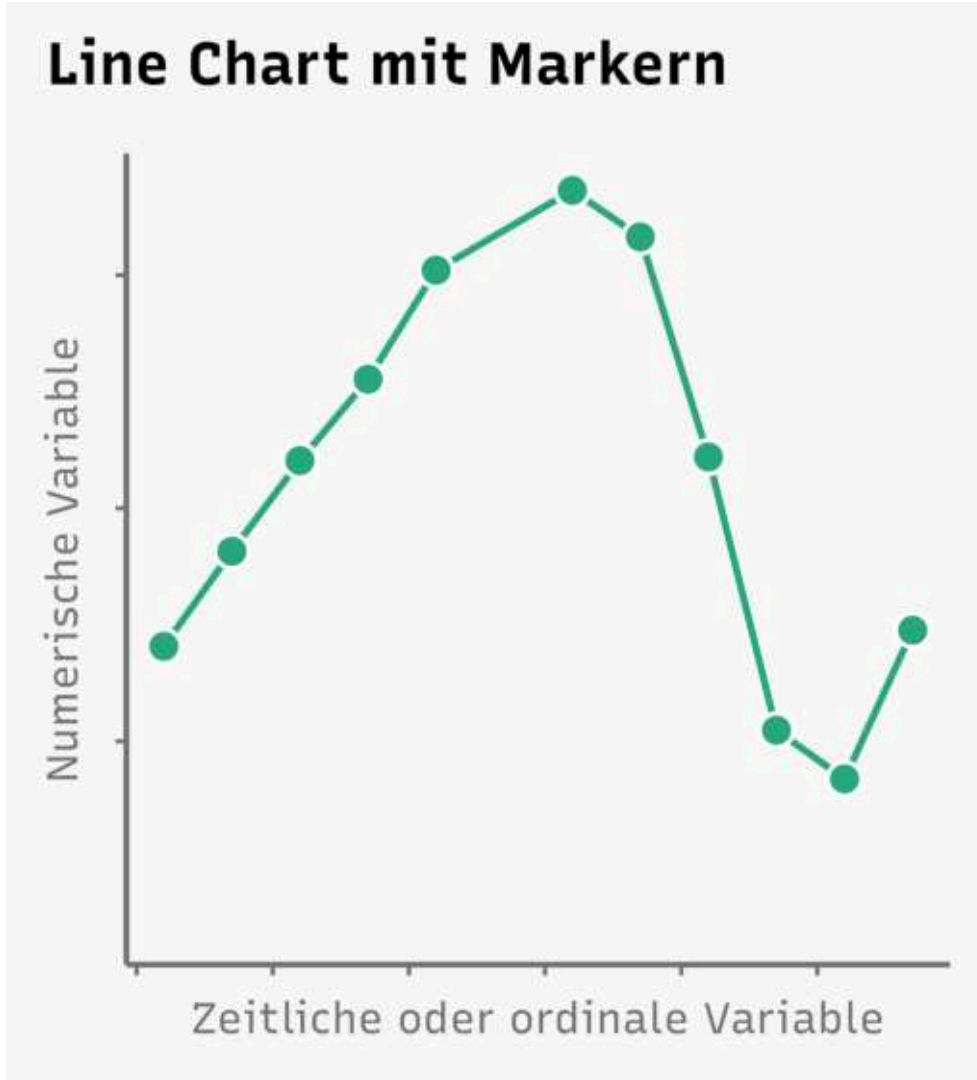

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

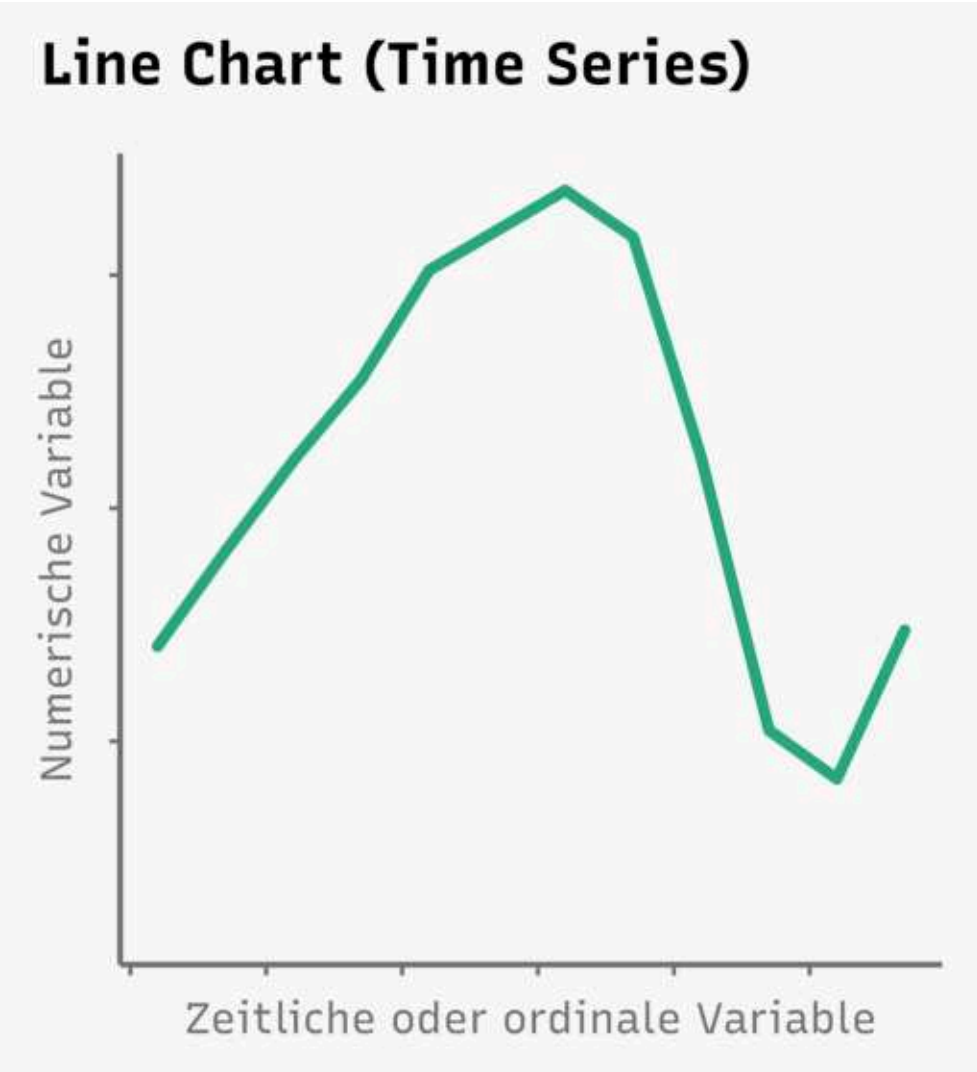

Area Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

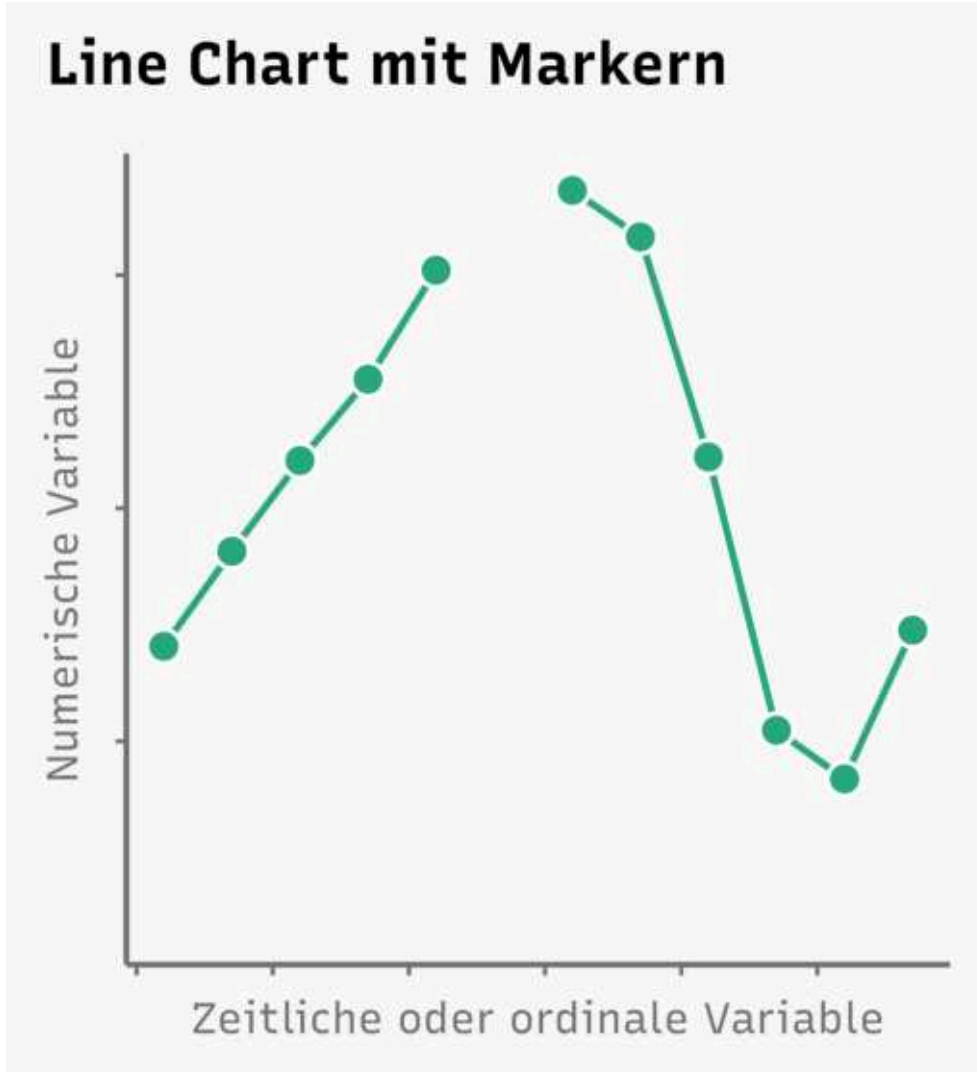

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

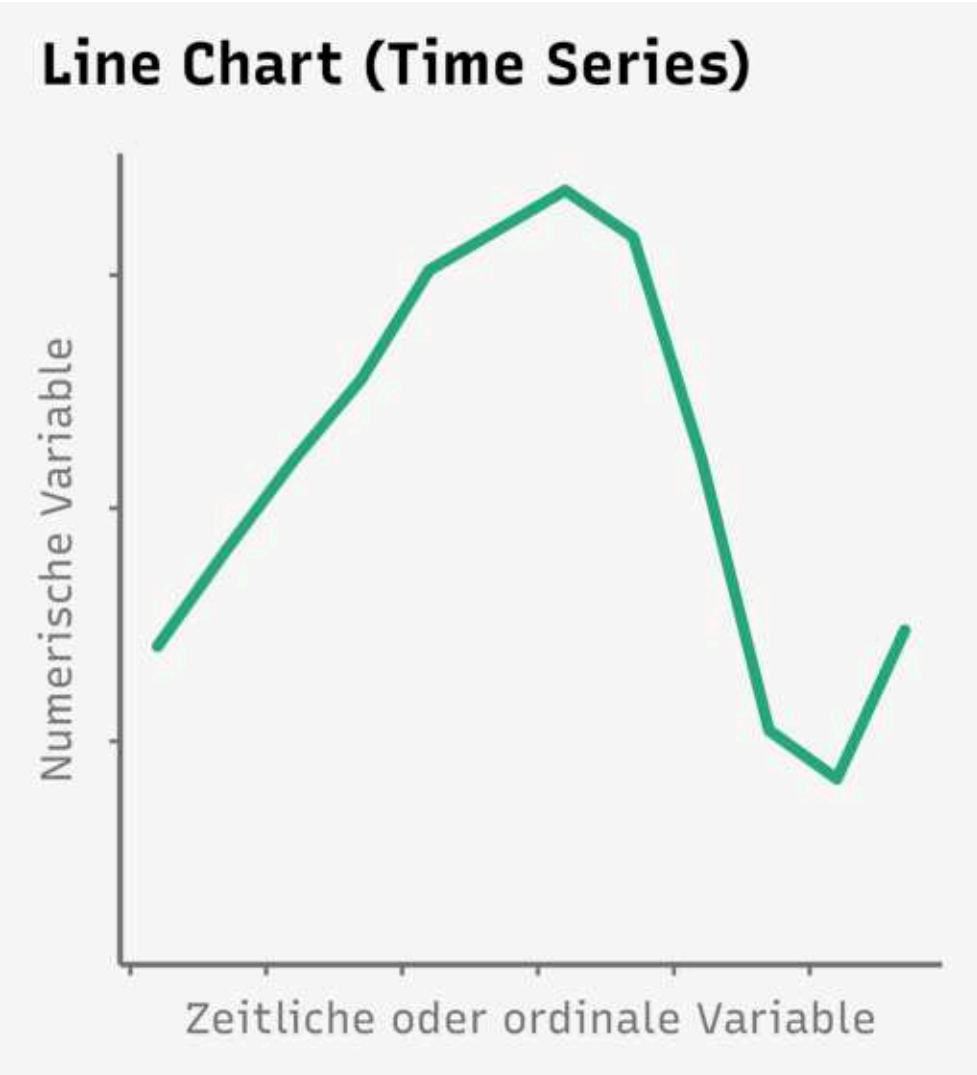

Scatter Plot (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

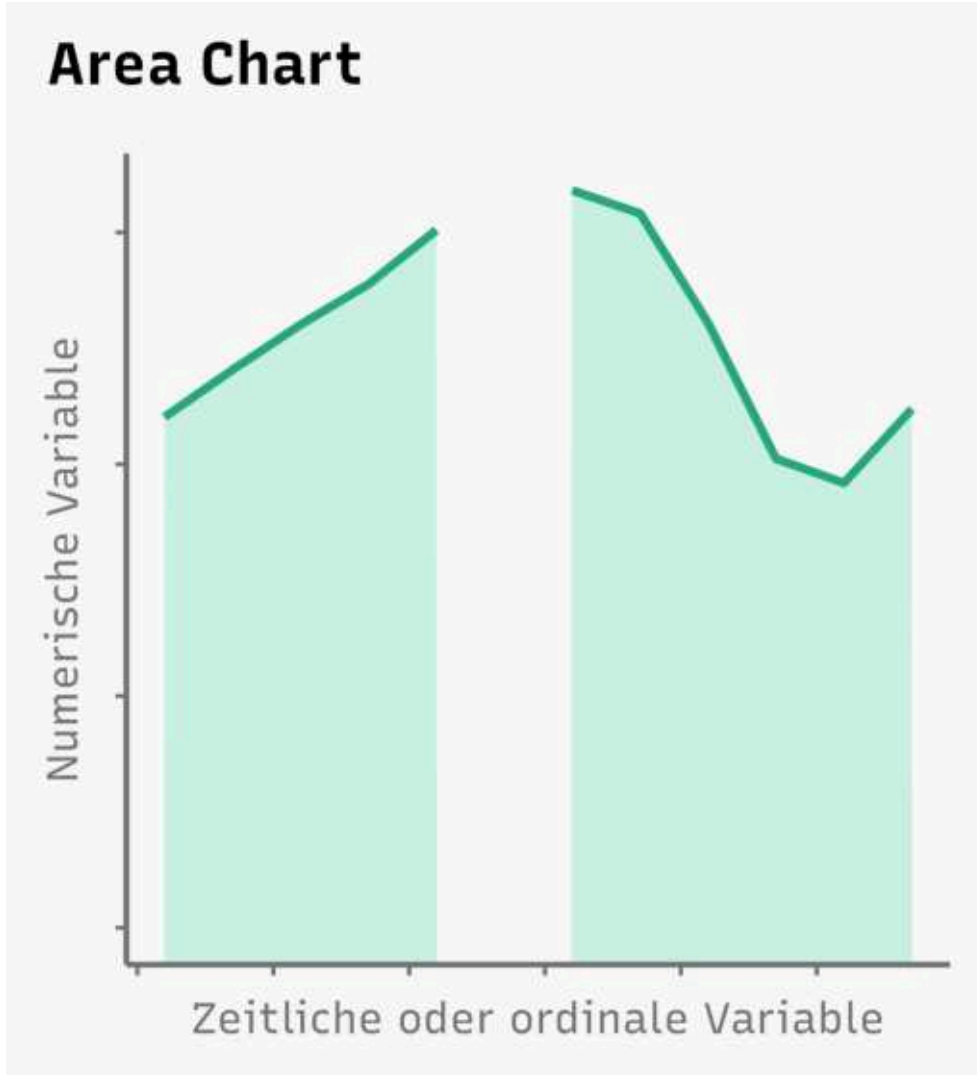

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

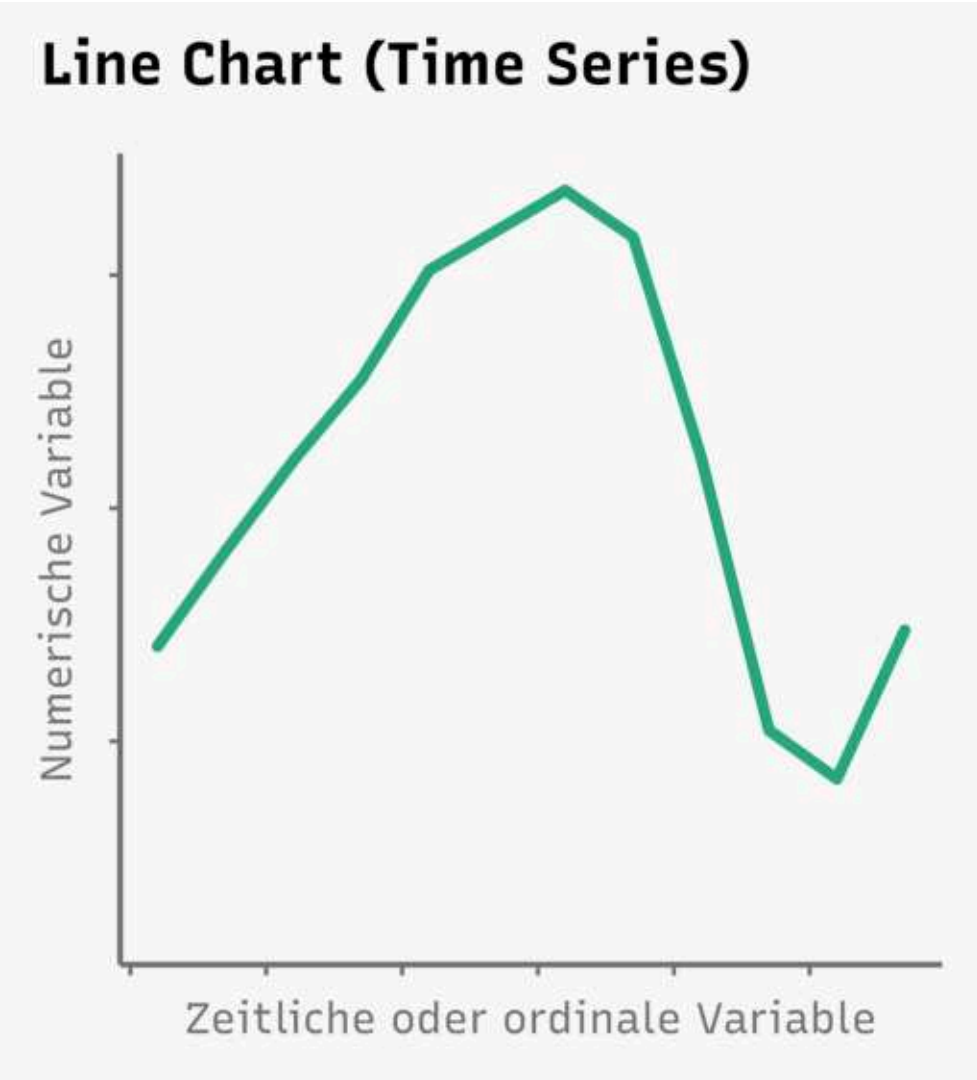

Line Chart mit Markern
Numerische Variable
Zeitliche oder ordinale Variable

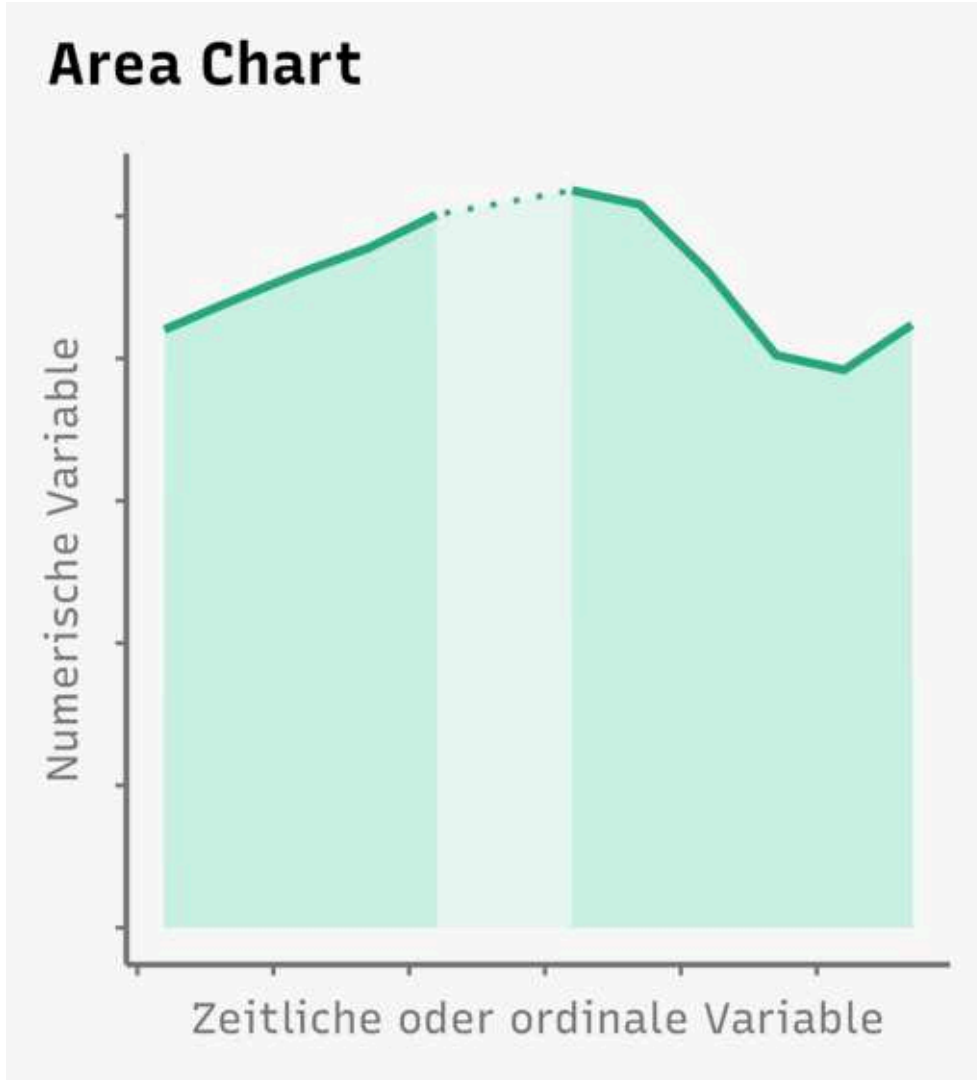

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

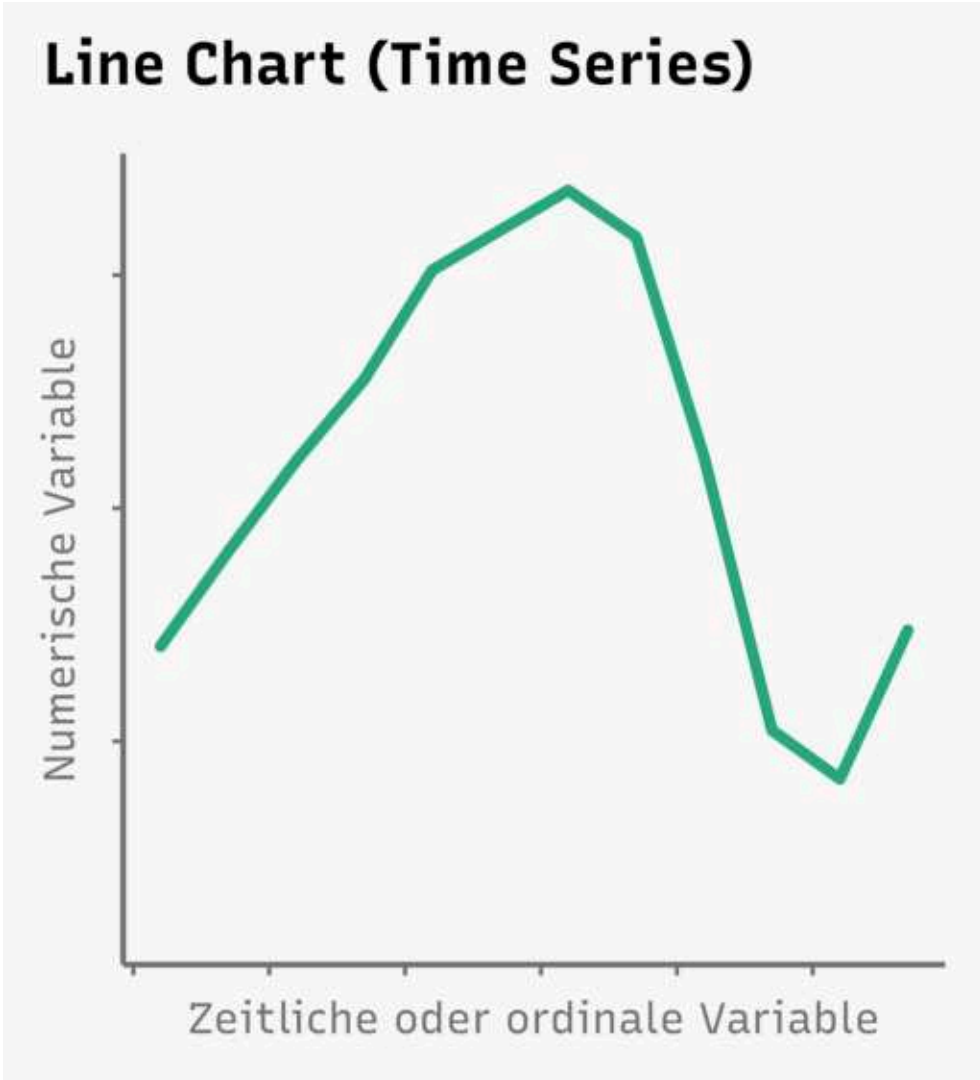

Line Chart mit Markern
Numerische Variable
Zeitliche oder ordinale Variable

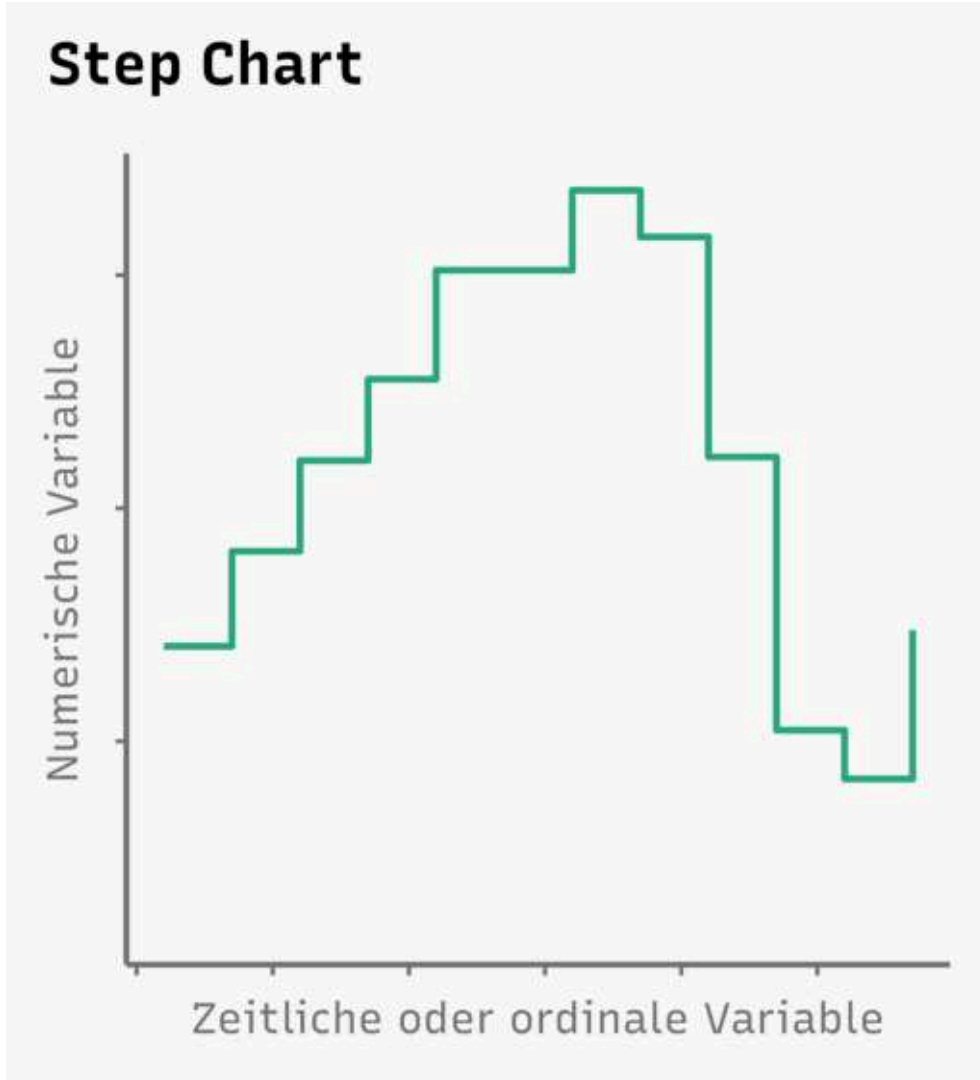

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

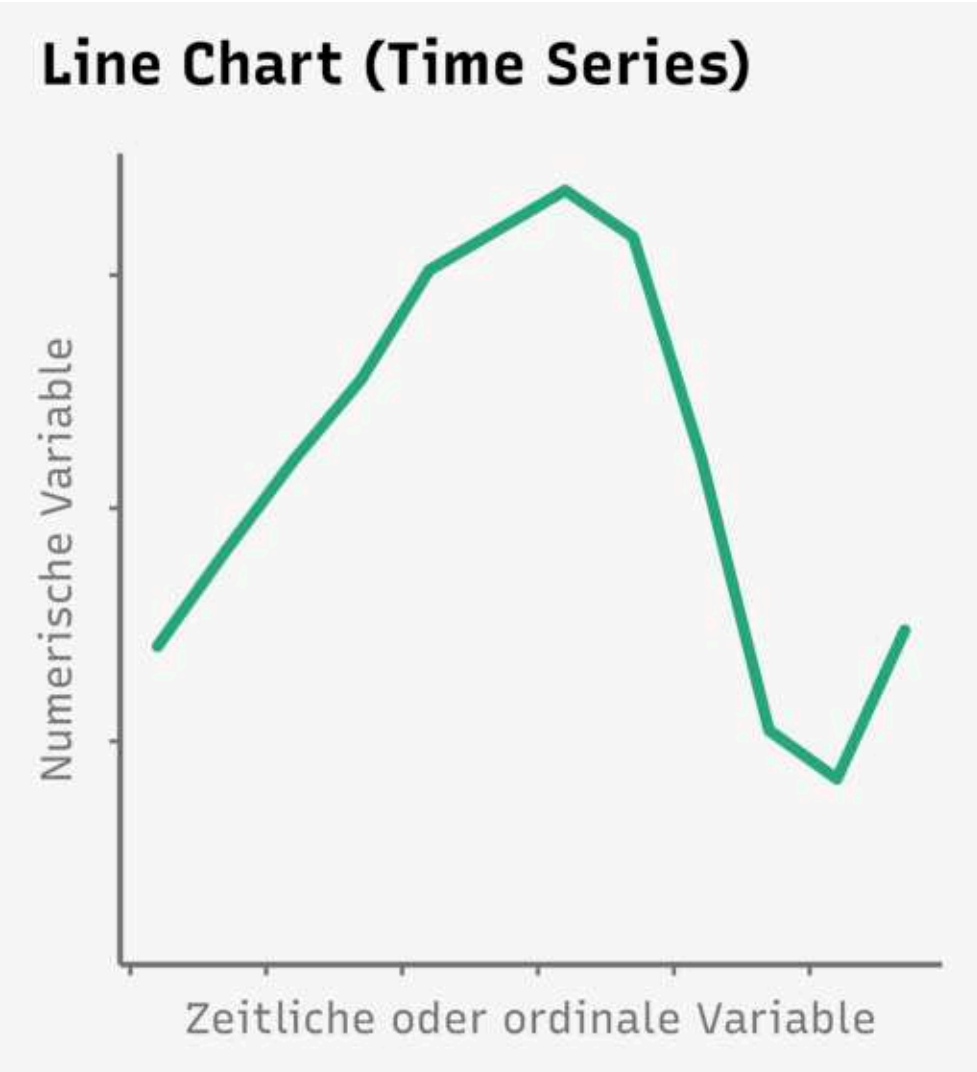

Area Chart
Numerische Variable
Zeitliche oder ordinale Variable

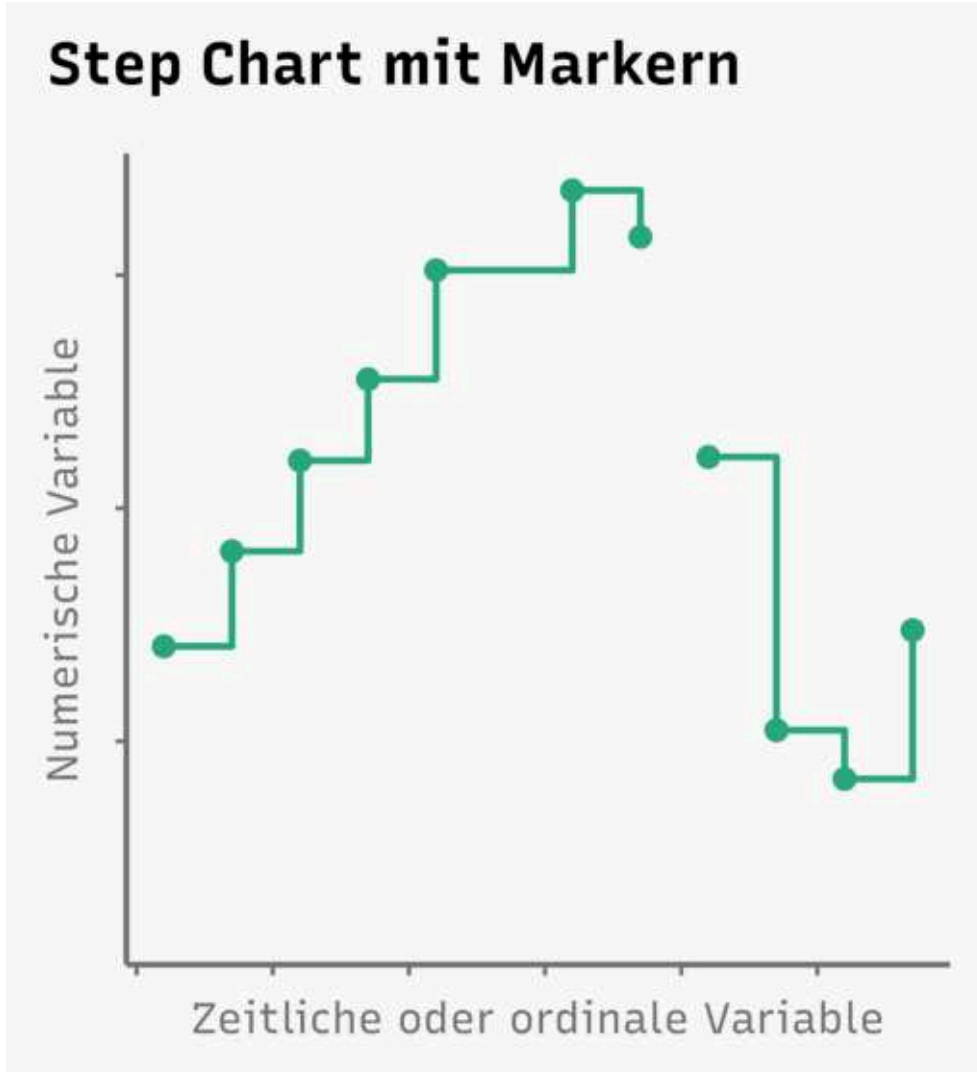

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

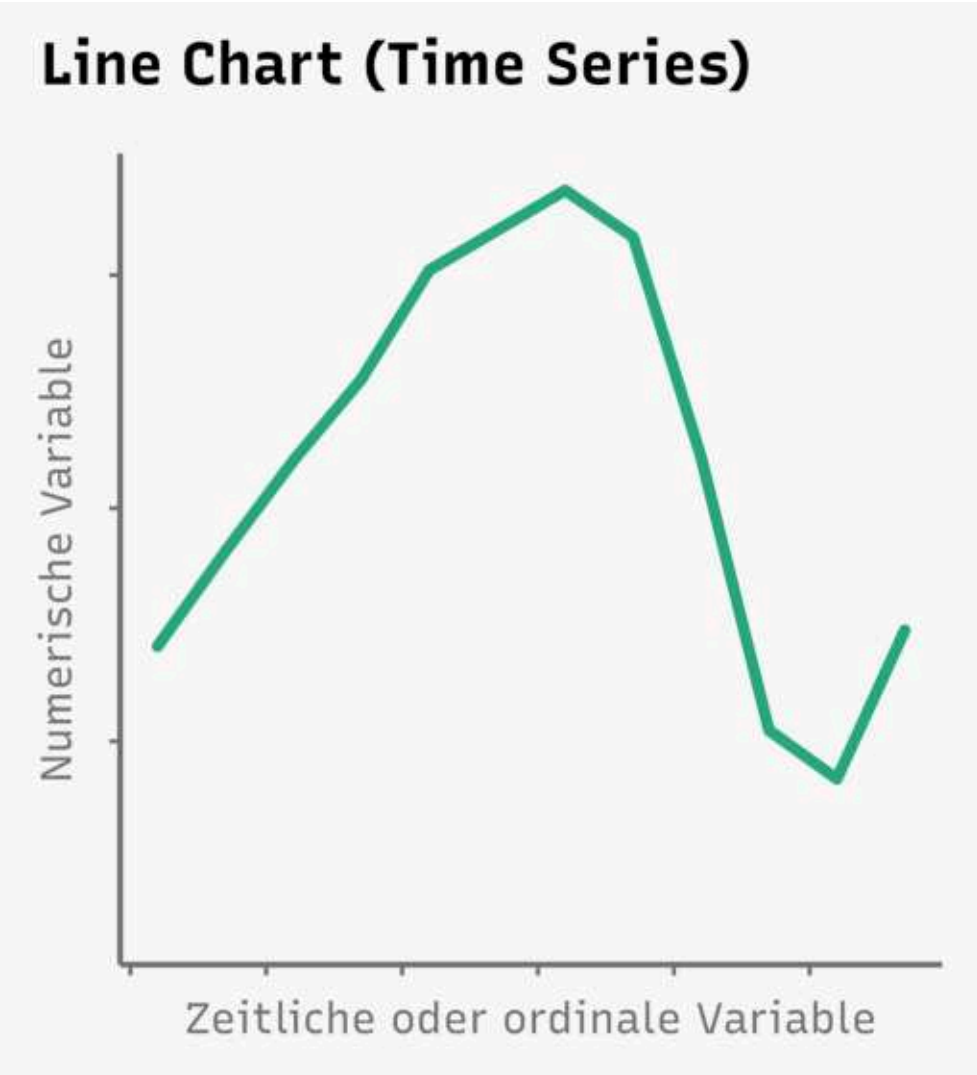

Area Chart
Numerische Variable
Zeitliche oder ordinale Variable

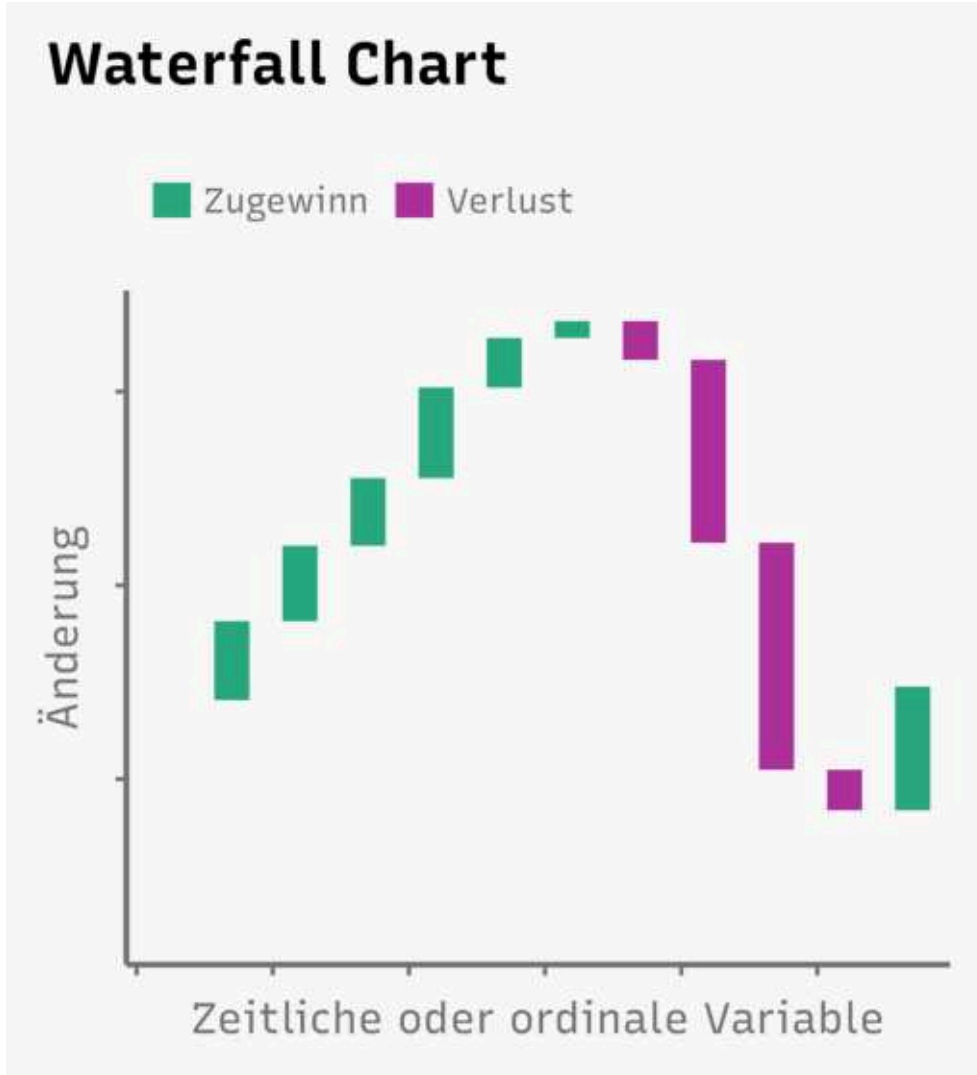

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable


Step Chart
Numerische Variable
Zeitliche oder ordinale Variable


Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

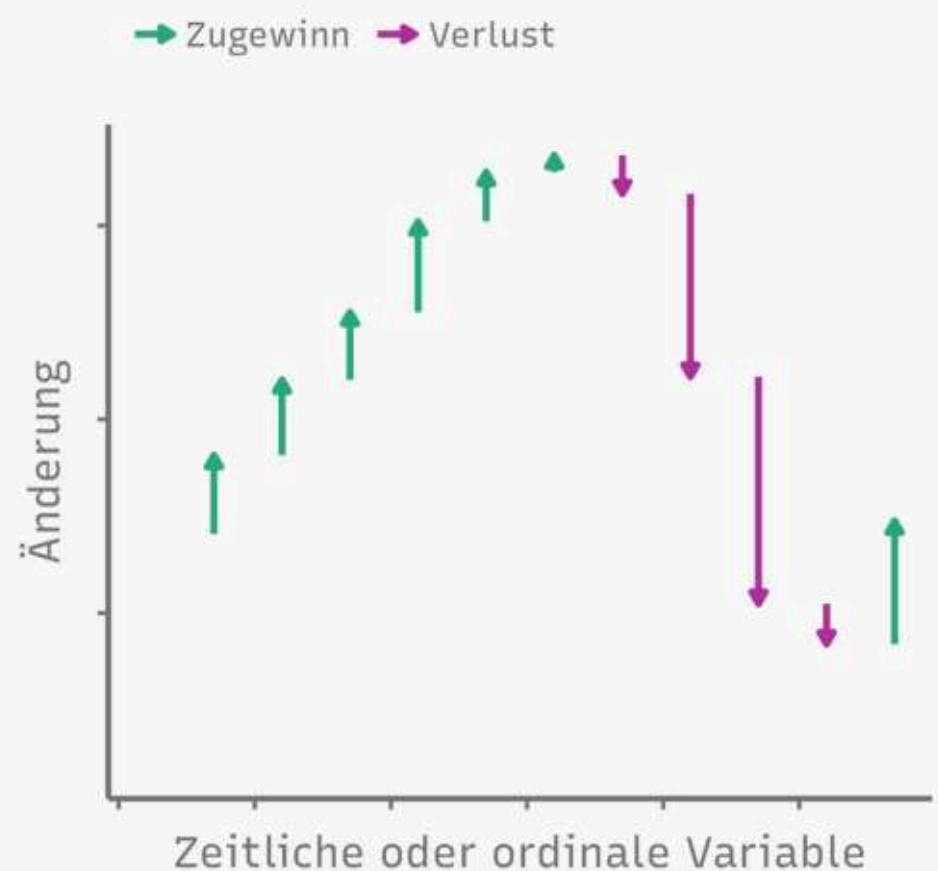

Step Chart mit Markern
Numerische Variable
Zeitliche oder ordinale Variable

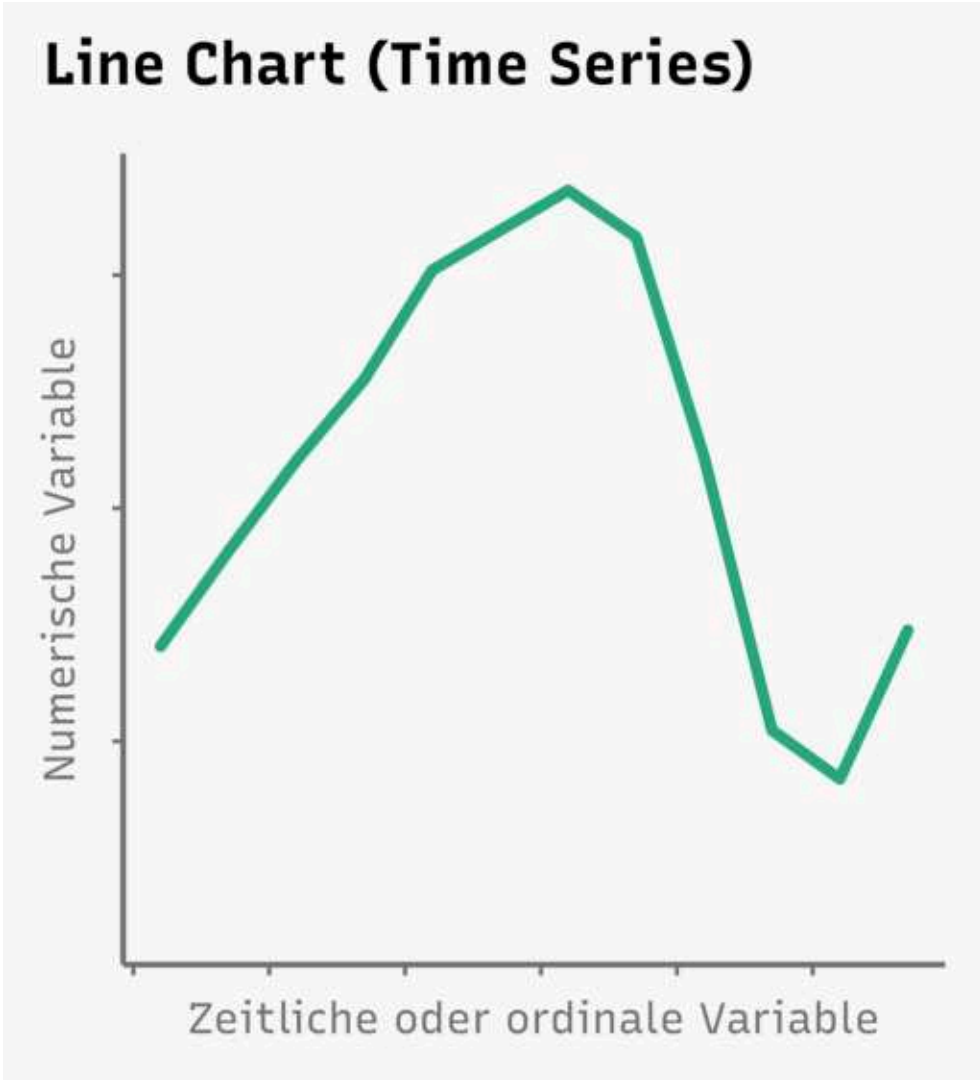

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

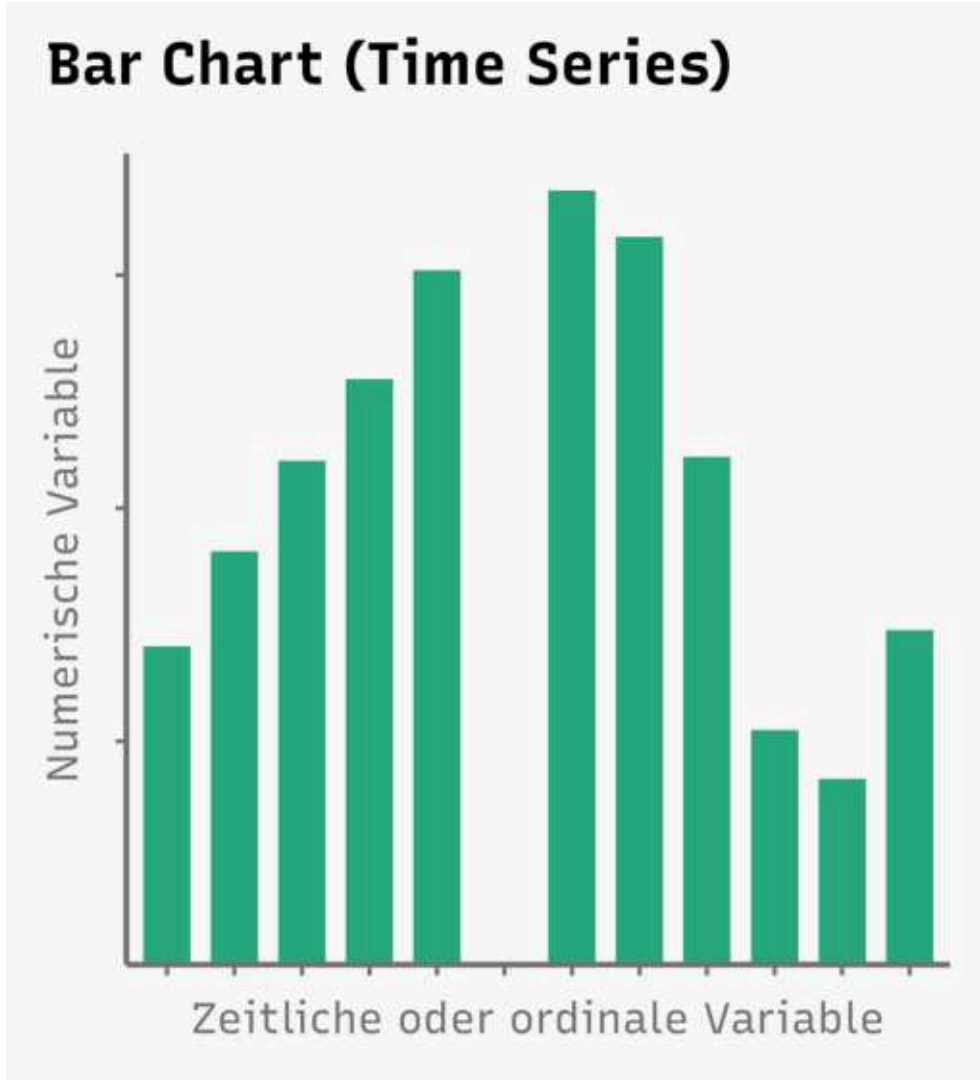

Waterfall Chart
Zugewinn
Verlust
Änderung
Zeitliche oder ordinale Variable

Line Chart (Time Series)

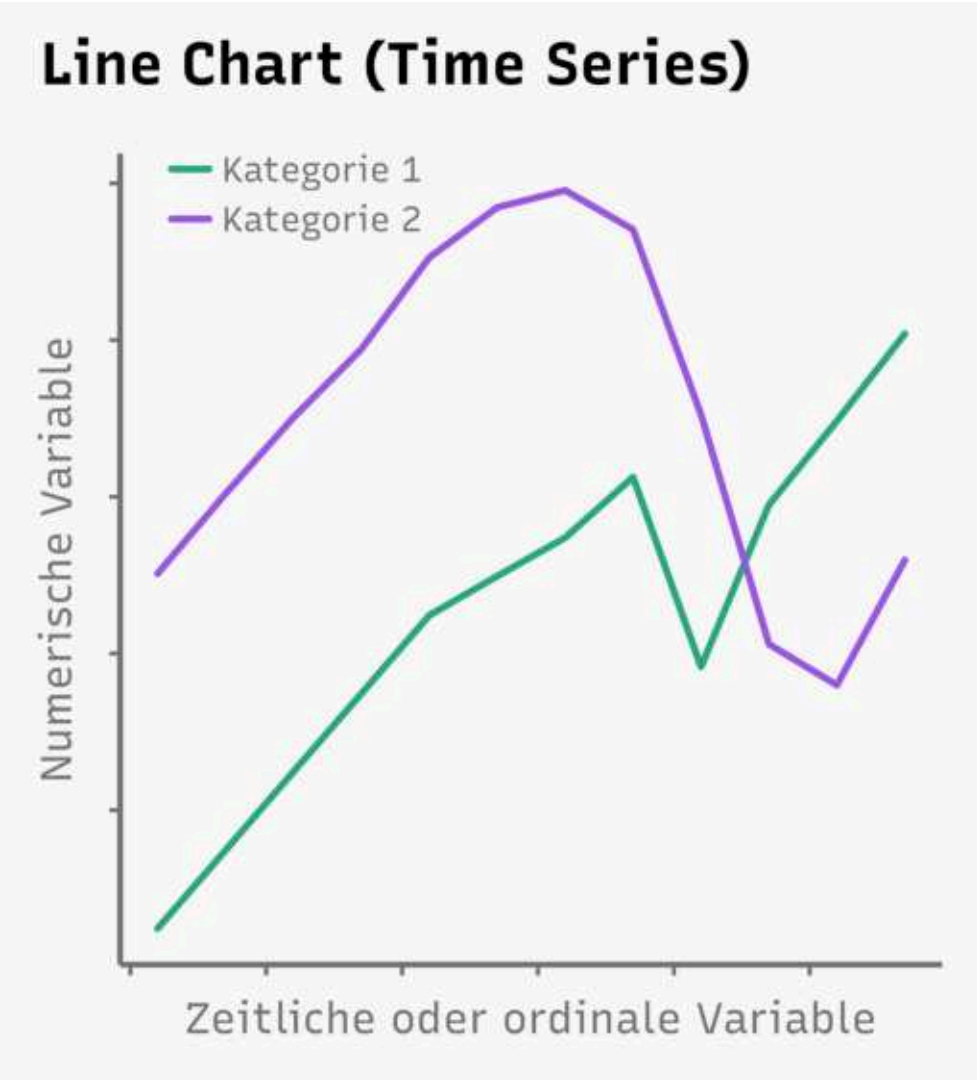
Waterfall Chart

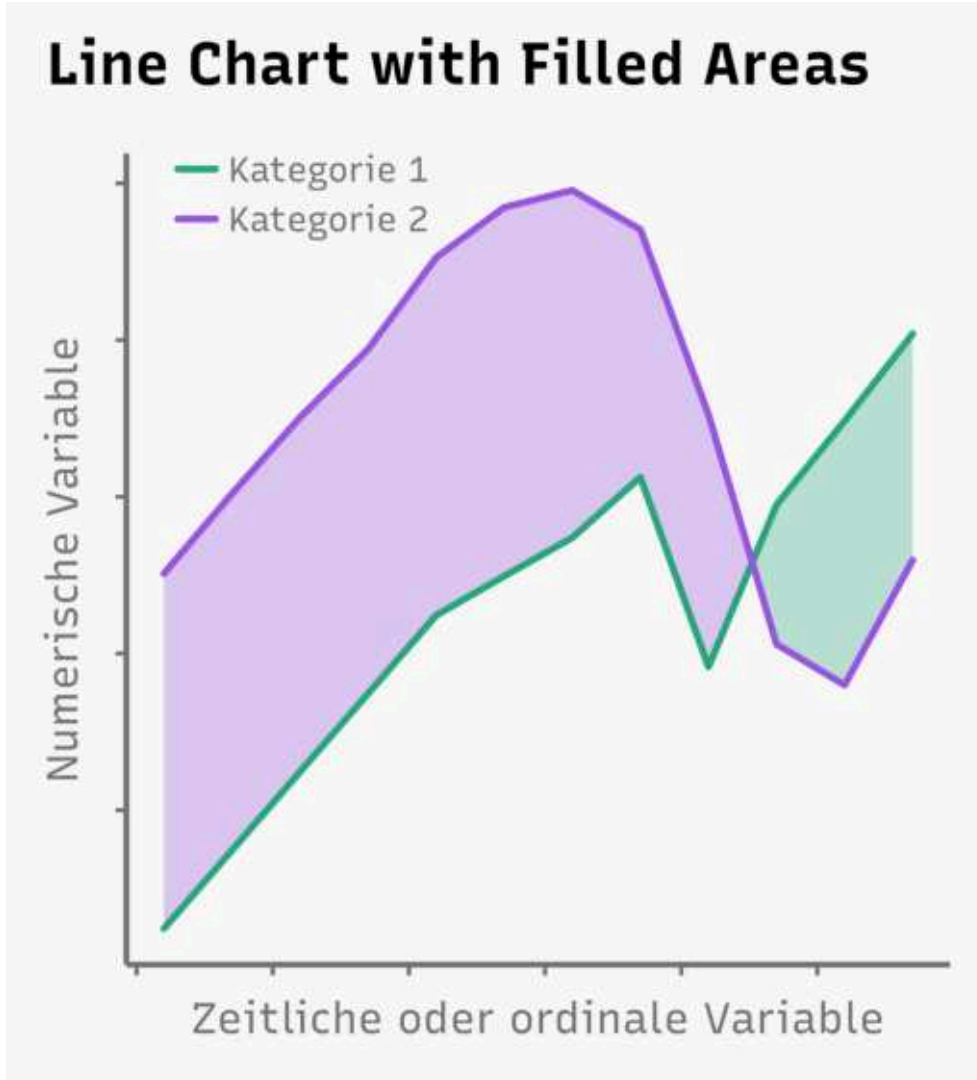


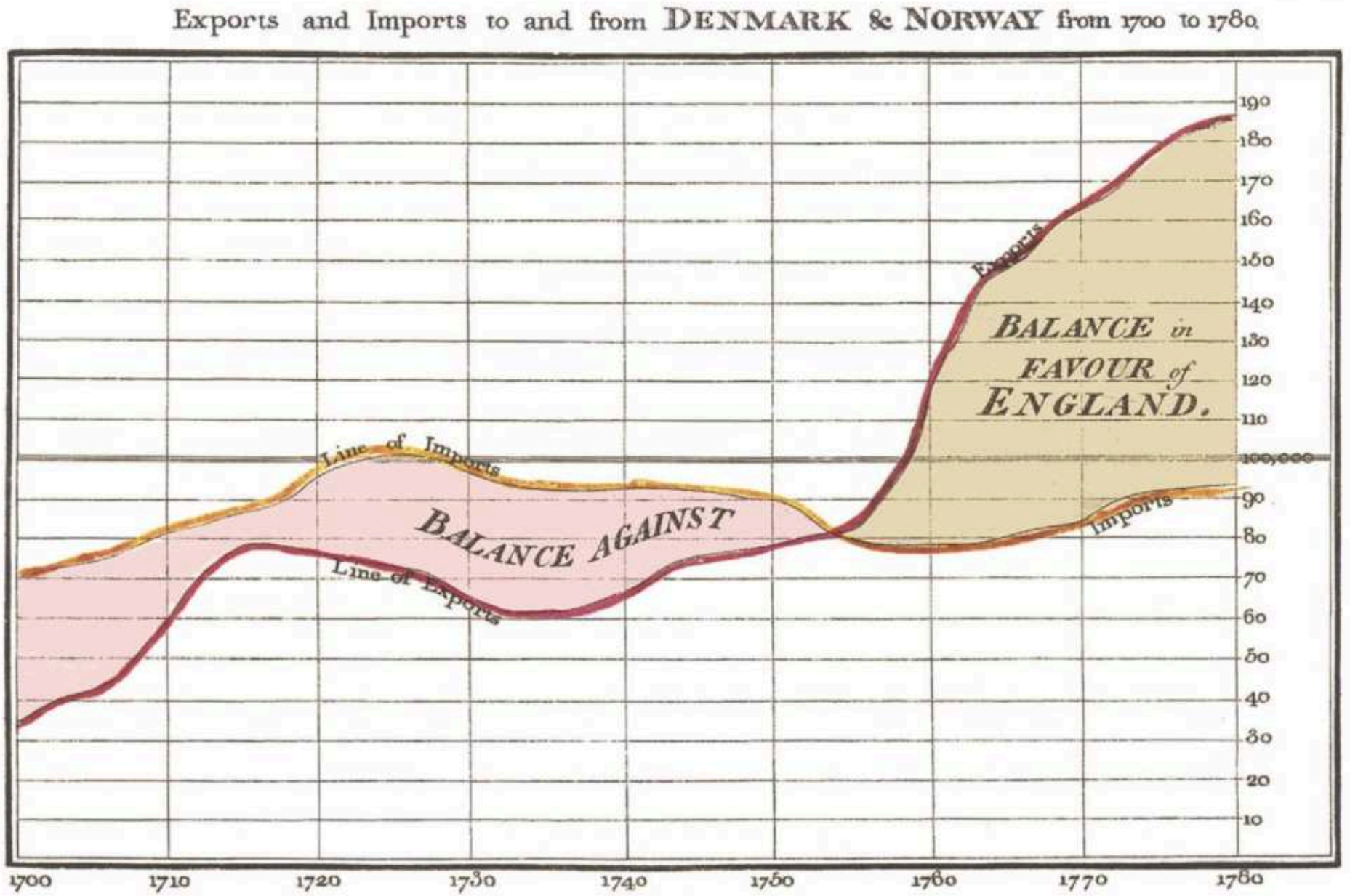

Line Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable


Bar Chart (Time Series)
Numerische Variable
Zeitliche oder ordinale Variable

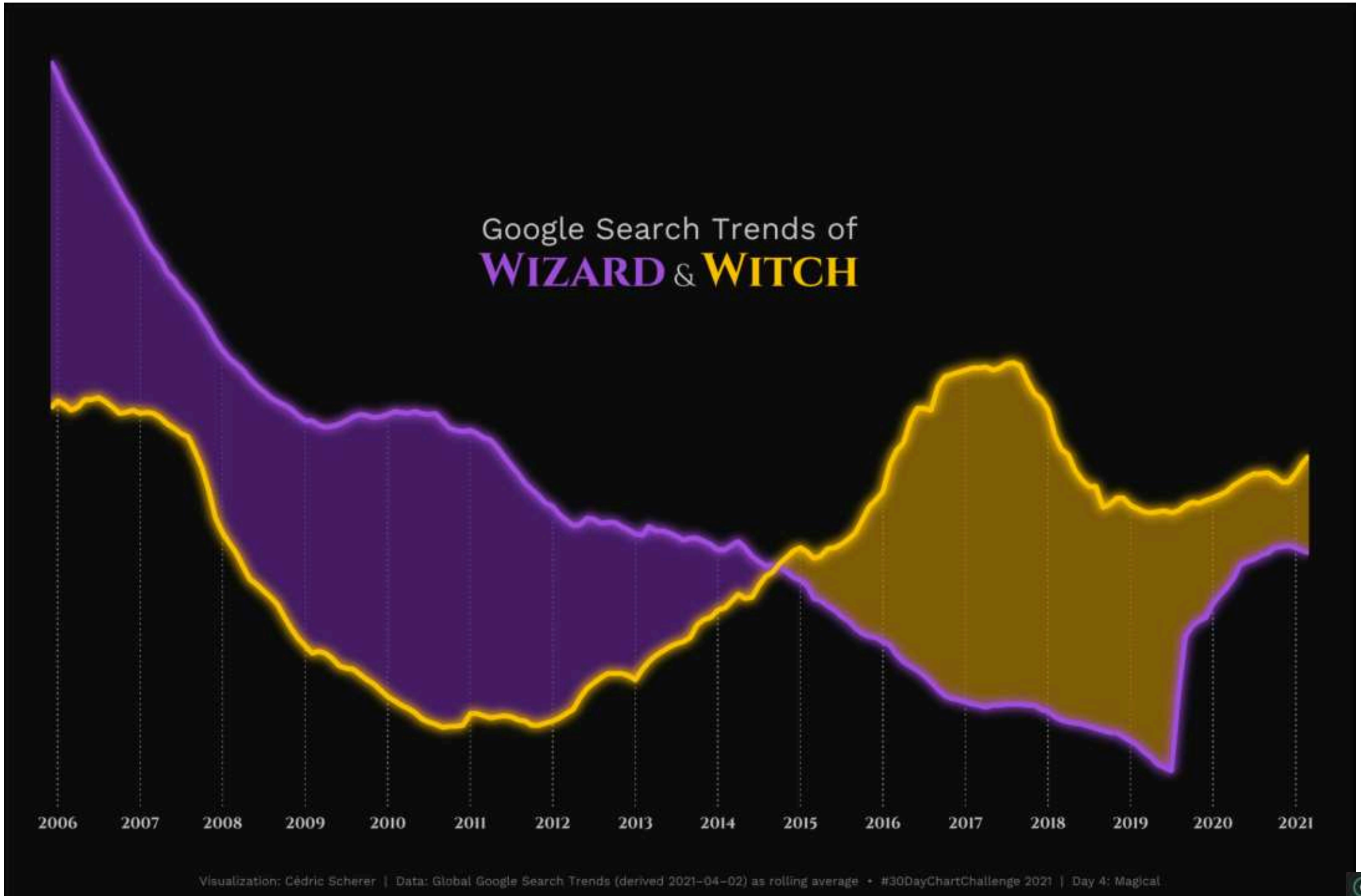
Beziehungen vergleichen

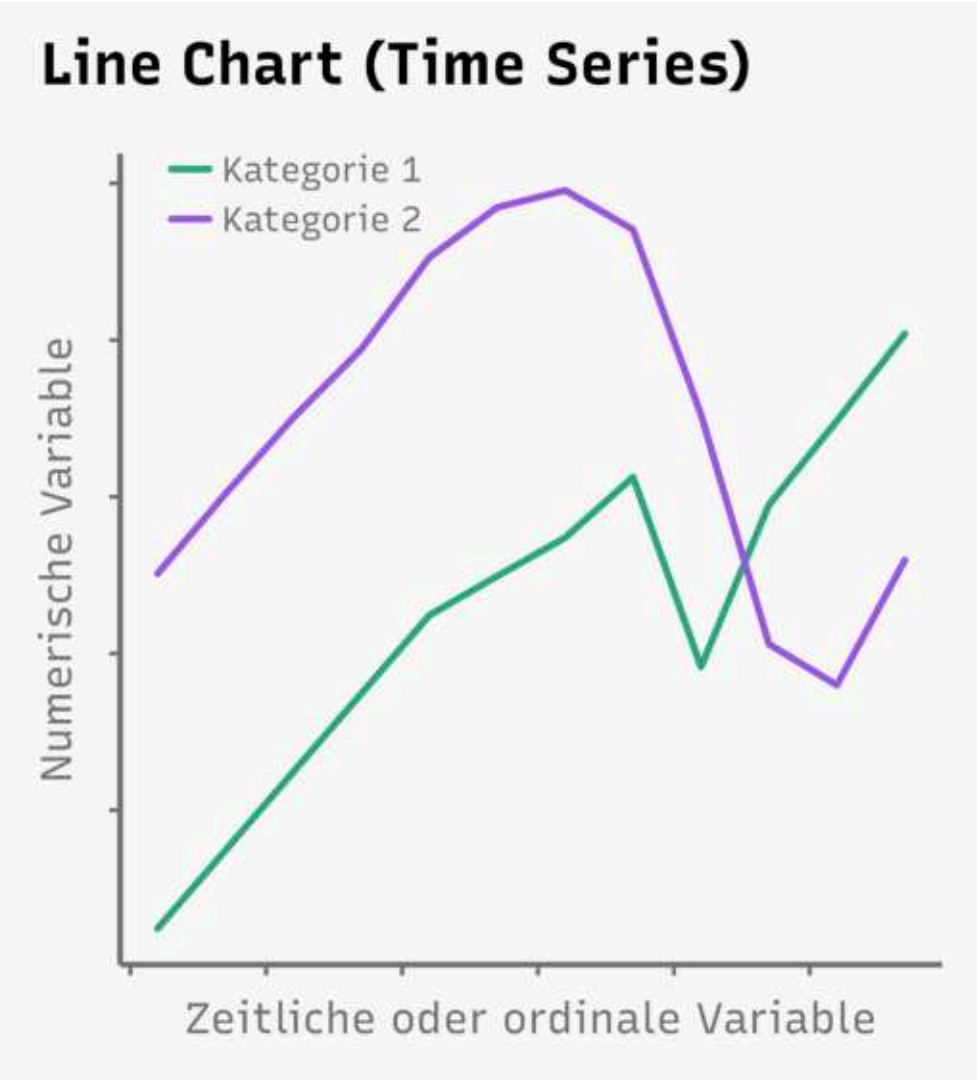

Line Chart (Time Series)
Kategorie 1
Kategorie 2
Numerische Variable
Zeitliche oder ordinale Variable

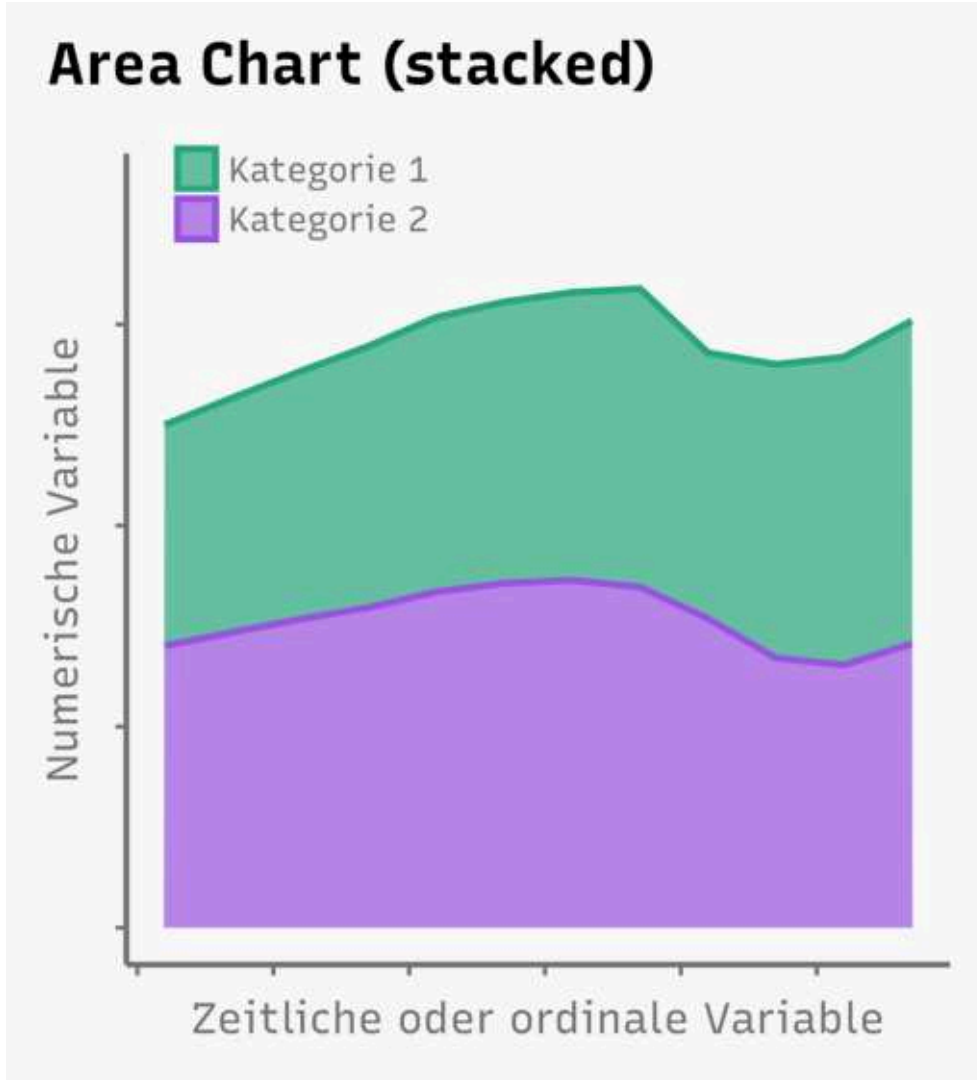

Line Chart with Filled Areas
Kategorie 1
Kategorie 2
Numerische Variable
Zeitliche oder ordinale Variable



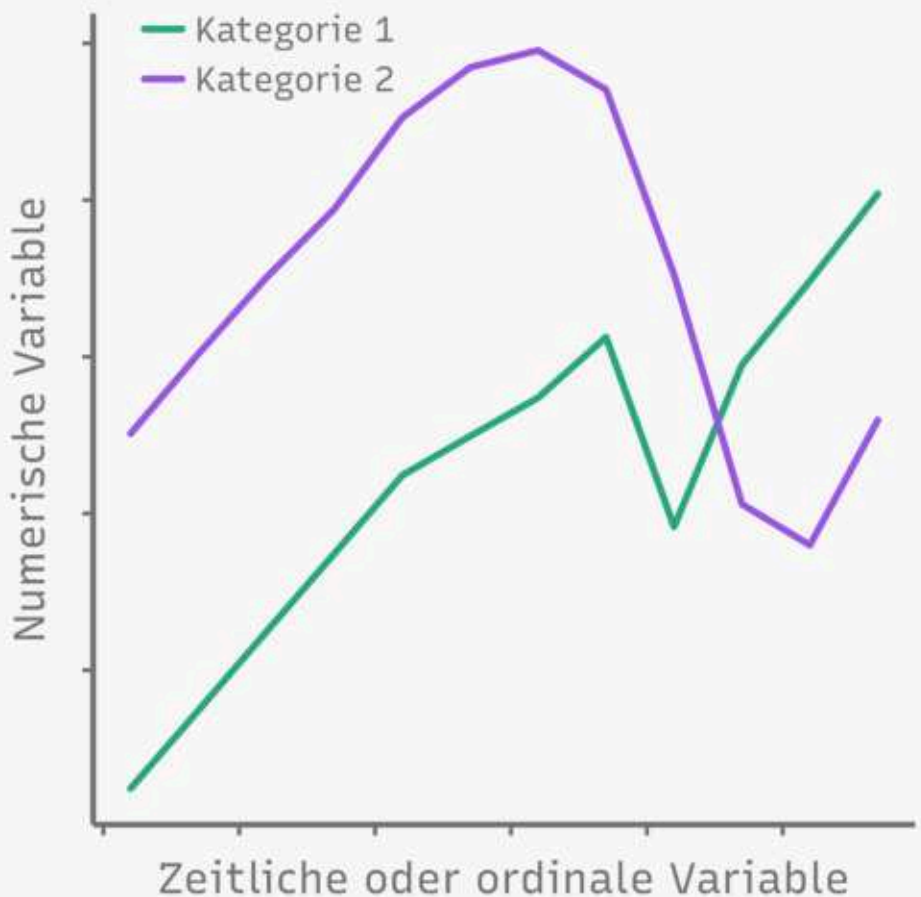
Zeitreihendiagramm mit Anmerkungen von William Playfair aus „The Commercial and Political Atlas and Statistical Breviary" (1786)


Google Search Trends of
WIZARD & WITCH
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Visualization: Cédric Scherer | Data: Global Google Search Trends (derived 2021-04-02) as rolling average • #30DayChartChallenge 2021 | Day 4: Magical

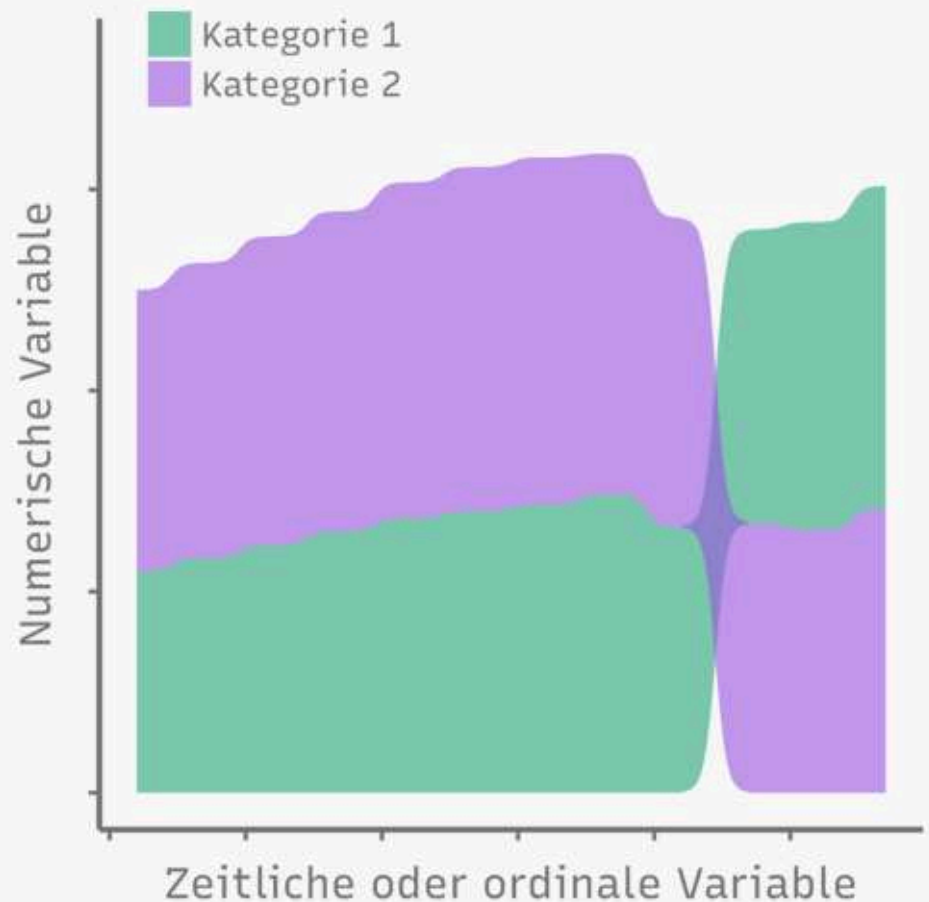

Line Chart (Time Series)
Kategorie 1
Kategorie 2
Numerische Variable
Zeitliche oder ordinale Variable


Area Chart (stacked)
Kategorie 1
Kategorie 2
Numerische Variable
Zeitliche oder ordinale Variable

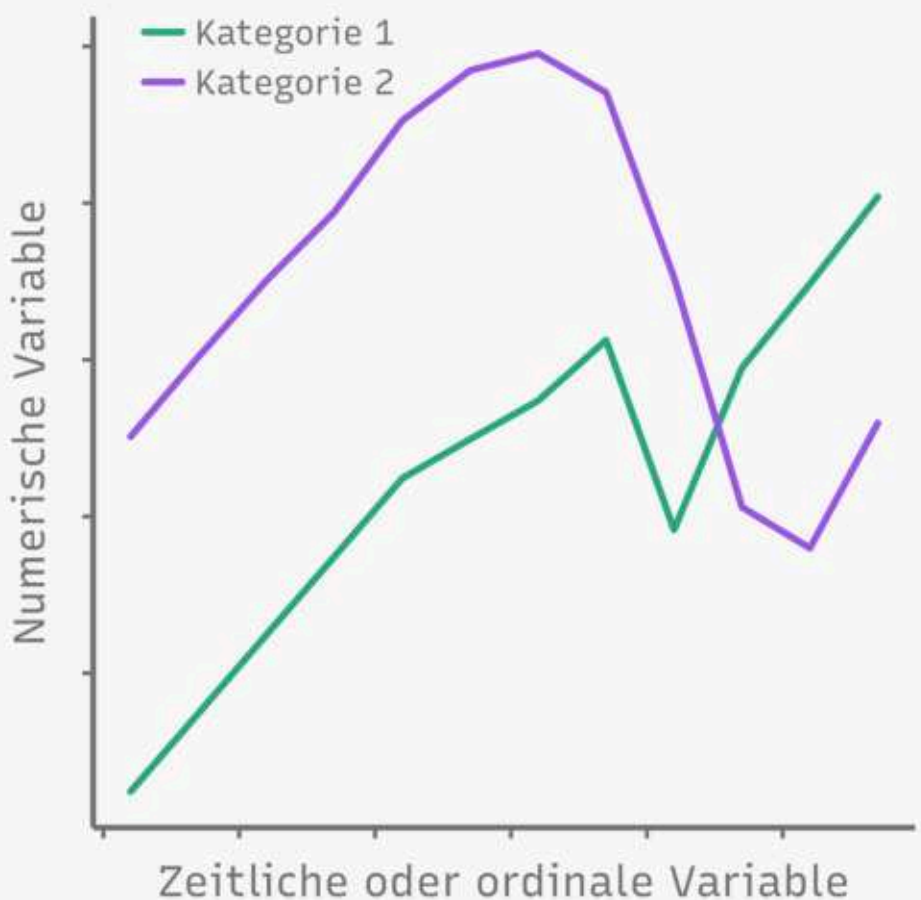
Line Chart (Time Series)



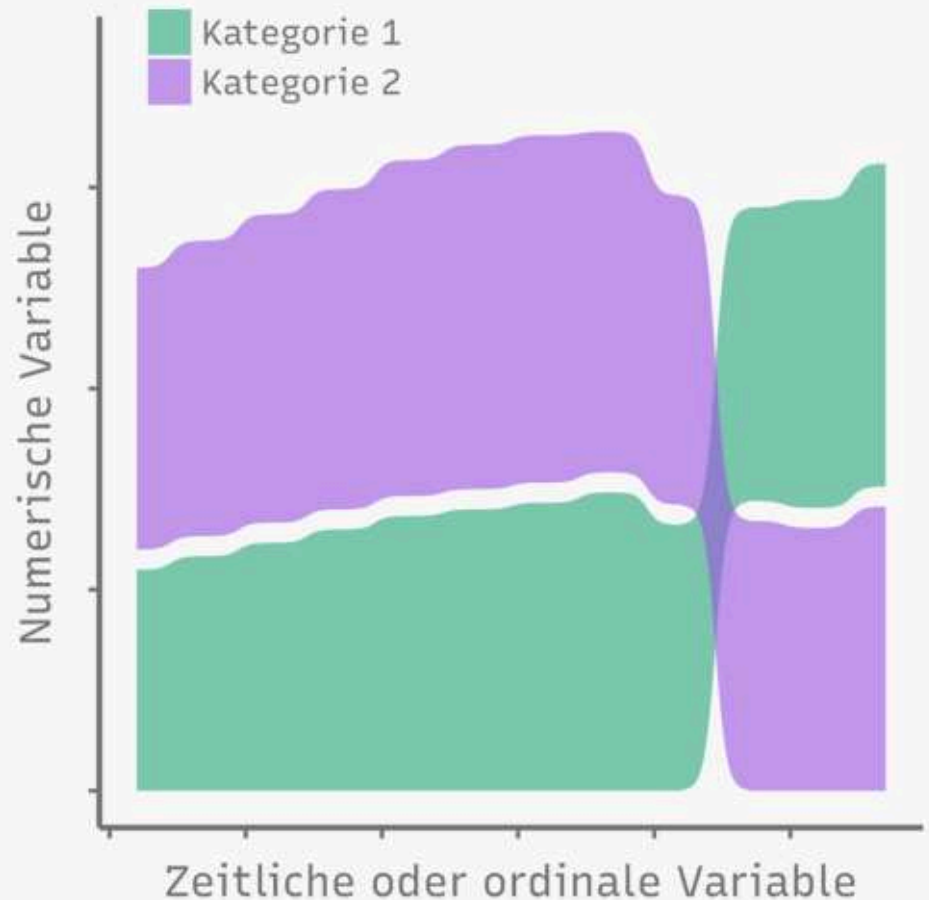
Sankey Bump Chart

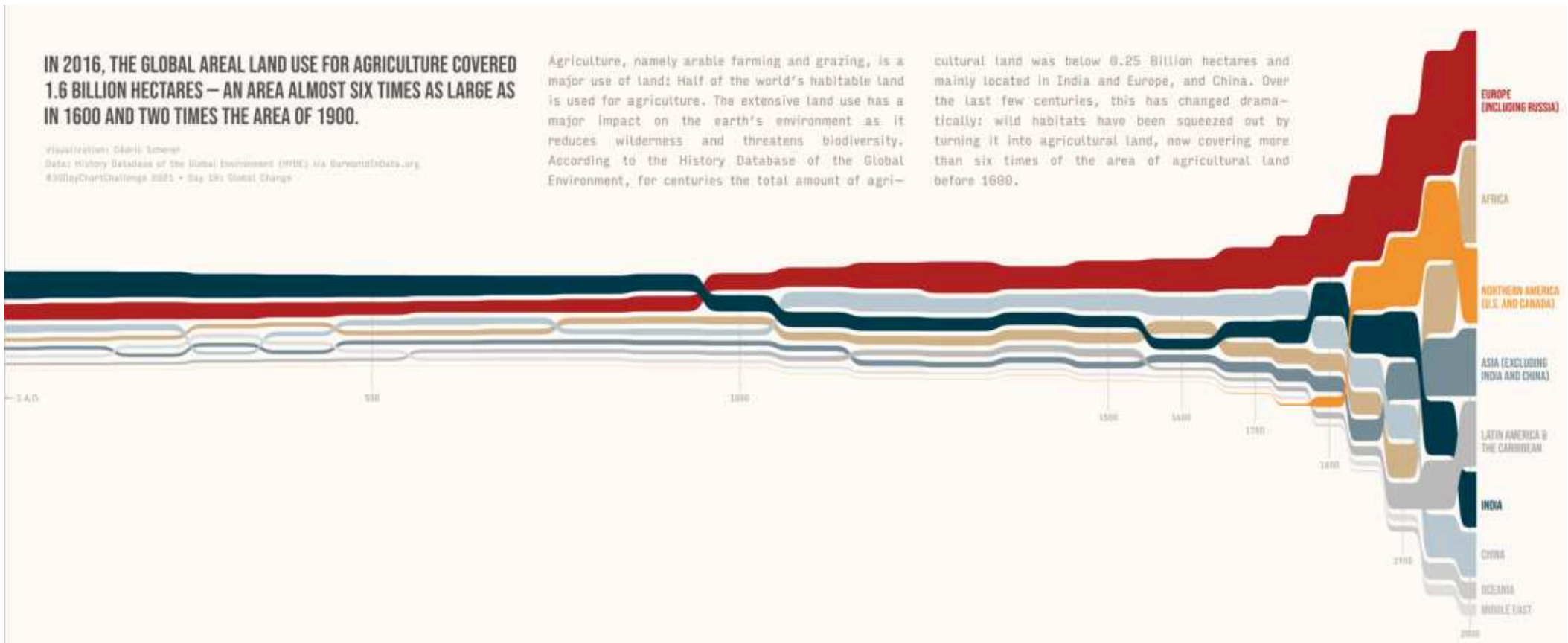


Line Chart (Time Series)



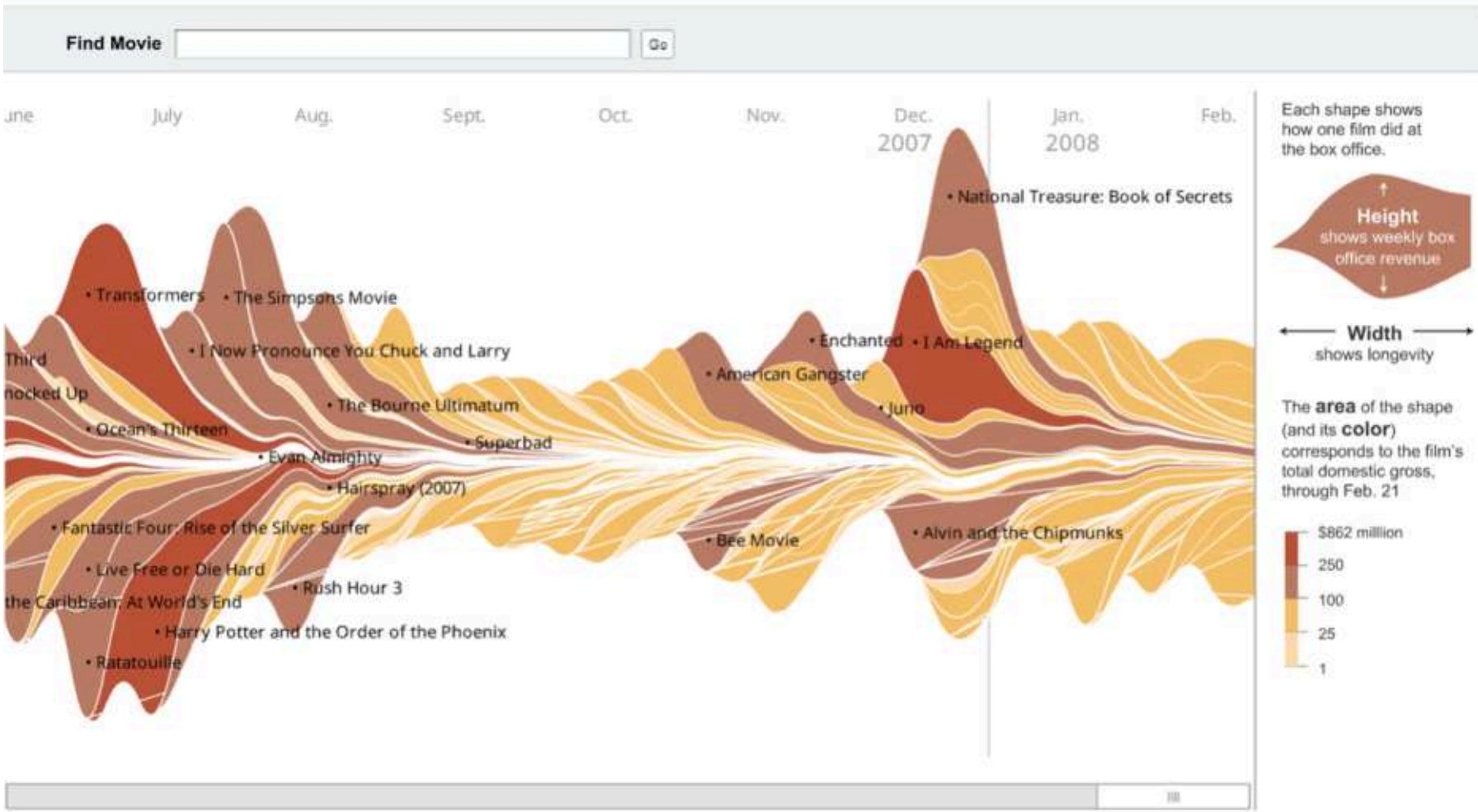
Ribbon oder Sankey Bump Chart




IN 2016, THE GLOBAL AREAL LAND USE FOR AGRICULTURE COVERED 1.6 BILLION HECTARES – AN AREA ALMOST SIX TIMES AS LARGE AS IN 1600 AND TWO TIMES THE AREA OF 1900.
Agriculture, namely arable farming and grazing, is a major use of land: Half of the world's habitable land is used for agriculture. The extensive land use has a major impact on the earth's environment as it reduces wilderness and threatens biodiversity. According to the History Database of the Global Environment, for centuries the total amount of agricultural land was below 0.25 Billion hectares and mainly located in India and Europe, and China. Over the last few centuries, this has changed dramatically: wild habitats have been squeezed out by turning it into agricultural land, now covering more than six times of the area of agricultural land before 1600.
EUROPE (INCLUDING RUSSIA)
AFRICA
NORTHERN AMERICA (U.S. AND CANADA)
ASIA (EXCLUDING INDIA AND CHINA)
LATIN AMERICA & THE CARIBBEAN
INDIA
CHINA
OCEANIA
MIDDLE EAST

The Ebb and Flow of Movies: Box Office Receipts 1986 — 2008

Summer blockbusters and holiday hits make up the bulk of box office revenue each year, while contenders for the Oscars tend to attract smaller audiences that build over time. Here's a look at how movies have fared at the box office, after adjusting for inflation.



Sources: Baseline StudioSystems; Box Office Mojo

Mathew Bloch, Lee Byron, Shan Carter and Amanda Cox

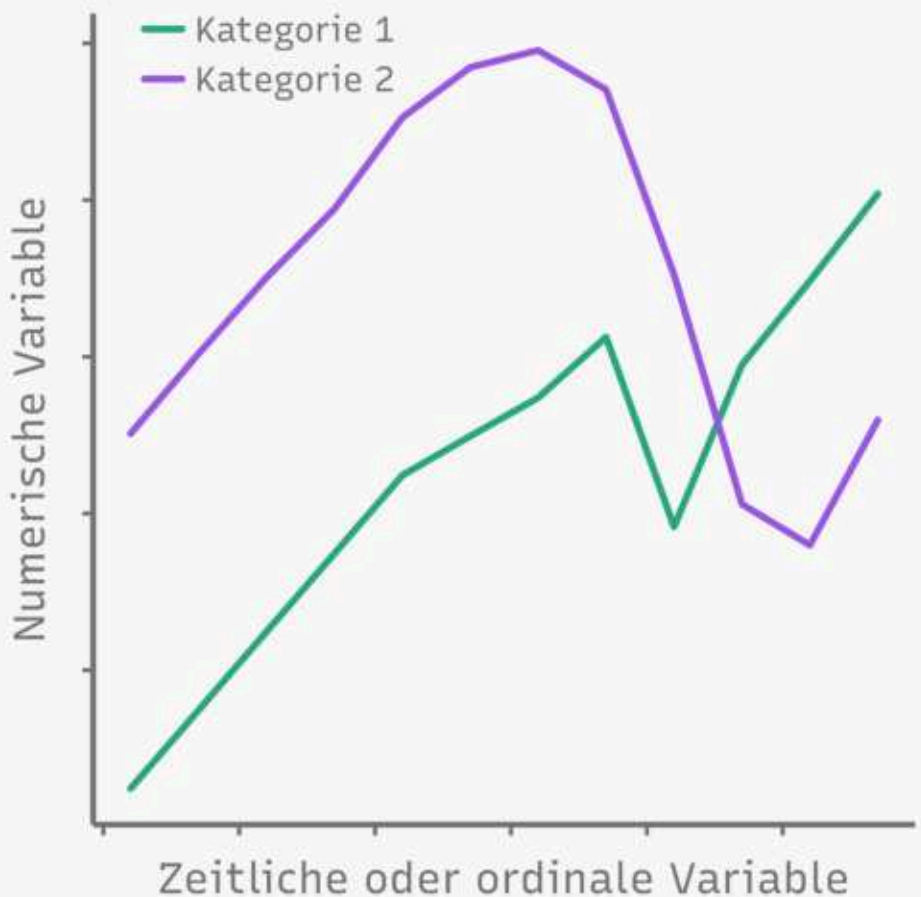
Innerhalb weniger Wochen explodierten Anzahl und Reichweite der Nachrichten zu QAnon auf Telegram. Kanäle wie Qlobal-Change konnten sich innerhalb weniger Monate von 20.000 Abonnent:innen (März 2020) auf über 100.000 Abonnent:innen (Mai 2020) vergrößern. Zahlreiche Telegram-Gruppen und -Kanäle wurden gegründet.

Mit Beginn der Pandemie in Deutschland verbreiteten sich die Erzählungen, dass die in diesem Zeitraum angesetzte NATO-Mission *Defender-Europe 20* insgeheim ein vermeintlicher Plan Donald Trumps zur Vernichtung eines angeblich existierenden *Deep States* wäre. Bei diesen Erzählungen wurden Elemente des Reichsbürger:innen-Milieus aufgegriffen und mit QAnon-Narrativen verknüpft.

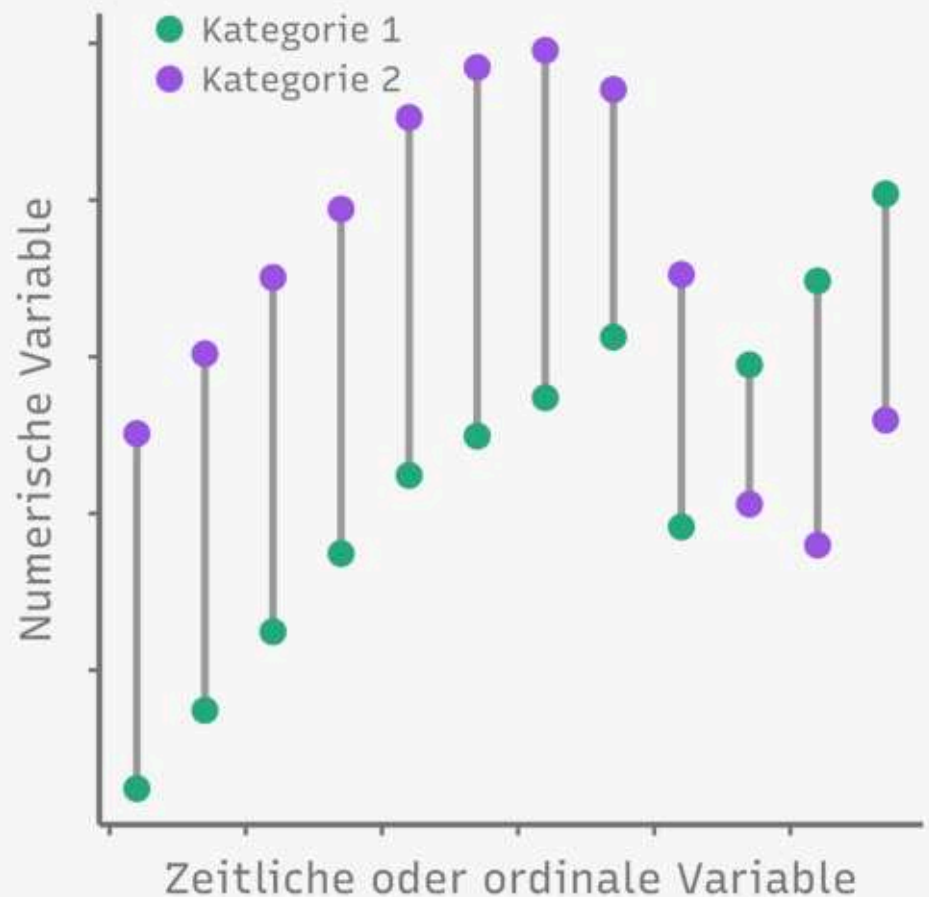
Mit der Löschung vieler YouTube-Kanäle im Oktober 2020 wurde Telegram noch relevanter für das Milieu. Insbesondere im Nachgang der US-Präsidentschaftswahl am 03.11.2020 wurden die Szene besonders aktiv. Viele erwarteten den Sieg Trumps. Nach Auszählung der Stimmen und der sich abzeichnenden Niederlage Trumps vermuteten viele einen vermeintlichen Wahlbetrug.

Die Aktivität der Gruppen und Kanäle findet mit dem Sturm auf das Kapitol am 06.01.2021 ihren Höhepunkt – und bewegt sich seitdem auf einem konstant hohen Niveau.

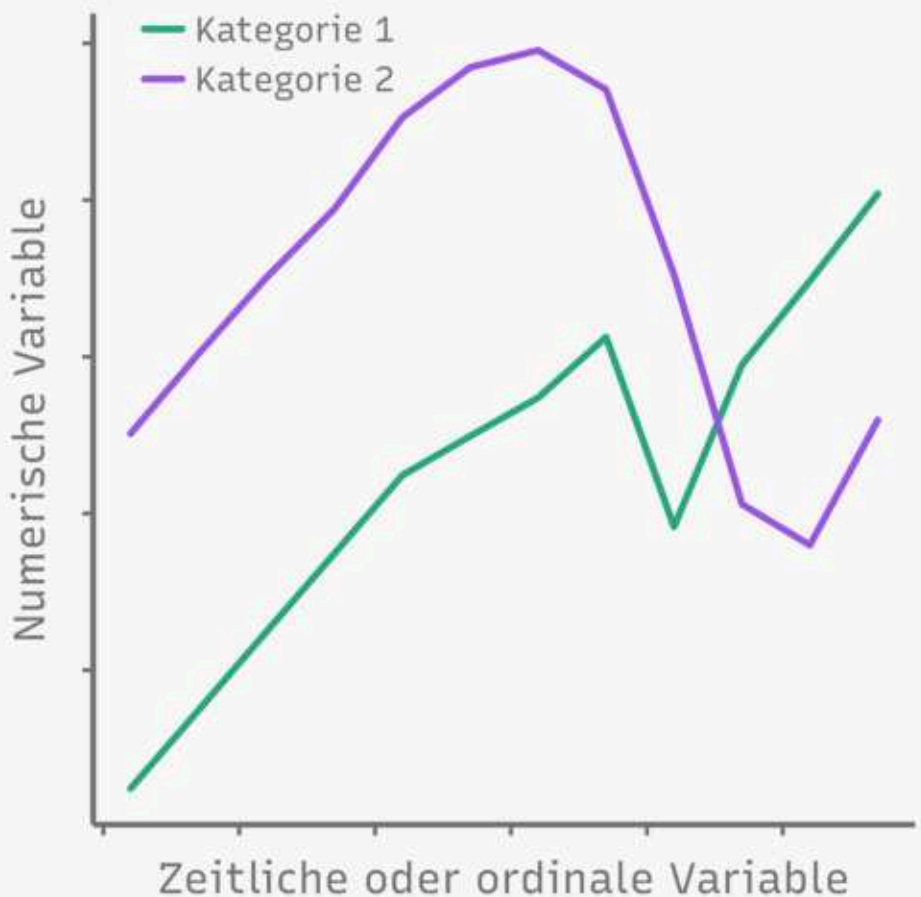
Line Chart (Time Series)



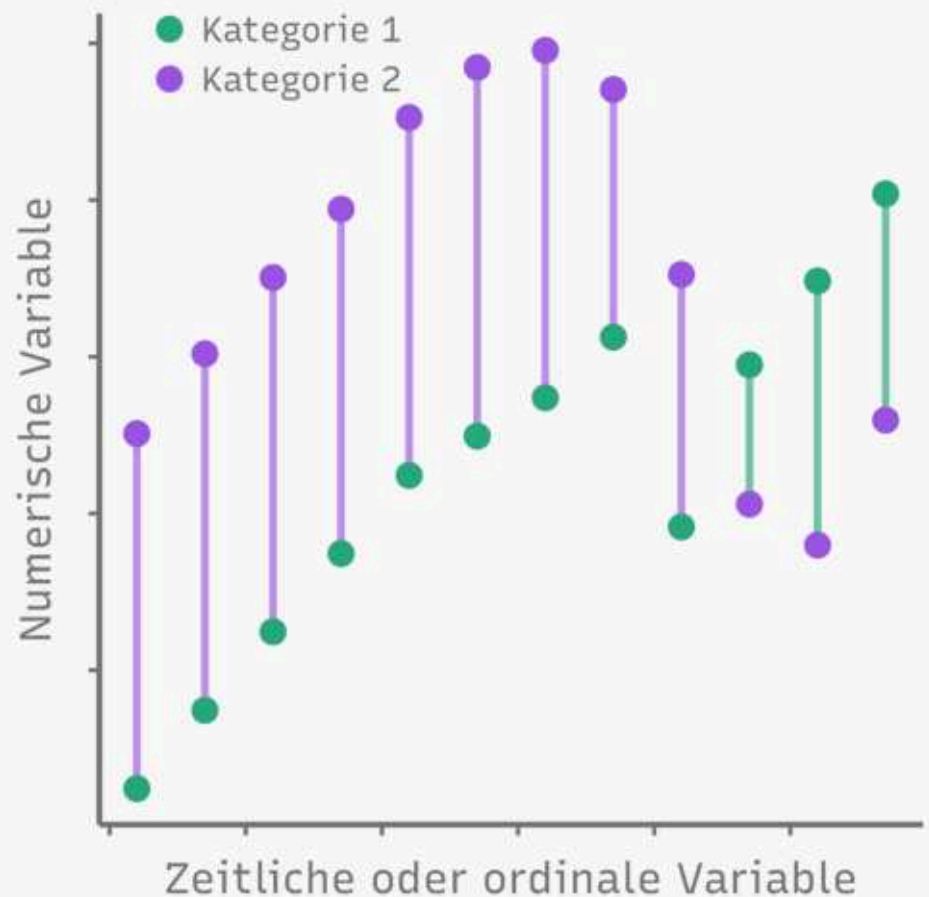
Dumbbell Plot



Line Chart (Time Series)



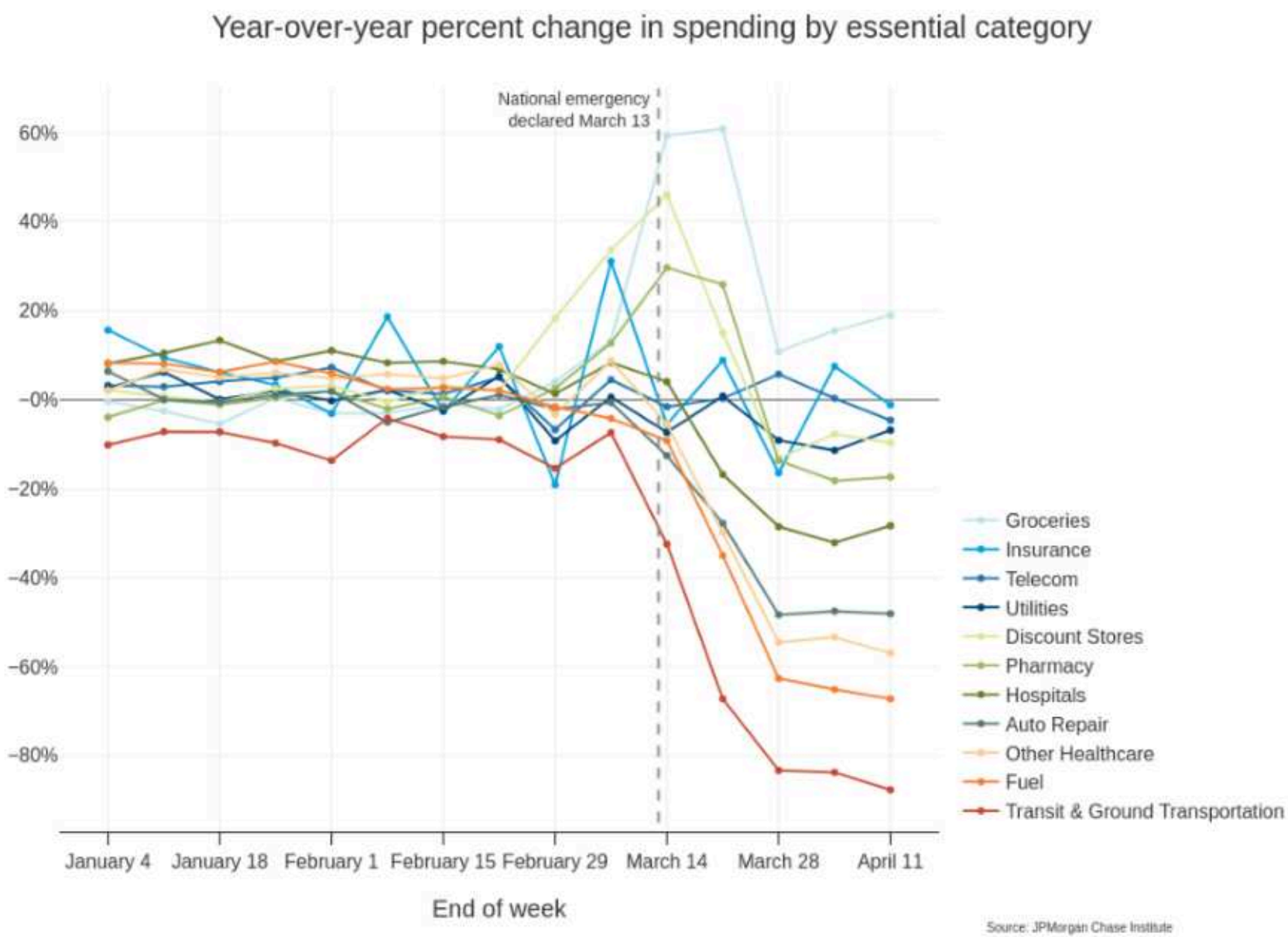
Dumbbell Plot



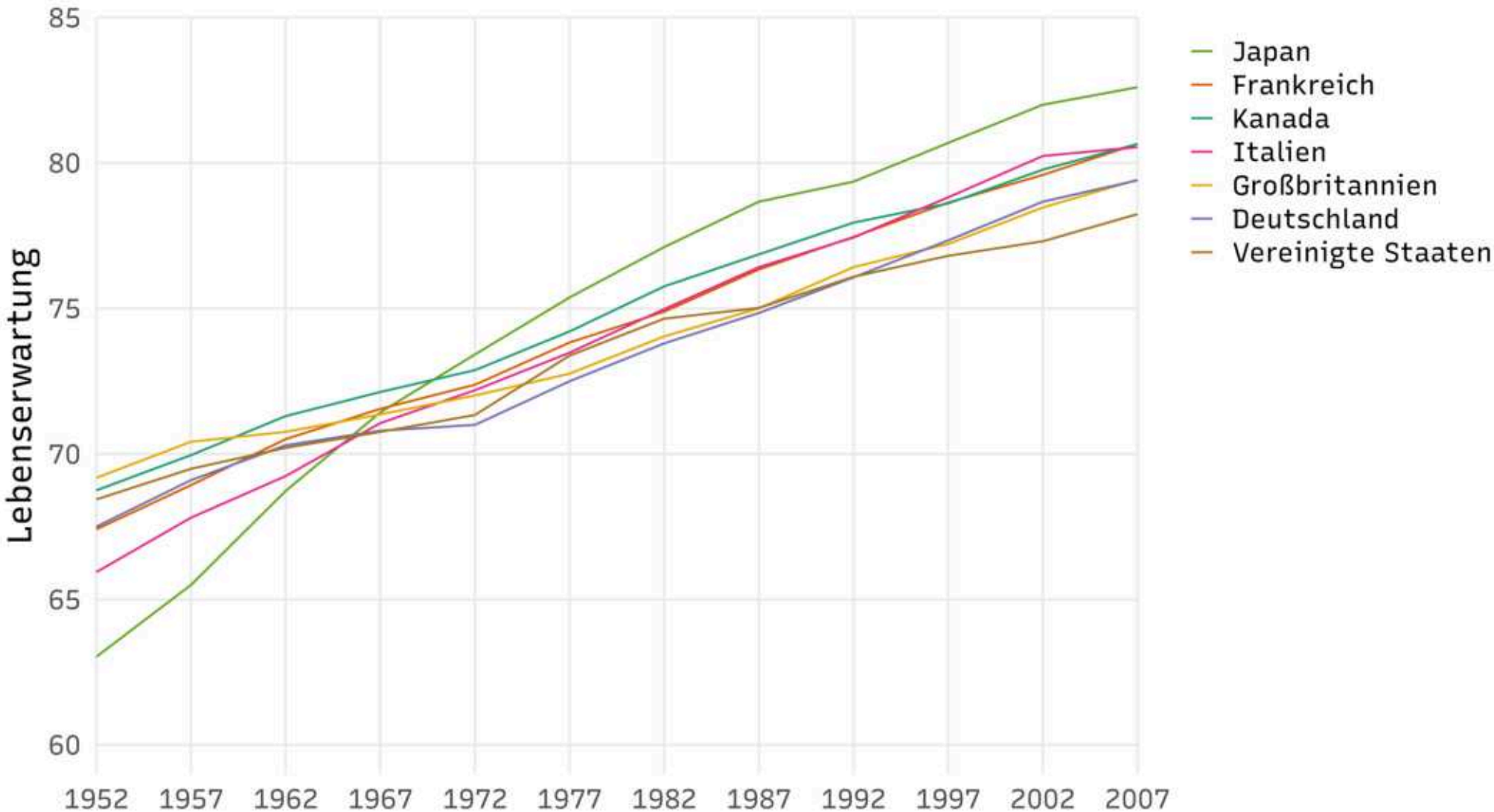
Häufige Diagrammprobleme

„Spaghetti Plots"

„Spaghetti Plots"



„Spaghetti Plots"



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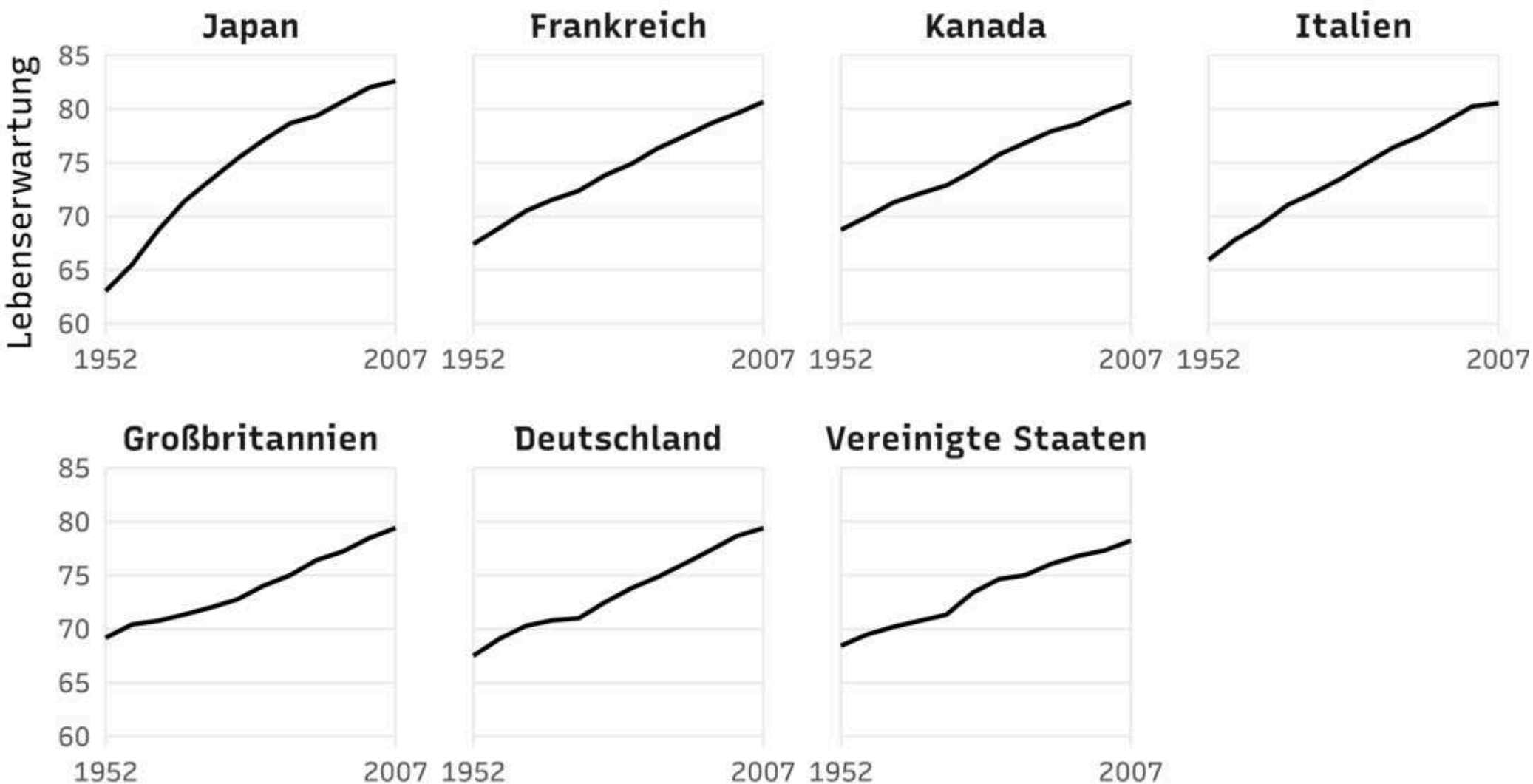

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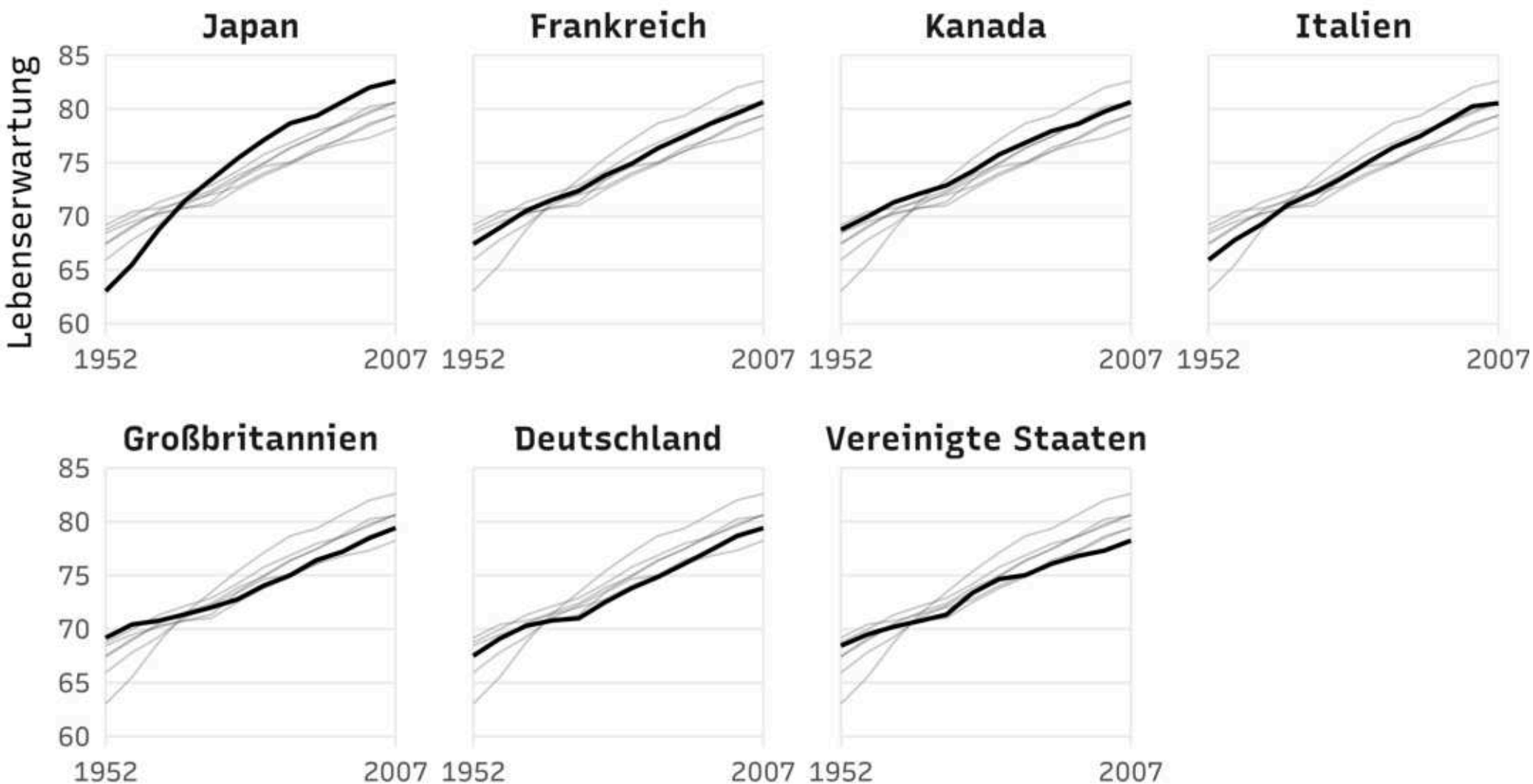

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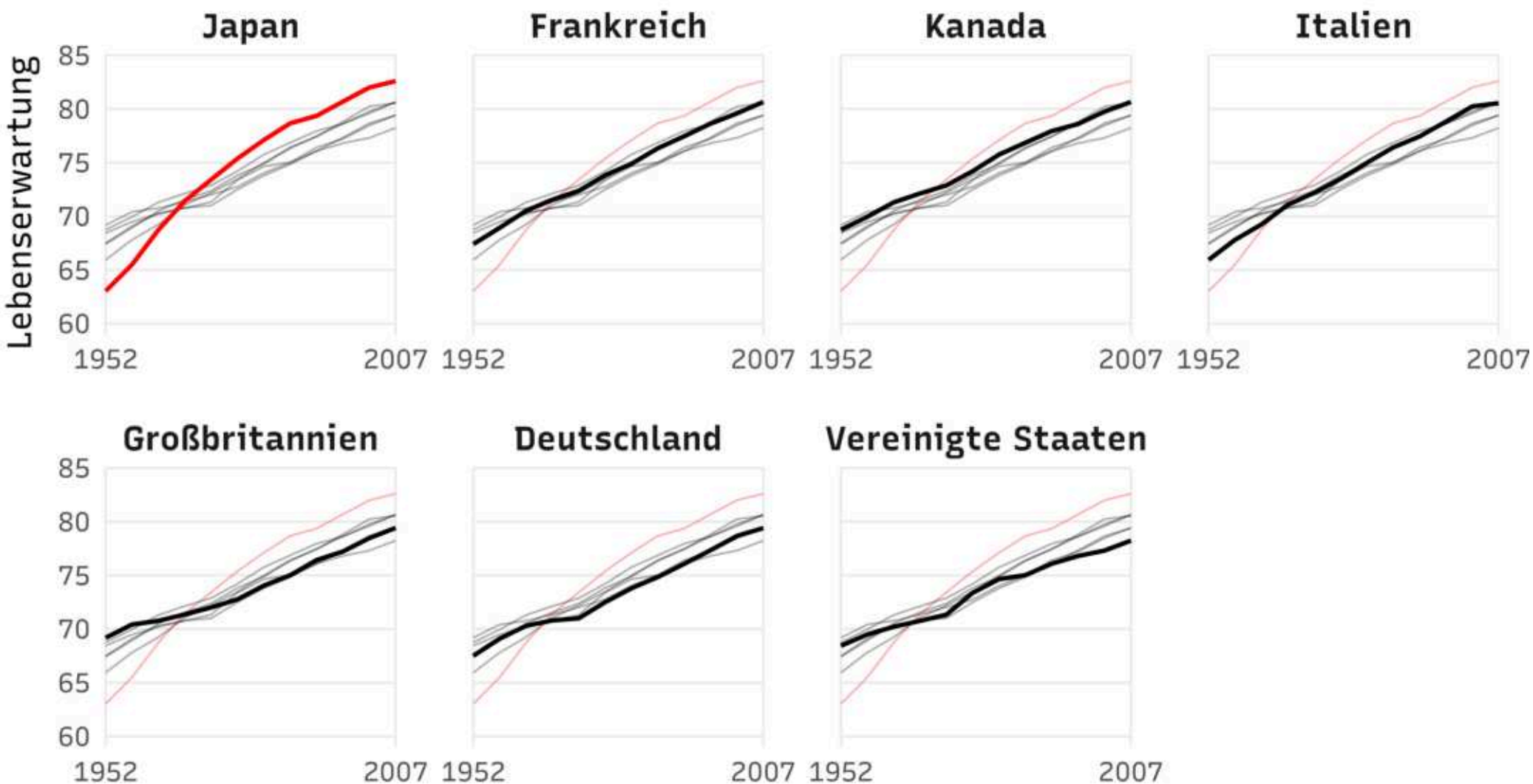
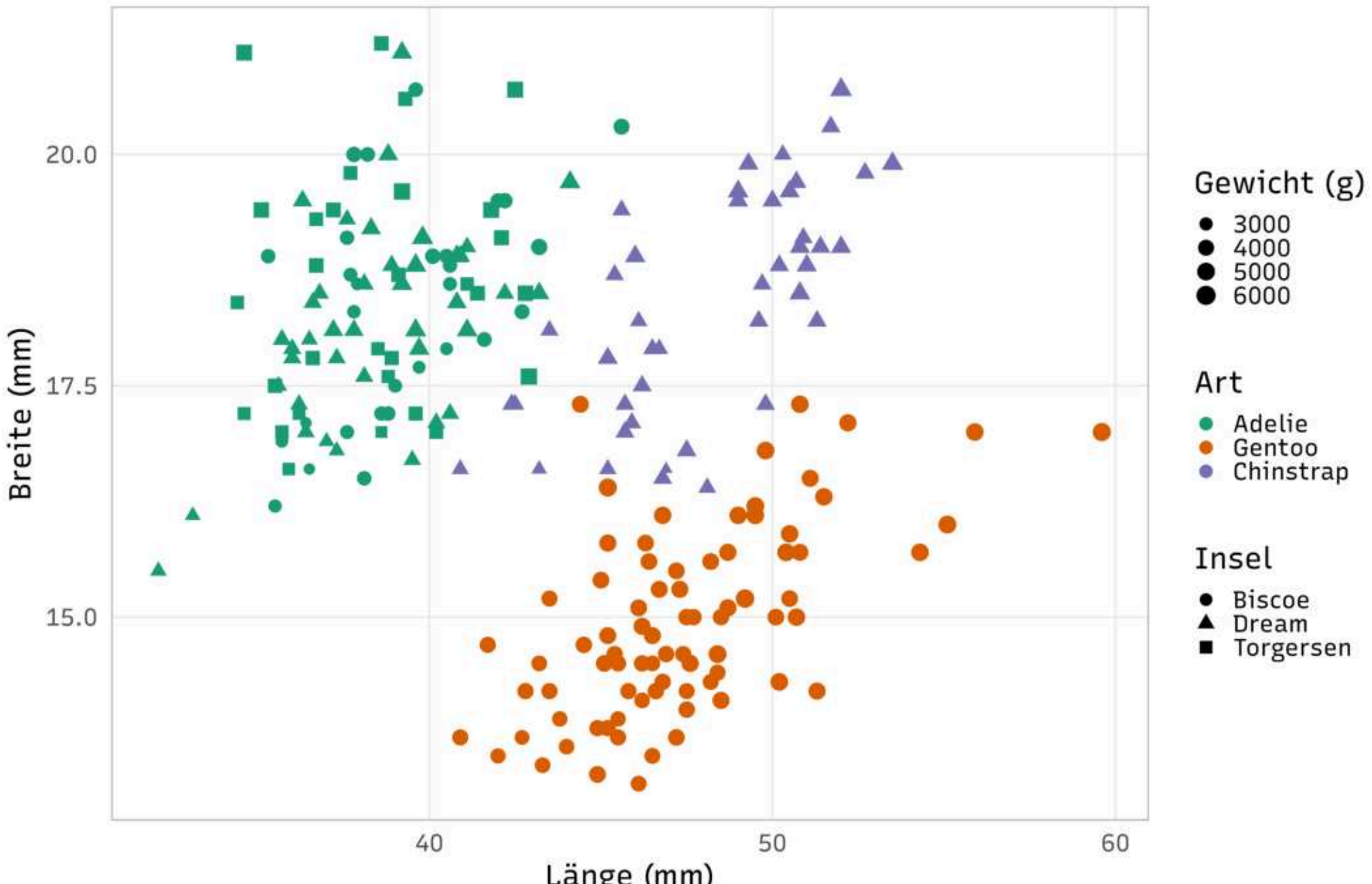


Informations-
überflutung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17.5
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Breite (mm)
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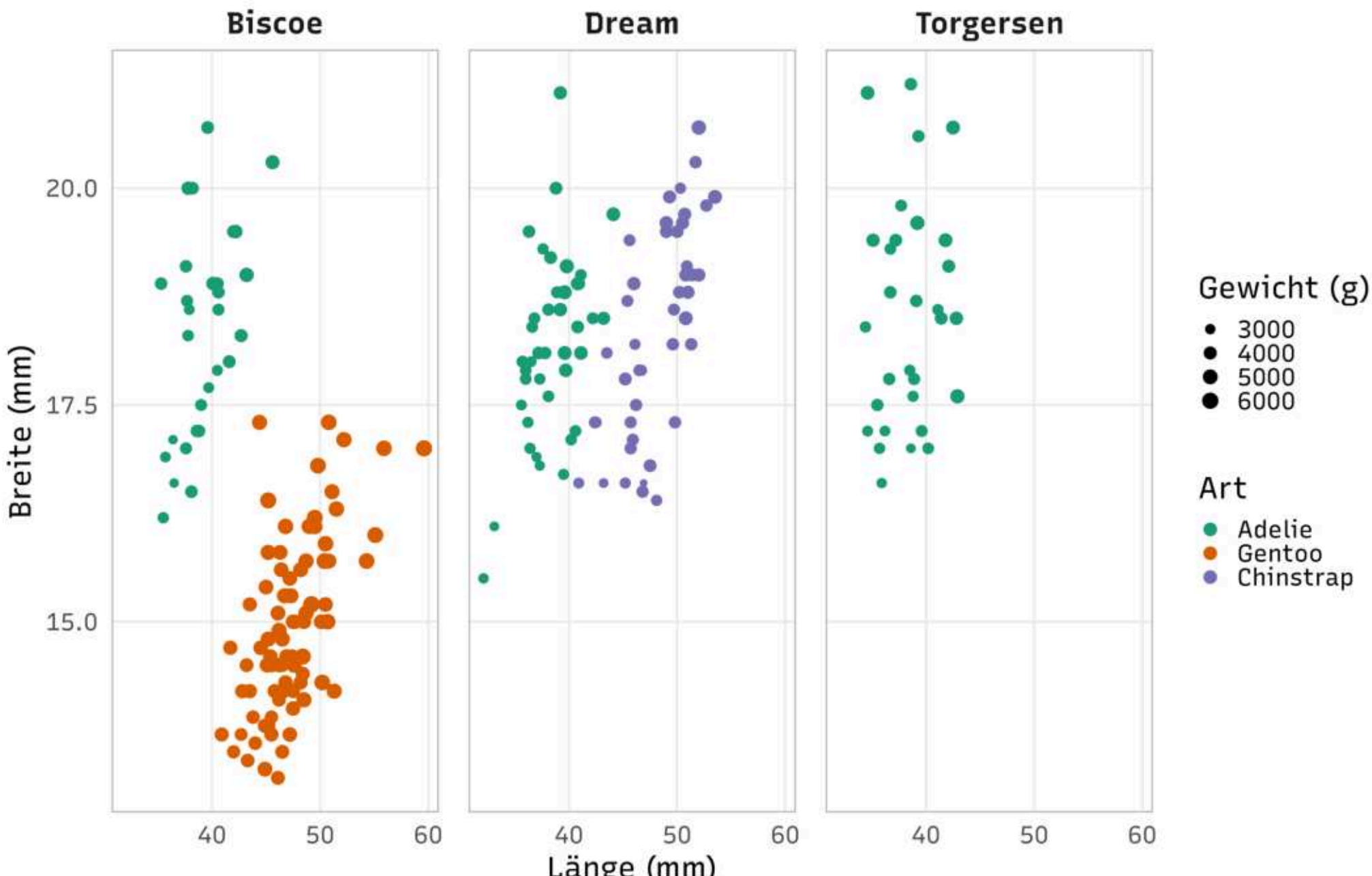
6000
Art
Adelie
Gentoo
Chinstrap
Insel
Biscoe
Dream
Torgersen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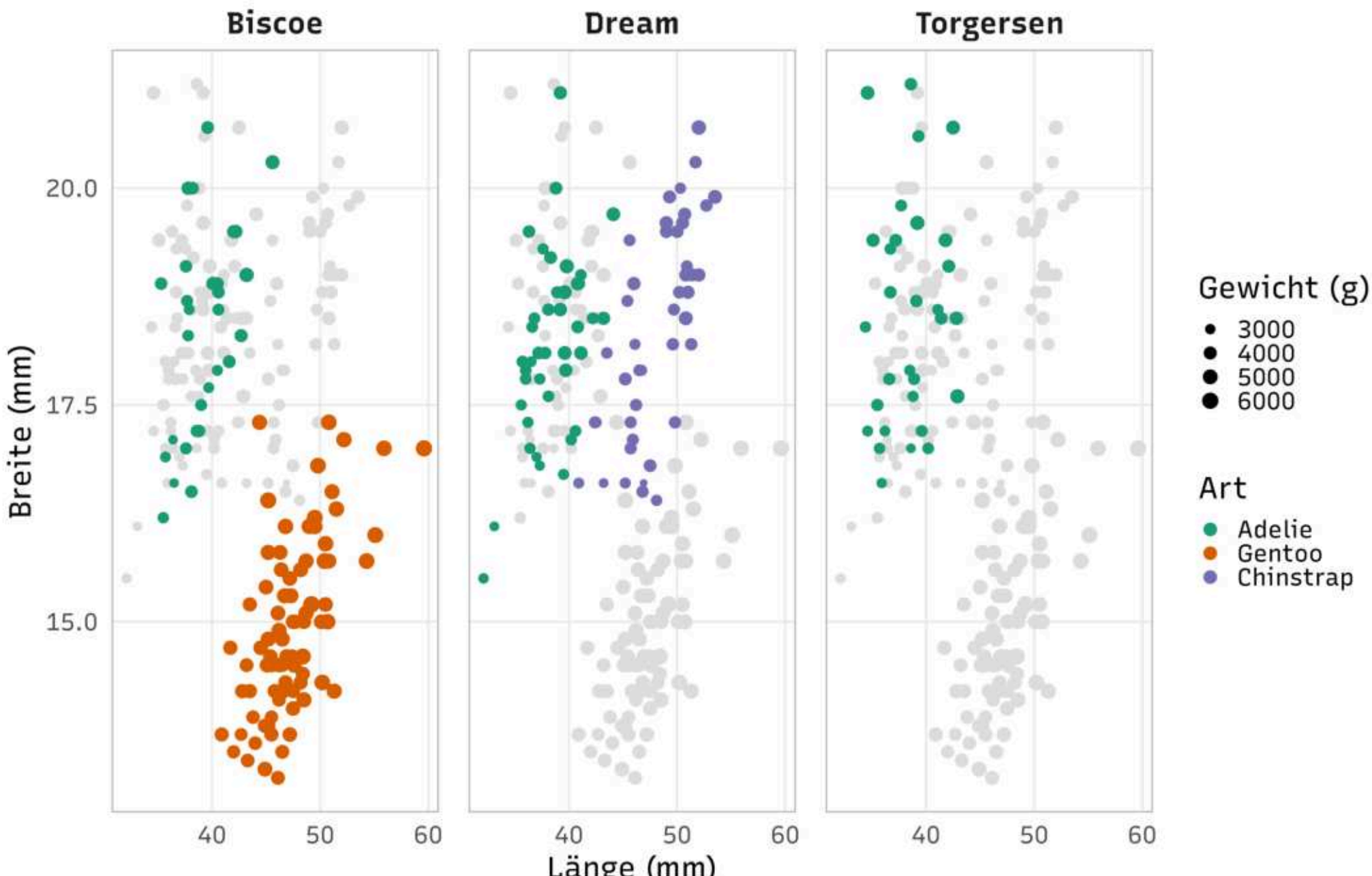
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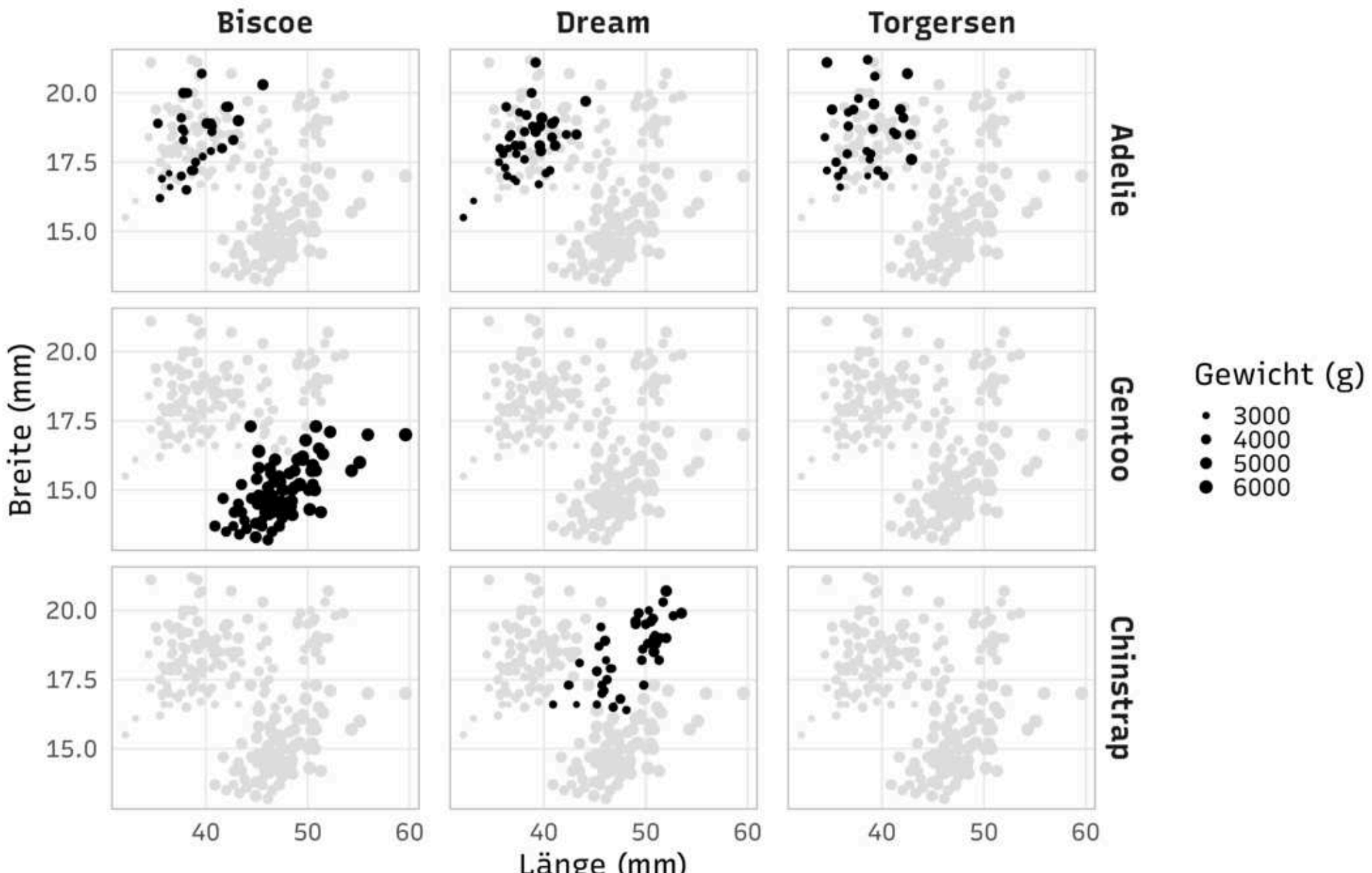
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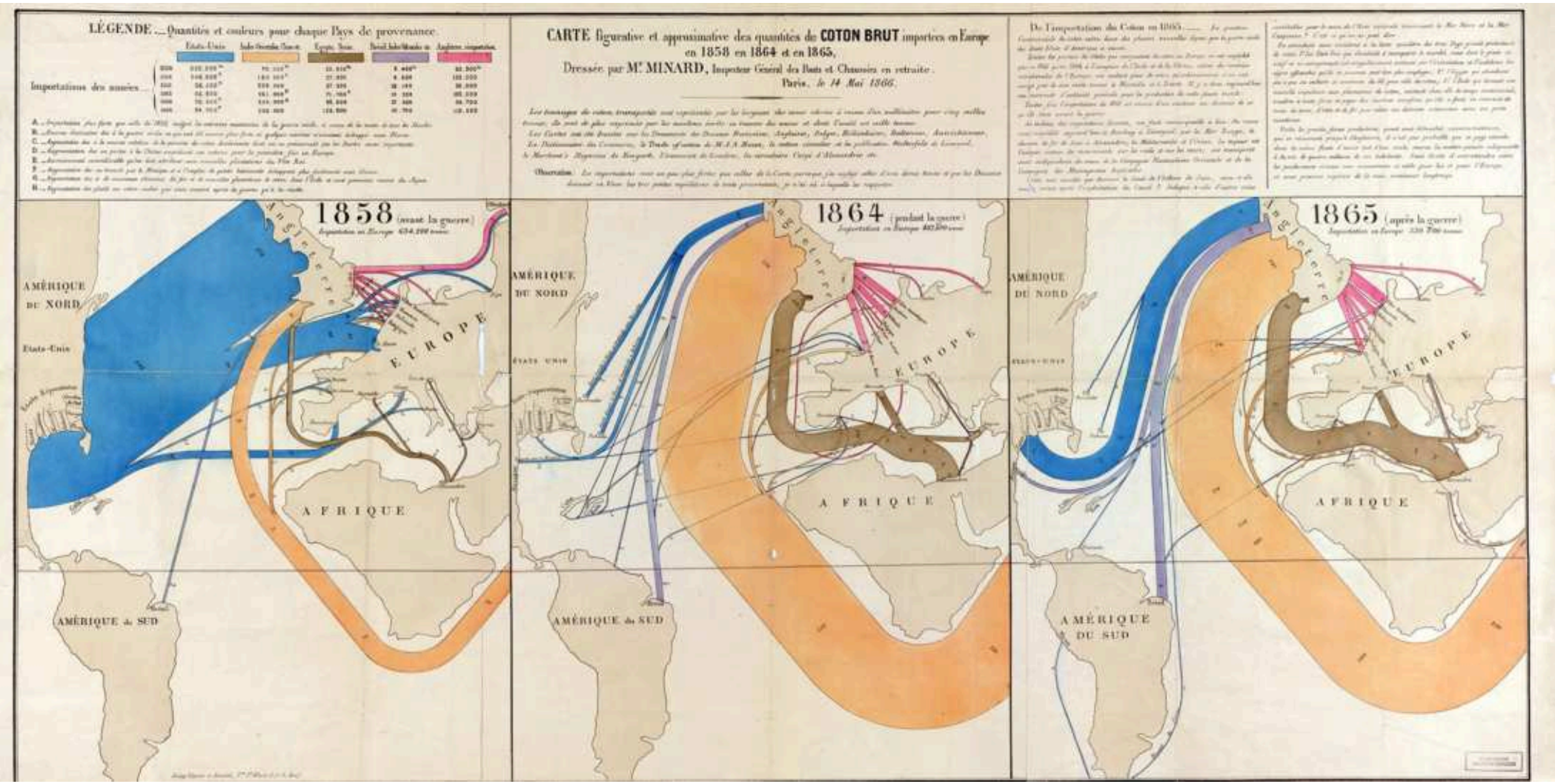
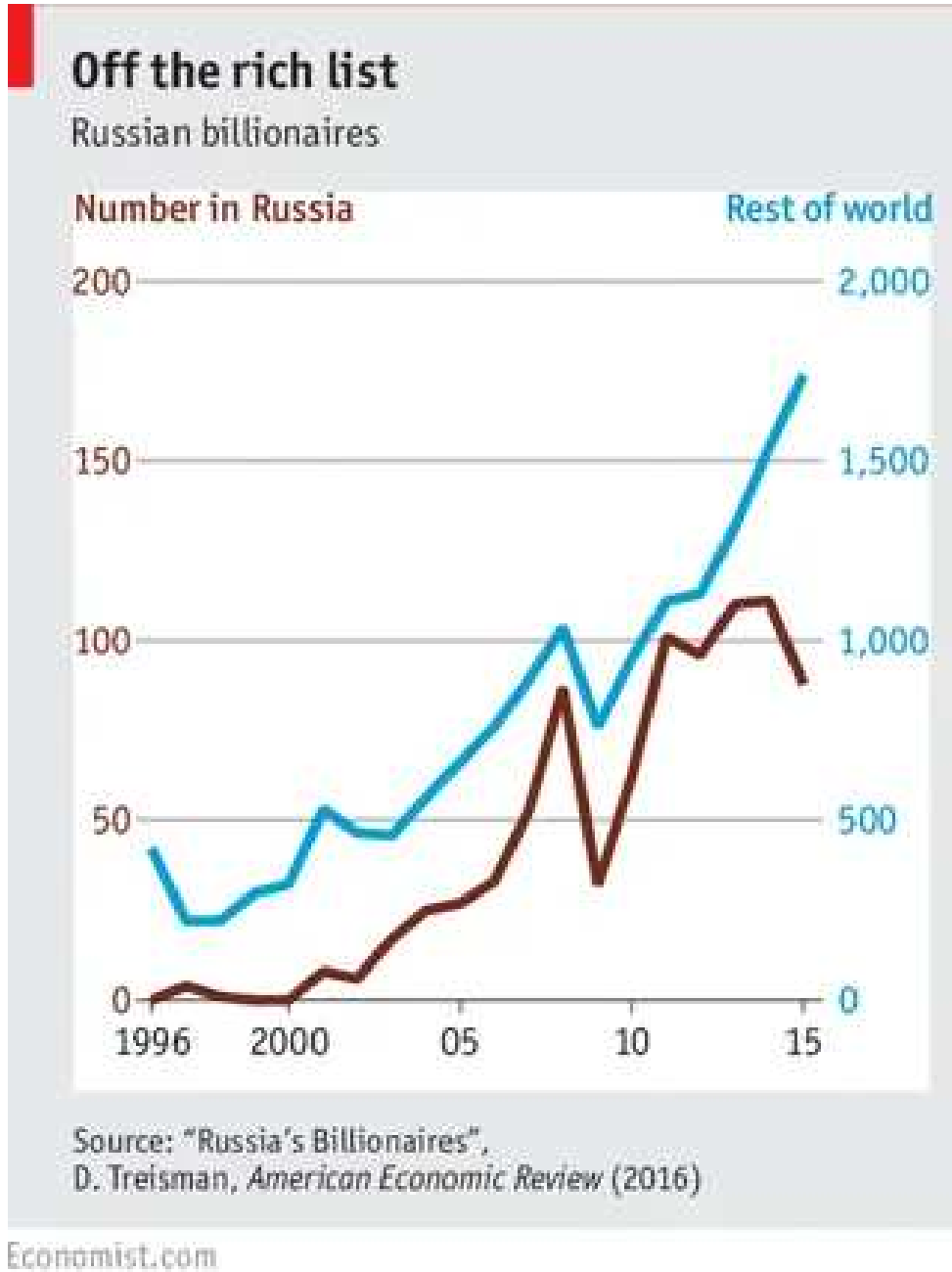


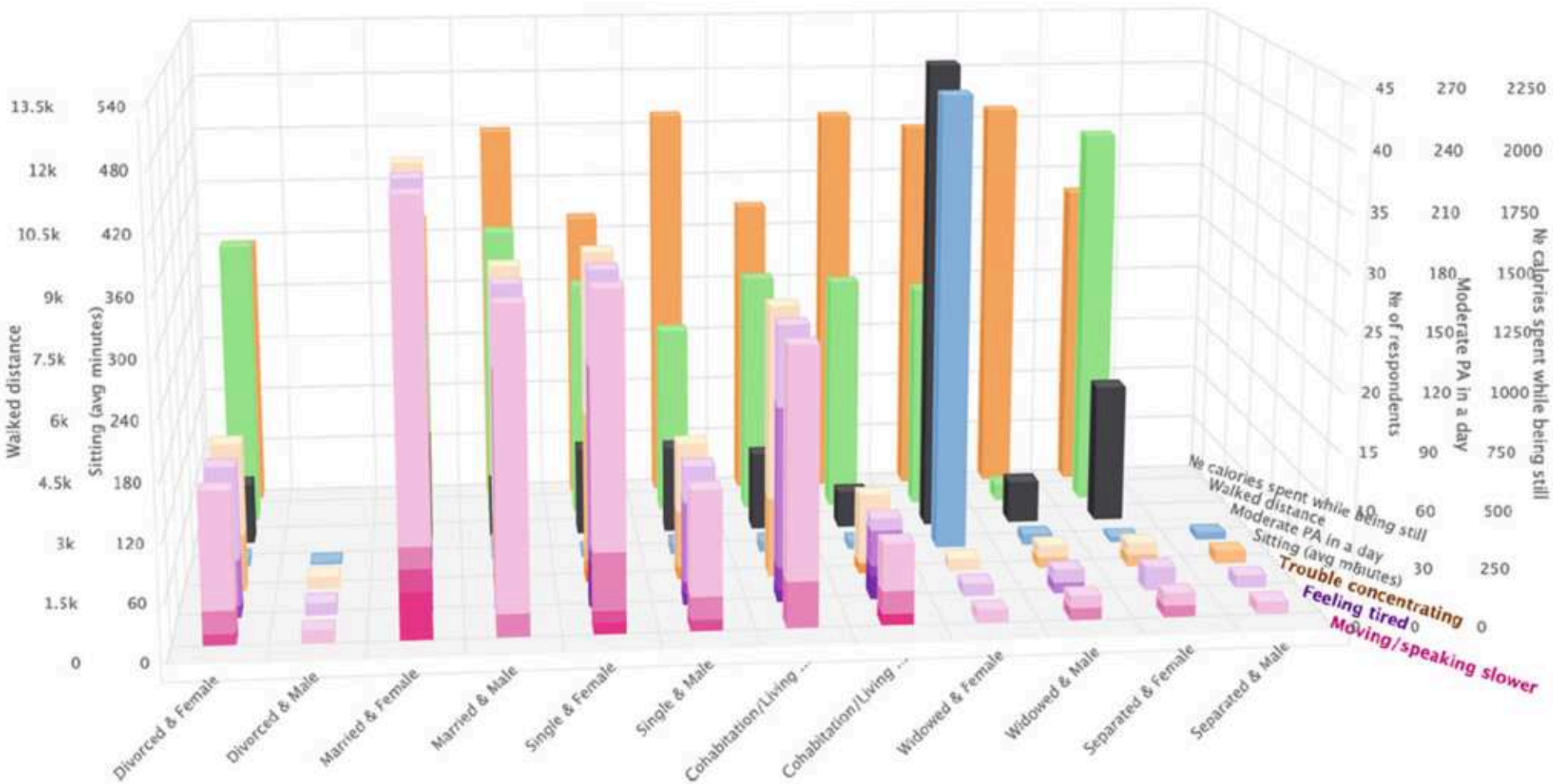
„Carte figurative et approximative des quantités de coton brut importées en Europe en 1858, en 1864 et en 1865" von Charles Joseph Minard (1866)

Doppelachsen



Quelle: The Economist

Quelle: The Economist

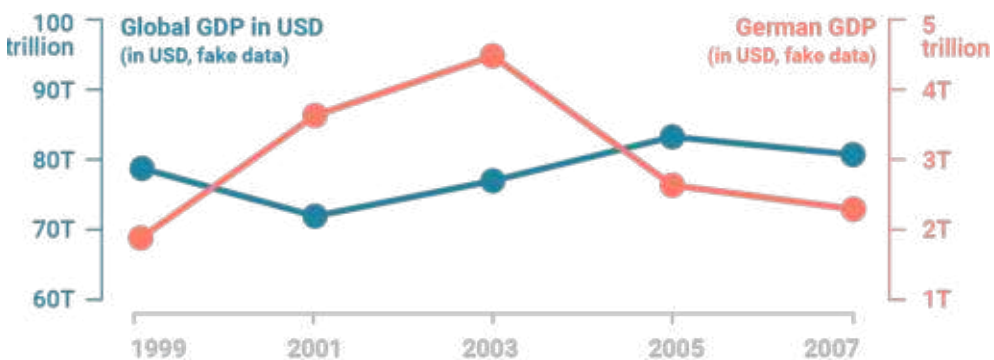


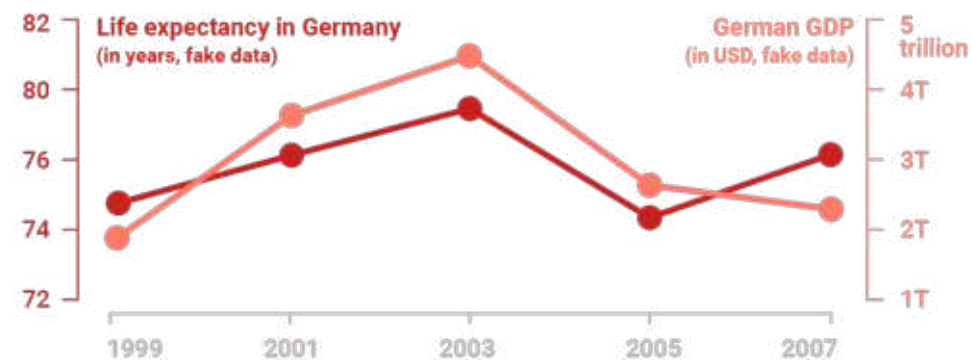
Quelle: Gonzalez-Martinez et al. (2022)

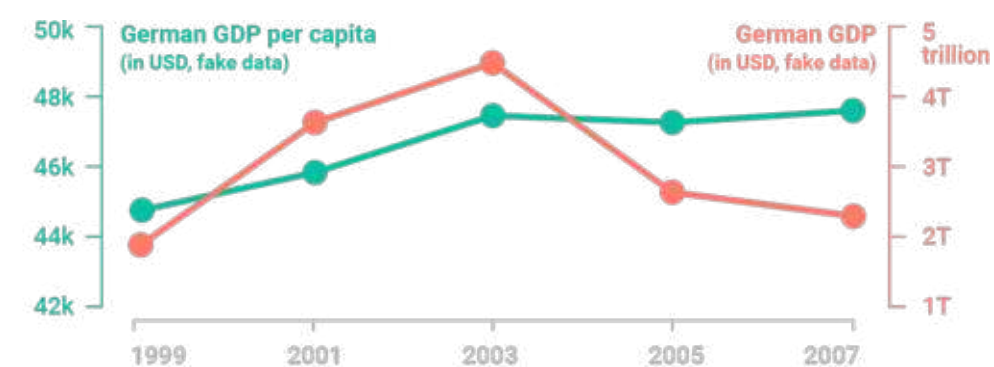
Quelle: maischberger (Sendung vom 27. September 2023)

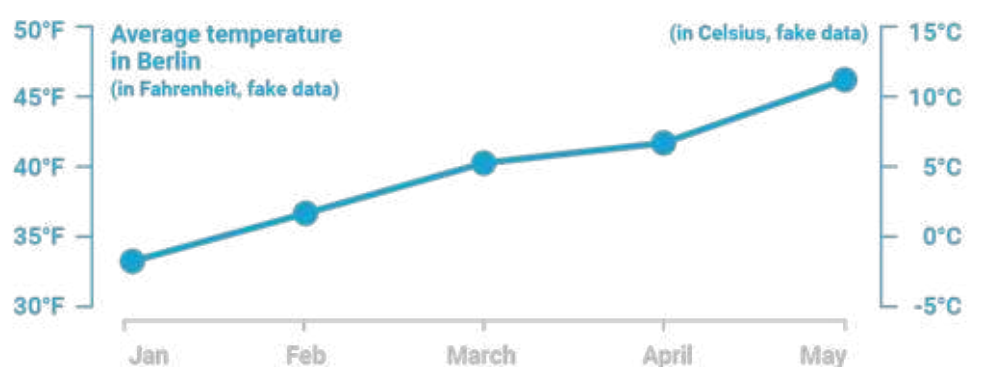
Doppelachsen

Beispiele von Lisa Charlotte Muth, DataWrapper Blog









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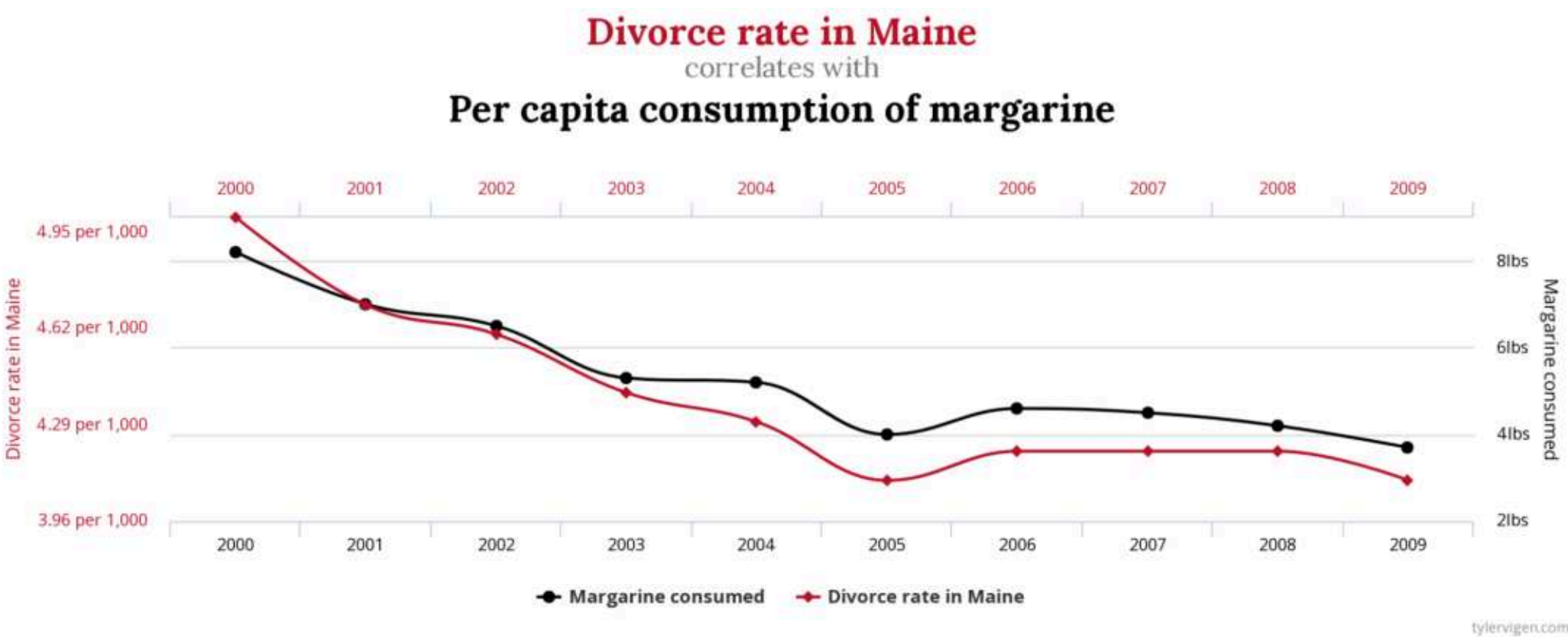
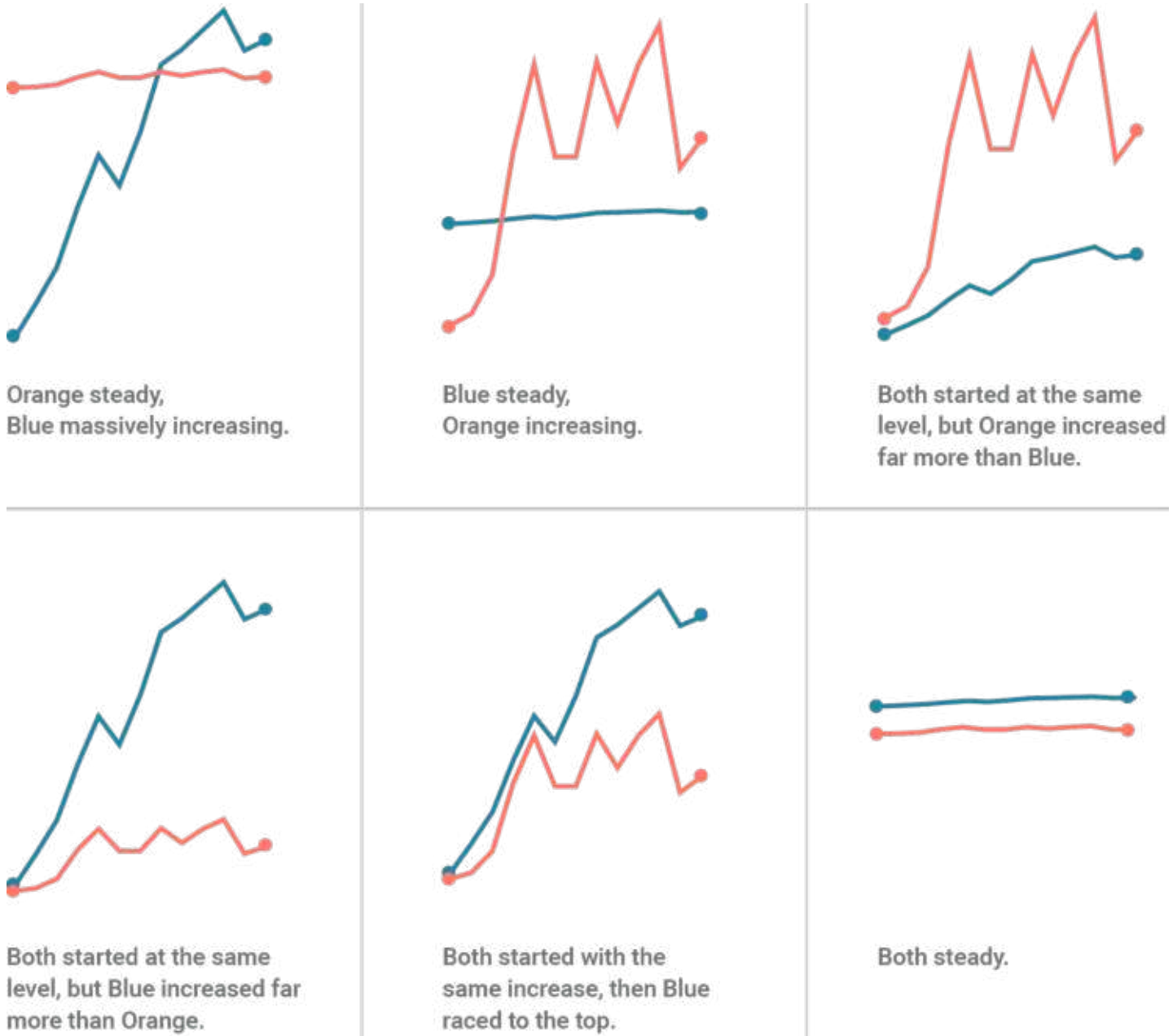
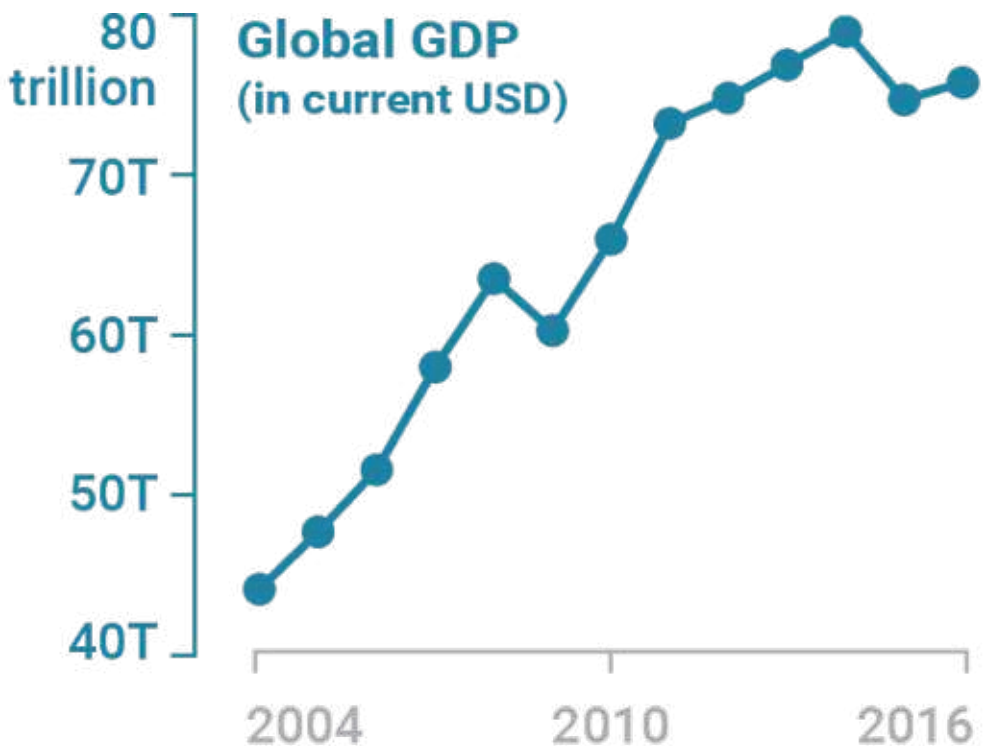
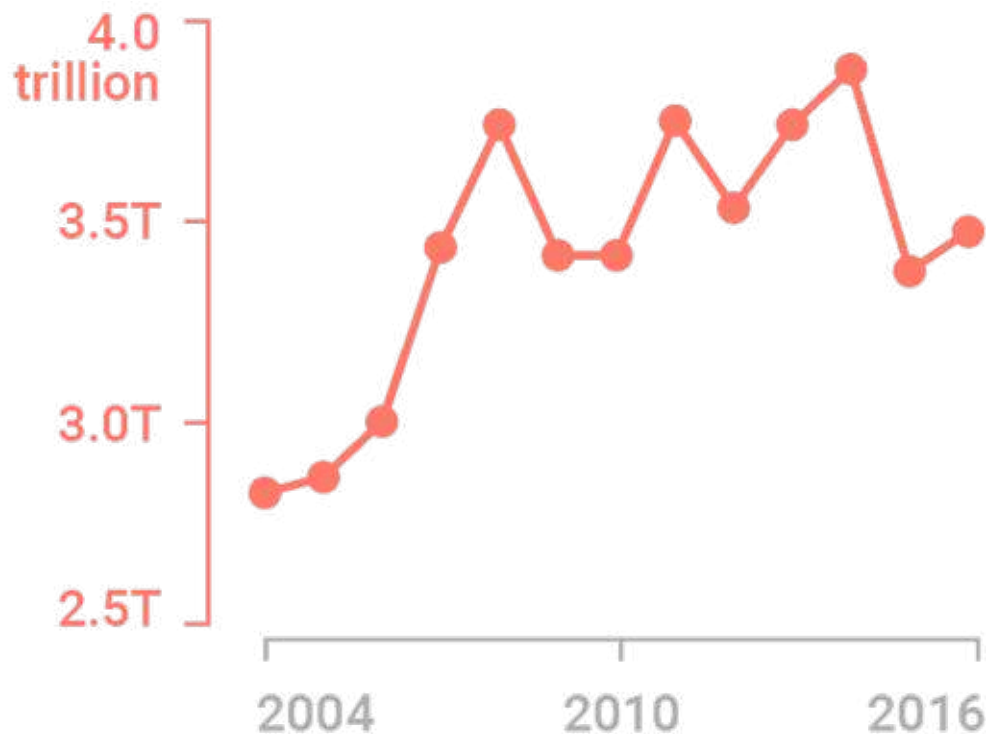


Quelle: Spurious Correlations

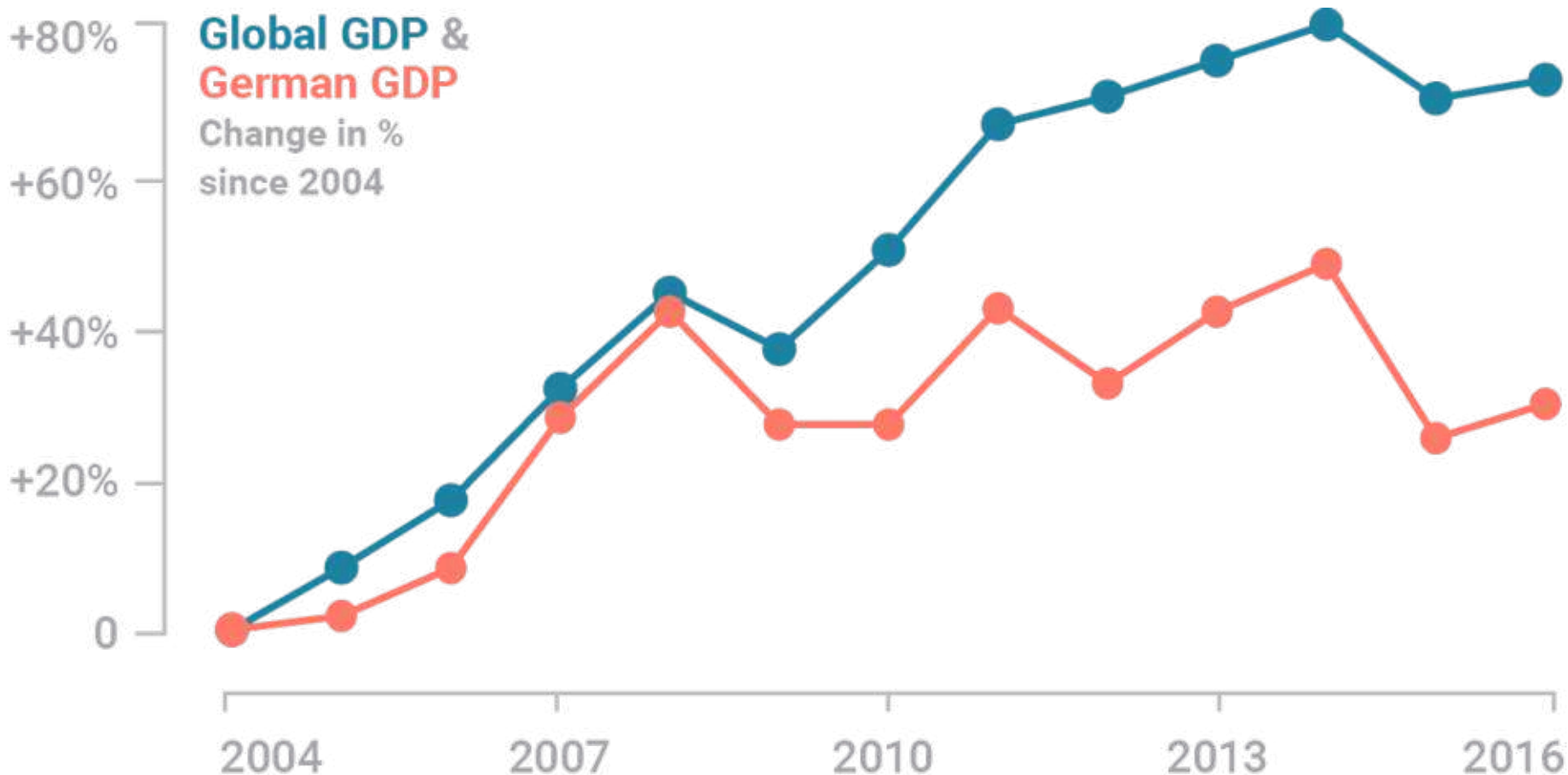


Quelle: Lisa Charlotte Muth, DataWrapper Blog



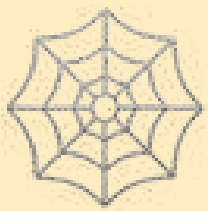


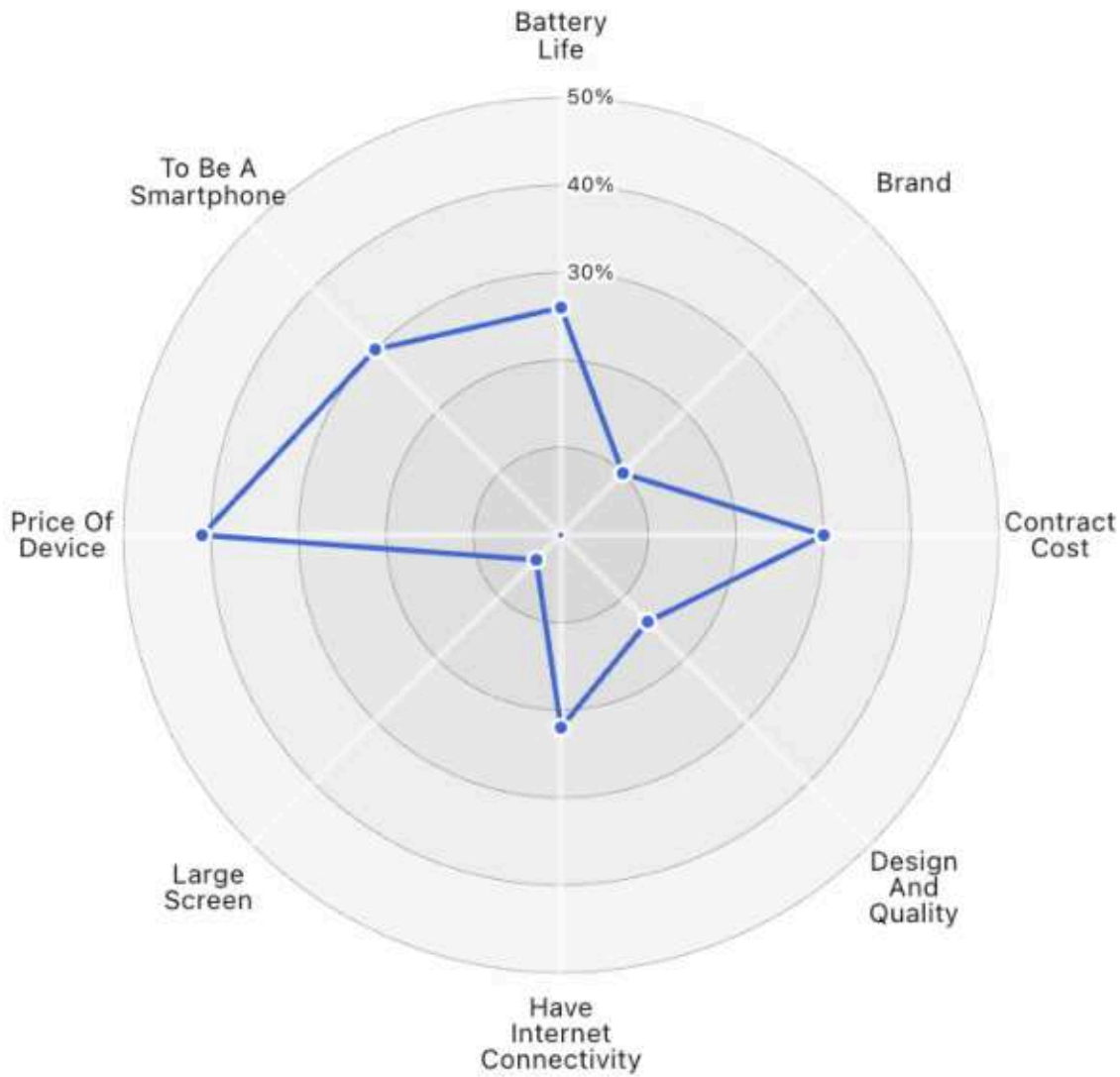
Quelle: Lisa Charlotte Muth, DataWrapper Blog



Quelle: Lisa Charlotte Muth, DataWrapper Blog

Radar Charts





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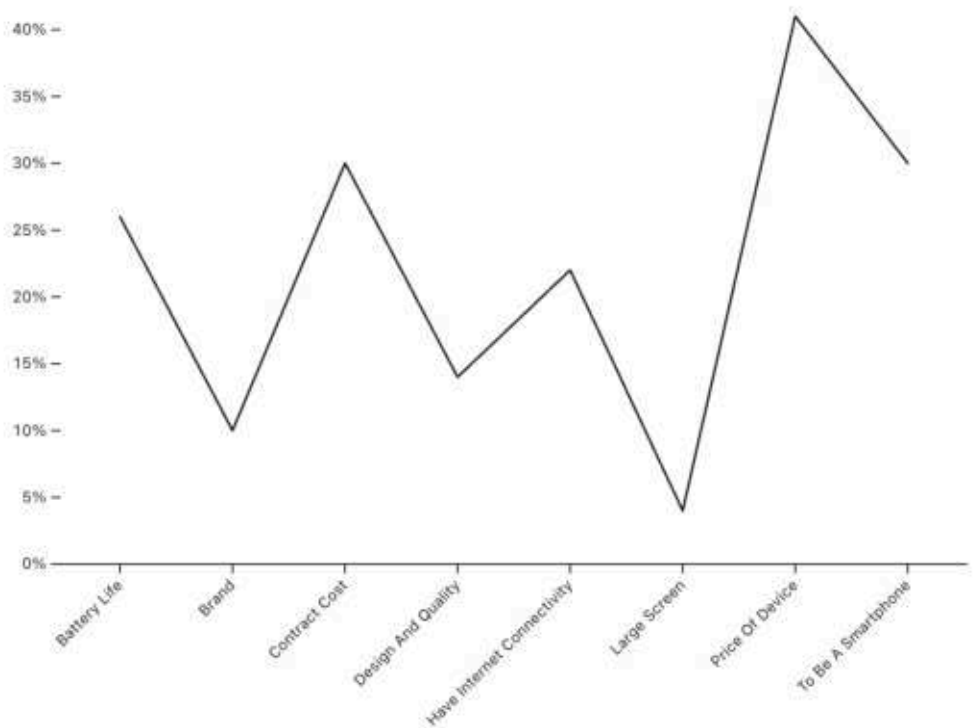

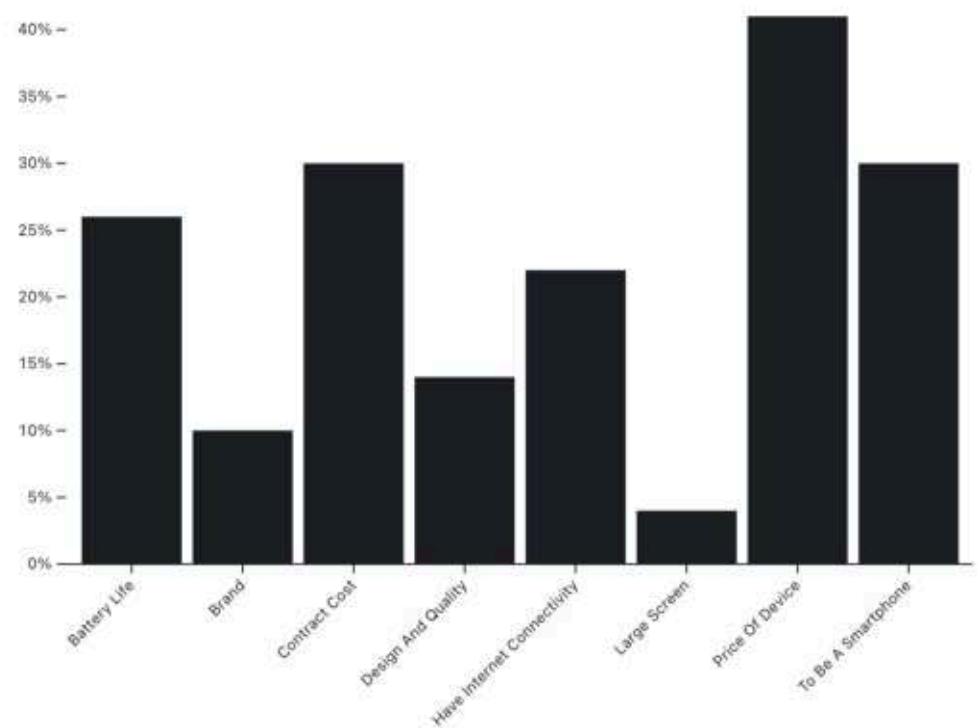

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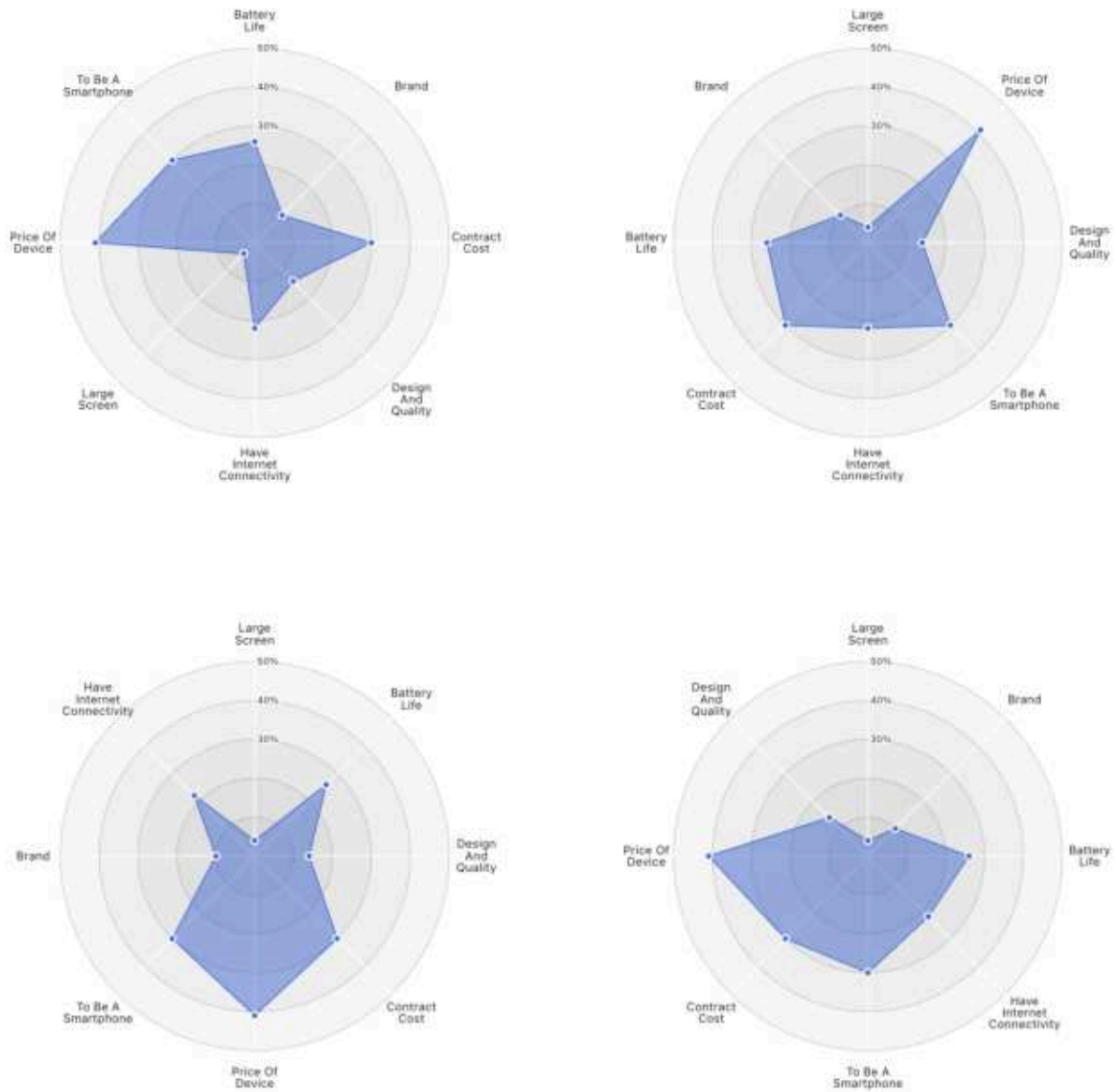

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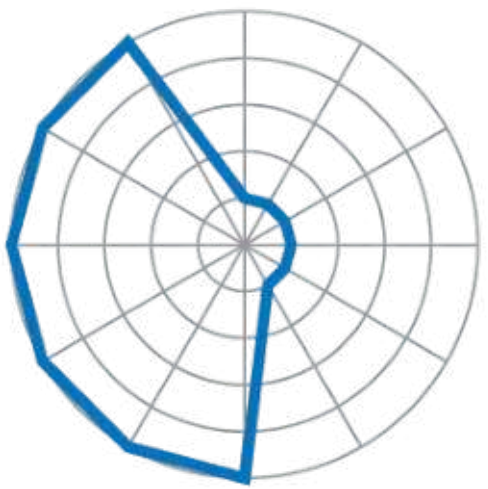
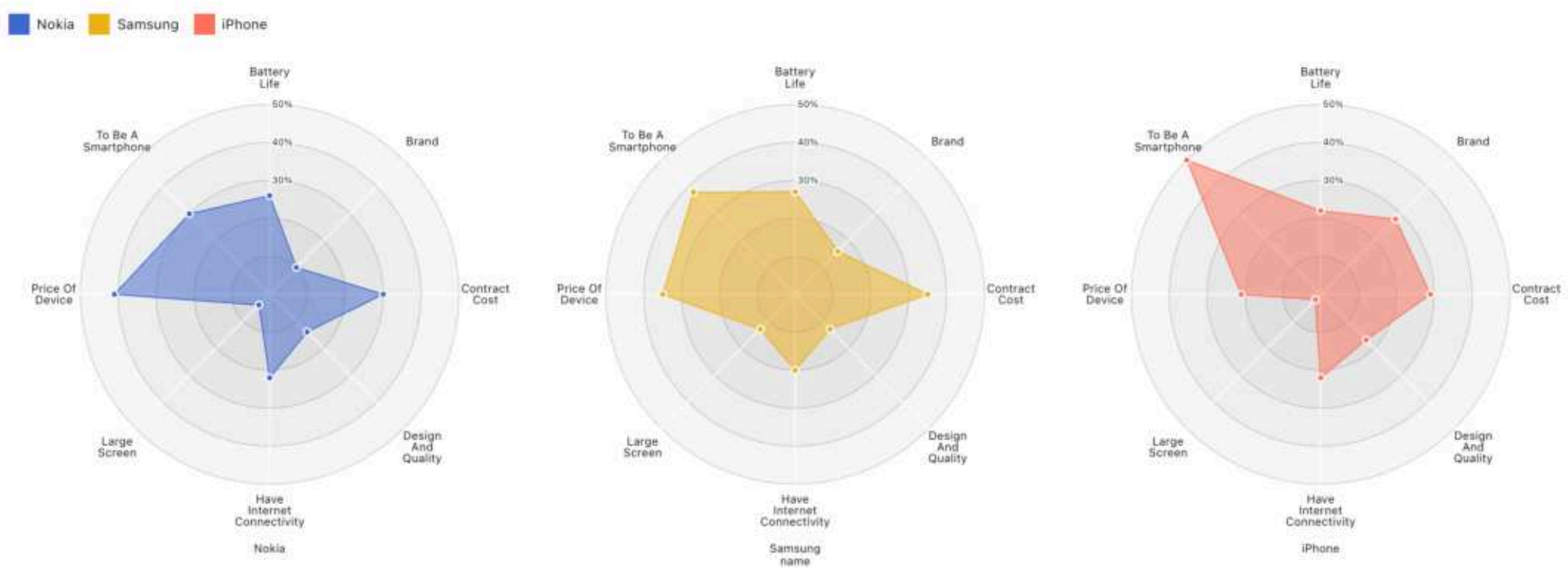


Quelle: Jasper McChesney



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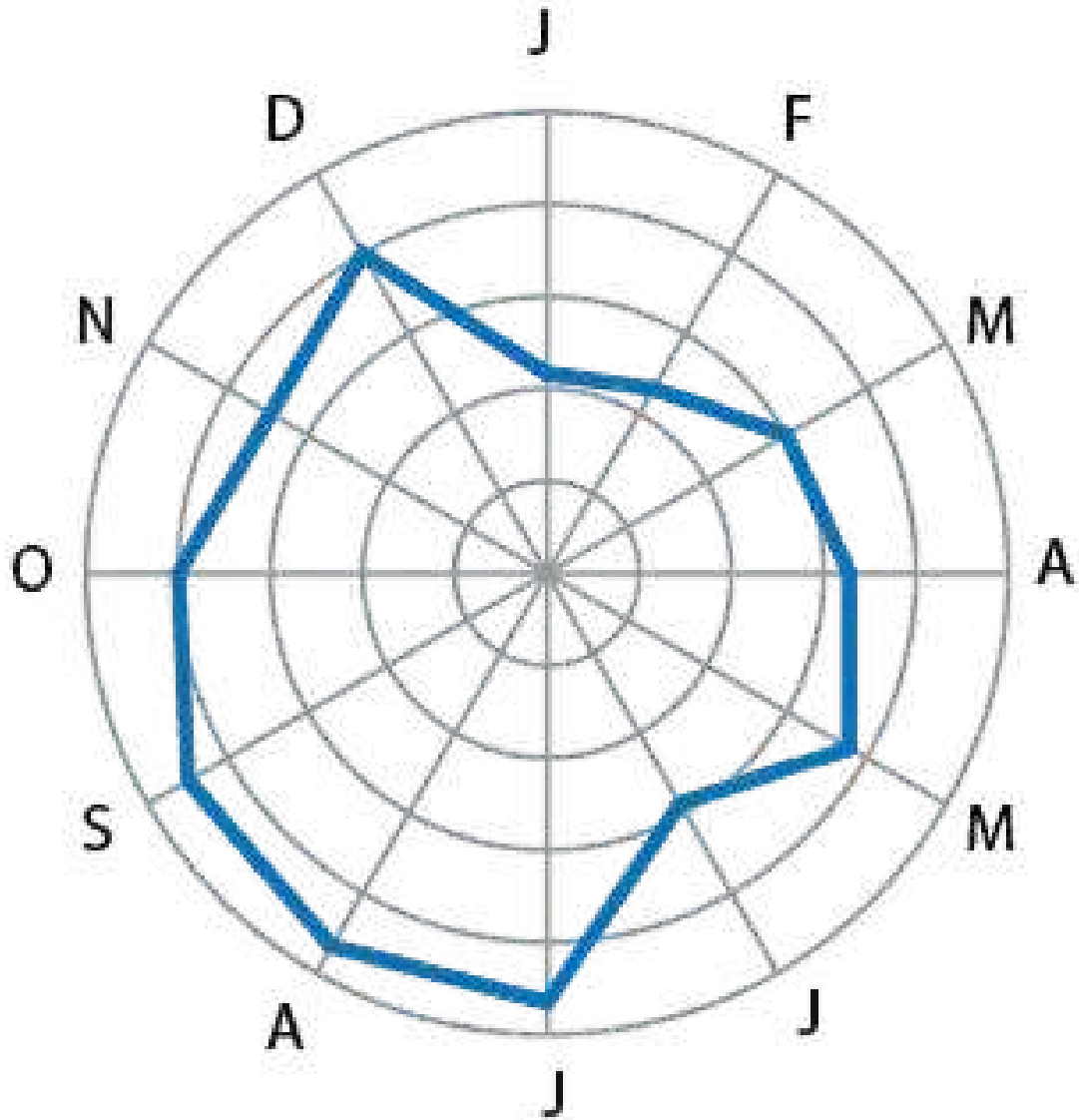


Quelle: Jasper McChesney

Checkliste

- Wähle mehrere **potentielle Diagrammtypen** aus, die zu deinen Datentypen und gewählten Kodierungen passen.
- **Skizziere mögliche Umsetzungen** basierend auf den Typen und der Struktur in deinem Datesatz – oder erstelle direkt erste Visualisierungen auf Basis deiner Daten.
- Erprobe unterschiedliche **Varianten**, z.B. durch den Wechsel der Perspektive oder der Farbpalette.
- Beurteile, wie gut jedes Diagramm deine **zentrale Botschaft** unterstützt. Ordne die Diagramme nach Zweckmäßigkeit.
- Reflektiere, welche Varianten auch im Hinblick auf **Publikum, Storytelling und gestalterische Originalität** besonders geeignet sind.

Visuelle Form

Eleganz der Grafik

Prinzipien der visuellen Wahrnehmung

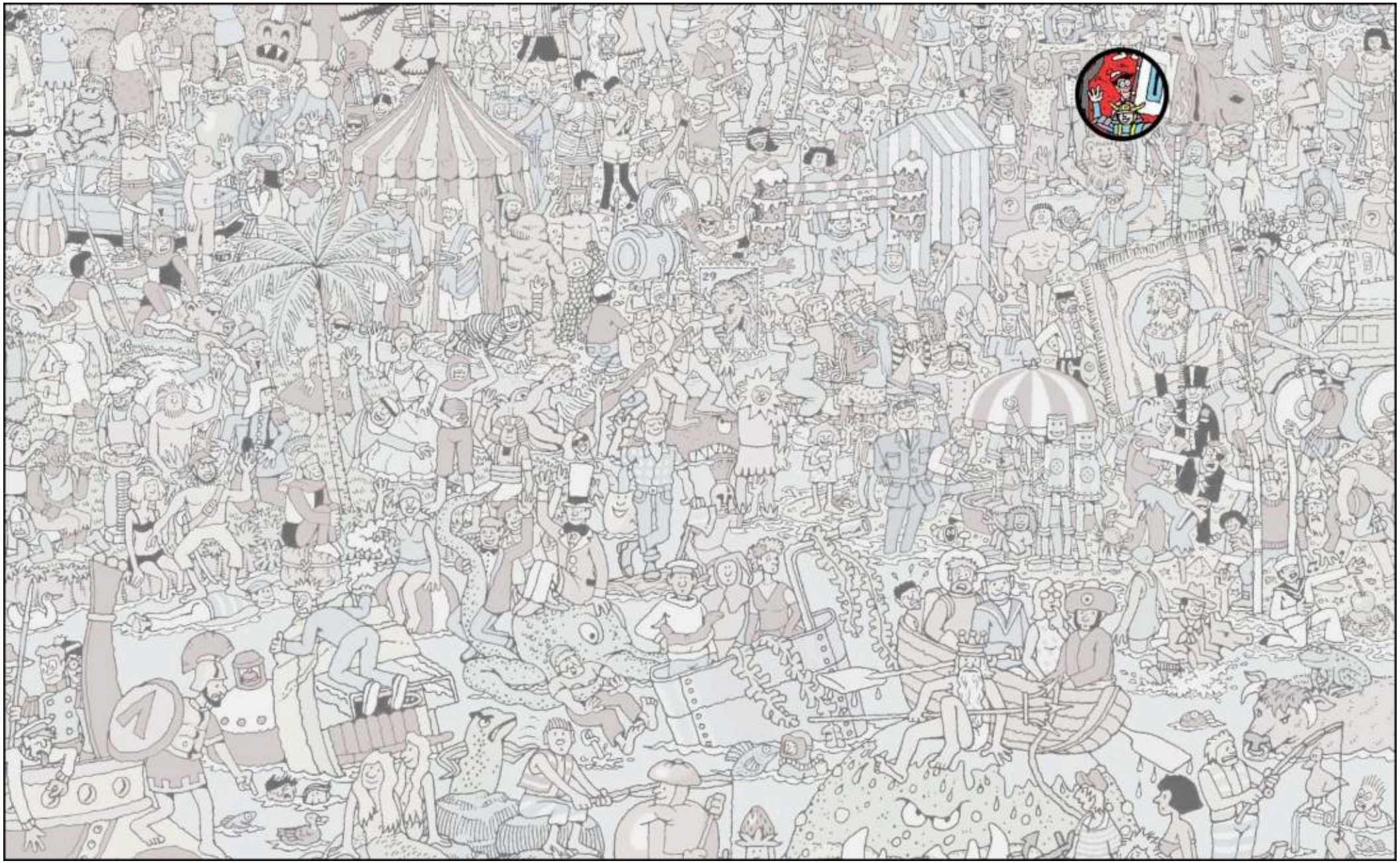
Ein

Ikonisches Gedächtnis

ist eine Form des **sensorischen Gedächtnisses**, das visuelle Informationen für einen sehr kurzen Zeitraum vorübergehend speichert.

Es arbeitet auf einer **präattentiven Ebene** – das heißt, es reagiert, bevor bewusste Aufmerksamkeit auf die visuellen Reize gerichtet wird.

Quelle: „Where's Waldo?" von Martin Handford © Kilburn & Strode LLP



Quelle: „Where's Waldo?" von Martin Handford © Kilburn & Strode LLP

5 3 7 2 0 9 4 8 1 3

9 4 5 4 3 5 2 5 4 6

1 0 4 5 8 2 6 8 5 0

7 3 2 9 6 0 2 5 9 1

4 8 2 1 0 7 0 2 4 3

1 5 9 7 **4** 5 0 2 0 1

4 7 6 9 3 5 1 3 6 0

6 9 3 1 2 **4** 9 7 5 **4**

5 6 **4** 3 8 0 2 3 **4** 1

8 **4** 1 3 7 2 9 6 1 2

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6 3 0 2 1 9 7 5 4 8

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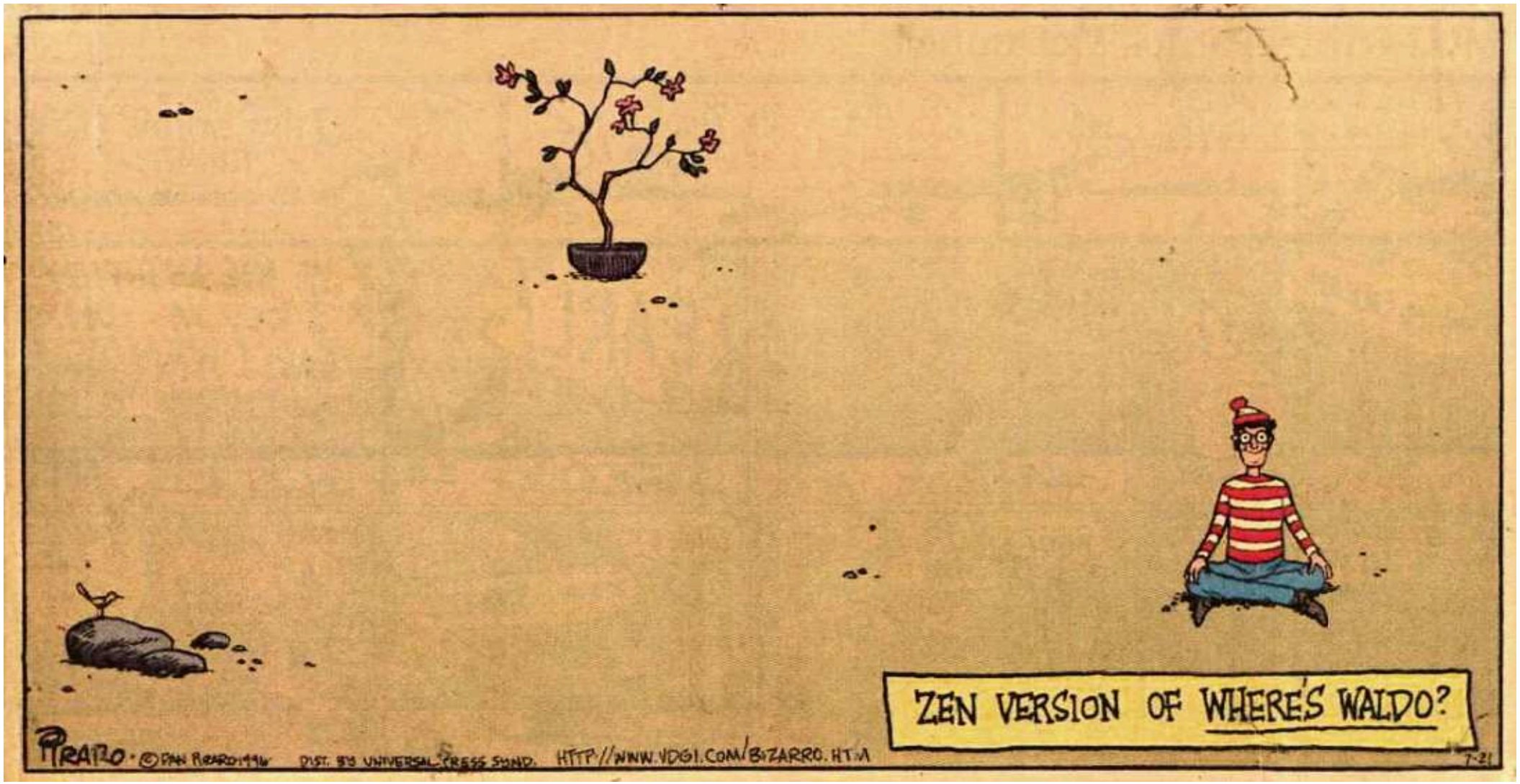
9 2 1 5 8 7 3 4 5 6

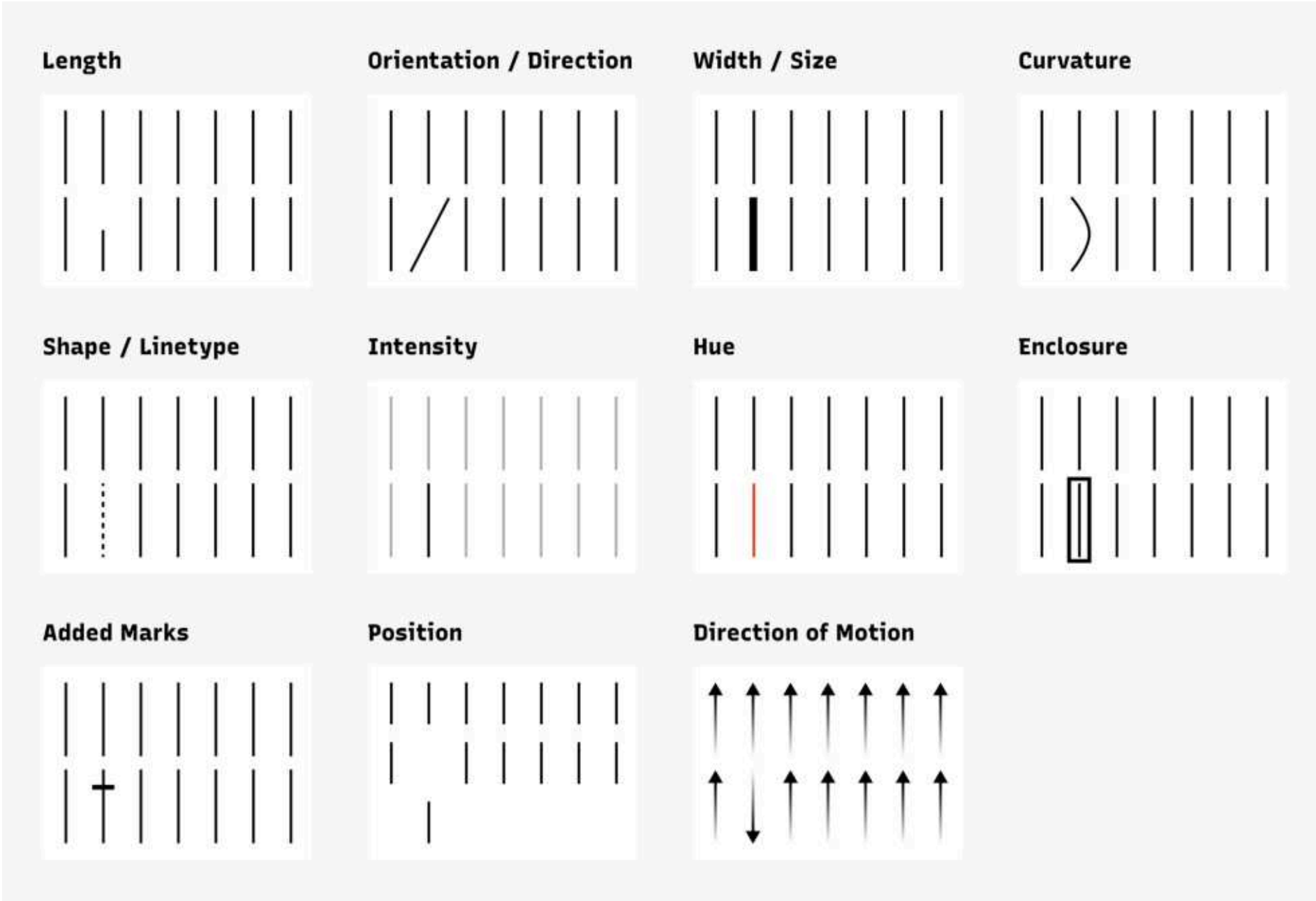
4 6 2 8 1 4 7 2 3 0



Quelle: Zen-Version von „Where's Waldo?" von Dan Piraro

Präattentive Attribute

Visuelle Eigenschaften, die das menschliche Gehirn <u>unmittelbar</u> und <u>unterbewusst</u> verarbeitet.



Basierend auf Grafiken von Stephen Few und anderen

Keep it simple

size, weight, type + spacing

color + added mark

In his book Information Visualization: Perception for Design, Colin Ware states:

added mark

spacing

> *"It is easy to spot a hawk in a sky full of pigeons, but as the variety of birds increases the hawk becomes harder to pick out."*

type + style

position

spacing

In other words, **the more things are made different, the less any of them stand out.**

weight

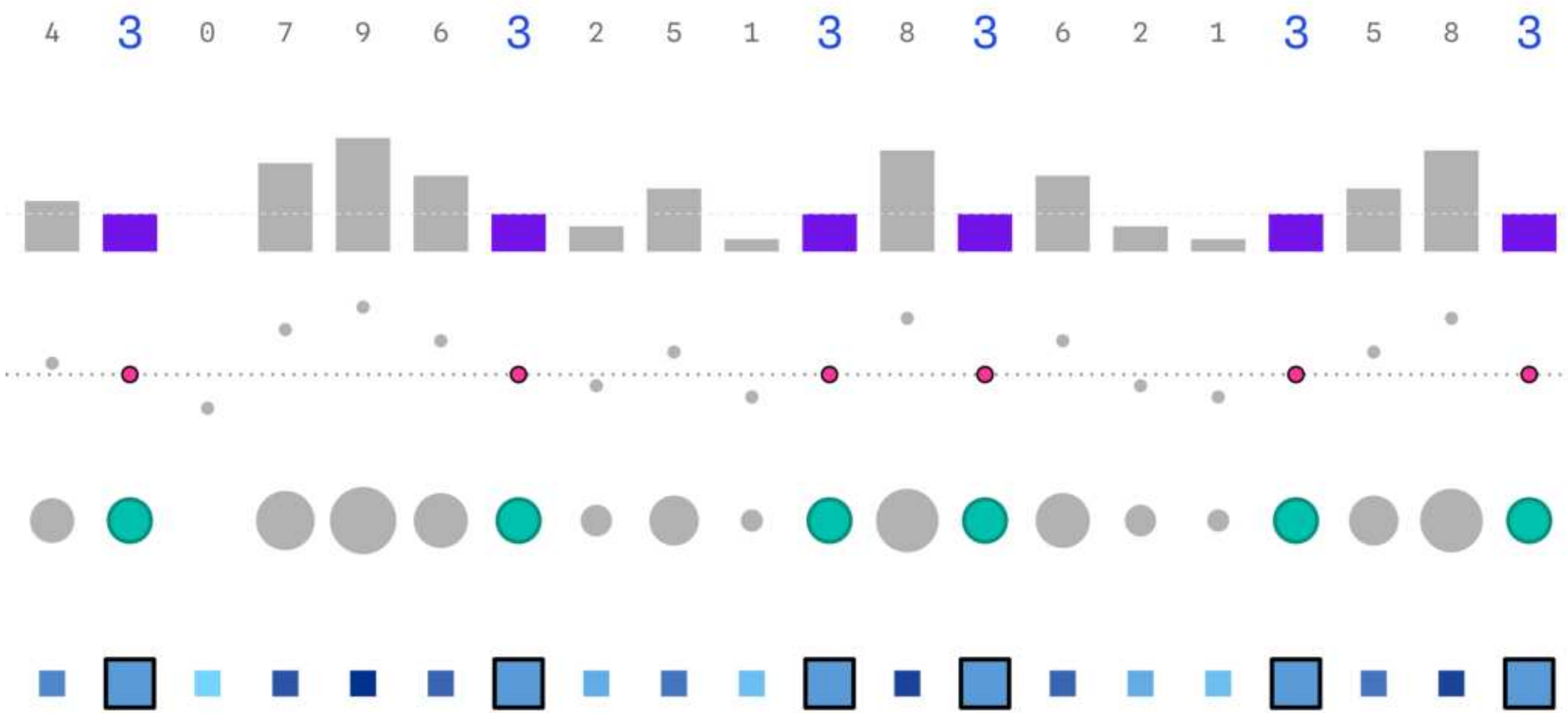
style

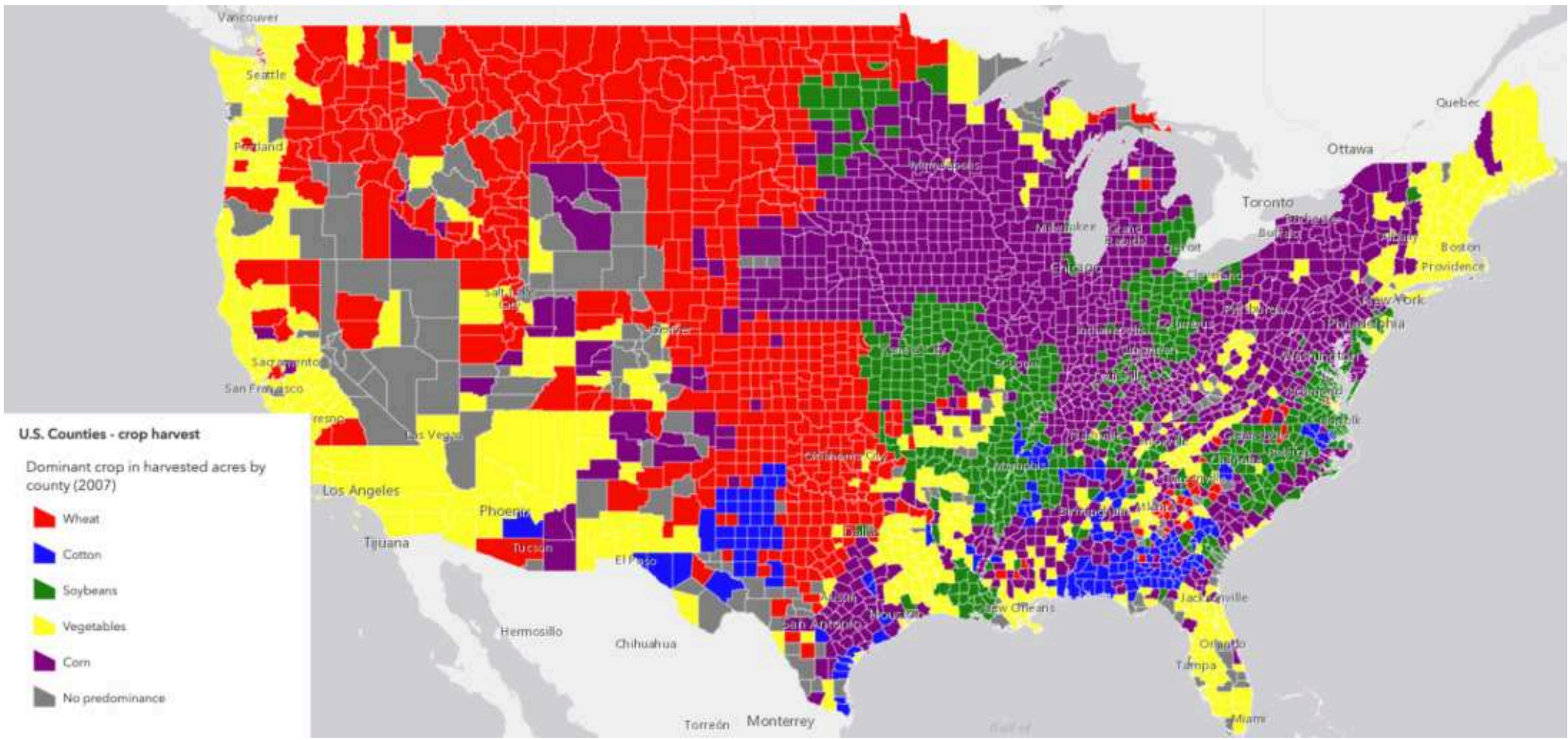
spacing

So, it is *good practice* to start with figuring out an item of interest you want to emphasise, and then trying to make it the one thing that is different, thus leveraging your contrast strategically.

Source: Deya Milcheva (5rdata.com) size, color + spacing

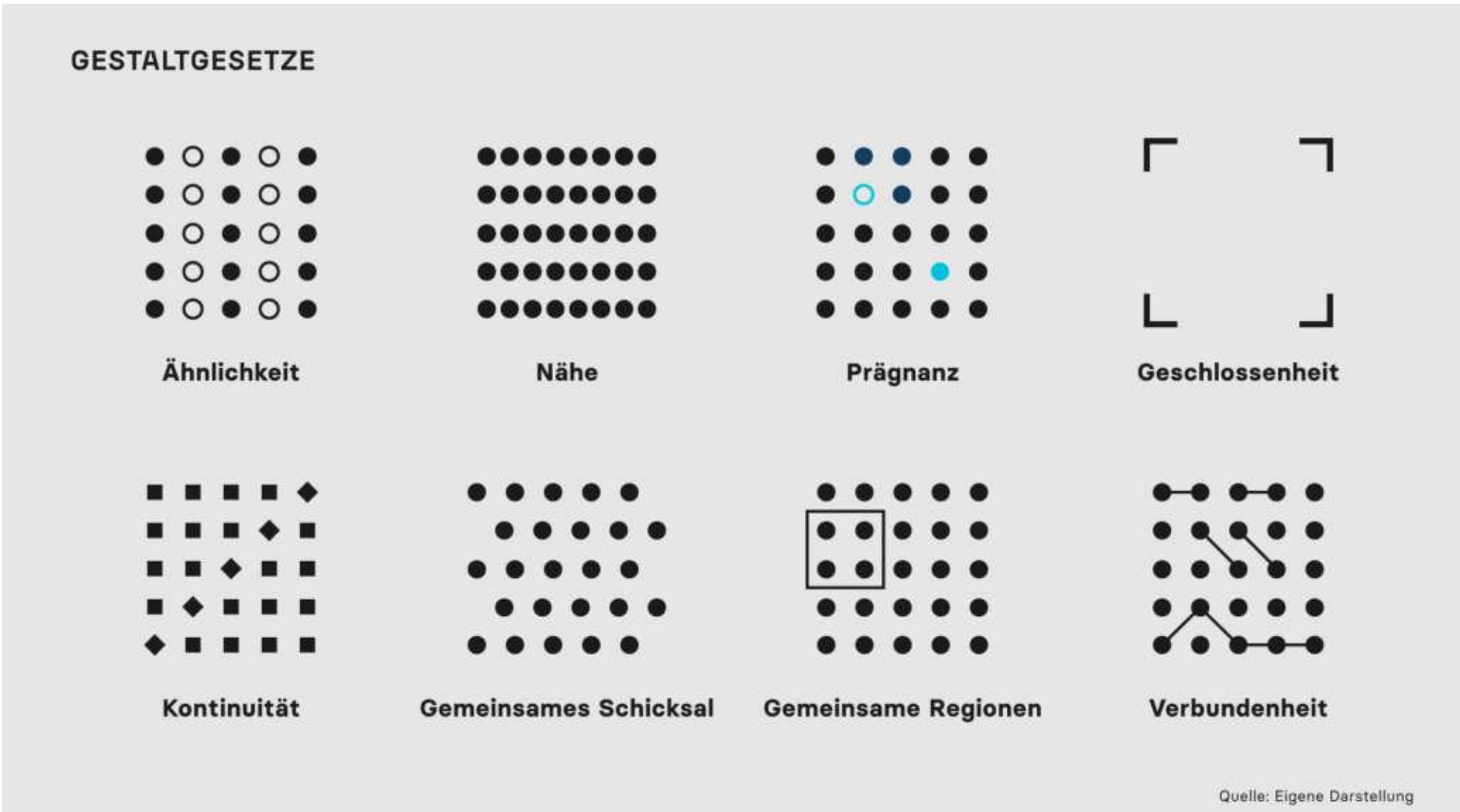
Datenwerte hervorheben




U.S. Counties - crop harvest
Dominant crop in harvested acres by county (2007)
Wheat
Cotton
Soybeans
Vegetables
Corn
No predominance
Vancouver
Seattle
Portland
Sacramento
San Francisco
Fresno
Las Vegas
Los Angeles
Phoenix
Tucson
Tijuana
El Paso
Hermosillo
Chihuahua
Torreón
Monterrey
Dallas
Austin
San Antonio
Houston
New Orleans
Jacksonville
Orlando
Tampa
Miami
Atlanta
Birmingham
Charlotte
Raleigh
Norfolk
Richmond
Washington
Philadelphia
New York
Providence
Boston
Quebec
Ottawa
Toronto
Buffalo
Detroit
Grand Rapids
Milwaukee
Chicago
Minneapolis
Omaha
Kansas City
Denver
Salt Lake City

Quelle: ESRI

Gestalt-Prinzipien



"Decluttering"

Überflüssige Elemente entfernen, Klarheit fördern.

Clutter

auch bekannt als

"Chart Junk"

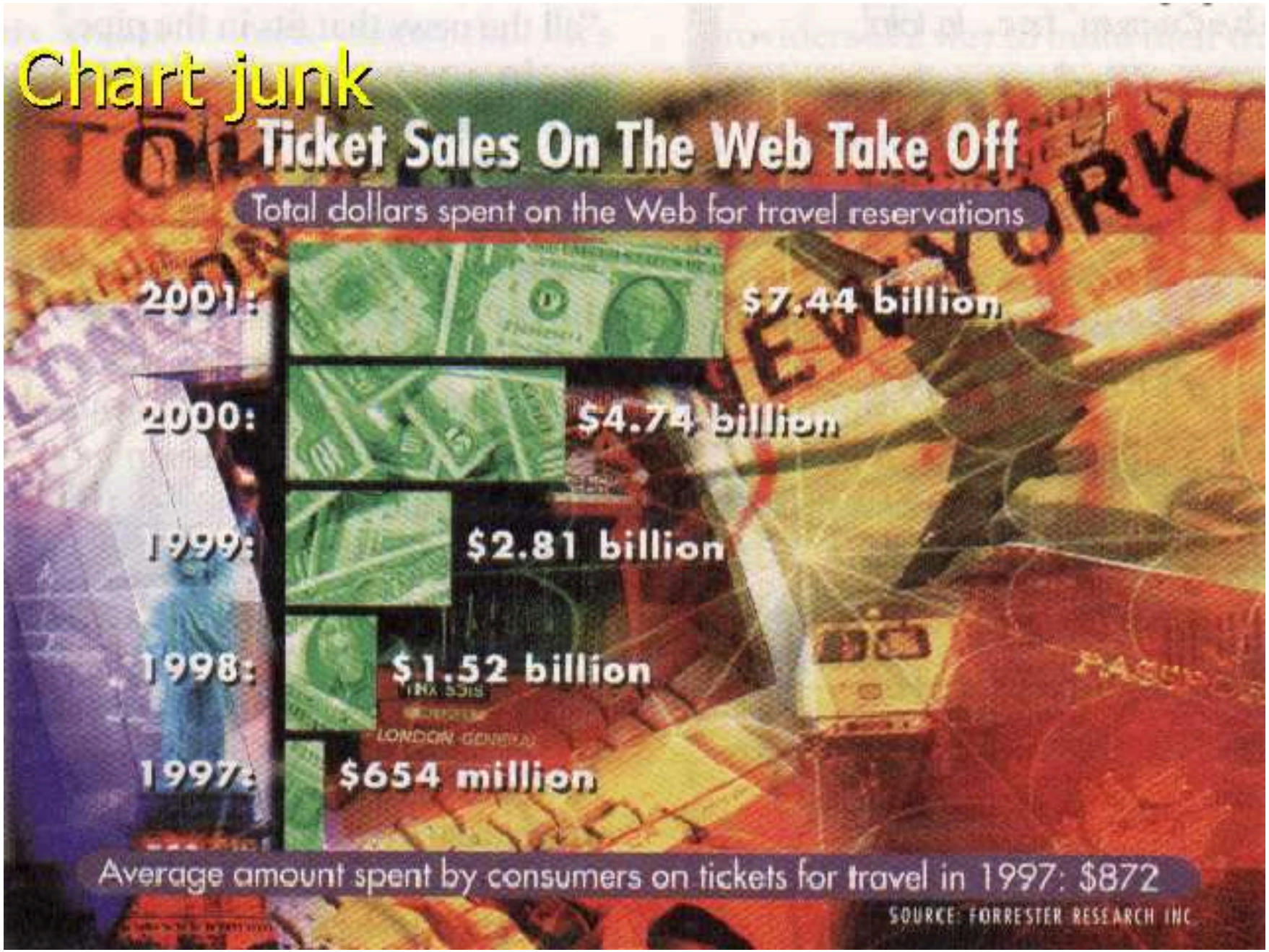
sind visuelle Elemente, die Platz einnehmen
aber das Verständnis nicht verbessern.

Noch schlimmer:
Sie erhöhen die kognitive Belastung.

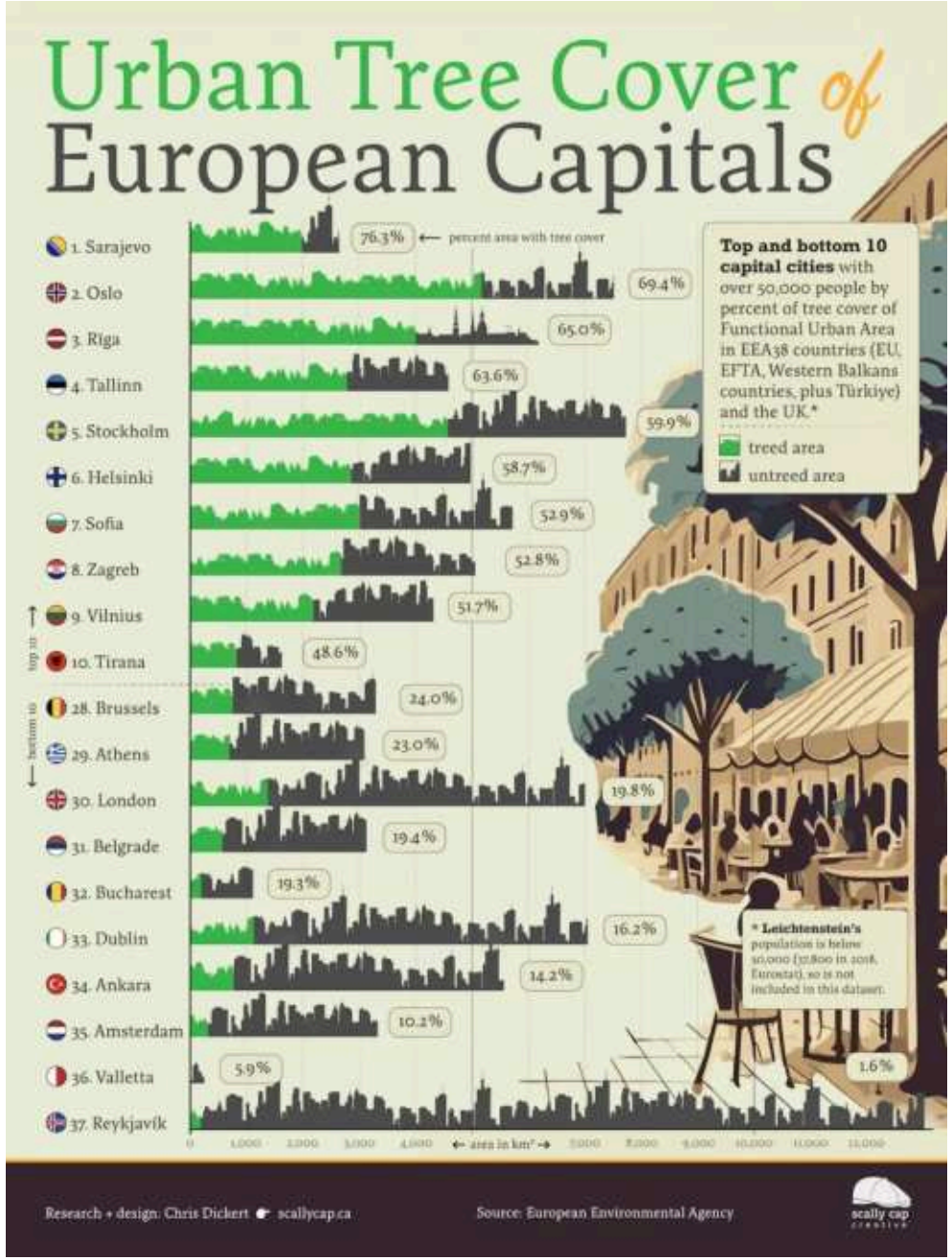
„The larger the share of a graphic's ink devoted to data, the better."

Edward Tufte (1983)

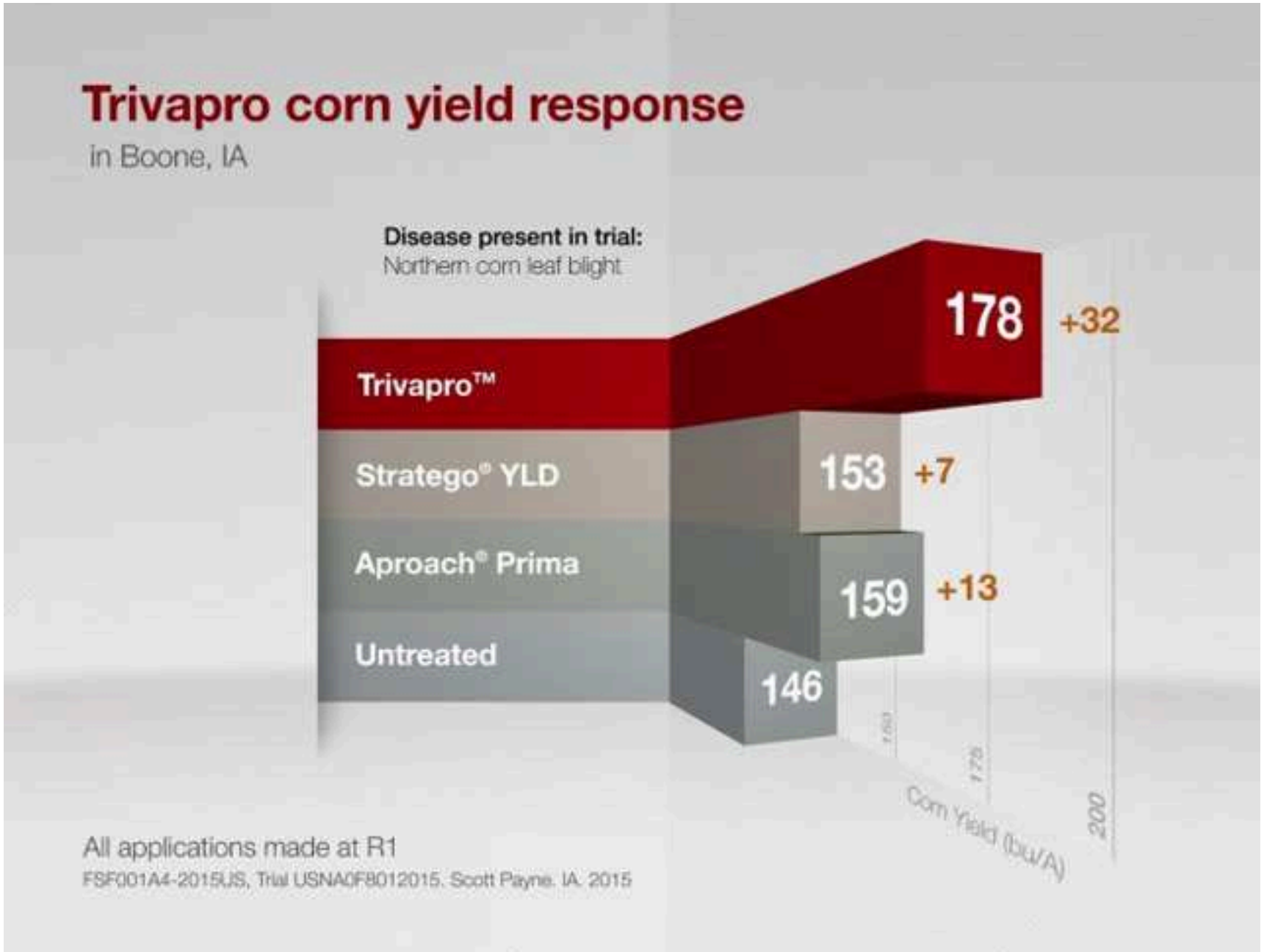
Chart junk



Gefunden in "News that fit to print" von Arturo Perez-Reyes



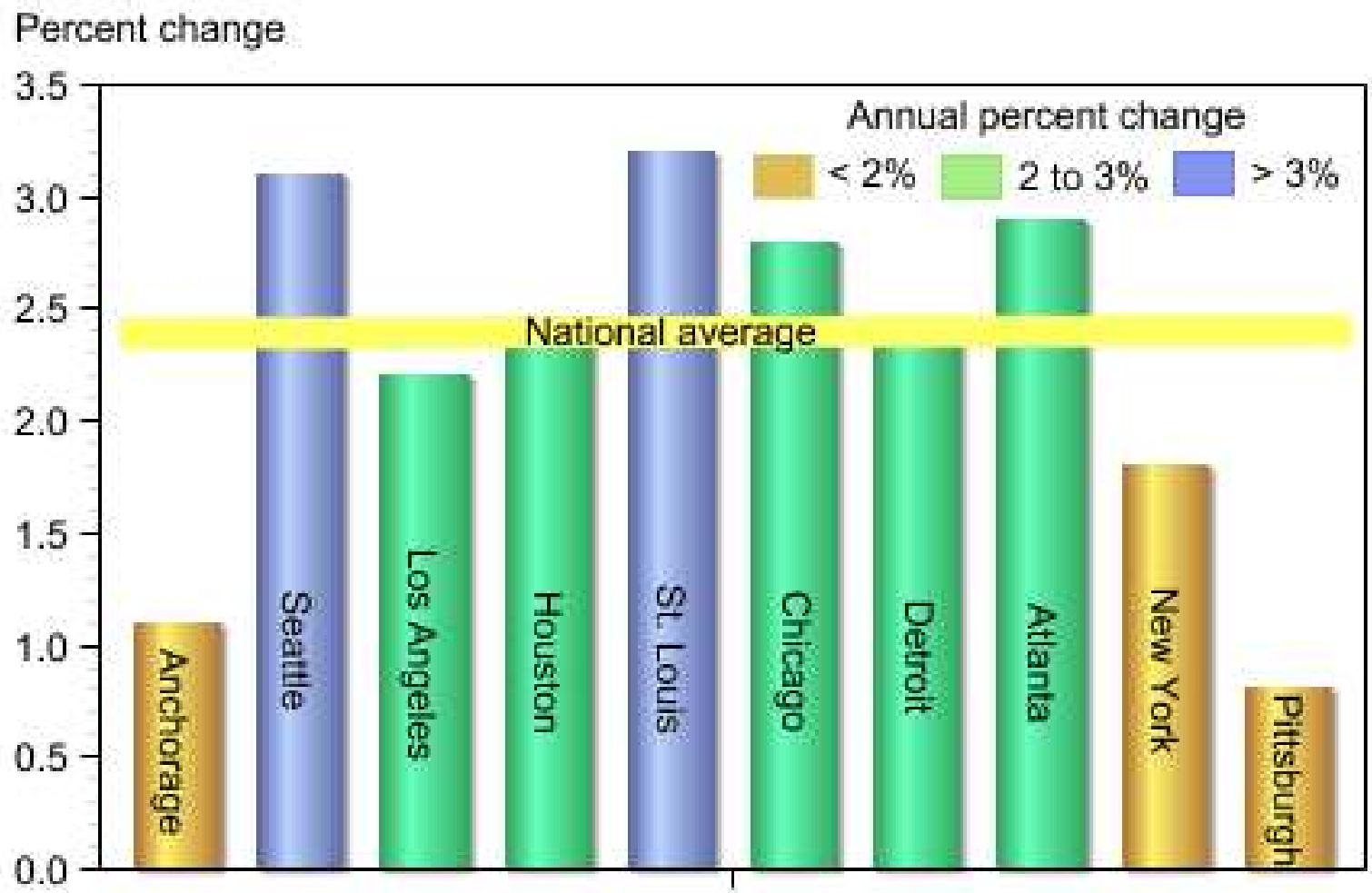
„Urban Tree Cover of European Capital Cities" von Chris Dickert



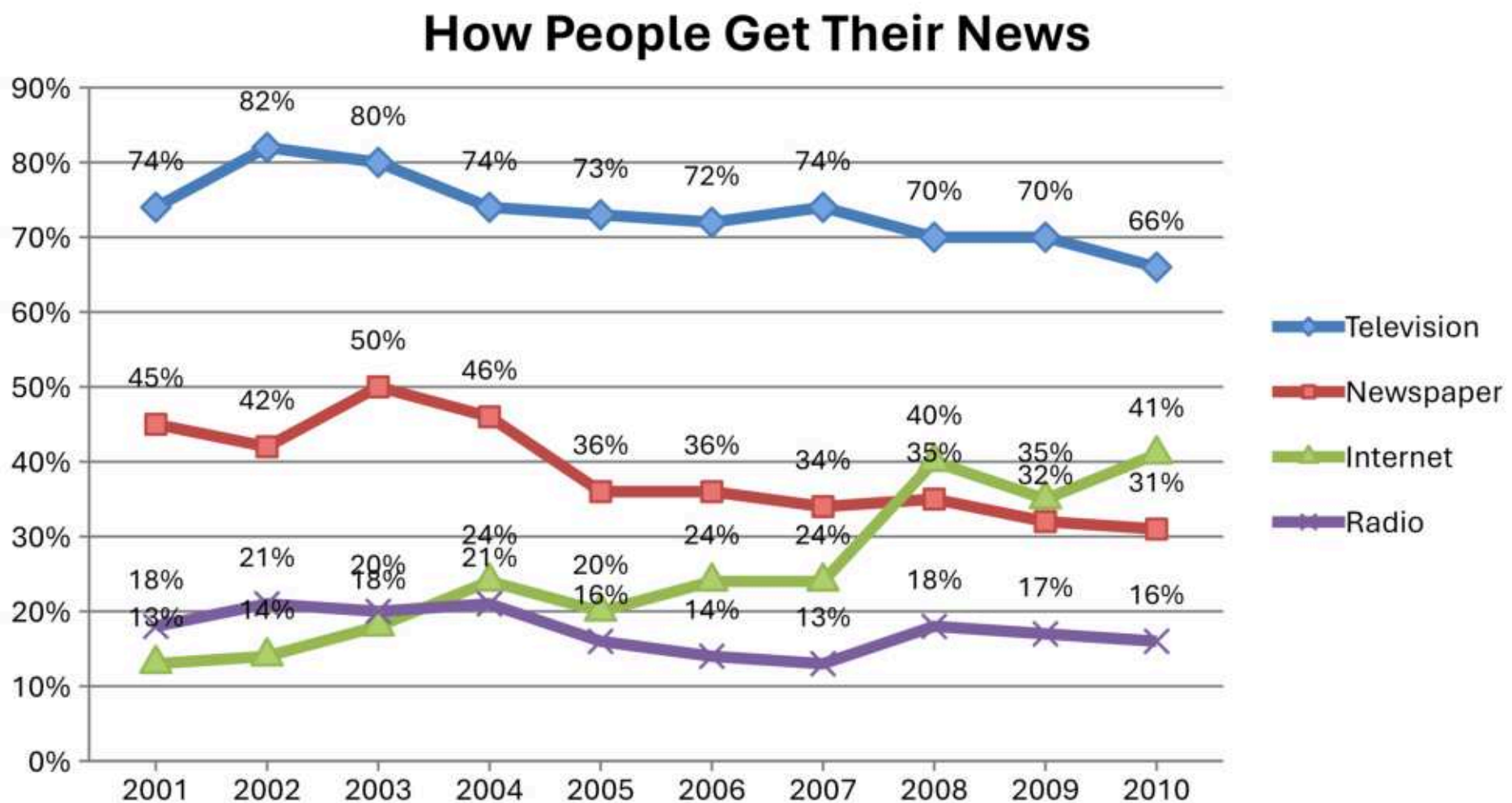
Quelle: Syngeta

Annual grocery store inflation by city, 2014

In 2014, food price inflation was higher in Seattle, St. Louis, Chicago, and Atlanta than in other metropolitan areas



Source: Calculated by ERS, USDA, using Bureau of Labor Statistics (BLS) data.



AN INCREASING PROPORTION CITE THE INTERNET AS THEIR PRIMARY NEWS SOURCE.
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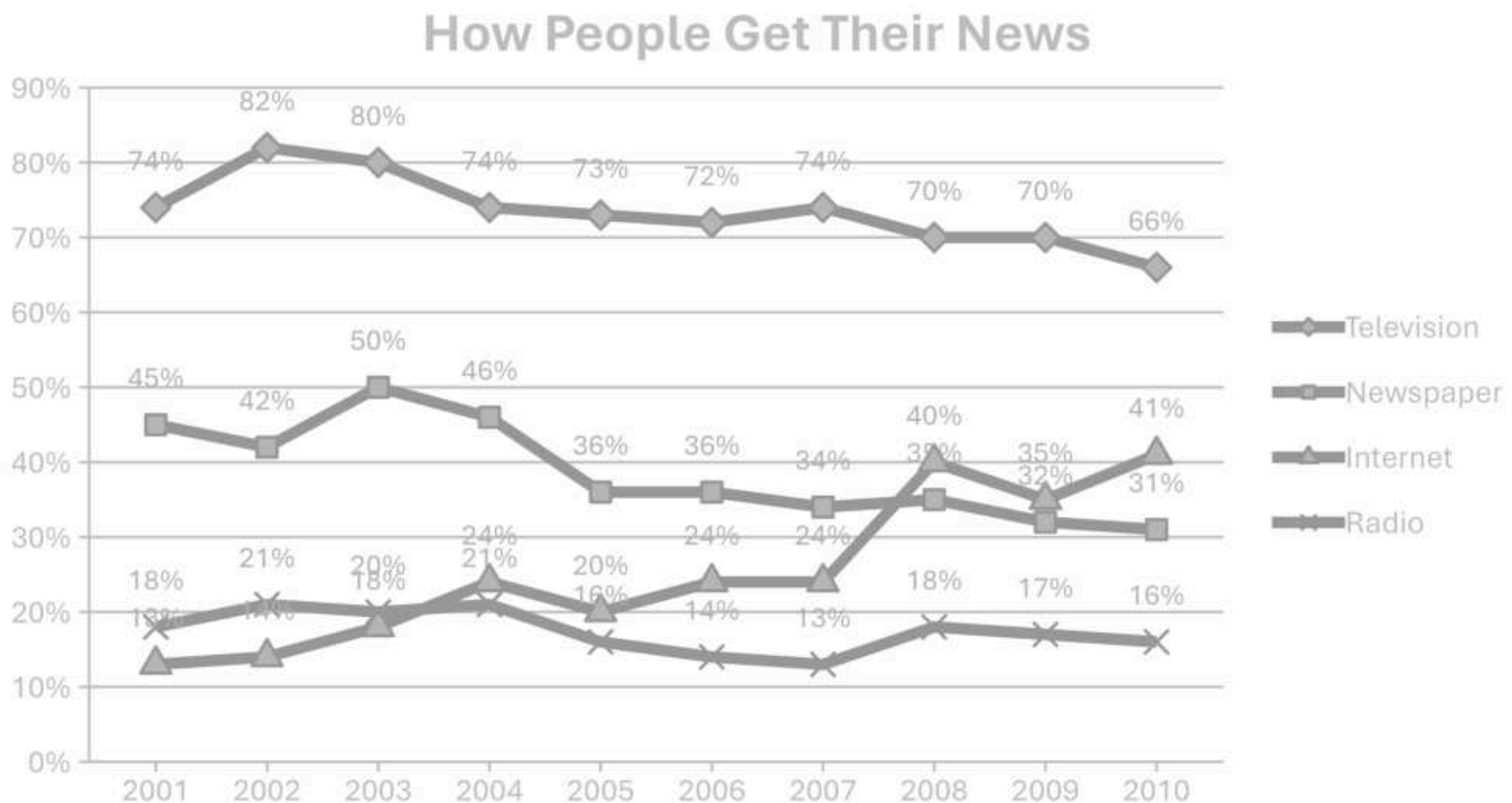

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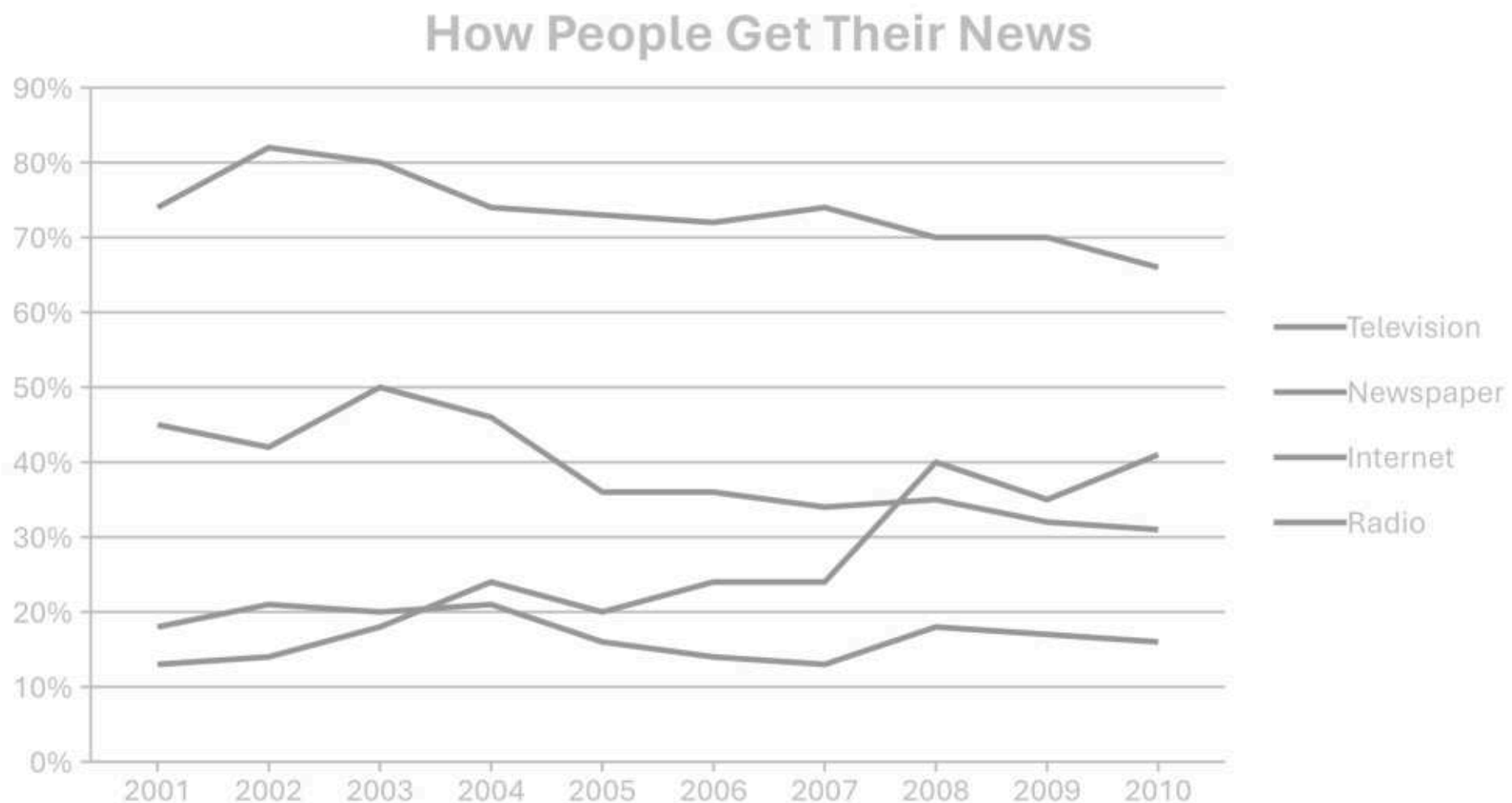

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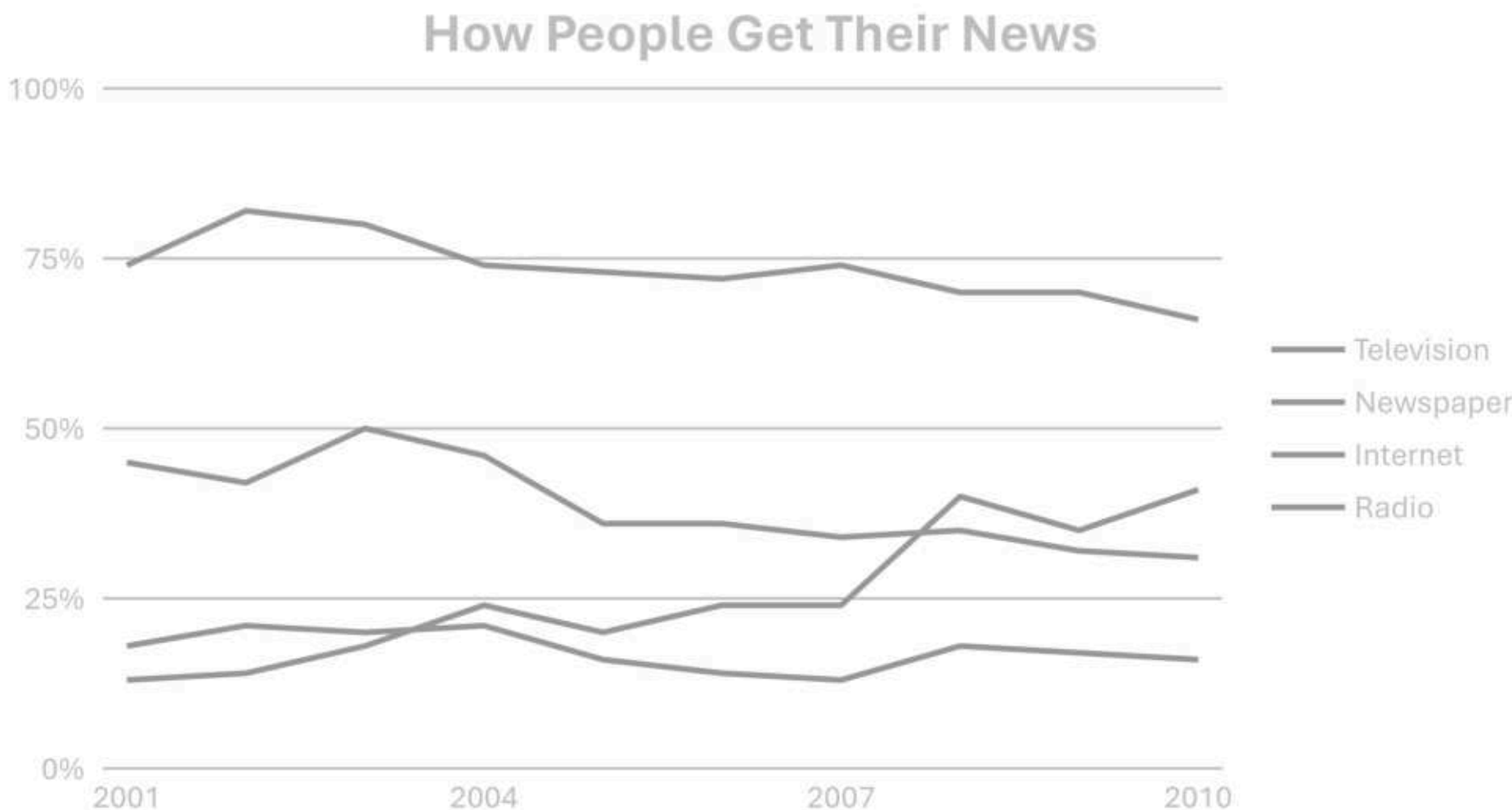

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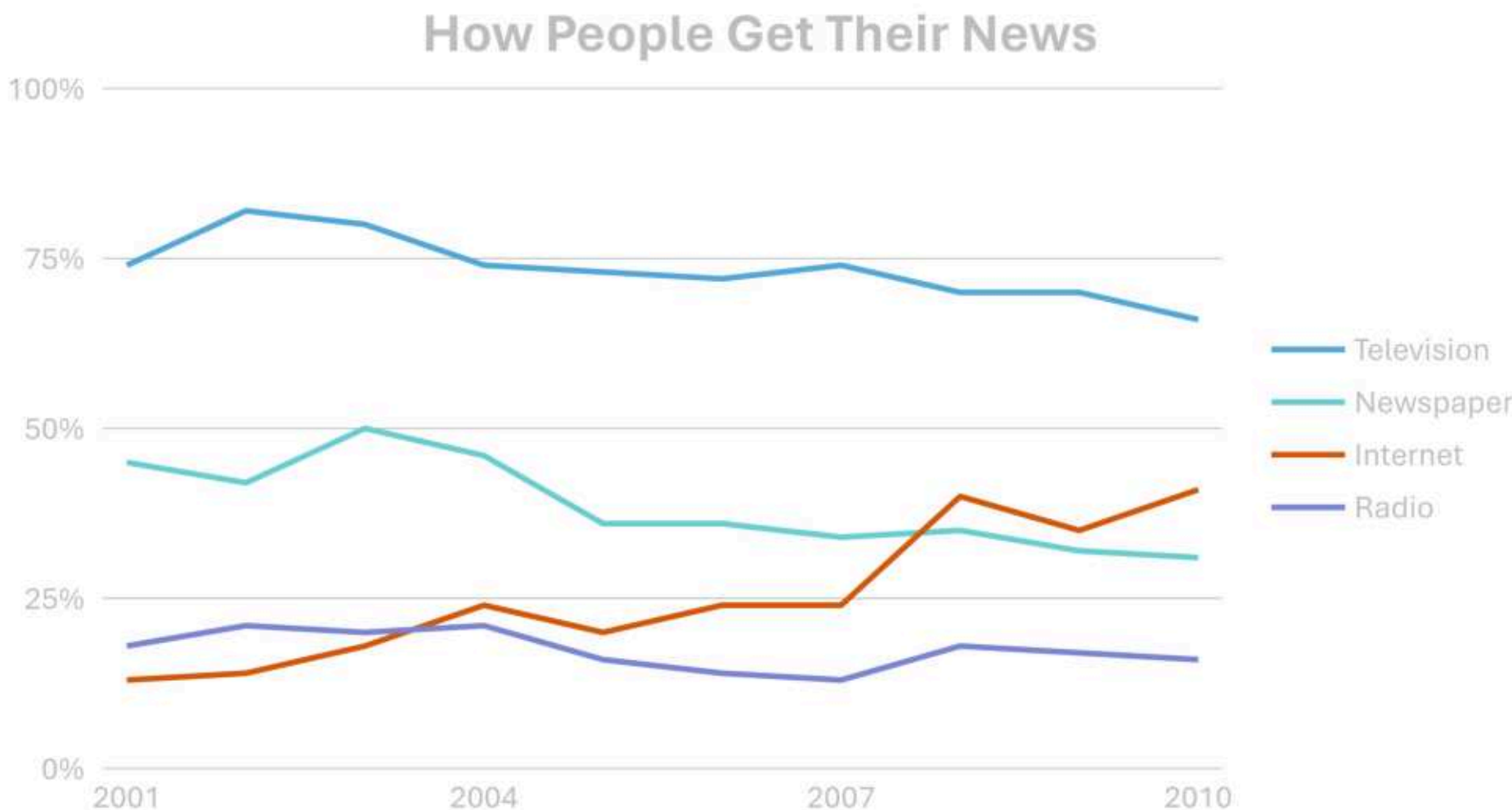

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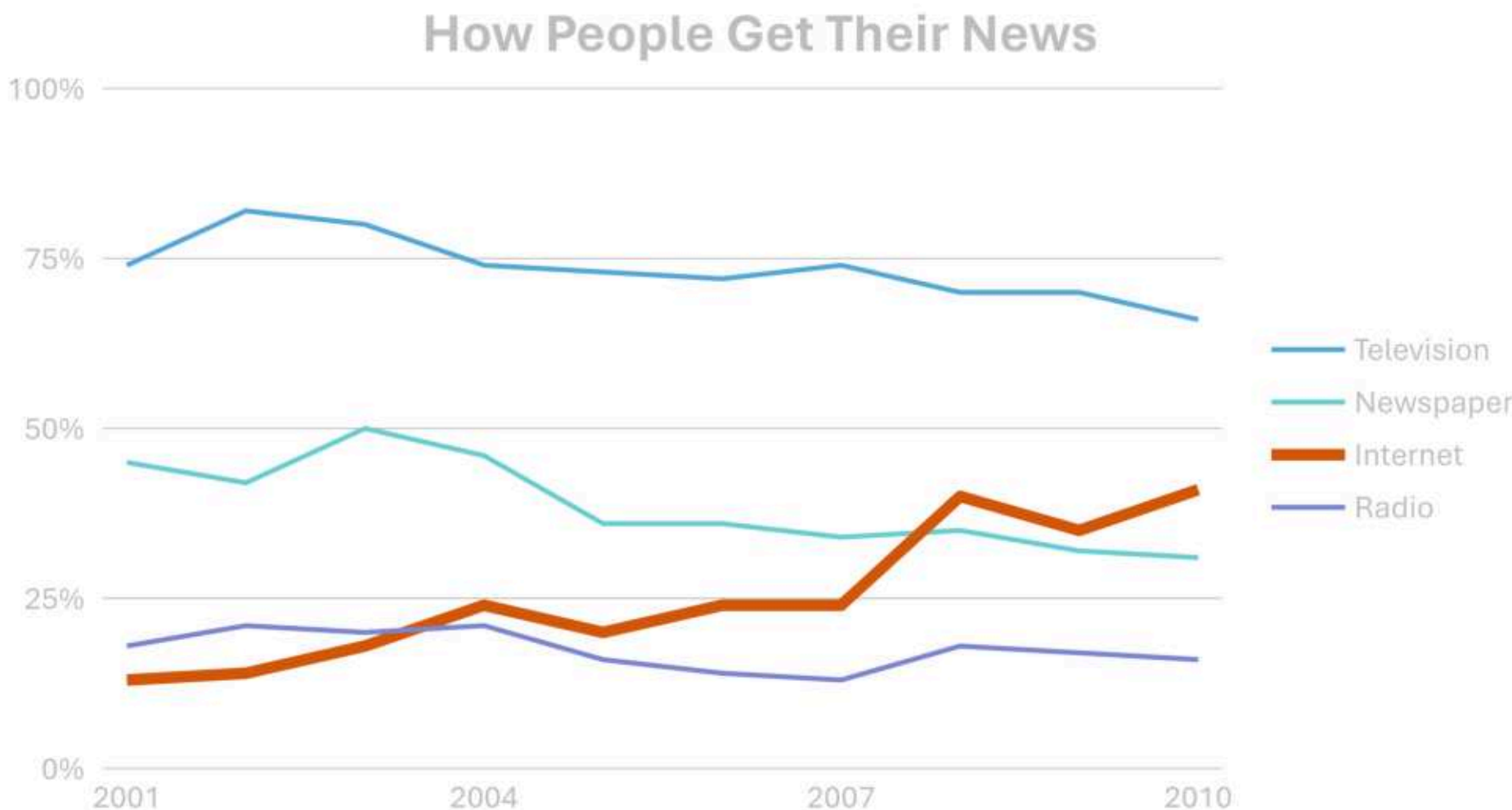

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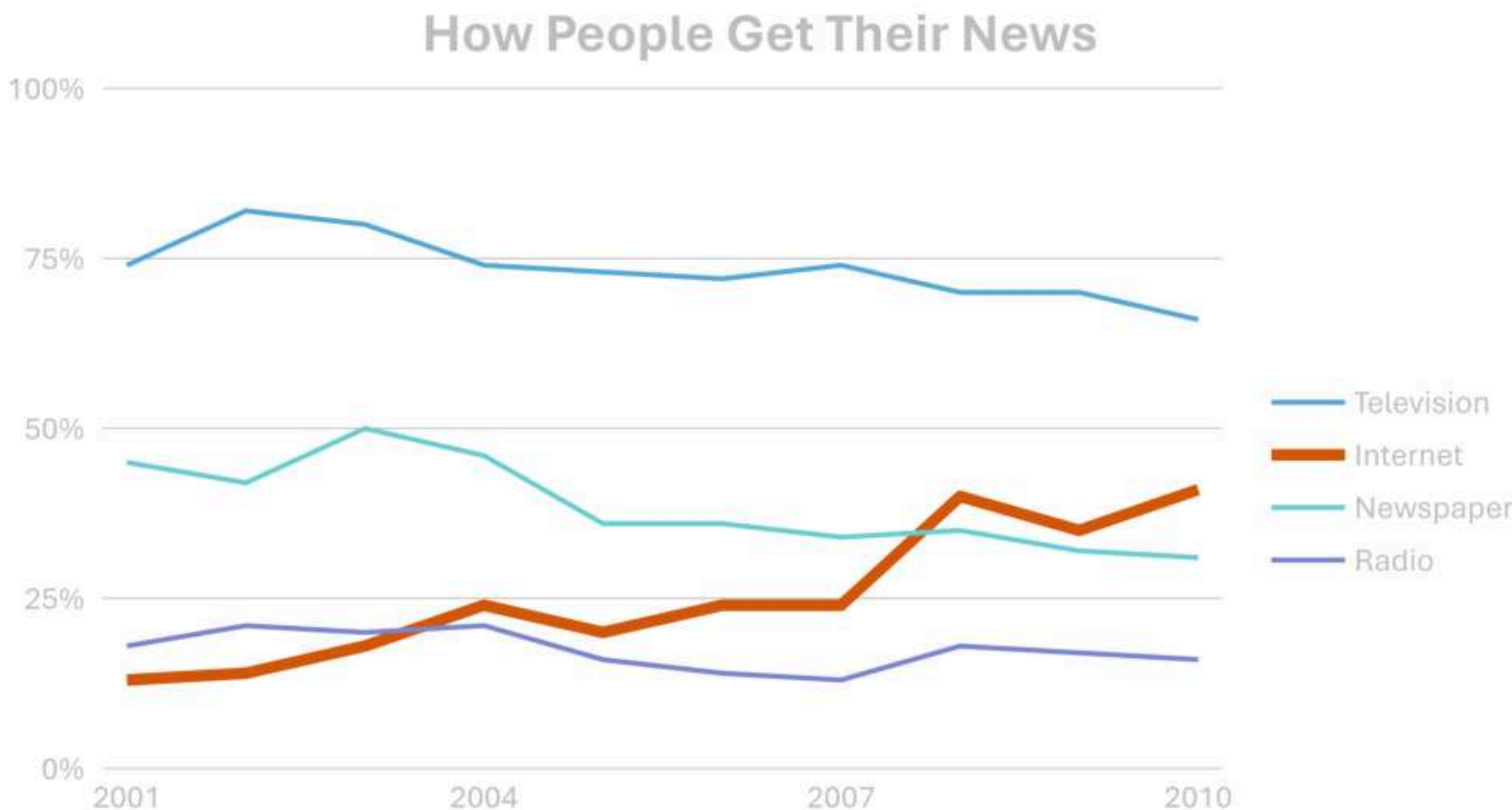

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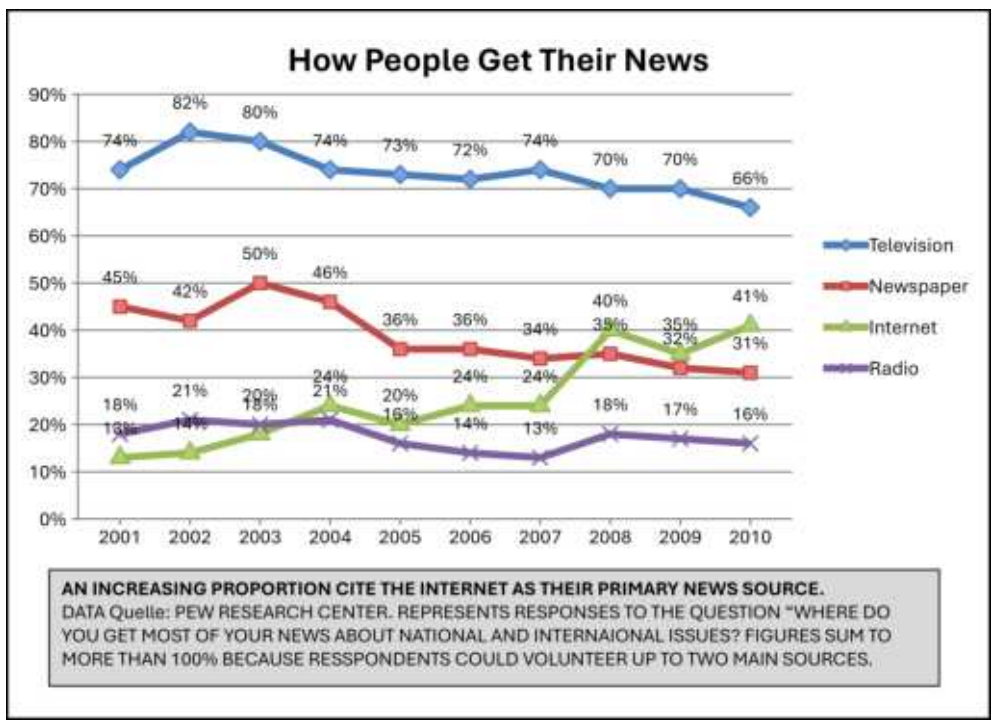

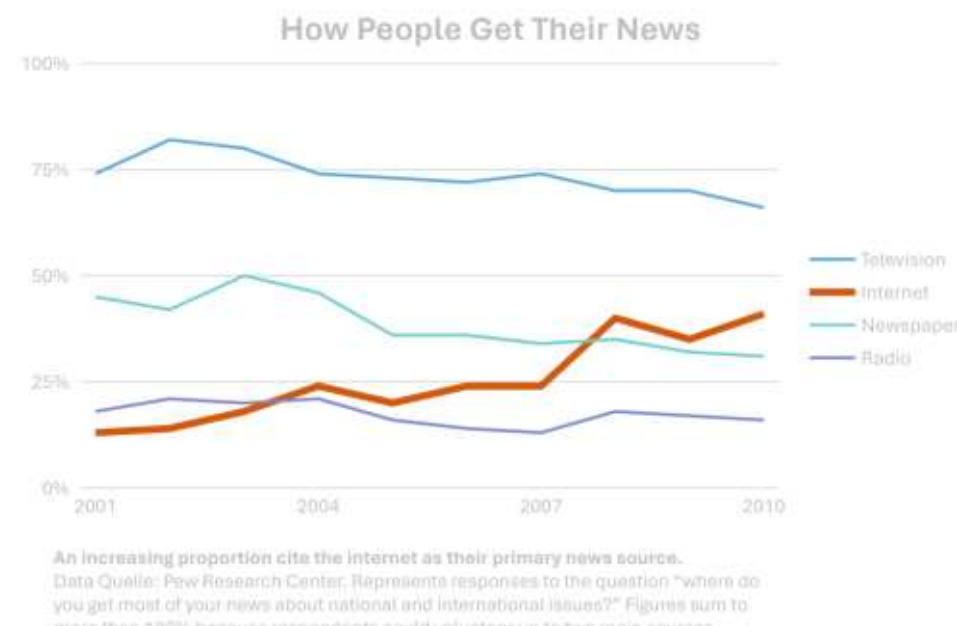

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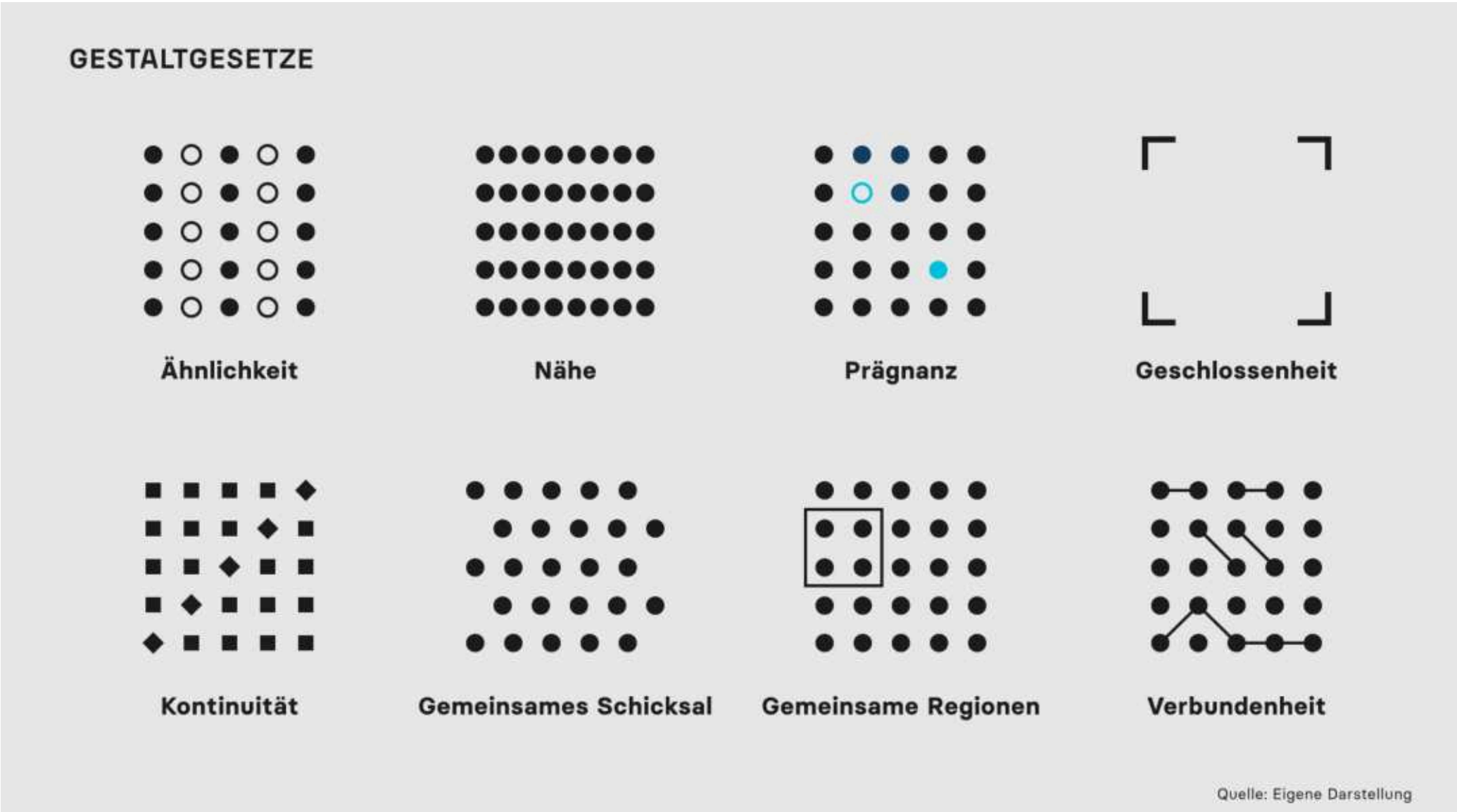
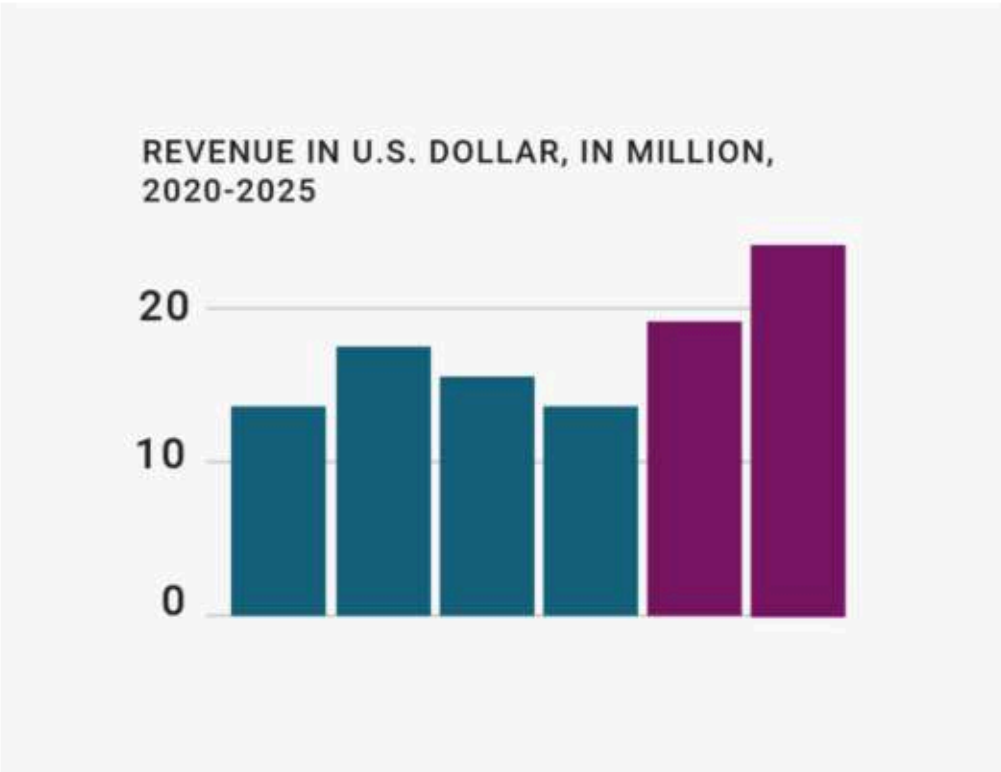
Guide the
Viewer(s)

Gestalt-Prinzipien



Quelle: Designsensor AG



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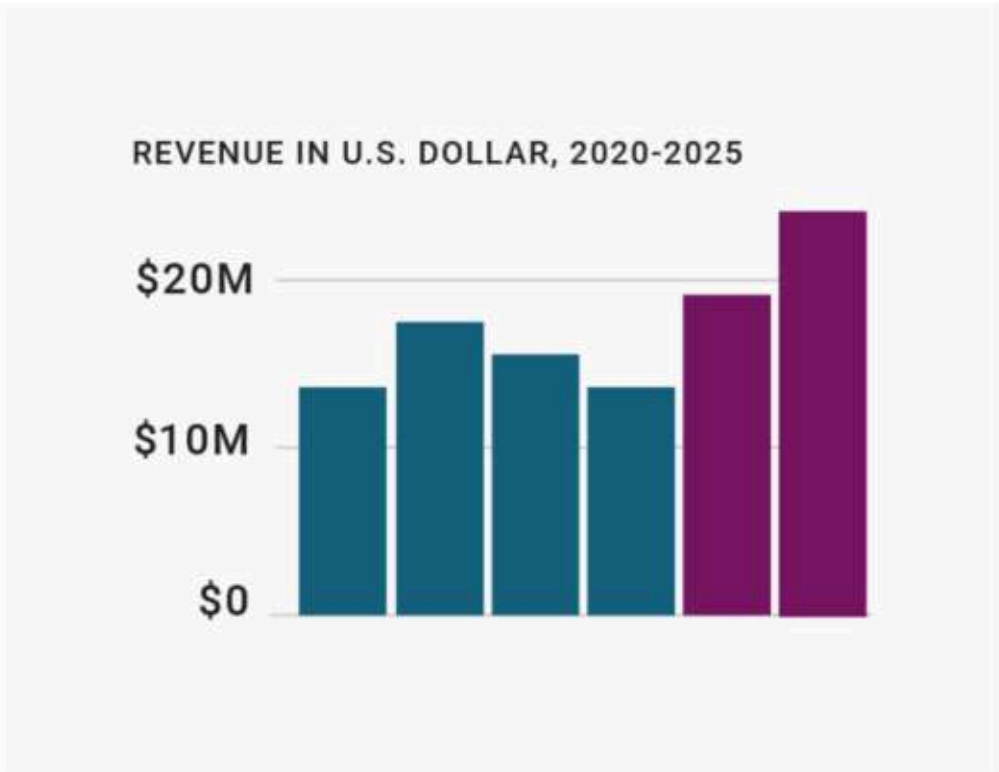
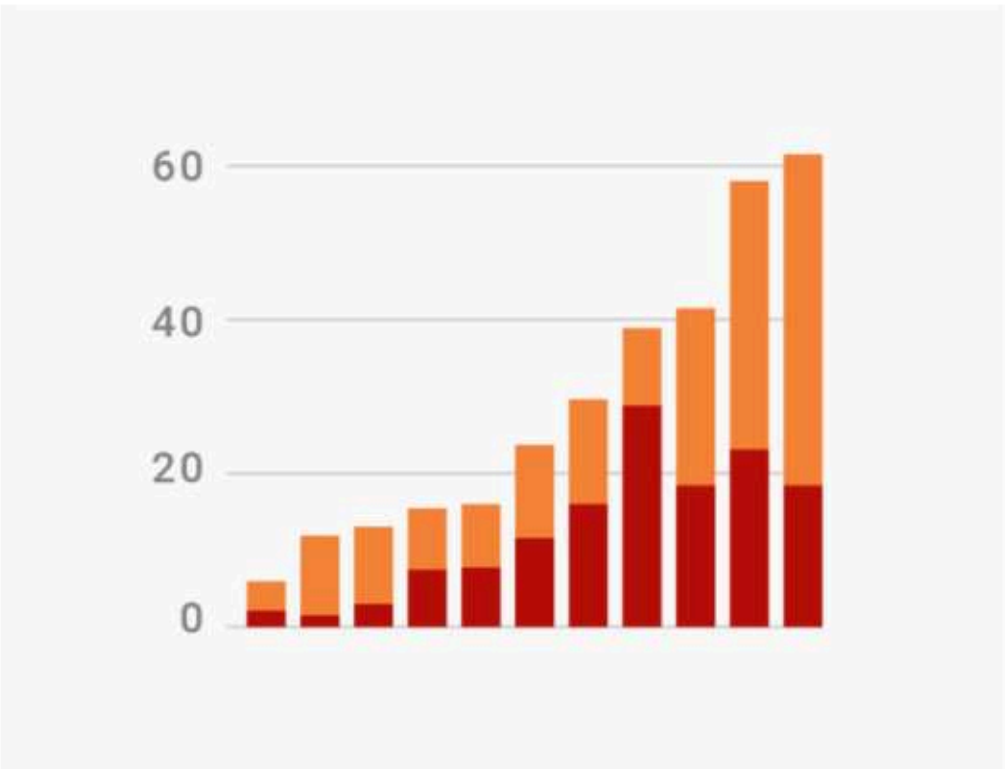


BETTER

Quelle: Lisa Charlotte Muth, Datawrapper Blog



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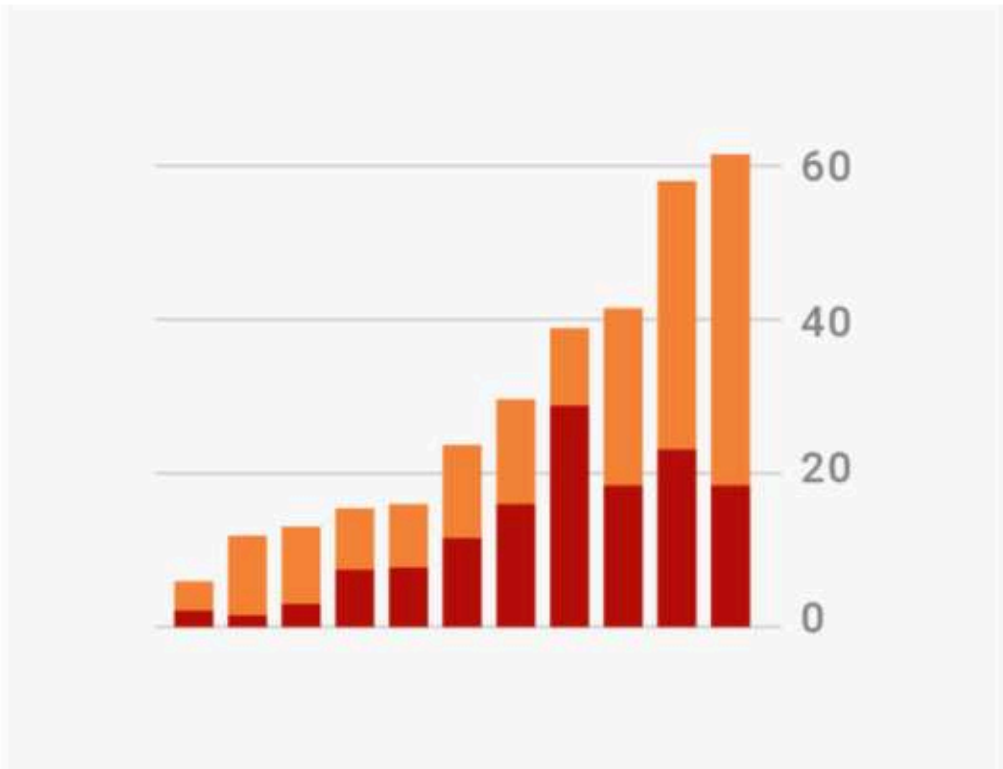

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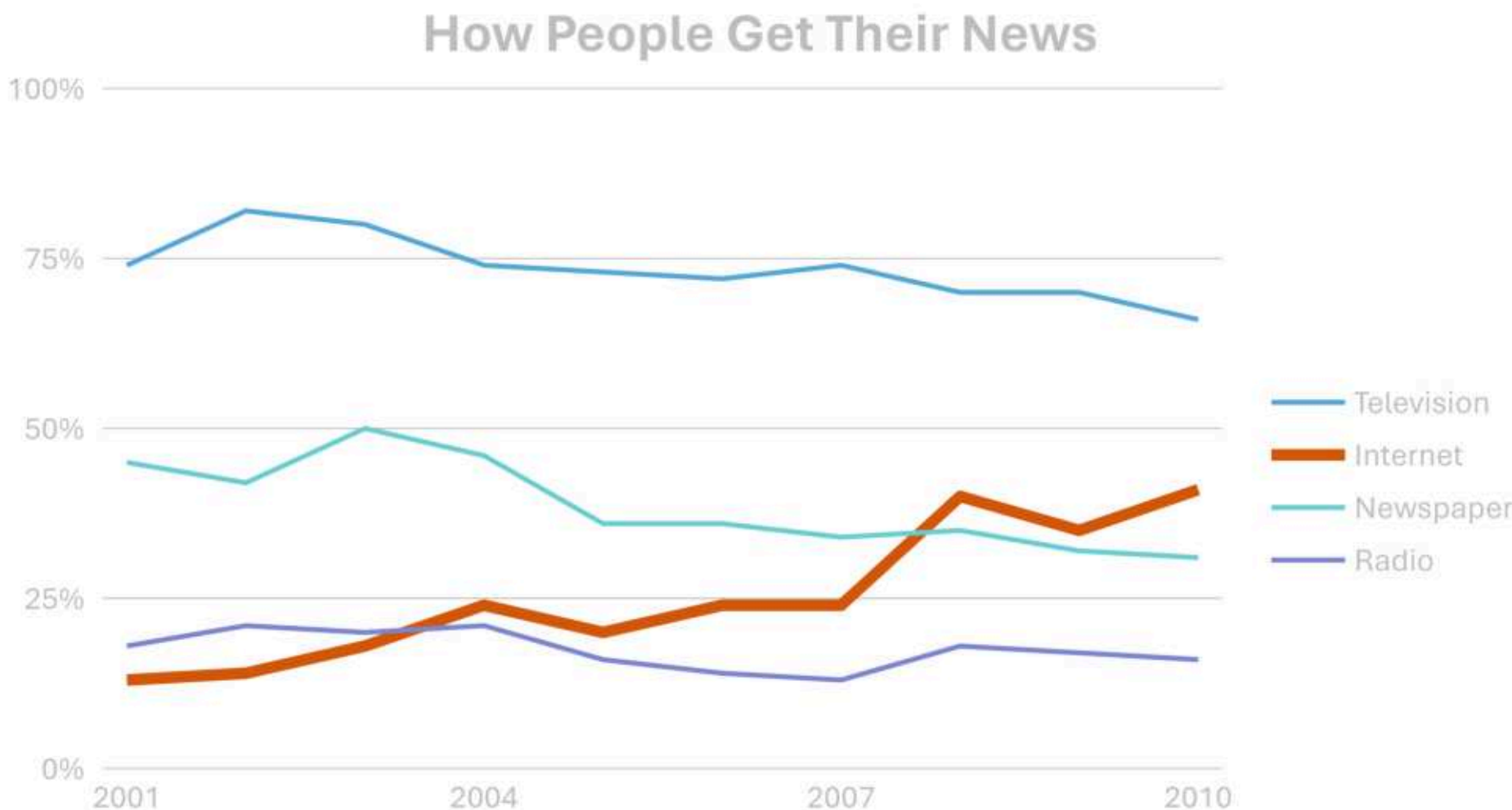

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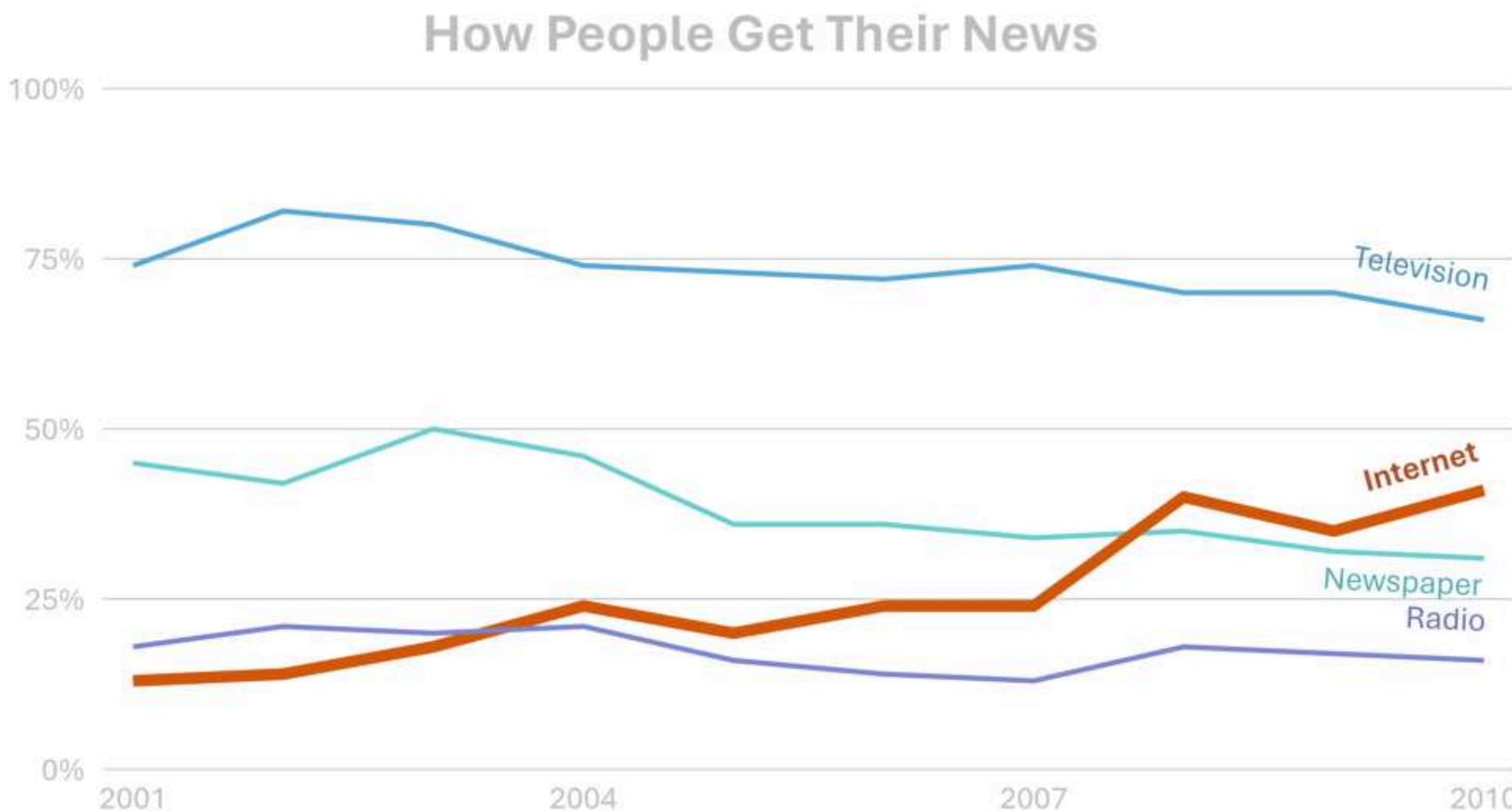

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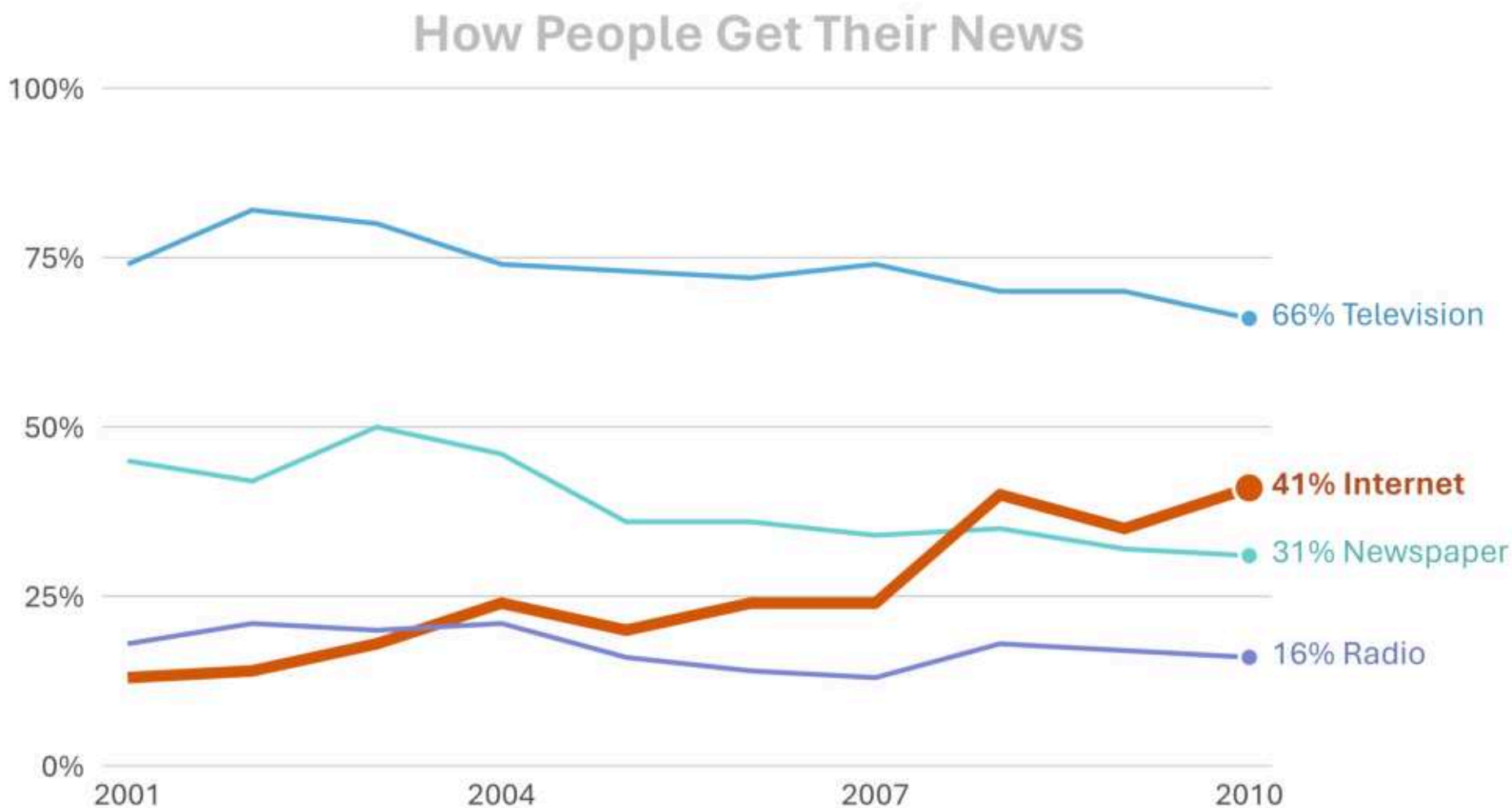

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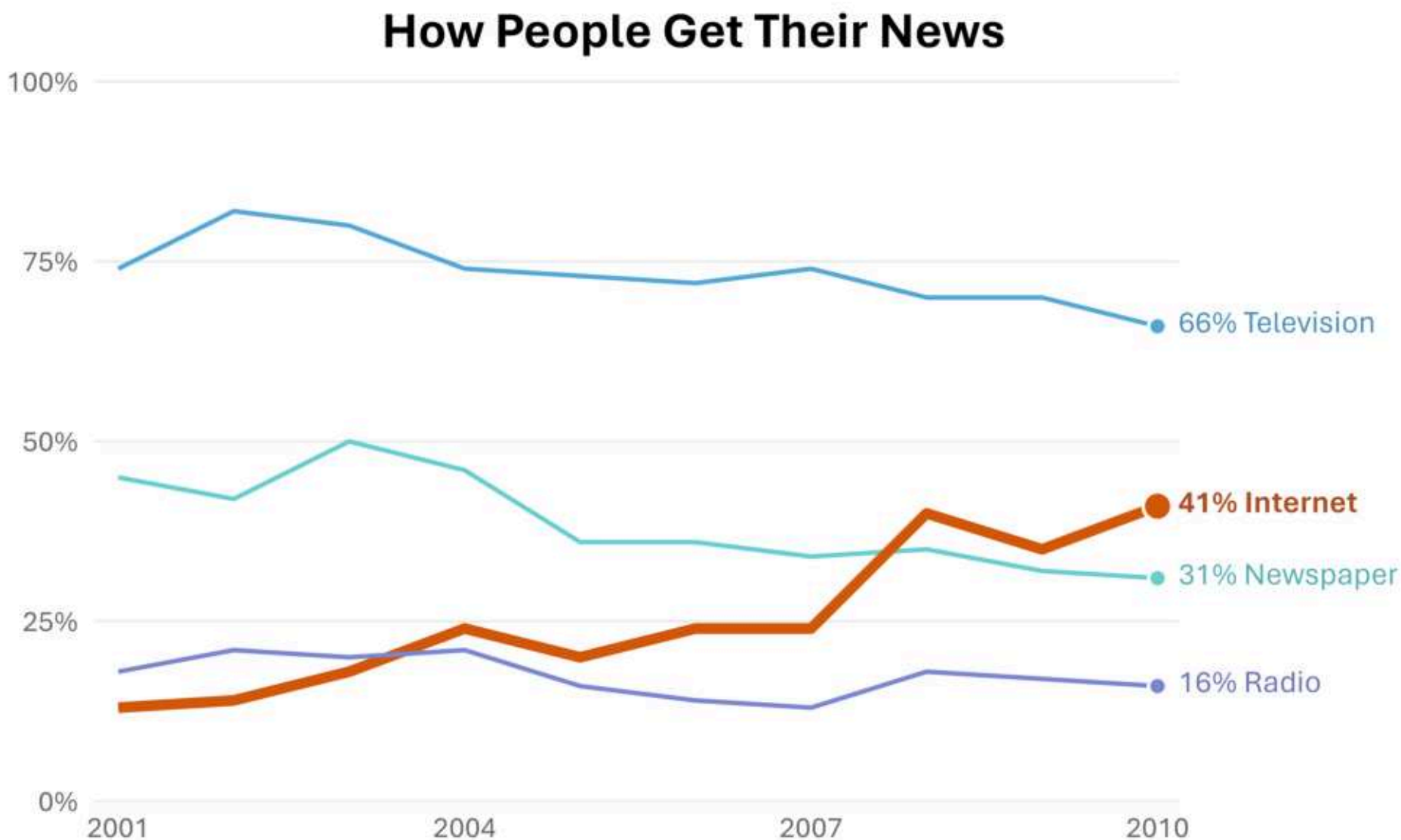

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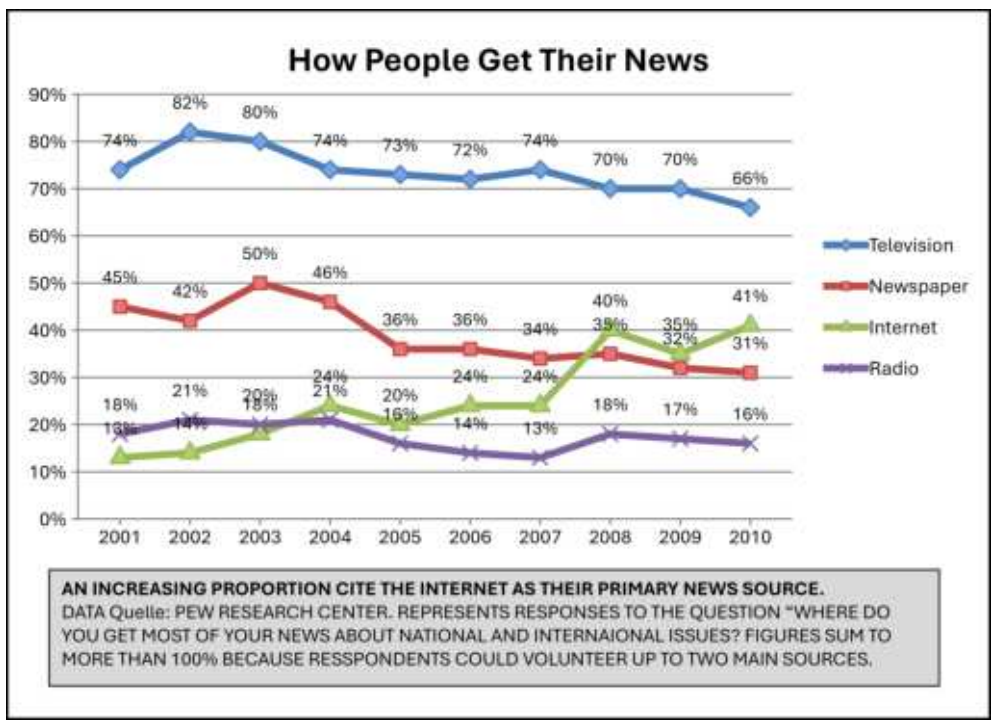
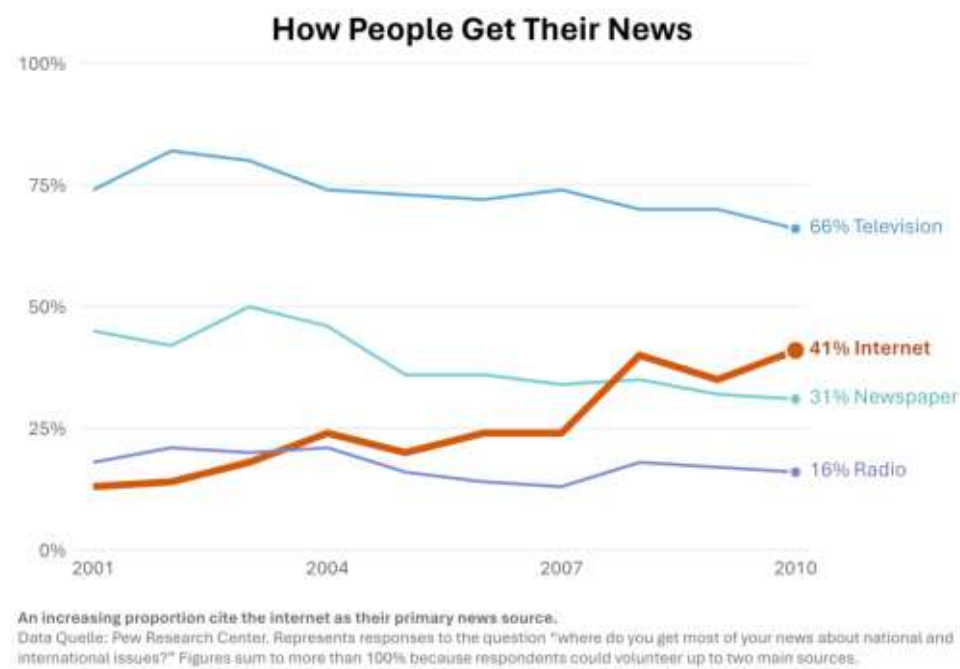
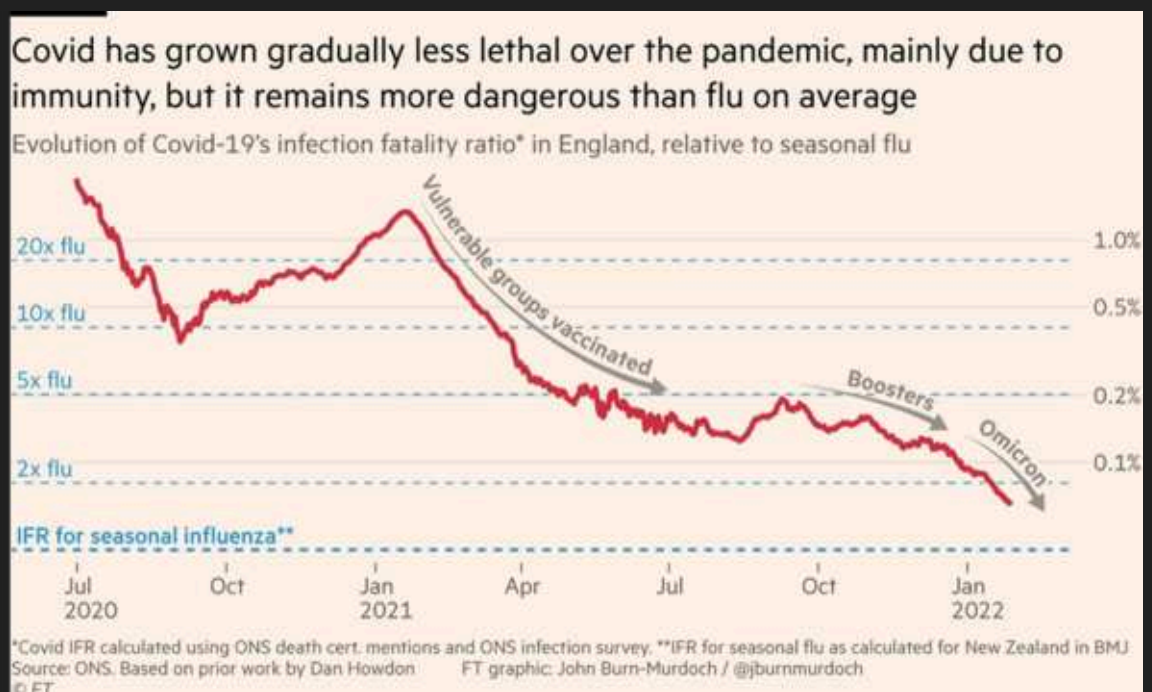




„The key thing we do is to **add a title to the chart**, as an entry point and to explain what is going on. **Text and other annotations add enormous value for non-chart people.**"

John Burn-Murdoch, Financial Times

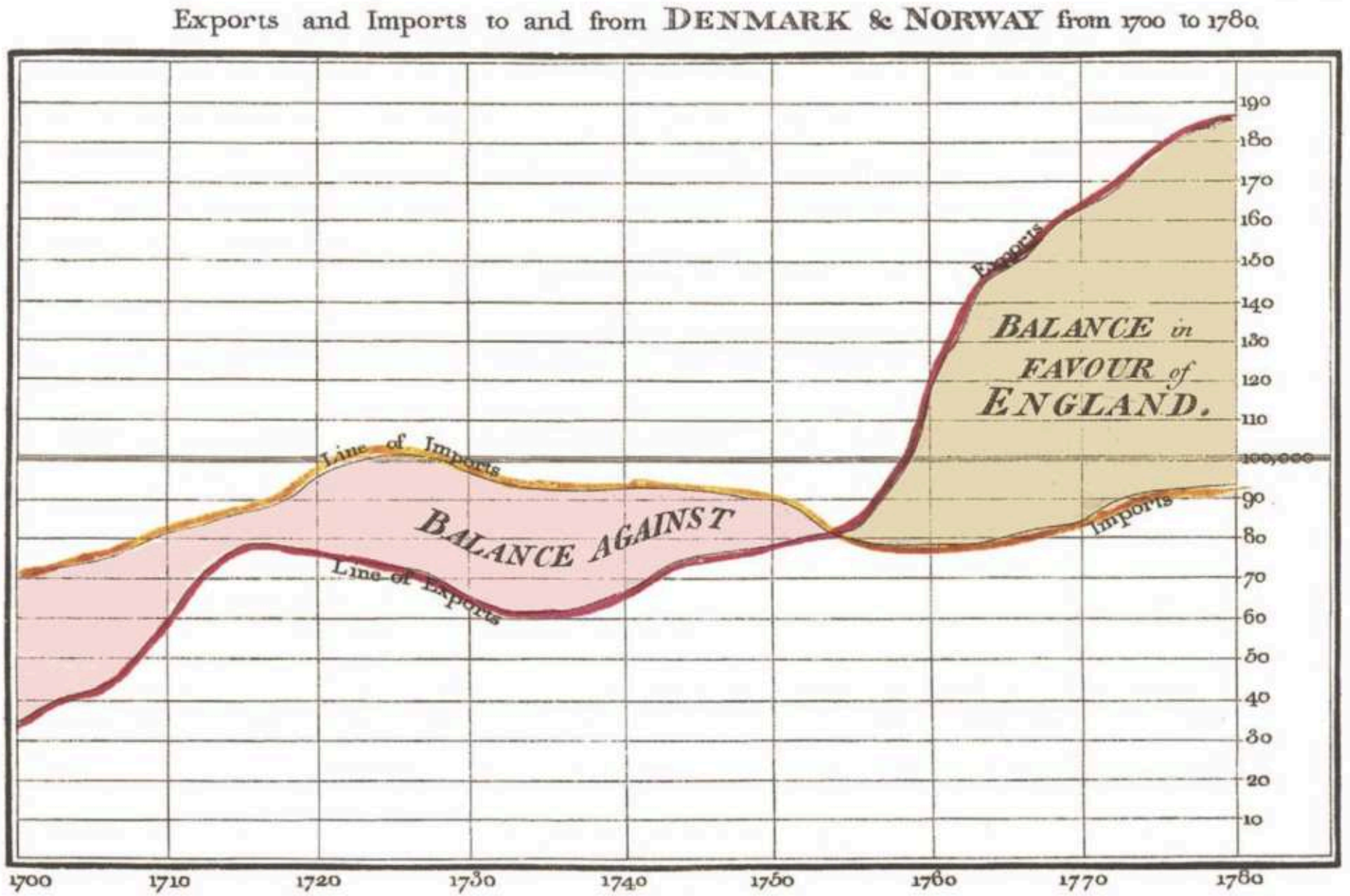


Quelle: Financial Times

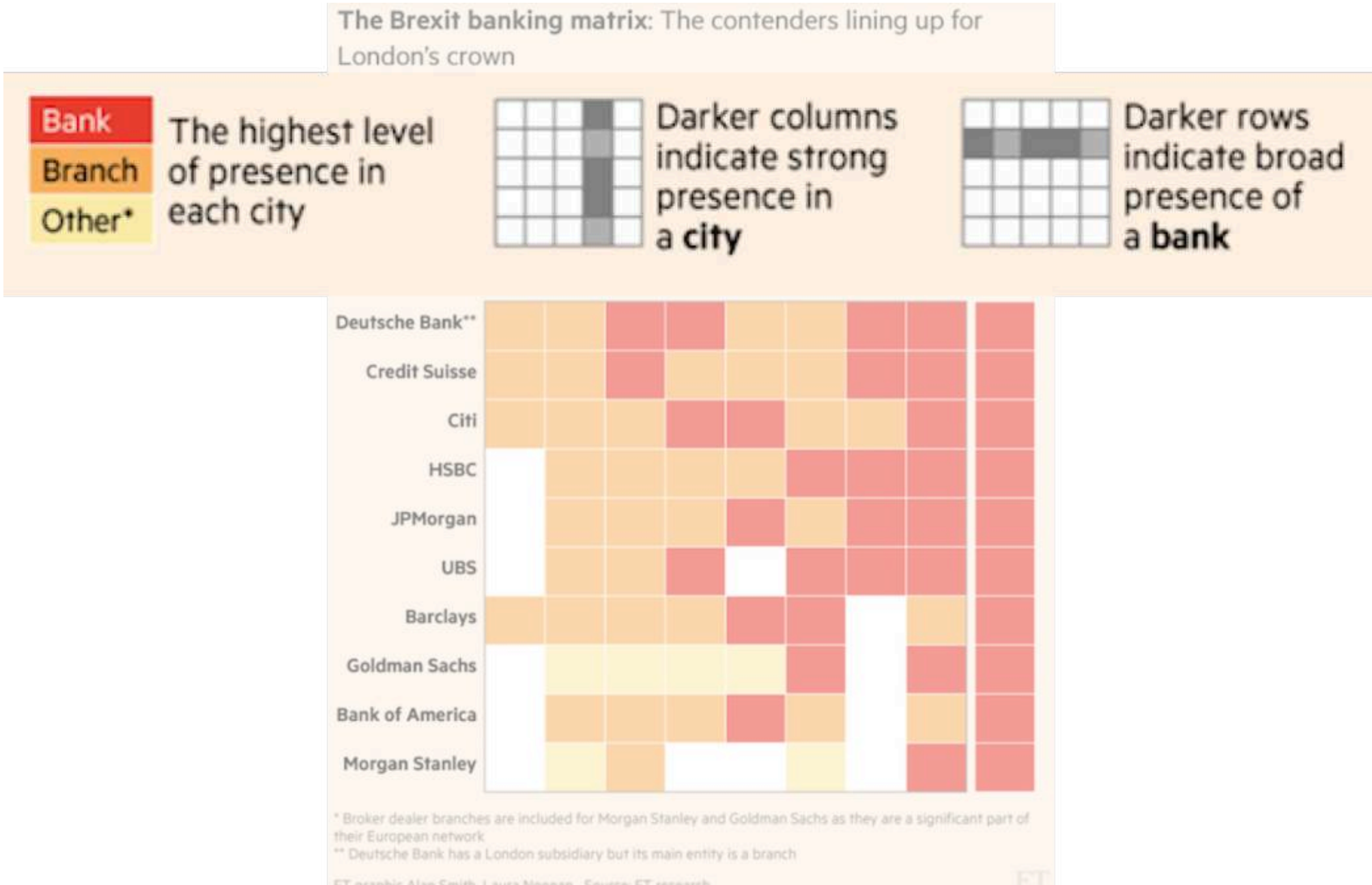
Peak Break-Up Times

According to Facebook status updates

Quelle: David McCandless & Lee Byron, Information is Beautiful



Zeitreihendiagramm mit Anmerkungen von William Playfair aus „The Commercial and Political Atlas and Statistical Breviary" (1786)



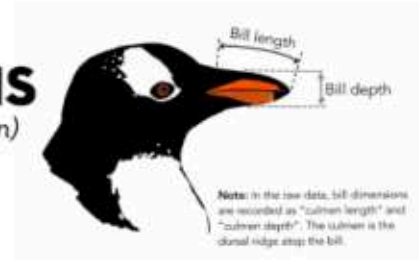
Quelle: „Frankfurt vies for UK banking jobs post-Brexit" von Alan Smith & Laura Noonan (Financial Times)

Supplementary supermarket shopping

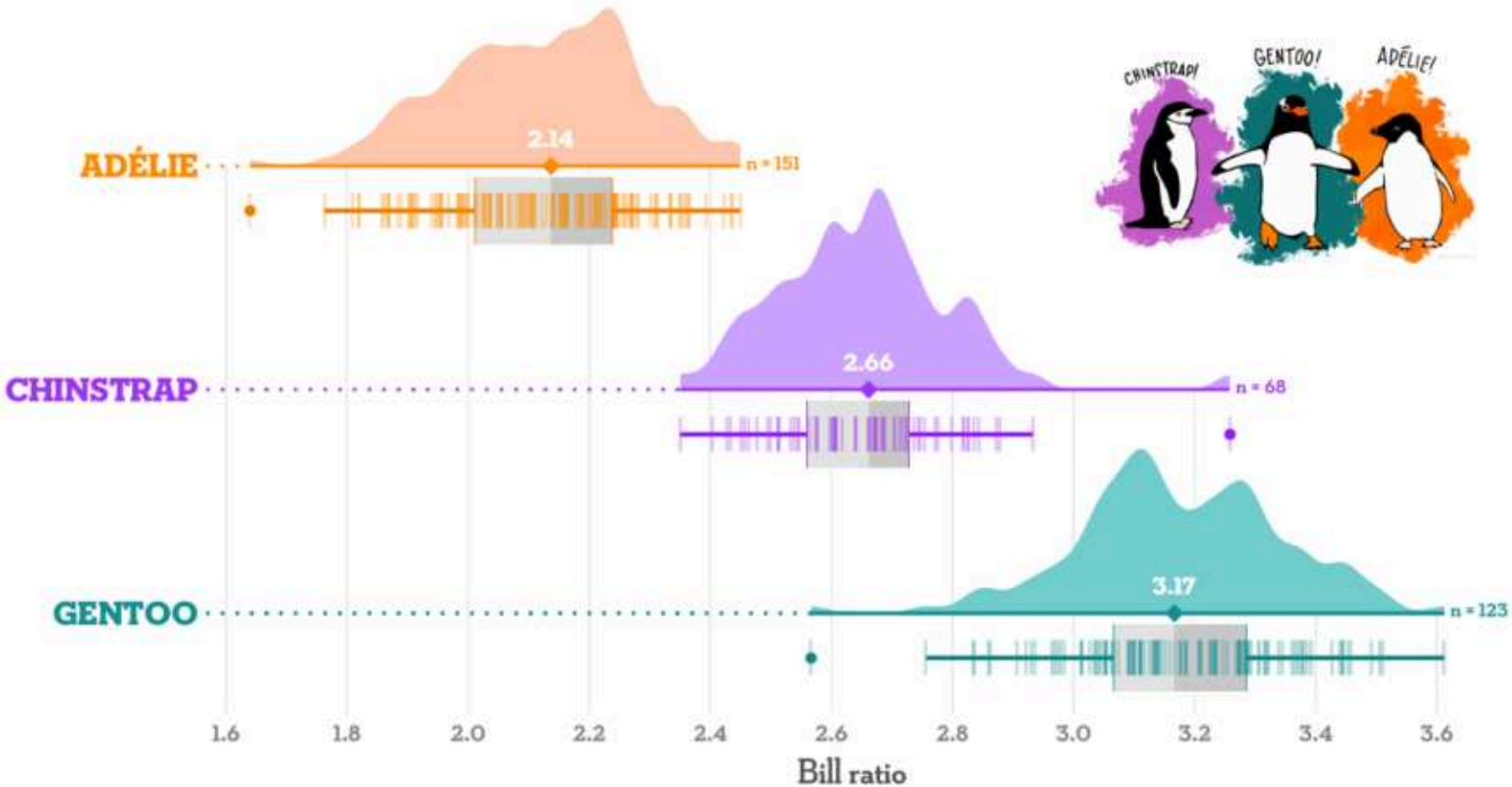
Quelle: „Tesco is the nation's primary AND secondary supermarket" von Matthew Smith (YouGov)

BILL DIMENSIONS OF BRUSH-TAILED PENGUINS

Pygoscelis adéliae (Adélie penguin) • P. antarctica (Chinstrap penguin) • P. papua (Gentoo penguin)

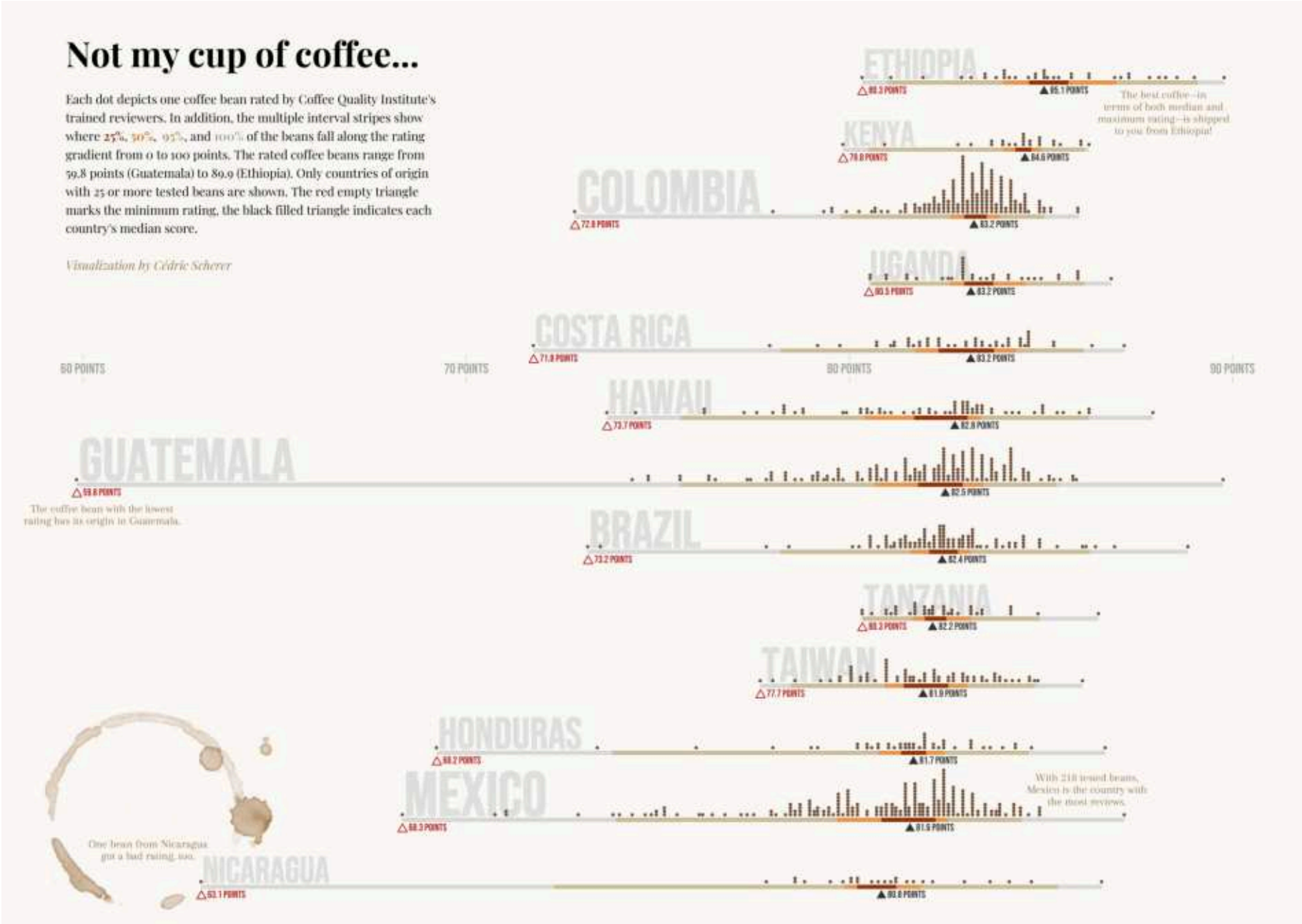


Distribution of the bill ratio, estimated as bill length divided by bill depth



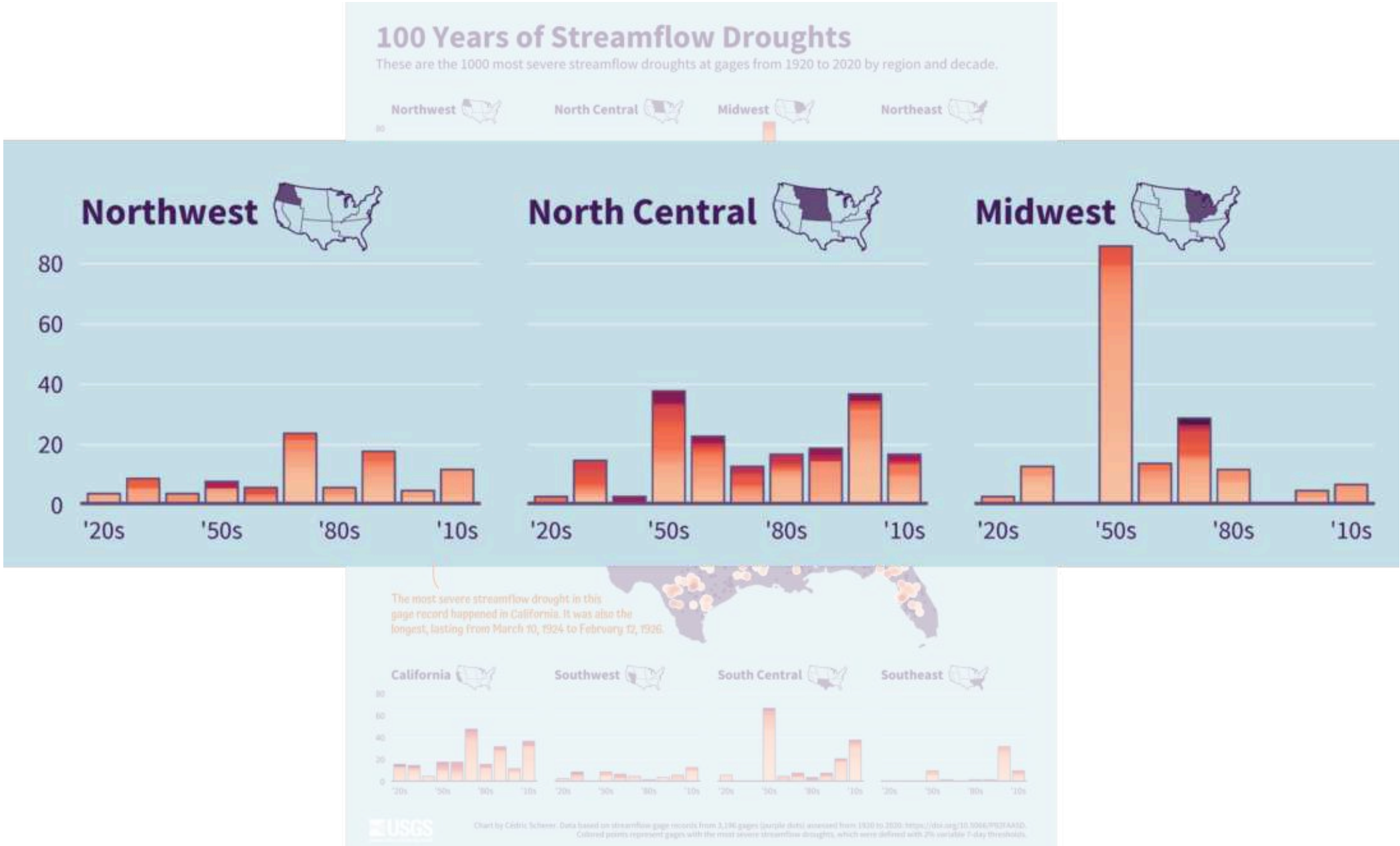
Note: In the original data, bill dimensions are recorded as "culmen length" and "culmen depth". The culmen is the dorsal (upper) ridge of a bird's bill.
Visualization: Cédric Scherer • Data: Gorman, Williams & Fraser (2014) DOI: 10.1371/journal.pone.0090081 • Illustrations: Allison Horst

Modified #TidyTuesday Contribution | Images: Allison Horst

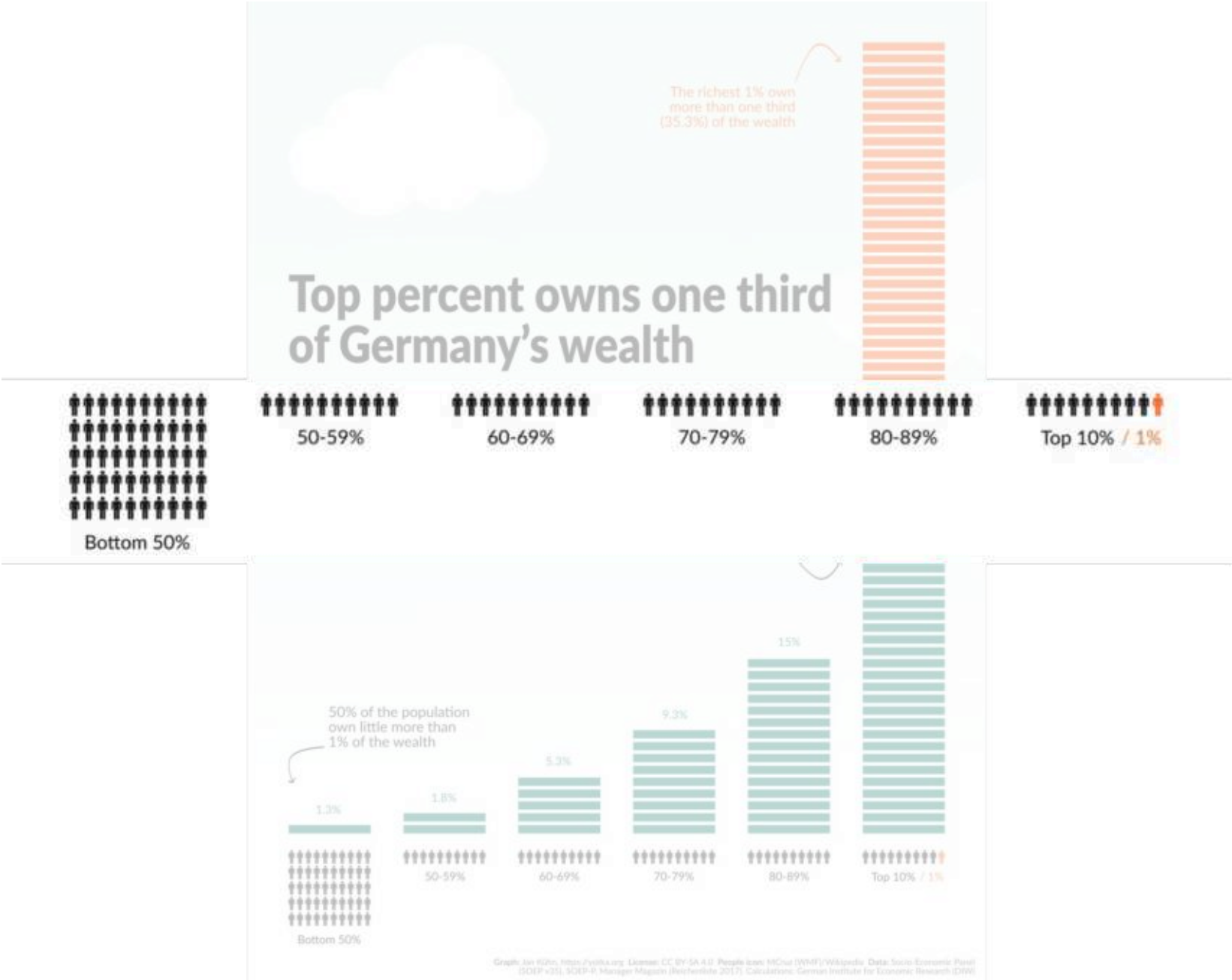


„Not my Cup of Coffee" (#TidyTuesday Contribution)

Cédric Scherer Data Visualization & Information Design



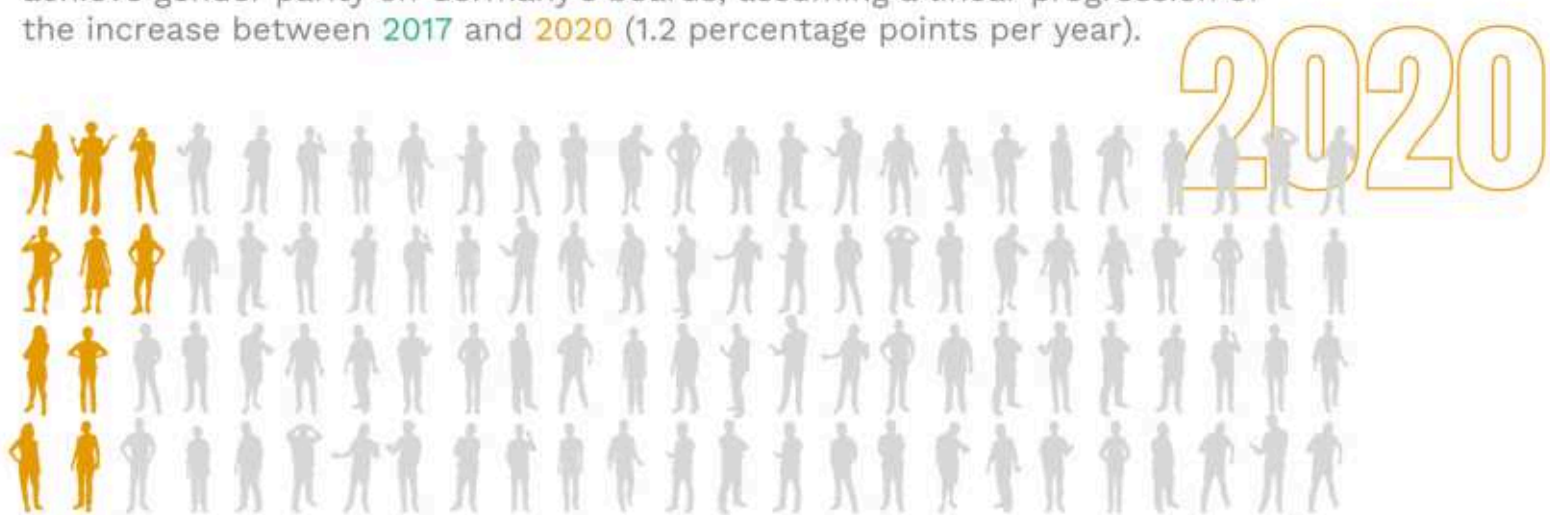
„100 Years of Streamflow Drought", in collaboration with USGS



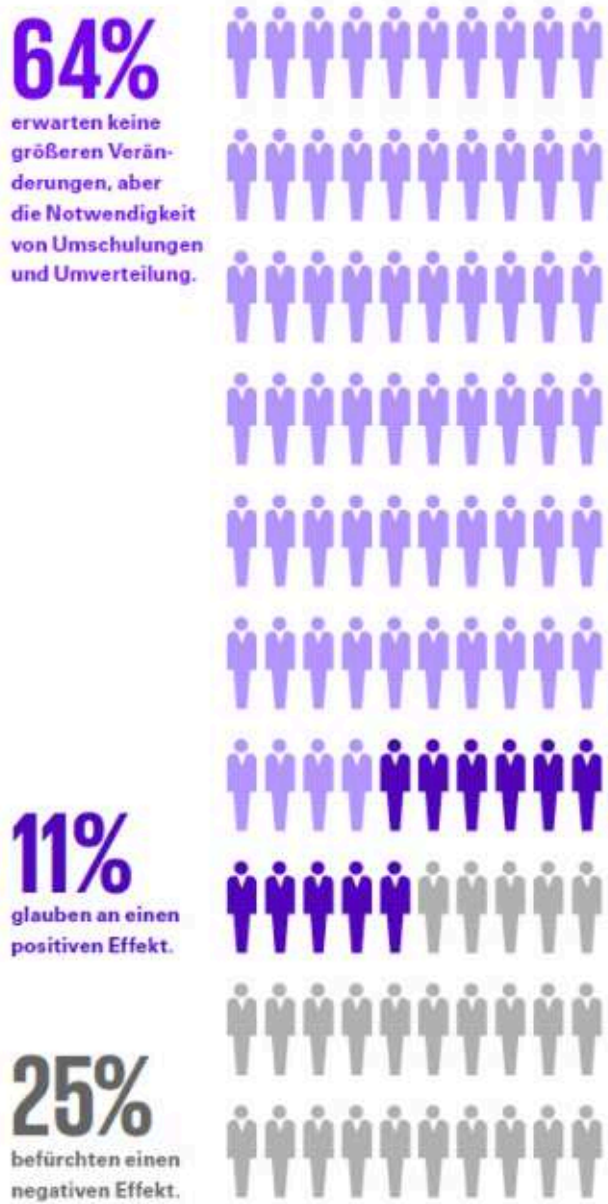
Quelle: Jan Kühn

The proportion of female chairs in board or CEOs in German companies remains vanishingly low

If the growth continues at the same pace, it will take more than 30 years to achieve gender parity on Germany's boards, assuming a linear progression of the increase between 2017 and 2020 (1.2 percentage points per year).

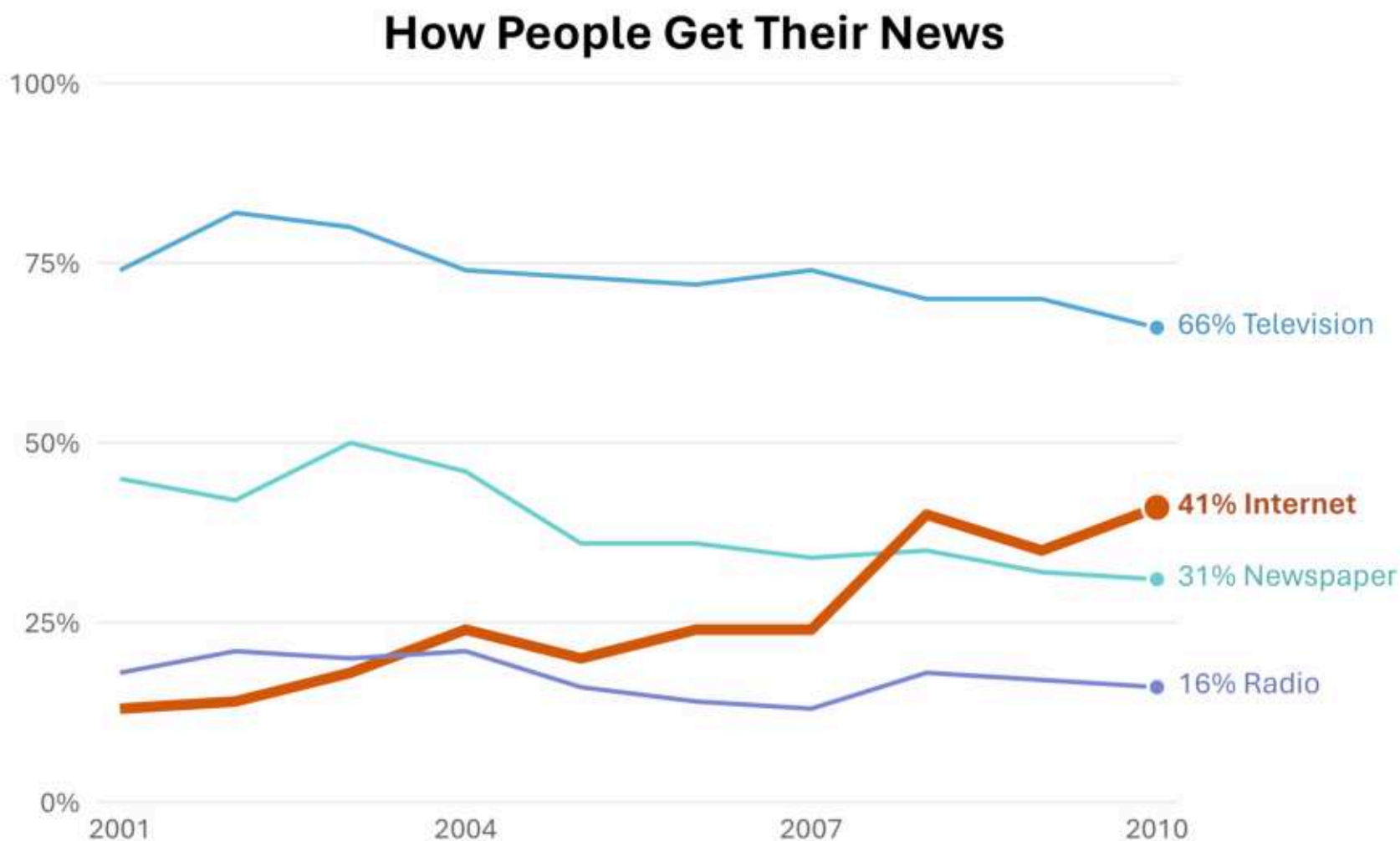


Visualization: Cédric Scherer | Data Source: BCG Gender Diversity Index 2017 and 2020 | Sillhouttes: Wee People by ProPublica
#30DayChartChallenge 2021 | Day 2: Pictogram



KPMG-Bericht „Generative KI in der deutschen Wirtschaft 2025"

{data-menu-title="Decluttering"}



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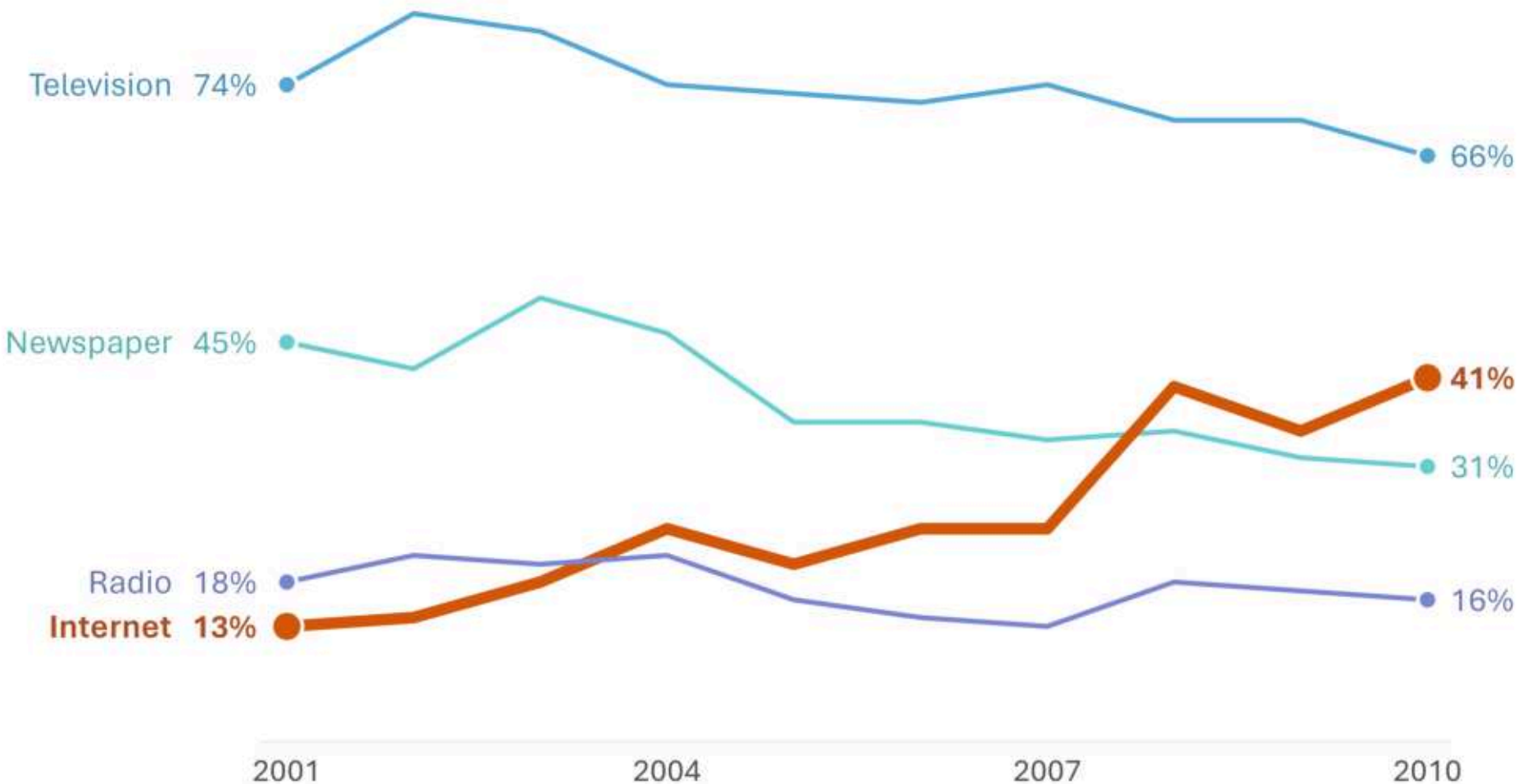

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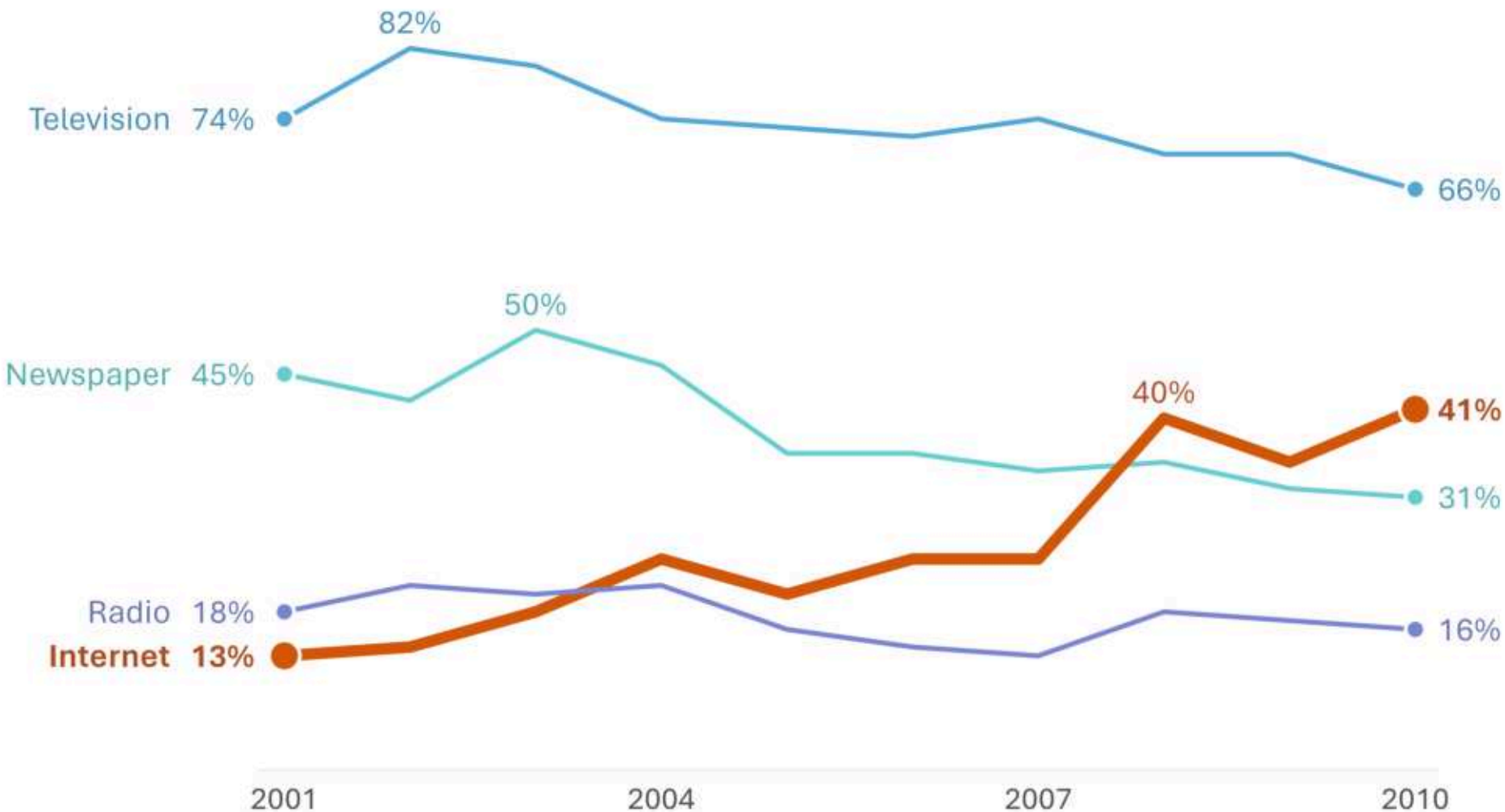

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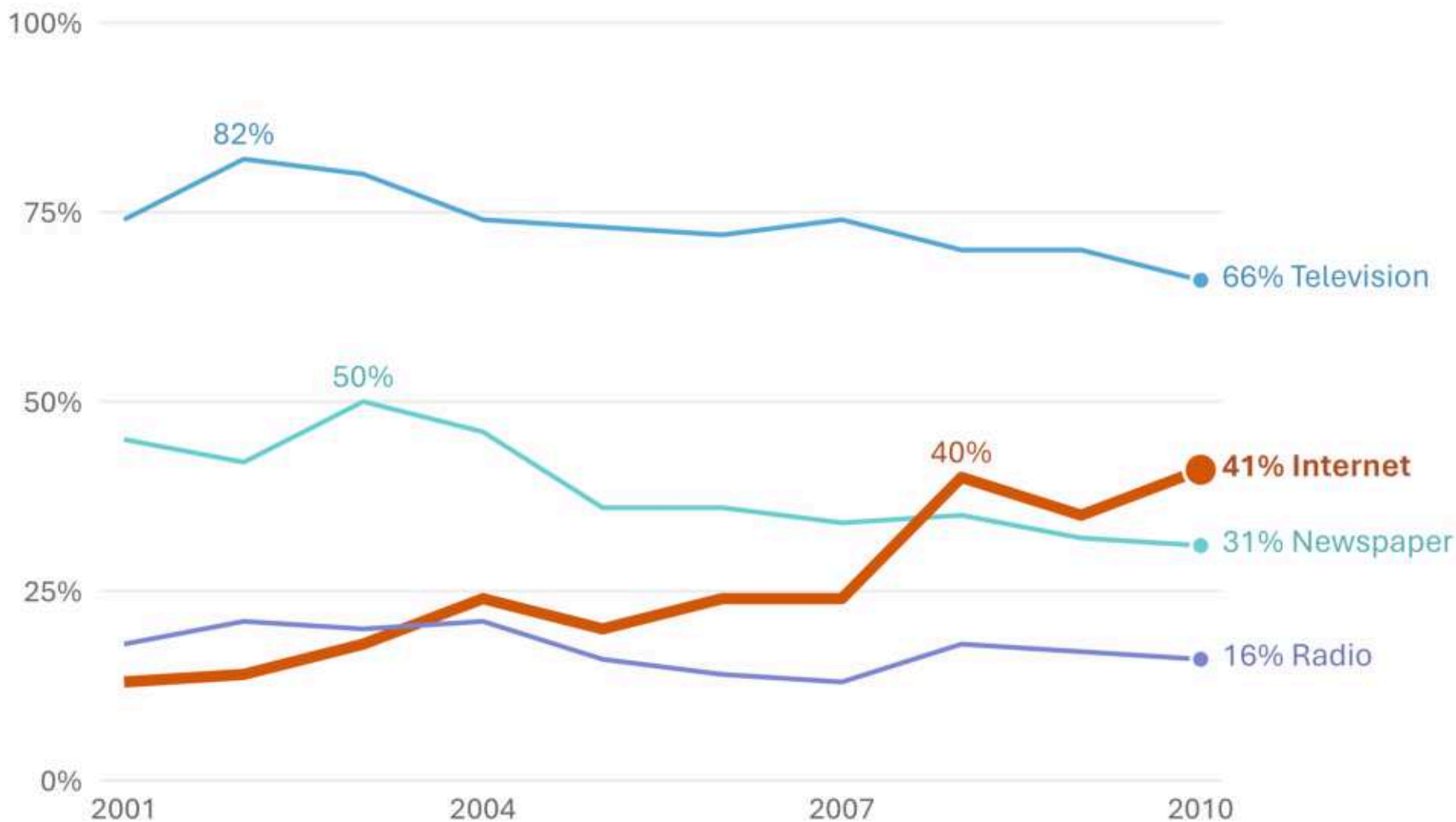

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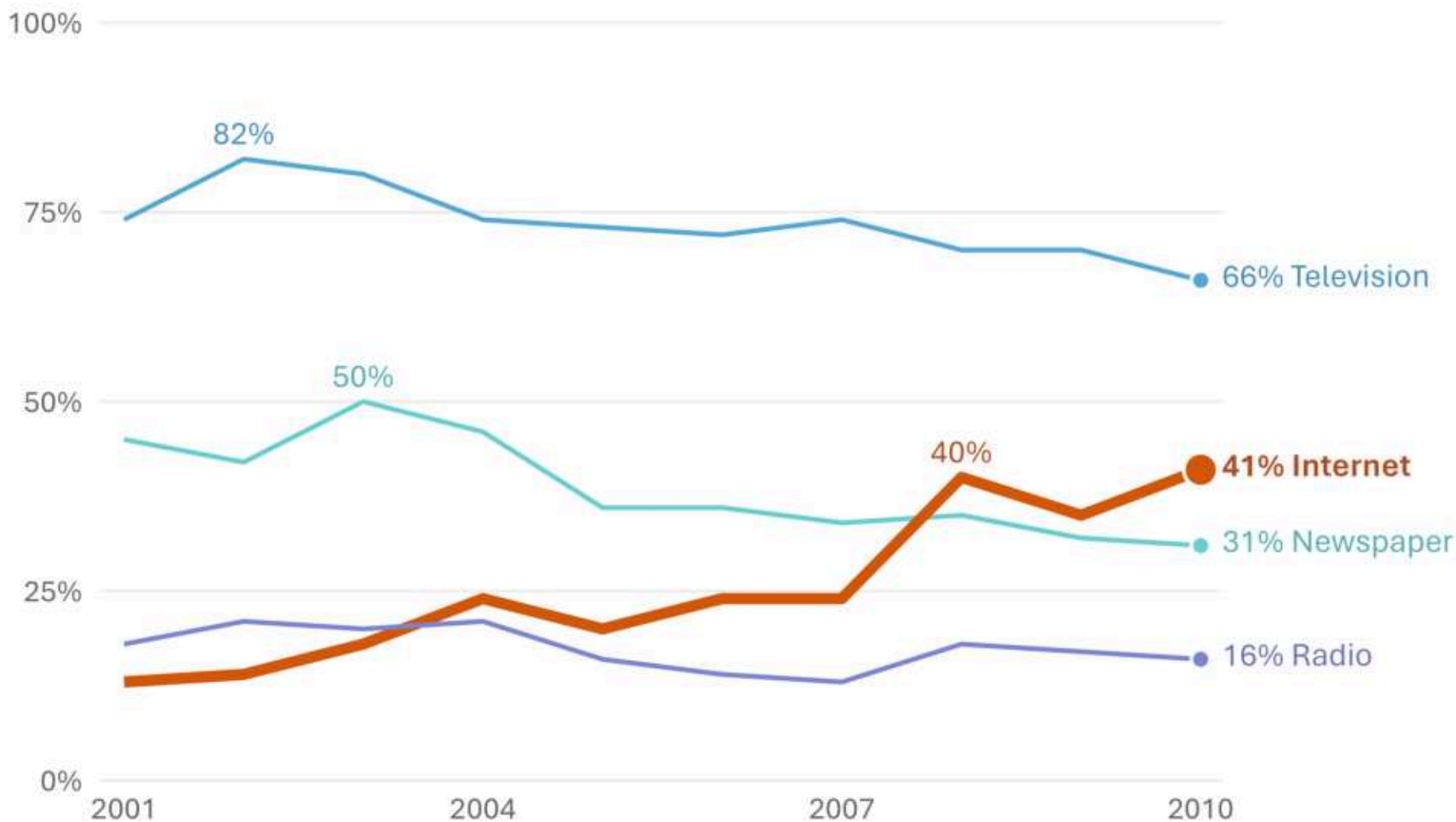

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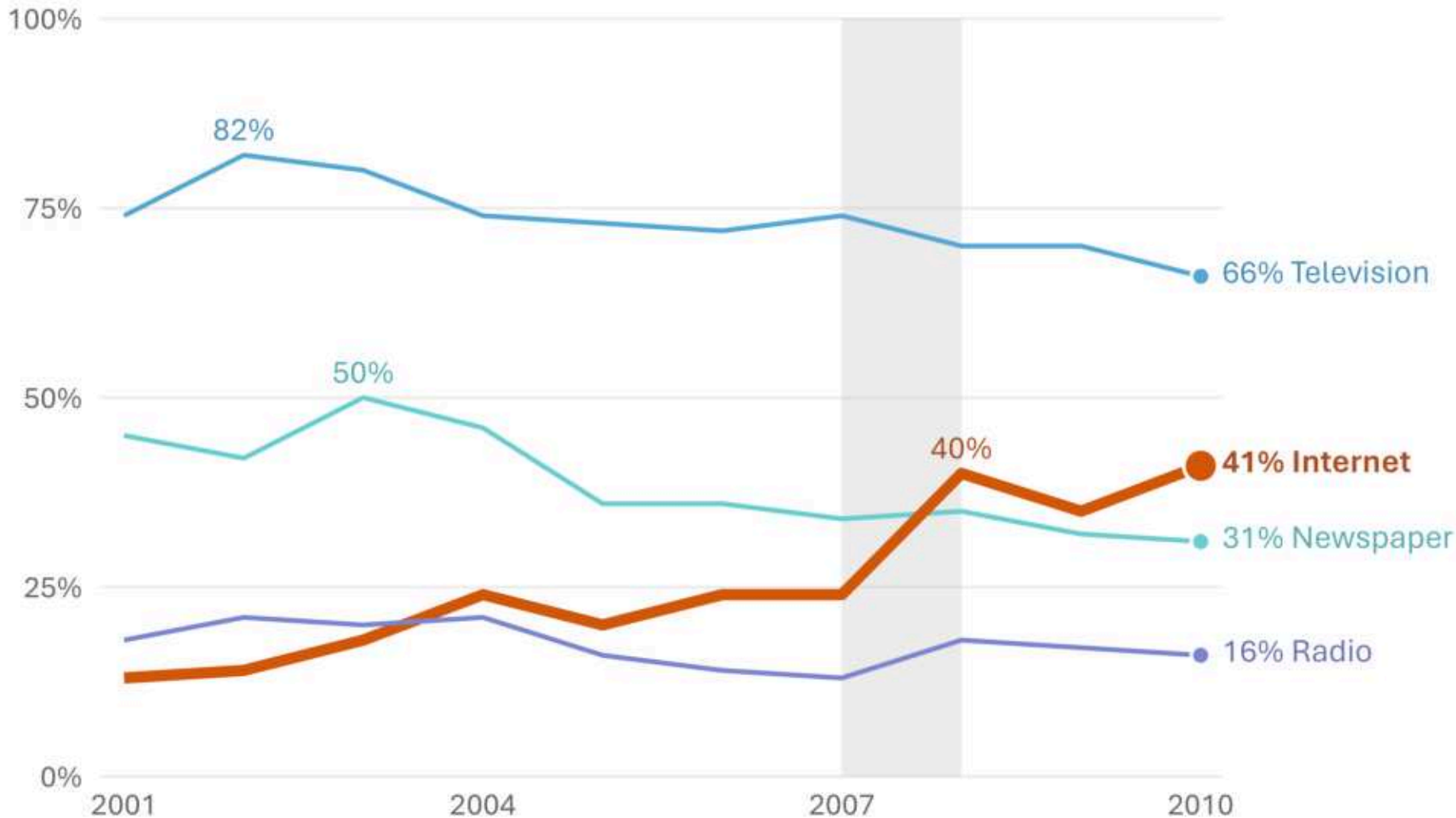

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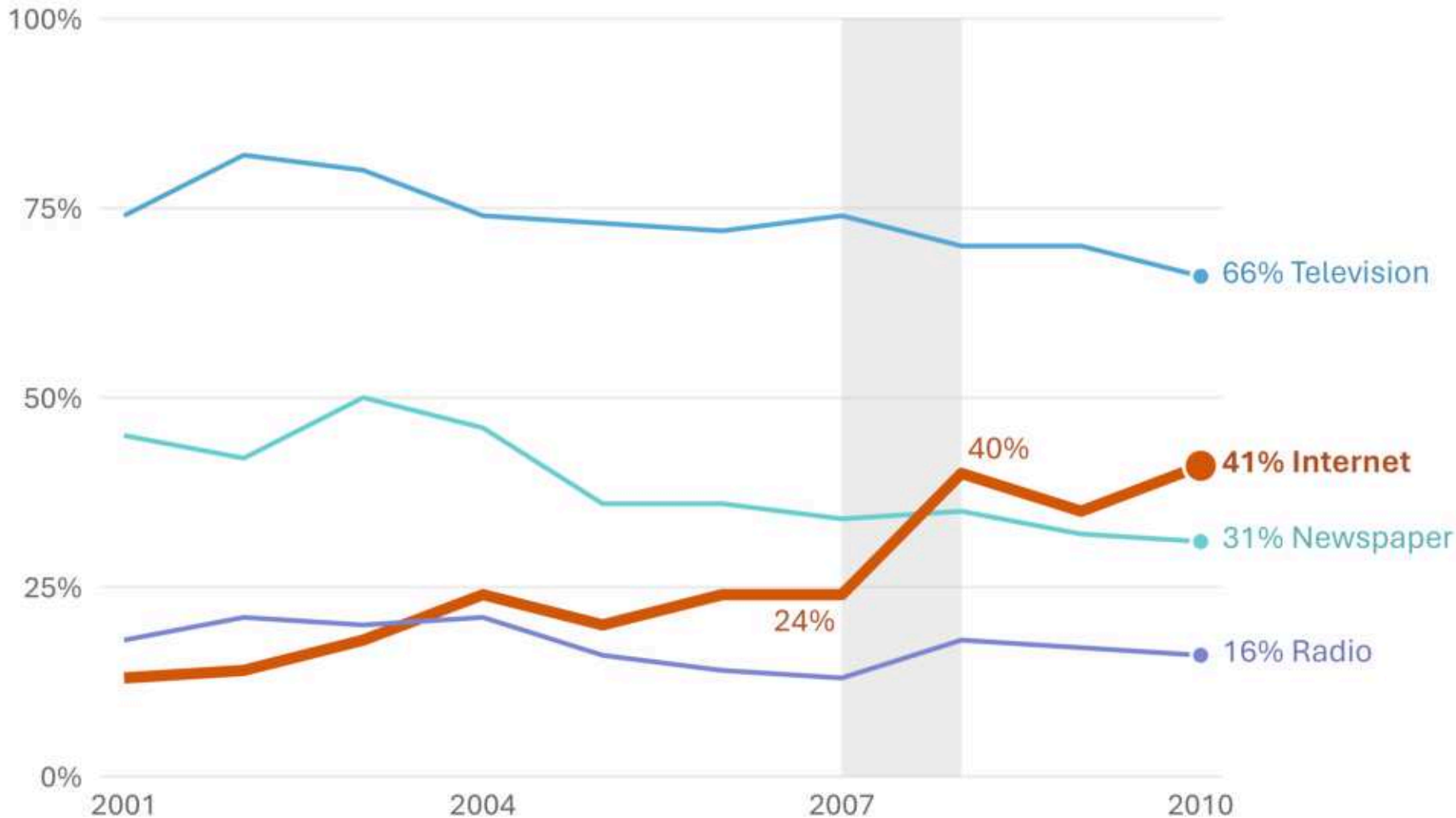

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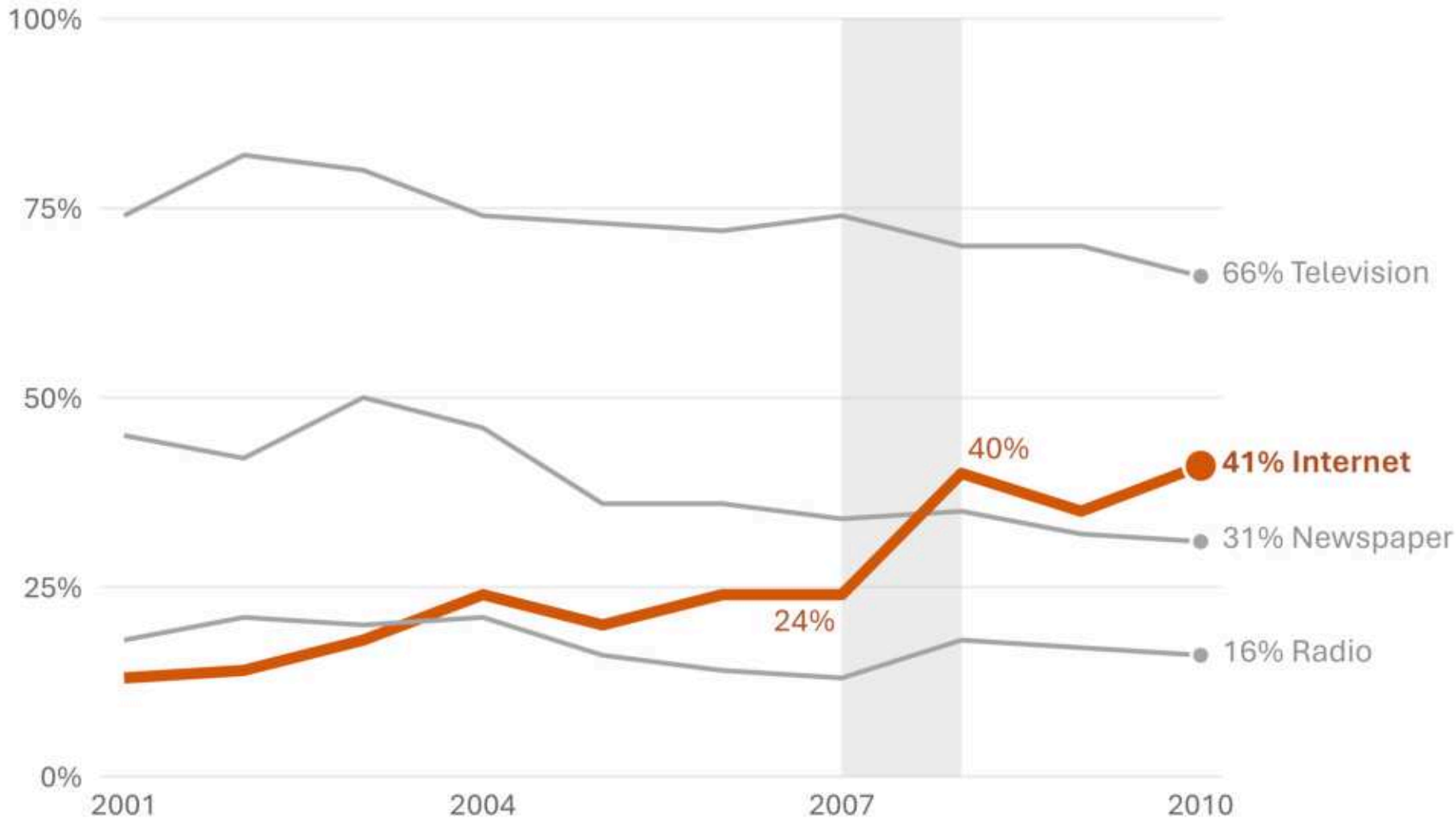

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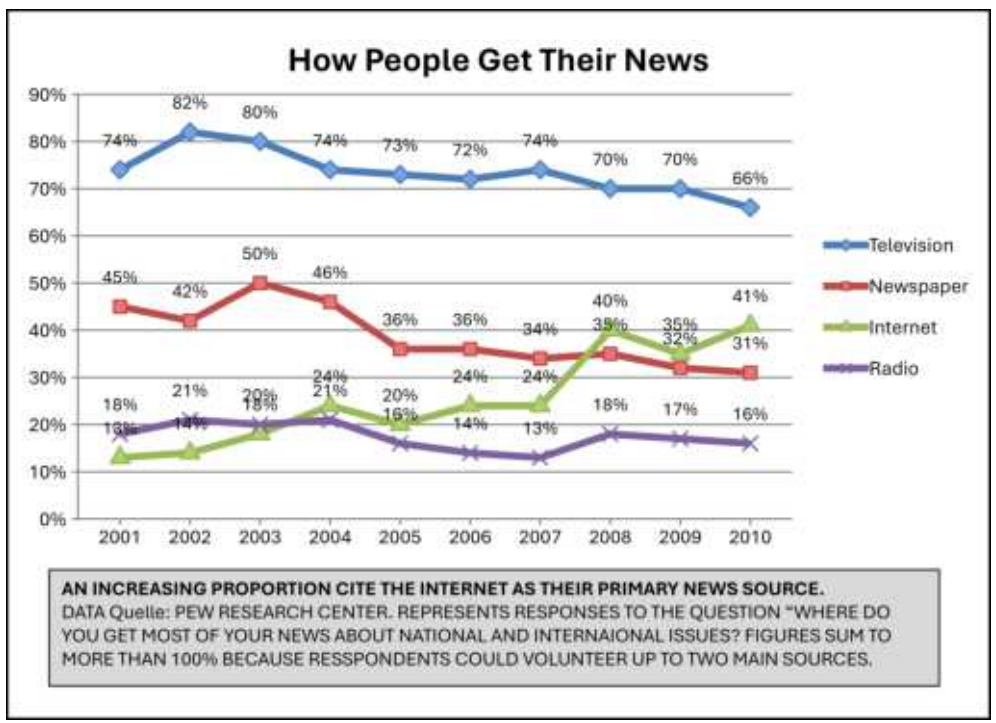

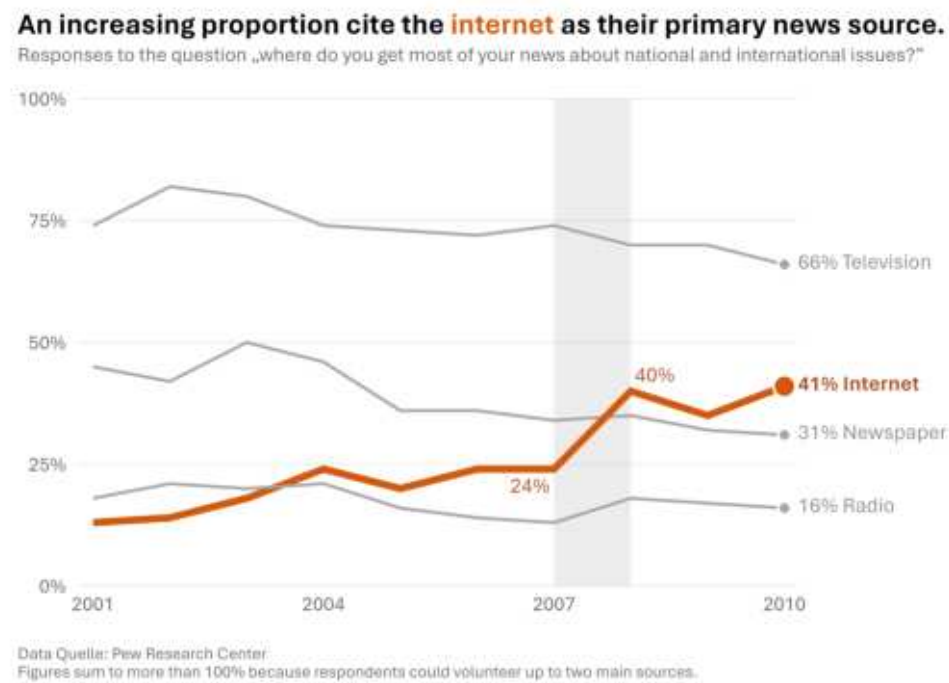

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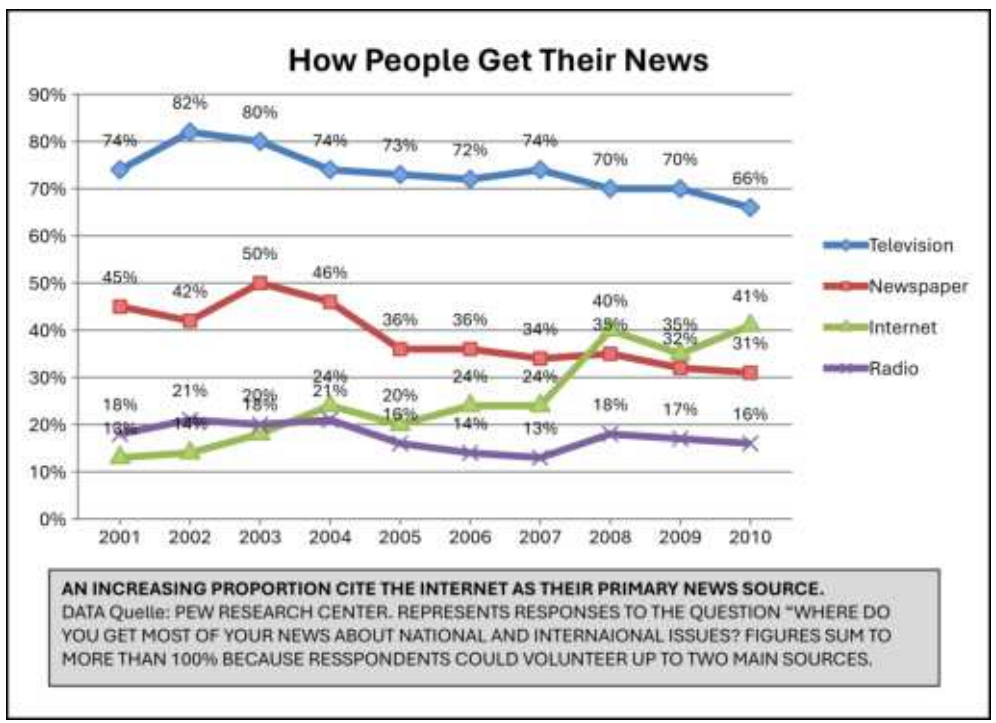
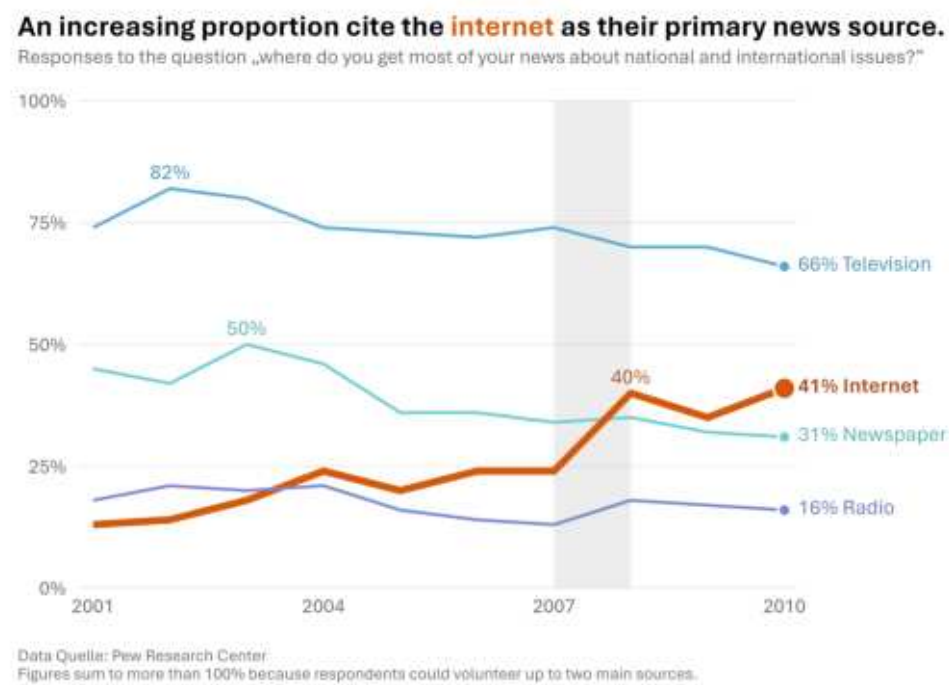


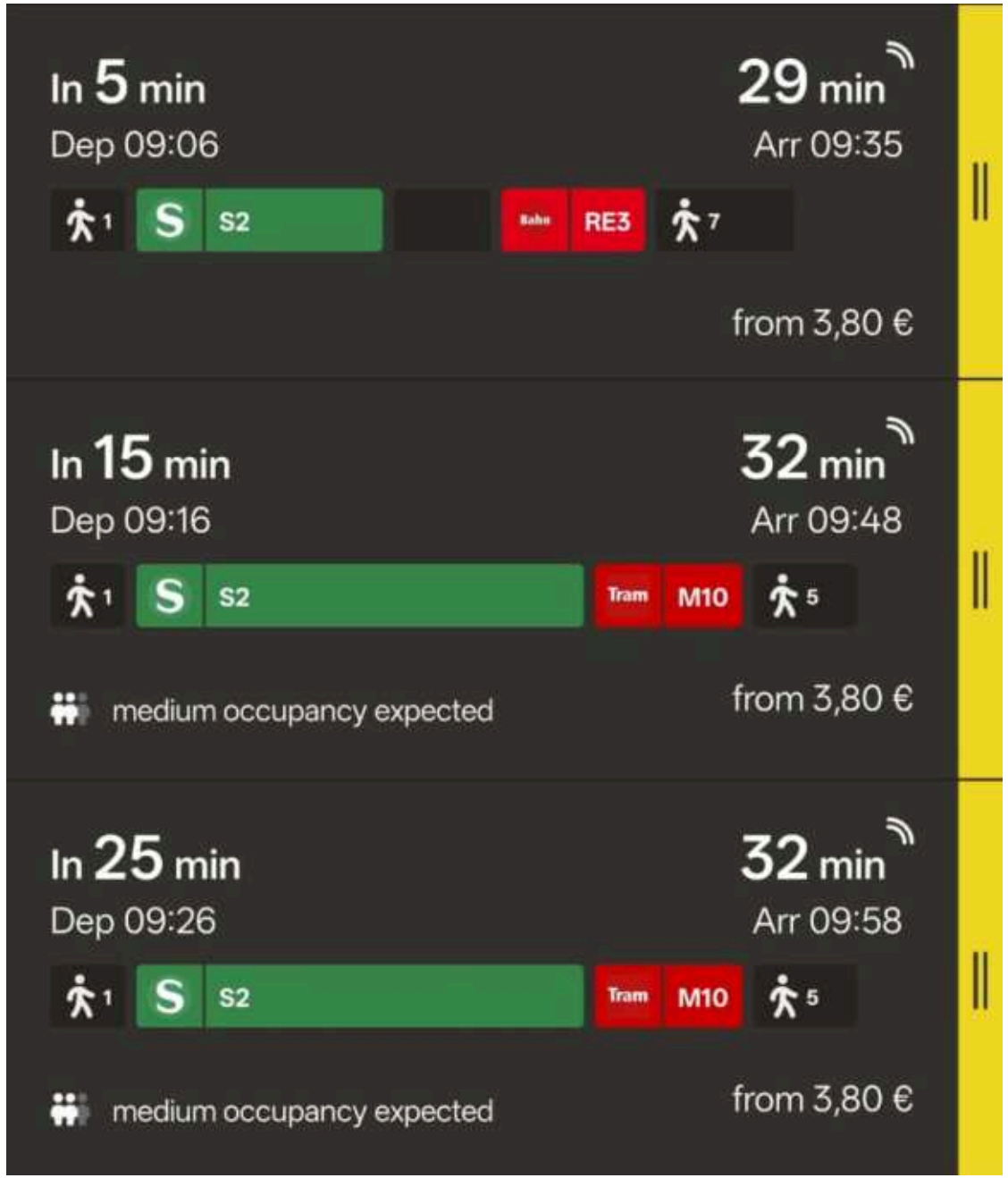


Farbwahl

(once again)

Konsistente Farbwahl

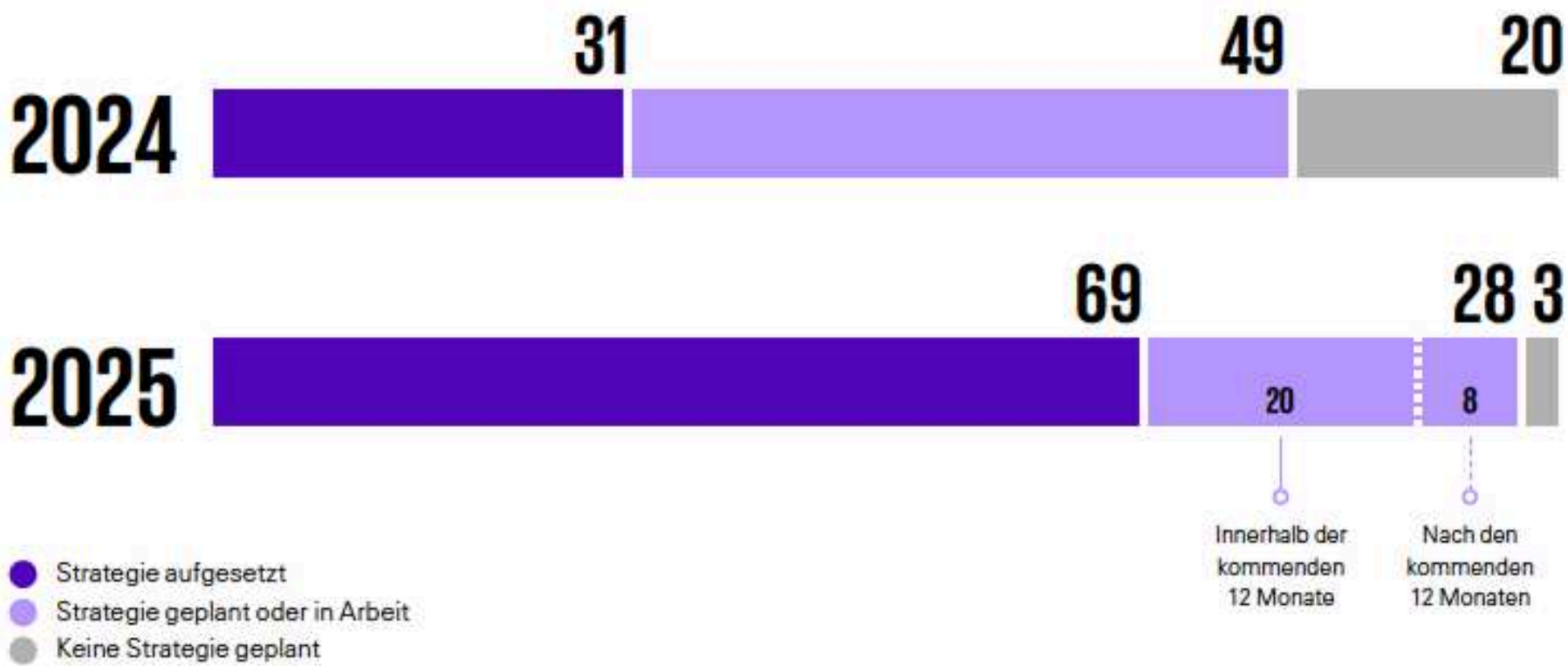
Quelle: Lisa Charlotte Muth, DataWrapper Blog



BVG Fahrinfo

Abbildung 1: Verteilung der Antworten auf die Frage, ob im Unternehmen bereits eine Strategie für generative KI aufgesetzt worden ist

Angaben in Prozent



Quelle: KPMG in Deutschland, 2025

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KPMG-Bericht „Generative KI in der deutschen Wirtschaft 2025"

Cédric Scherer Data Visualization & Information Design

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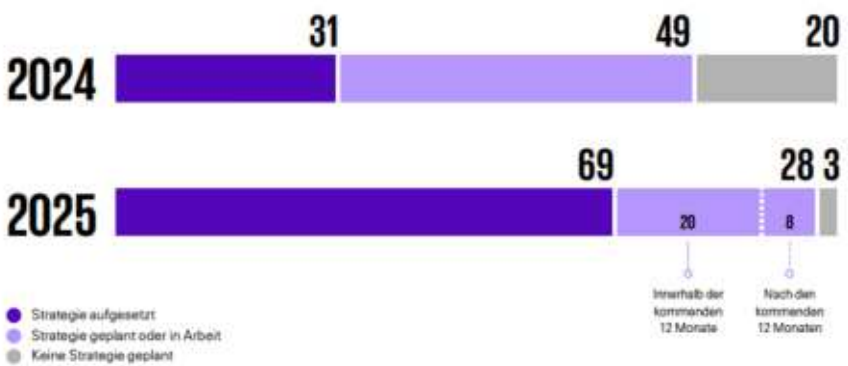
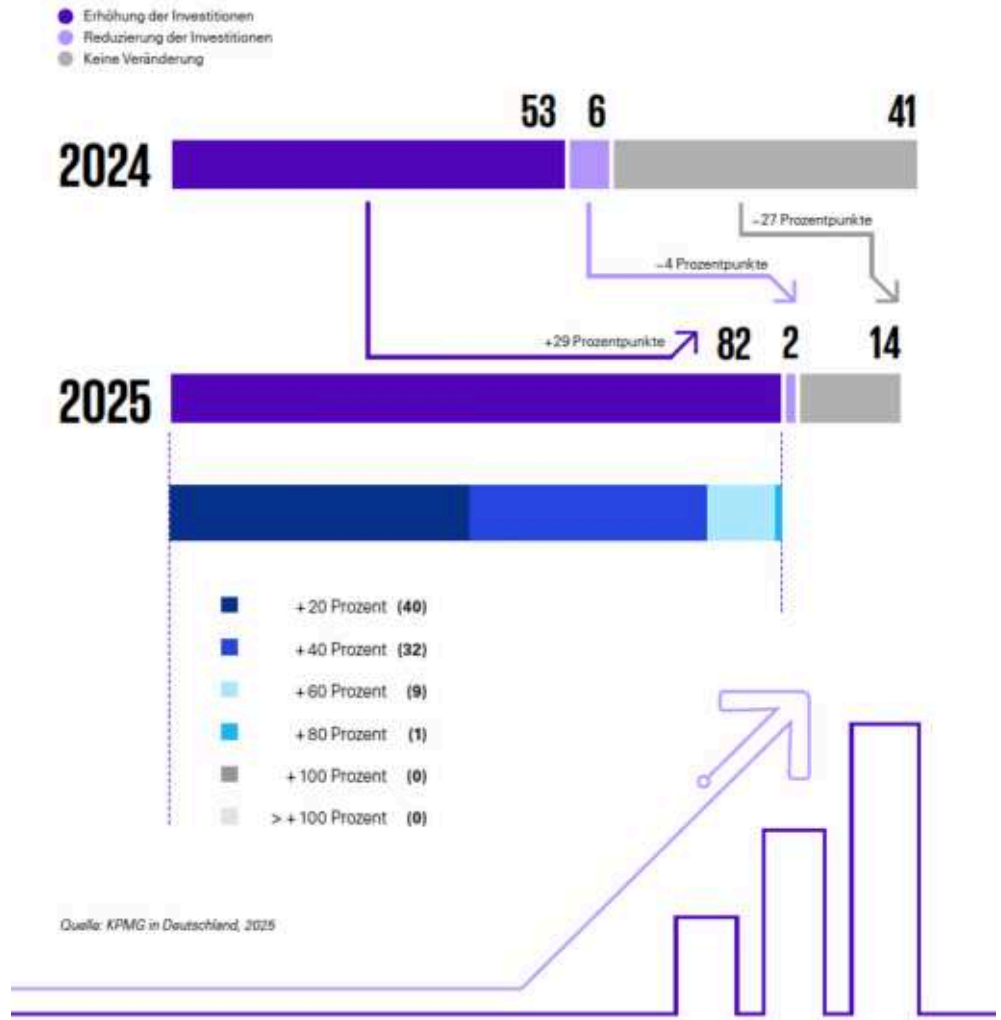


Quelle: KPMG in Deutschland, 2025

Generative KI in der deutschen Wirtschaft 2025 7

Abbildung 2: Verteilung der Antworten auf die Frage, wie sich die Investitionen in generative KI in den kommenden zwölf Monaten im Vergleich zum Istwert verändern werden

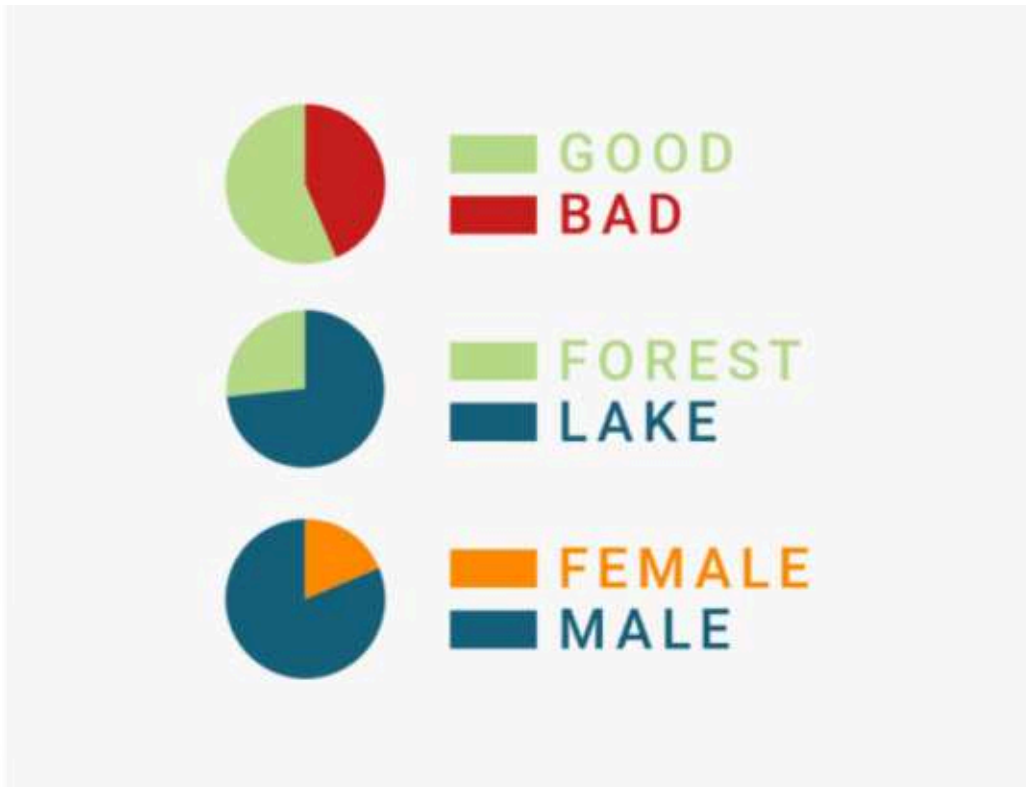
Angaben in Prozent. Aufgrund von Rundungsdifferenzen können die Werte geringfügig von 100 Prozent abweichen.



Quelle: KPMG in Deutschland, 2025

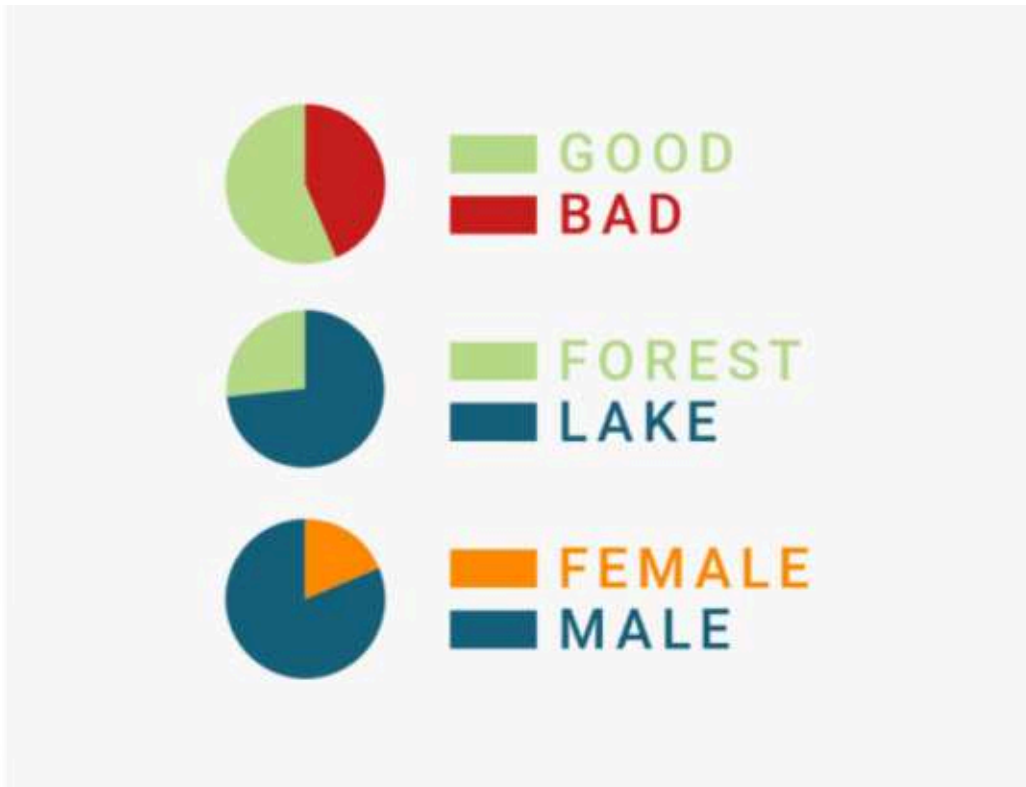
KPMG-Bericht „Generative KI in der deutschen Wirtschaft 2025"

Intuitive Farben (?)

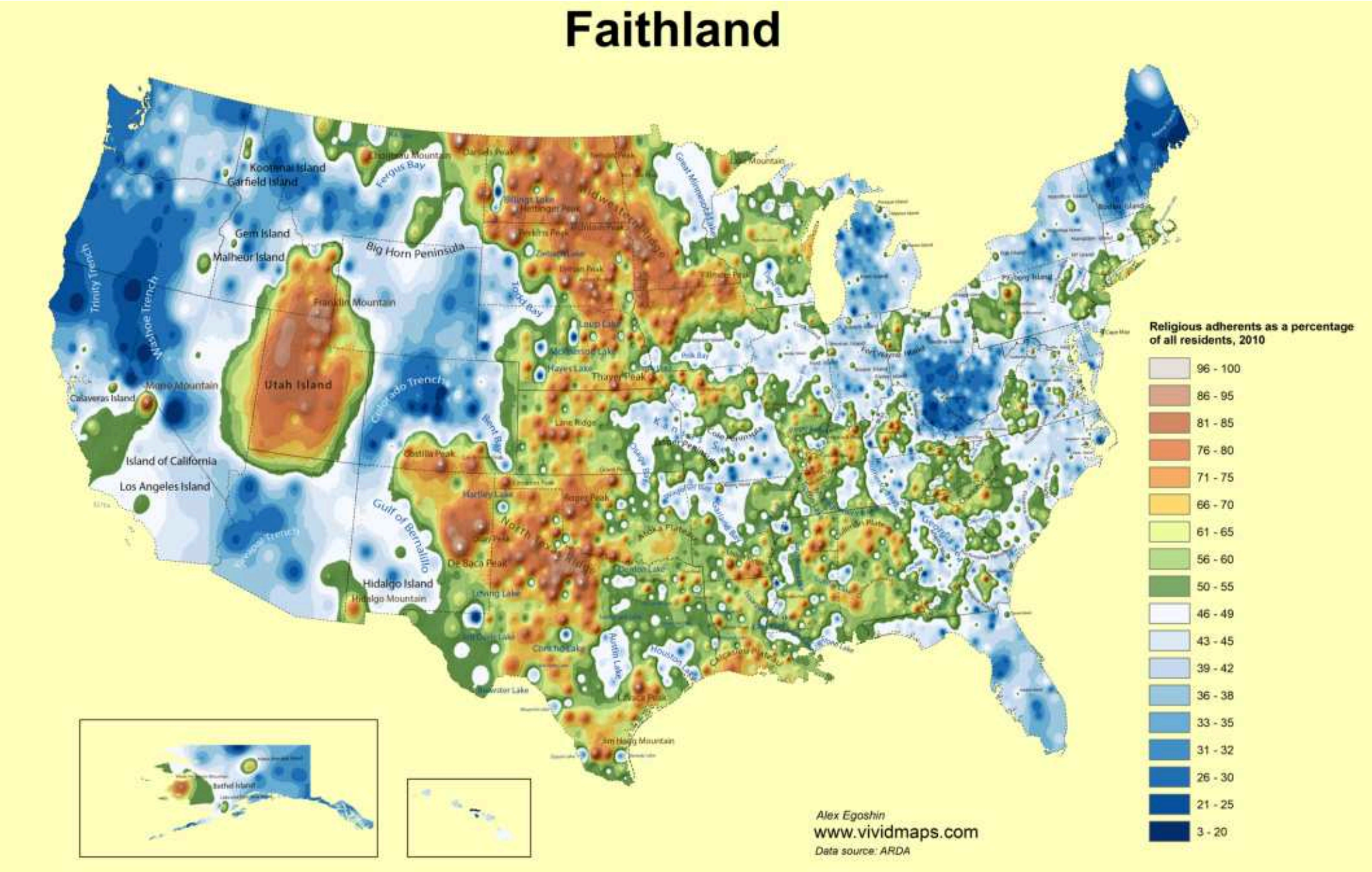


Quelle: Lisa Charlotte Muth, DataWrapper Blog

Intuitive Farben (?)

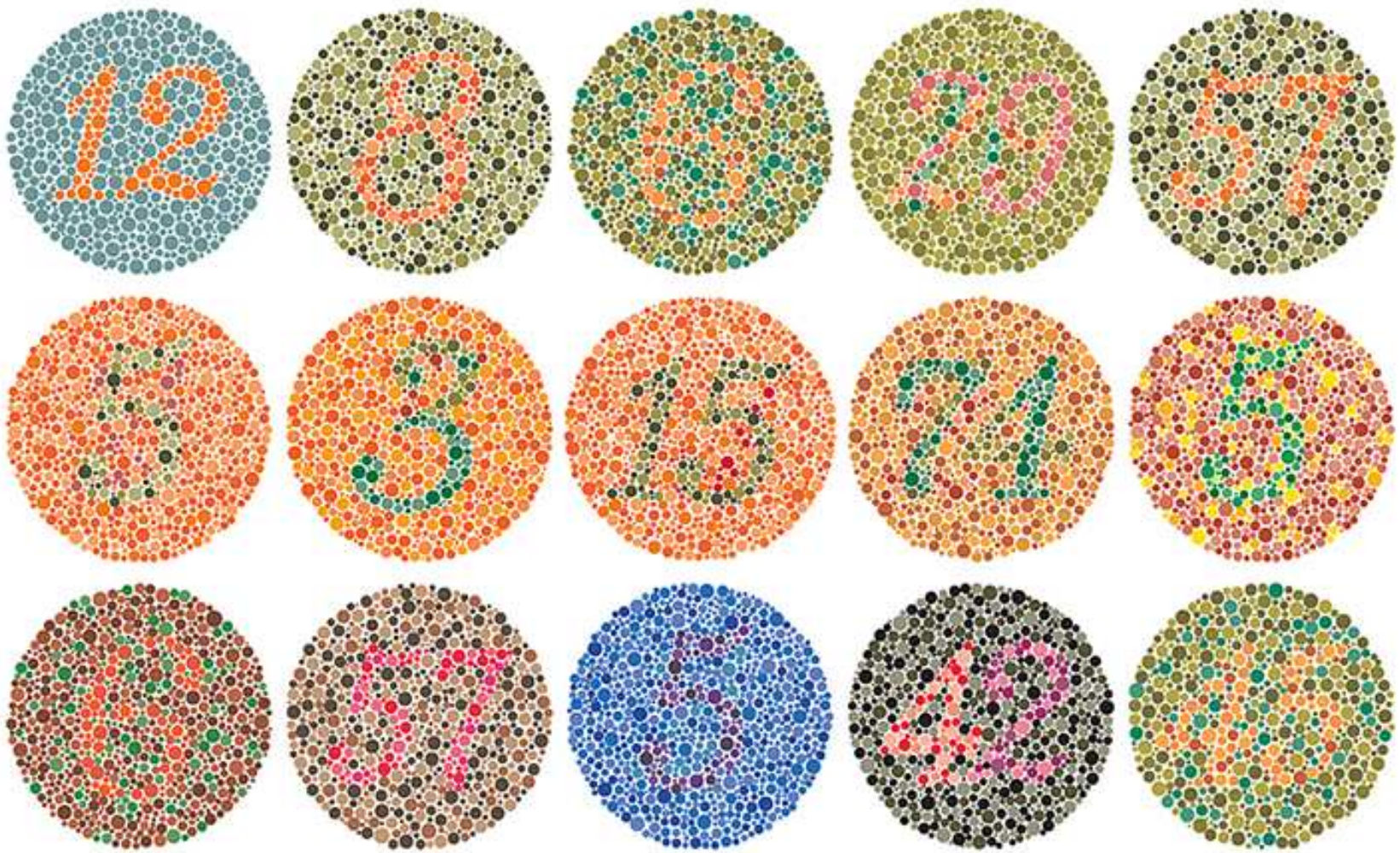


Quelle: Lisa Charlotte Muth, DataWrapper Blog



Quelle: Vivid Maps

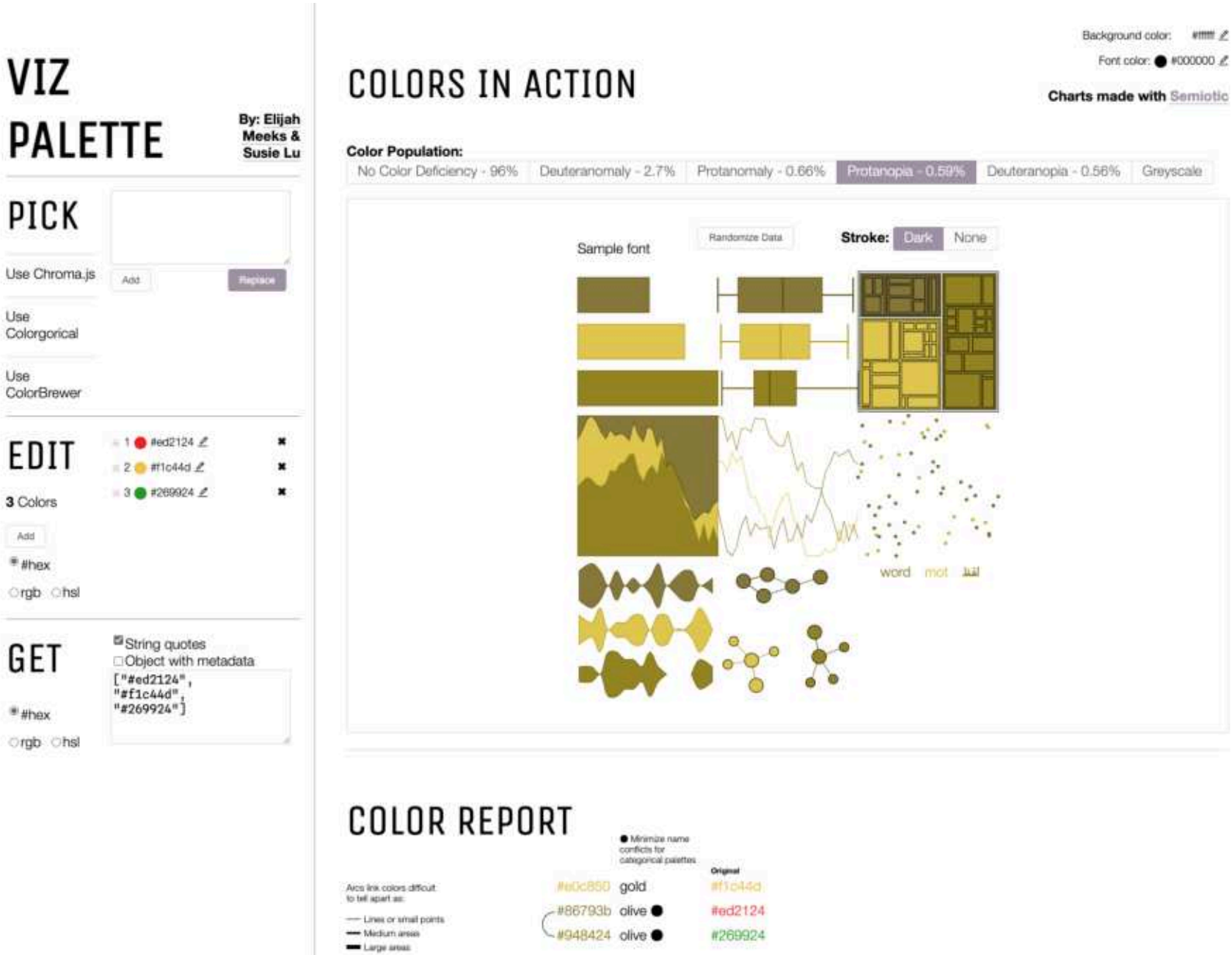
Farbsehschwächen



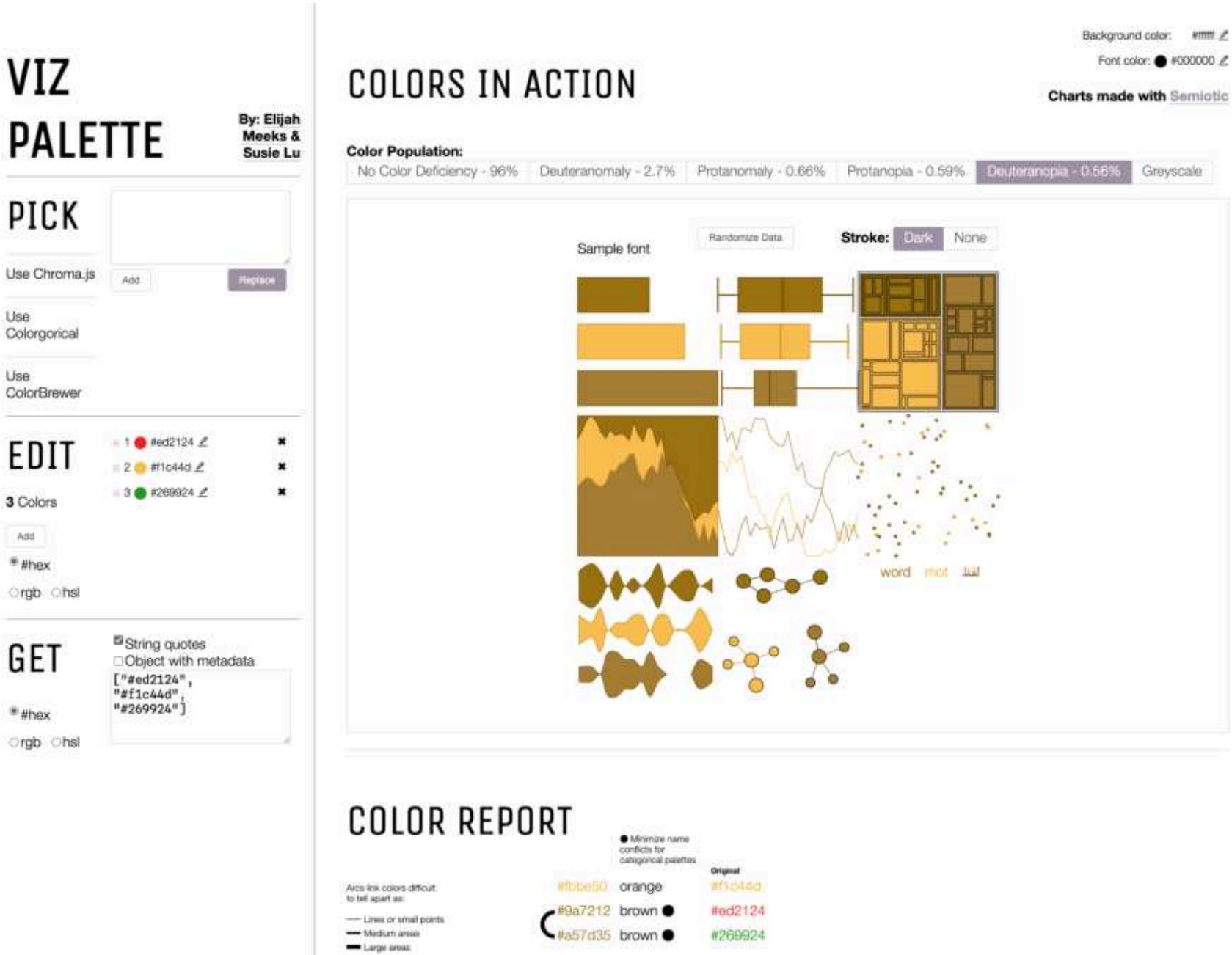
Quelle: Sarjak Thakkar

Problematische Kombinationen

Quelle: „Fundamentals of Data Visualization" von Claus O. Wilke



projects.susielu.com/viz-palette



projects.susielu.com/viz-palette

VIZ PALETTE

By: Elijah Meeks & Susie Lu

PICK

Use Chroma.js

Add

Replace

Use Colorgorical

Use ColorBrewer

EDIT

1 #ed2169

2 #f1c44d

3 #24998b

3 Colors

Add

#hex

rgb hsl

GET

String quotes

Object with metadata

```
["#ed2169",
"#f1c44d",
"#24998b"]
```

#hex

rgb hsl

COLORS IN ACTION

Background color: #ffffff

Font color: #000000

Charts made with Semiotic

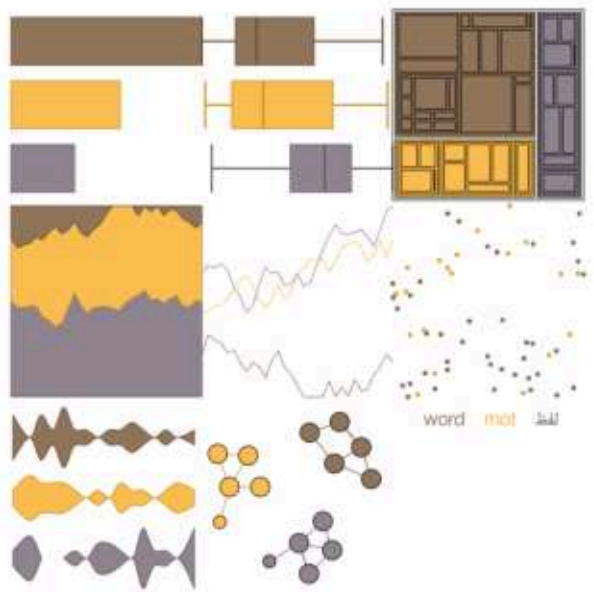
Color Population:

No Color Deficiency - 96% | Deuteranomaly - 2.7% | Protanomaly - 0.66% | Protanopia - 0.59% | Deuteranopia - 0.56% | Greyscale

Sample font

Randomize Data

Stroke: Dark None



COLOR REPORT

Minimize name conflicts for categorical palettes

Arcs link colors difficult to tell apart as:

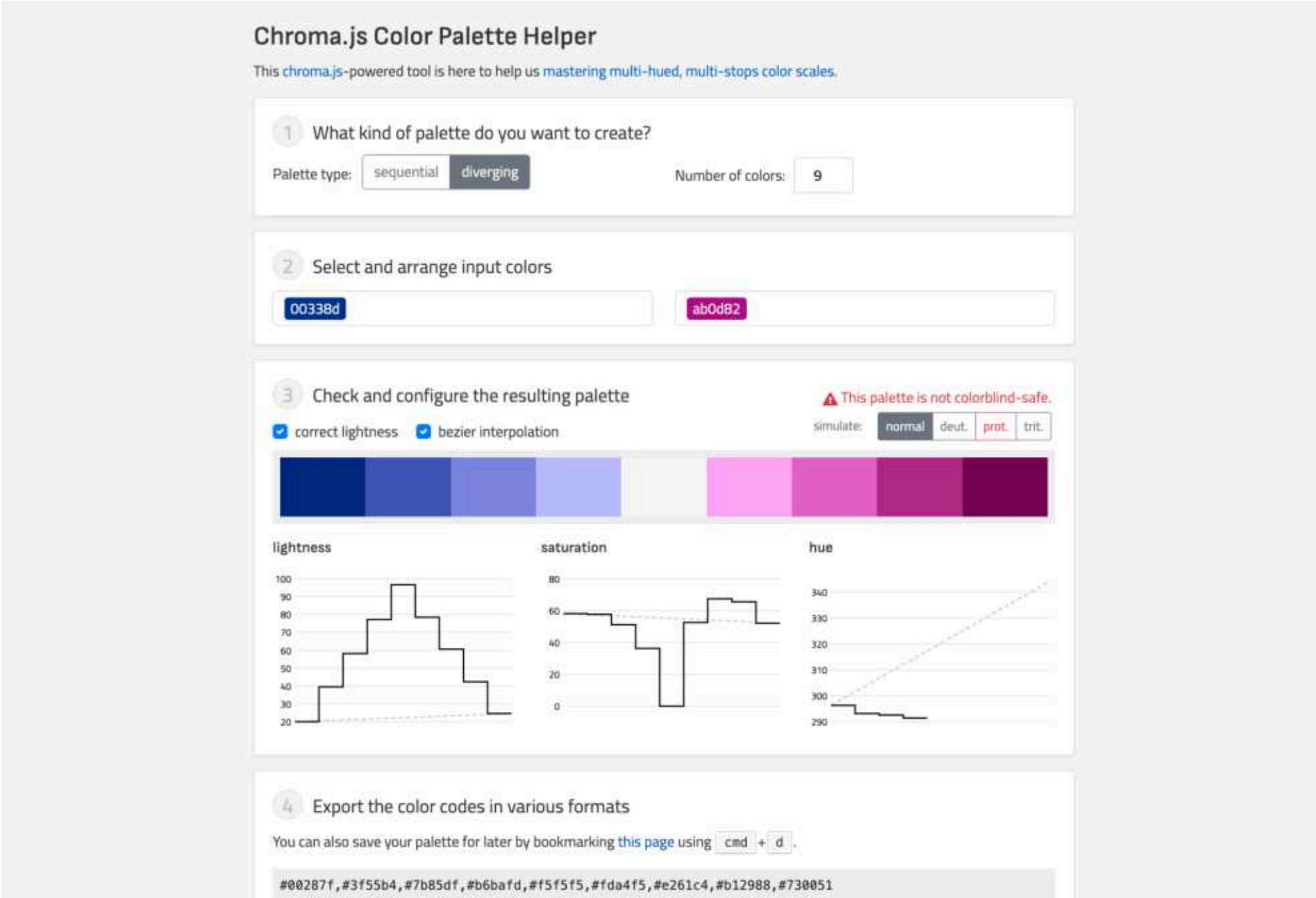
Lines or small points

Medium areas

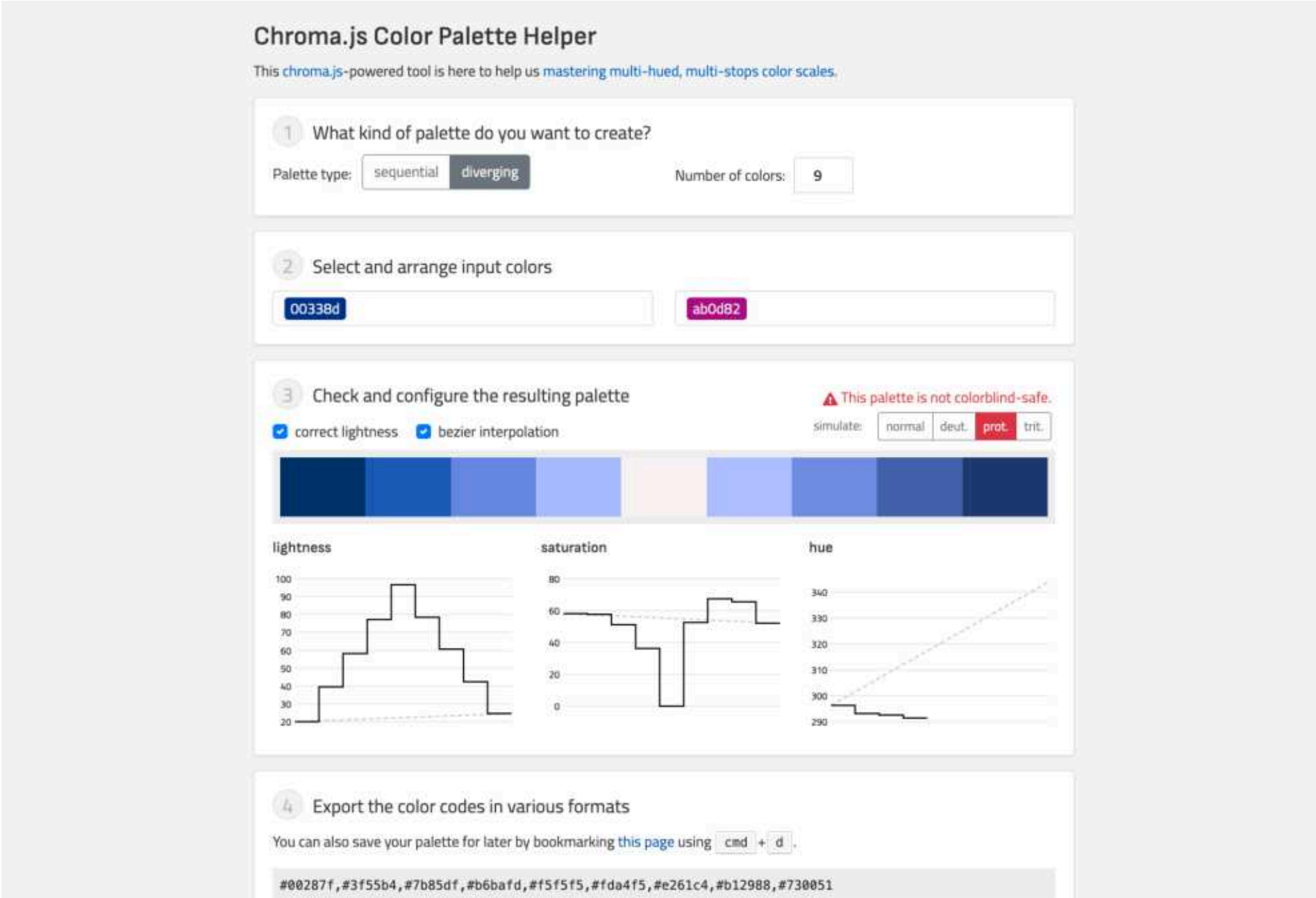
Large areas

		Original
#fbbe50	orange	#f1c44d
#92765c	grey	#ed2169
#918491	grey	#24998b

projects.susielu.com/viz-palette


Chroma.js Color Palette Helper
This chroma.js-powered tool is here to help us mastering multi-hued, multi-stops color scales.
1 What kind of palette do you want to create?
Palette type: sequential diverging
Number of colors: 9
2 Select and arrange input colors
00338d
ab0d82
3 Check and configure the resulting palette
This palette is not colorblind-safe.
correct lightness
bezier interpolation
simulate: normal deut. prot. trit.
lightness
saturation
hue
4 Export the color codes in various formats
You can also save your palette for later by bookmarking this page using cmd + d .
#00287f,#3f55b4,#7b85df,#b6bafd,#f5f5f5,#fda4f5,#e261c4,#b12988,#730051

chroma.js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1 What kind of palette do you want to create?
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00338d
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This palette is not colorblind-safe.
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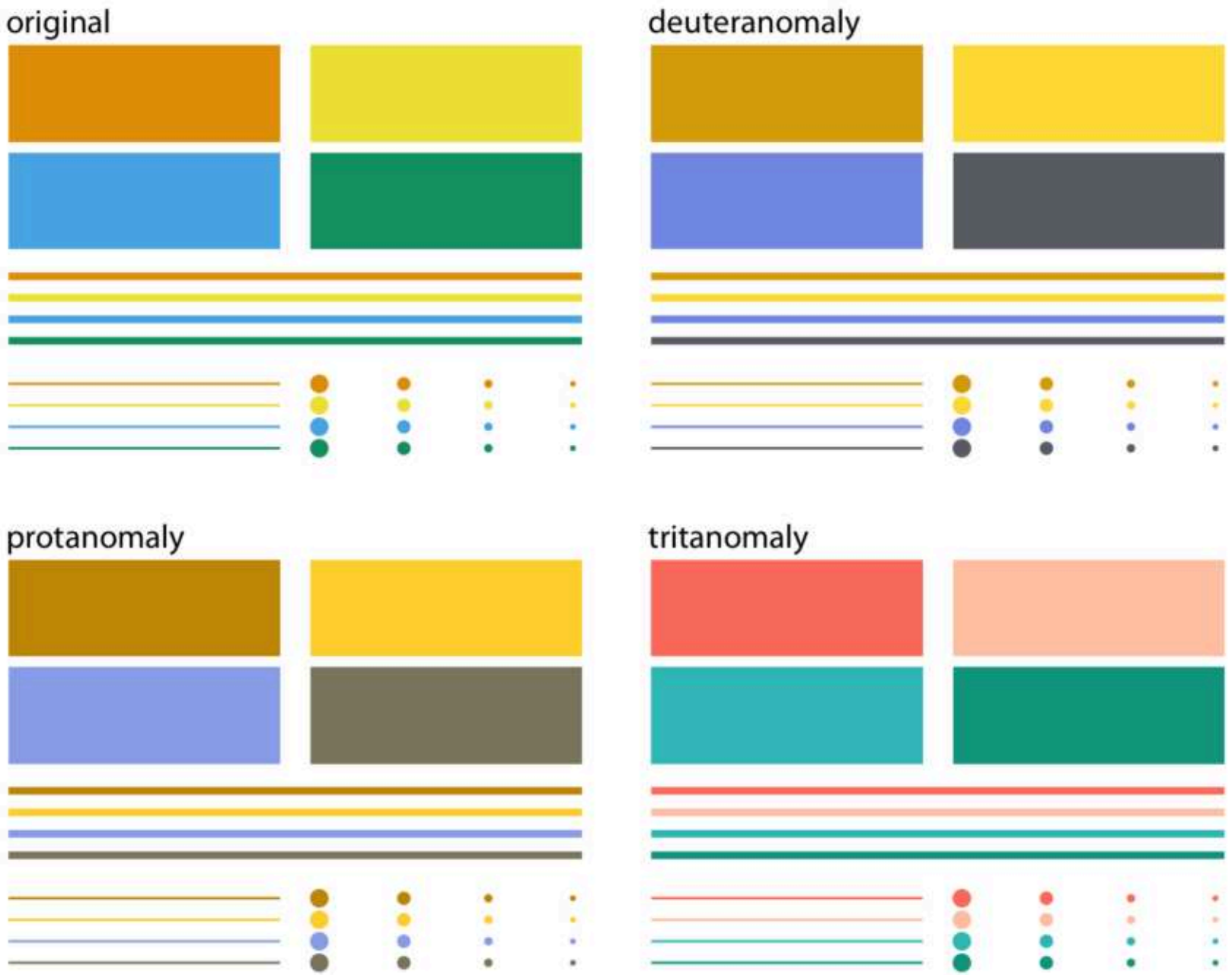
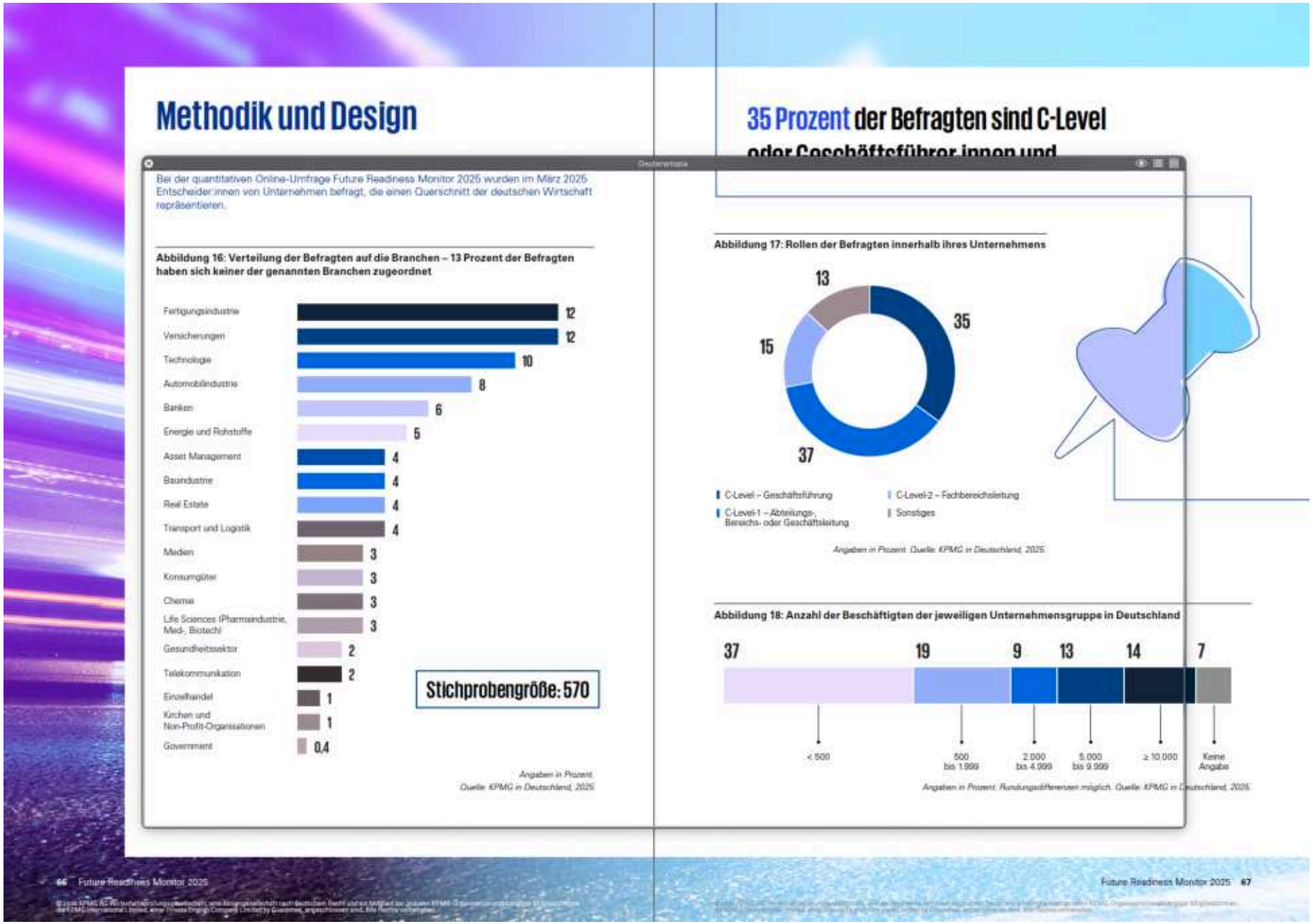
chroma.js



Quelle: "Fundamentals of Data Visualization" von Claus O. Wilke

Teste Farbpaletten!

- SimDaltonism
- ColourSimulations
- Coblis
- Color Oracle
- Vischeck
- Viz-Palette



Methodik und Design

Bei der quantitativen Online-Umfrage Future Readiness Monitor 2025 wurden im März 2025 Entscheider:innen von Unternehmen befragt, die einen Querschnitt der deutschen Wirtschaft repräsentieren.

Abbildung 16: Verteilung der Befragten auf die Branchen – 13 Prozent der Befragten haben sich keiner der genannten Branchen zugeordnet

35 Prozent der Befragten sind C-Level oder Geschäftsführer:innen und

Abbildung 17: Rollen der Befragten innerhalb ihres Unternehmens

Abbildung 18: Anzahl der Beschäftigten der jeweiligen Unternehmensgruppe in Deutschland

KPMG-Bericht „Future Readiness Monitor 2025"

Cédric Scherer Data Visualization & Information Design

Abbildung 3: Branchenvergleich Optimismus – Skalenwerte 8 bis 10 auf einer Skala von 0 bis 10; Branchen, die eine Stichprobengröße von mindestens 15 Teilnehmenden erreicht haben

Quelle: KPMG in Deutschland, 2025

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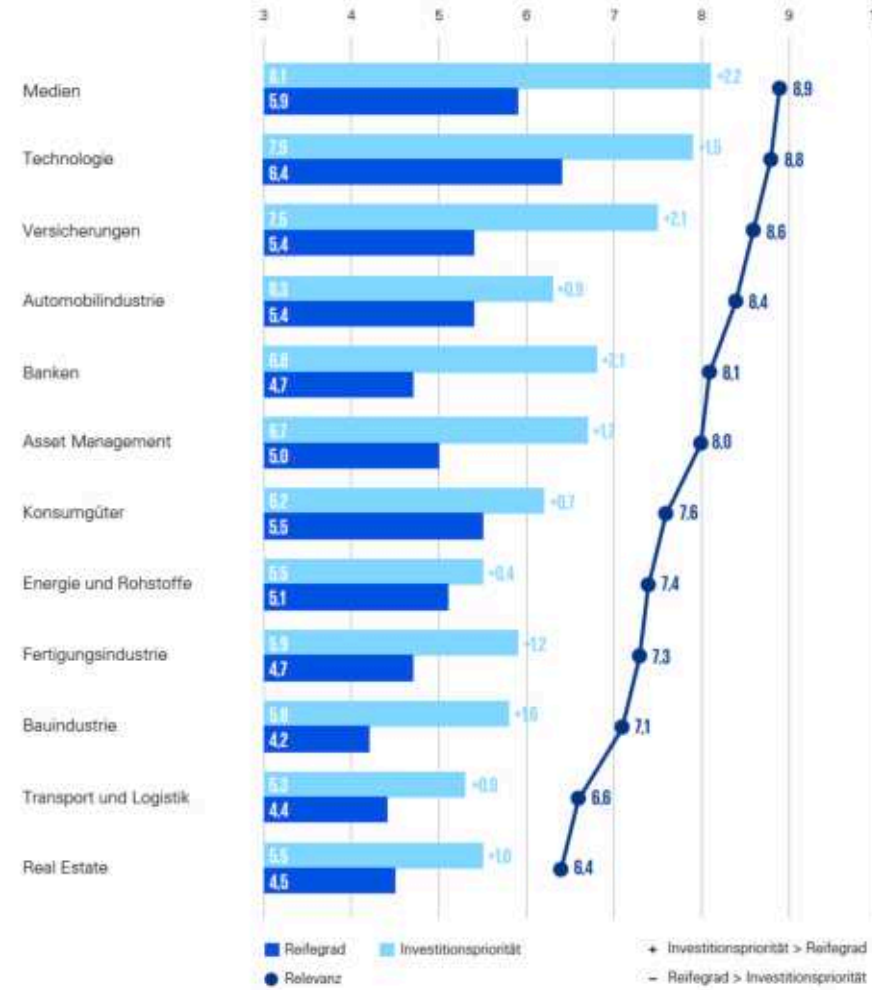
Abbildung 9: Übersicht der Bewertung von Relevanz, Reifegrad und Investitionspriorität der einzelnen Sektoren



Quelle: KPMG in Deutschland, 2025

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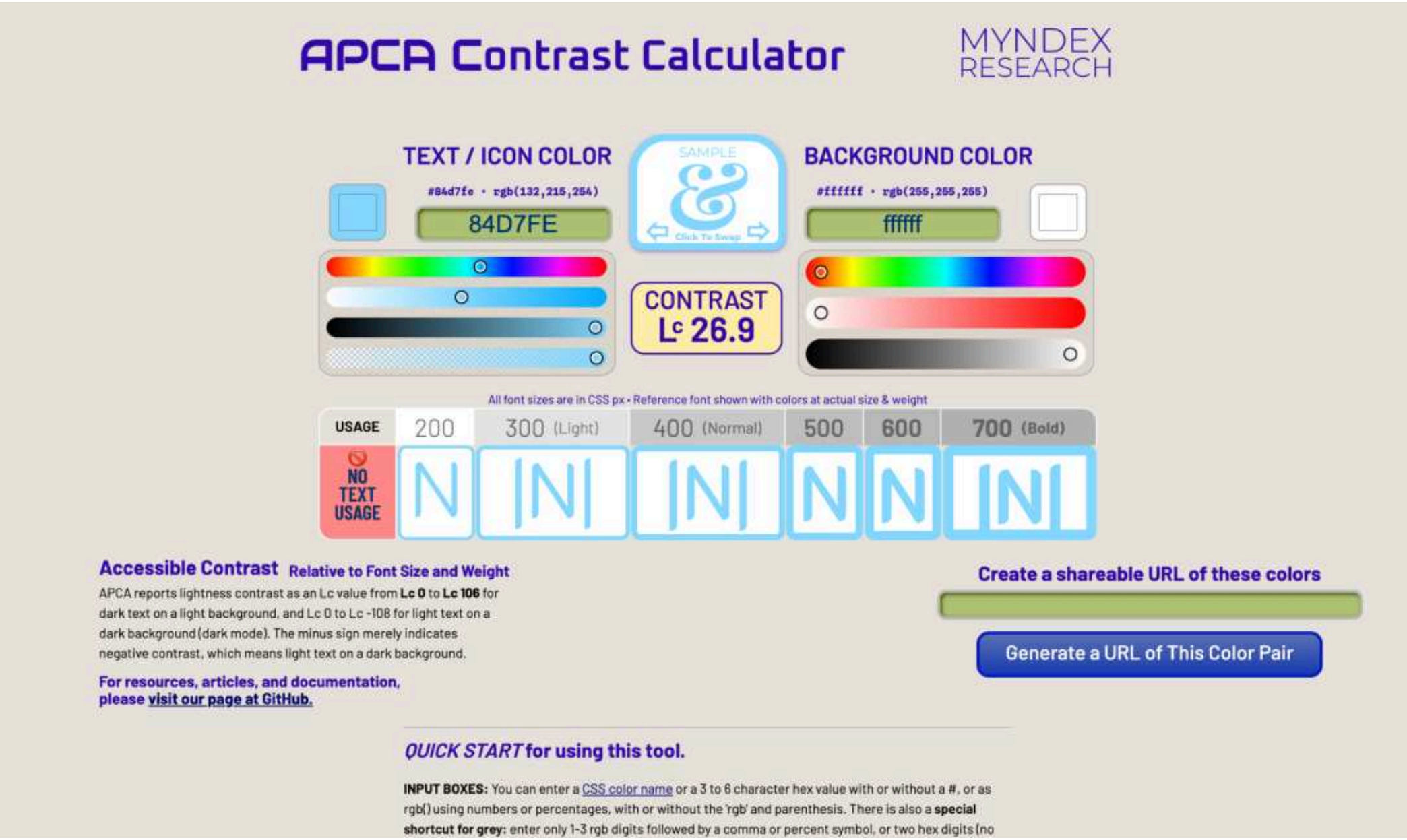
Cédric Scherer Data Visualization & Information Design

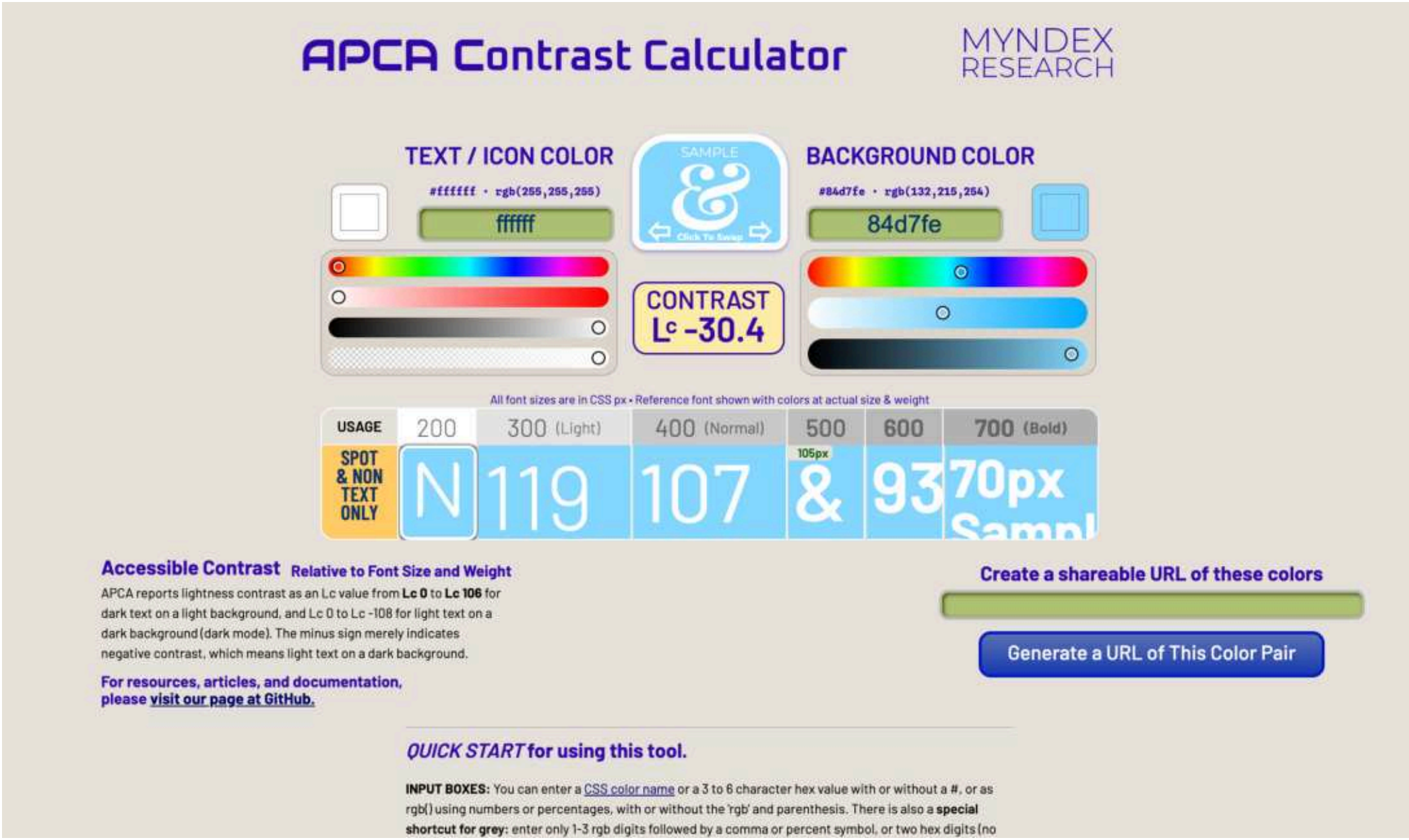
Light Blue

Primary text colors: Text on primary palette backgrounds	Text sample	Contrast ratio	Normal text WCAG AA	Large text WCAG AA	Graphical objects and user interface components	
Light Blue (#ACEAFF) on Dark Blue (#0C233C)	Sample	12.08:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on KPMG Blue (#00338D)	Sample	8.59:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Purple (#7213EA)	Sample	5.32:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Cobalt Blue (#1E49E2)	Sample	5.14:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Blue (#76D2FF)	Sample	1.28:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Pacific Blue (#00B8F5)	Sample	1:74:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Pink (#FD349C)	Sample	2.59:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on White (#FFFFFF)	Sample	1.31:1	Fail	Fail	Text Input ★	Fail

Primary text colors: Text on infographics and charts backgrounds	Text sample	Contrast ratio	Normal text WCAG AA	Large text WCAG AA	Graphical objects and user interface components	
Light Blue (#ACEAFF) on Dark Purple (#510DBC)	Sample	7.48:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Dark Pink (#AB0D82)	Sample	5.13:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Gray 1 (#333333)	Sample	9.6:1	Pass	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Gray 2 (#666666)	Sample	4.36:1	Fail	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Dark Green (#098E7E)	Sample	3.08:1	Fail	Pass	Text Input ★	Pass
Light Blue (#ACEAFF) on Gray 3 (#989898)	Sample	2.19:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Gray 4 (#B2B2B2)	Sample	1.61:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Gray 5 (#E5E5E5)	Sample	1.04:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Green (#00C0AE)	Sample	1.74:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Light Purple (#B497FF)	Sample	1.81:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Light Pink (#FFA3DA)	Sample	1.38:1	Fail	Fail	Text Input ★	Fail
Light Blue (#ACEAFF) on Light Green (#63EBDA)	Sample	1.1:1	Fail	Fail	Text Input ★	Fail



Myndex APCA Contrast Calculator zeigt Kontrastverhältnisse für verschiedene Kombinationen von Textgröße und Schriftstärke an



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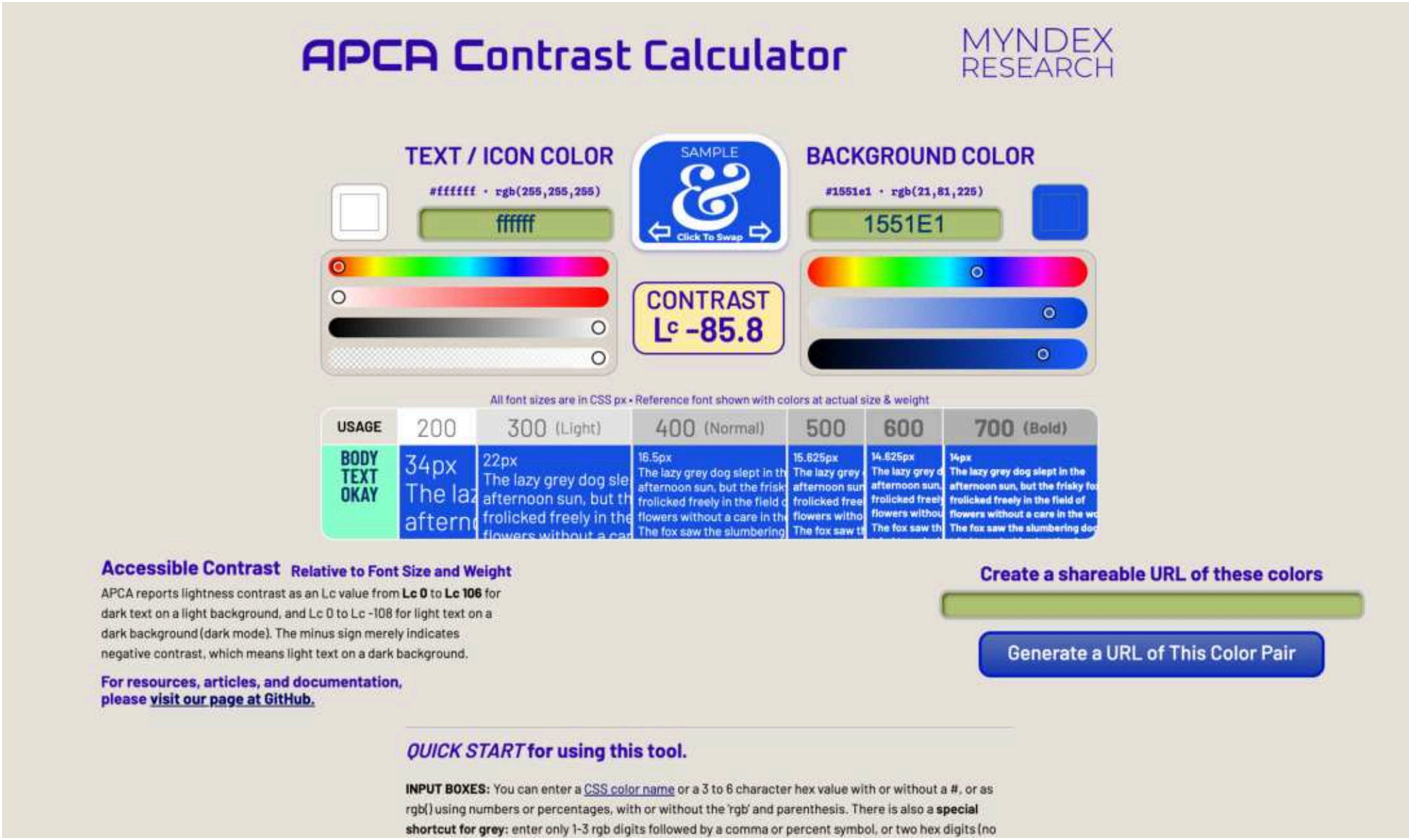

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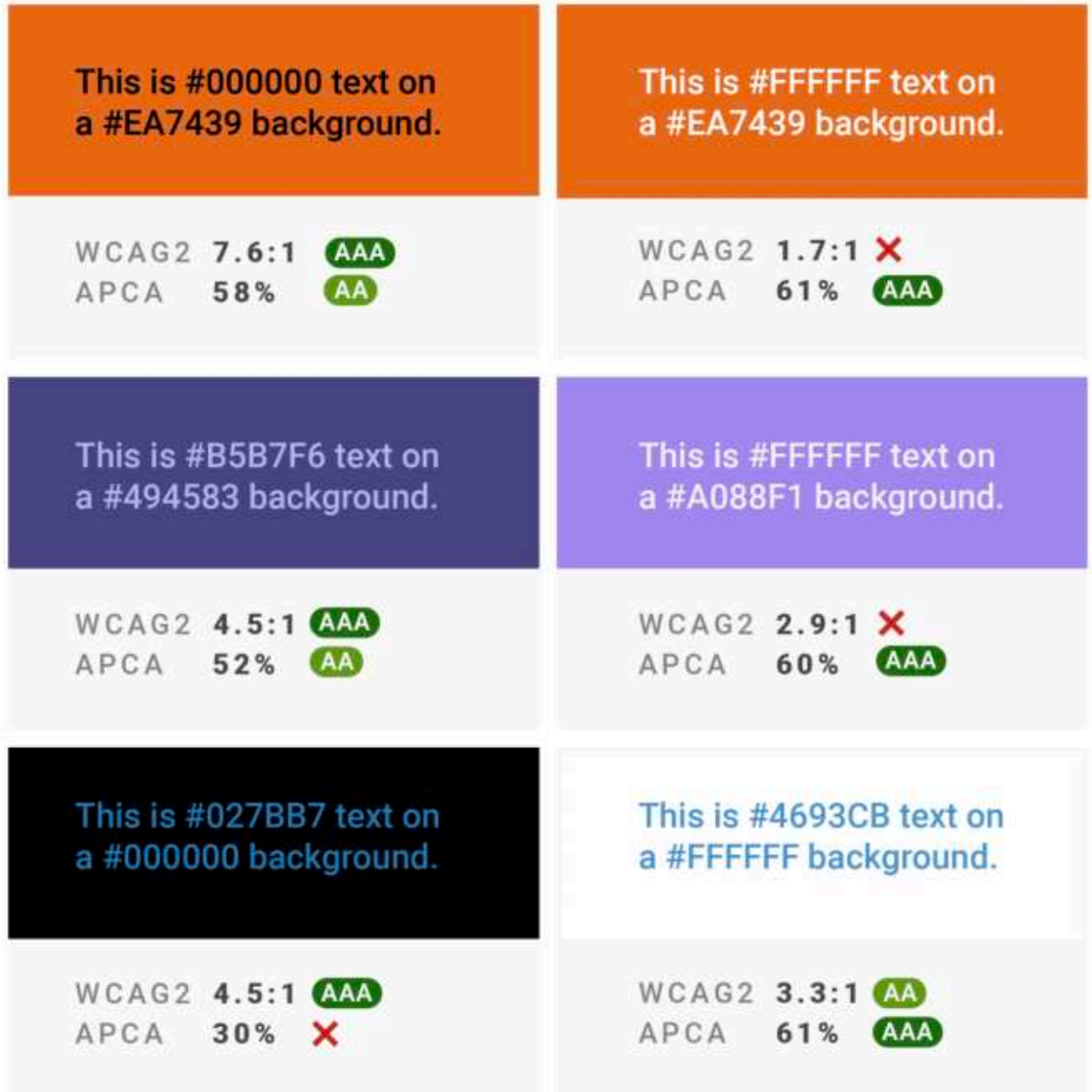
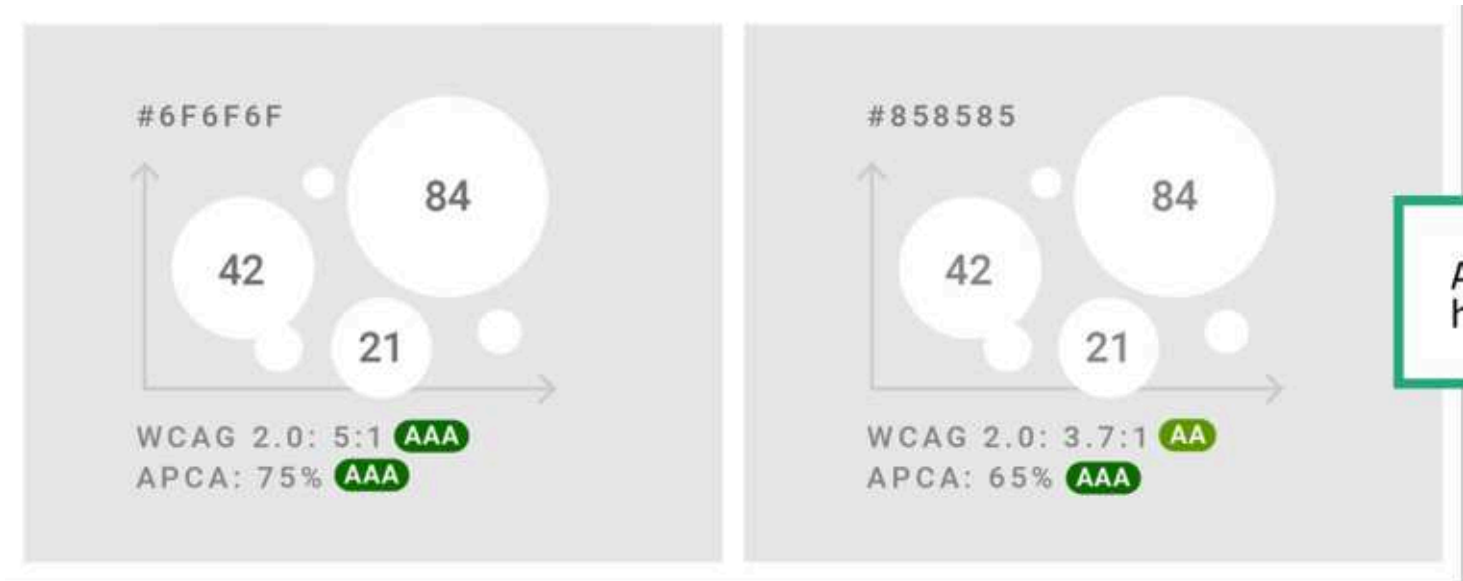


Quelle: Lisa Charlotte Muth, DataWrapper Blog



APCA erlaubt hellere Farben auf hellen Hintergründen als WCAG

Quelle: Lisa Charlotte Muth, DataWrapper Blog

APCA erlaubt hellere Farben auf hellen Hintergründen als WCAG

... aber erfordert auch hellere Farben für dunkle Hintergründe

Quelle: Lisa Charlotte Muth, DataWrapper Blog

Checkliste

- Wie ist das Verhältnis von Text, Theme-Elementen und Daten?
- Welche Möglichkeiten gibt es, die Daten mehr in den Vordergrund zu stellen?
- Welche anderen Details sollten sofort wahrgenommen werden?
- Kannst du die Botschaft durch das Nutzen preattentiver Attribute und Call-Outs hervorheben?
- Sind die Farben konsistent, intuitiv und für Menschen mit Sehschwächen geeignet?

Dashboard Design

Dashboards are

visual displays

of the

most important information needed

to achieve

one or more objectives

that has been

consolidated on a single screen

so it can be

monitored at a glance.

Visuelle Darstellungen

- Kombination aus Text, Tabellen und Grafiken
- vorzugsweise Schwerpunkt auf grafischen Elementen
  - effizienter
  - umfassender

→ wichtig **visuelle Wahrnehmung zu verstehen**

Wichtigste benötigte Informationen

- verstehen, an wen kommuniziert wird
- Fokus auf Informationen, die für “Action” notwendig sind
- prüfen, welche Daten zur Verfügung stehen, um diese
- Eignung der Kennzahlen sollte regelmäßig geprüft werden

→ wichtig **das Publikum zu kennen**

Ein oder mehrere Ziele

- Sammlung von Informationen
  - zu breite Zieldefinition vermeiden
  - Kombination zu vieler Datenquellen oder Teilmengen vermeiden
- oft als KPIs (Key Performance Indicators) definiert

→ wichtig **zweckmäßige Ziele zu definieren**

Auf einem einzigen Bildschirm

- alle Informationen müssen vollständig sichtbar sein
- ähnliche Informationen sollten gruppiert werden
- Fokus auf das Hauptziel

→ wichtig **Informationen zu verdichten**

Auf einen Blick erfassbar

- Übersicht über die Daten bereitstellen
  - unnötige Details vermeiden
- Nutzeende anleiten
  - zentrale Ergebnisse betonen
  - “Clutter” vermeiden
  - erforderliche Maßnahmen hervorheben

→ wichtig **Gestaltungsrichtlinien zu folgen**

Wie man Dashboards gestaltet

- → visuelle Wahrnehmung verstehen
- → das Publikum kennen
- → sinnvolle Ziele definieren
- → Informationen verdichten
- → Gestaltungsrichtlinien folgen

Wie man Diagramme gestaltet

- → visuelle Wahrnehmung verstehen
- → das Publikum kennen
- → sinnvolle Ziele definieren
- → Informationen verdichten
- → Gestaltungsrichtlinien folgen

Layout & Hierarchie

Grundprinzipien des Grafikdesigns

→ *Einheit*
→ *Vielfalt*
→ *Hierarchie*

Das richtige Gleichgewicht zwischen **Einheit** und **Vielfalt** schafft **Hierarchie**.

Table 1: Change in household wealth 2018–19 by region

	Total wealth	Change in total wealth		Wealth per adult	Change in wealth per adult	Change in financial assets		Change in non-financial assets		Change in debts	
	2019	2018-19	2018-19	2019	2018-19	2018-19	2018-19	2018-19	2018-19	2018-19	2018-19
	USD bn	USD bn	%	USD	%	USD bn	%	USD bn	%	USD bn	%
Africa	4,119	130	3.3	6,488	0.4	1	0.1	164	6.6	35	7.7
Asia-Pacific	64,778	825	1.3	54,211	-0.3	539	1.5	672	1.9	386	4.2
China	63,827	1,889	3.1	58,544	2.6	88	0.2	2,273	7.5	471	10.9
Europe	90,752	1,093	1.2	153,973	1.2	127	0.3	1,156	2.0	190	1.4
India	12,614	615	5.2	14,569	3.3	37	1.4	708	6.9	120	11.5
Latin America	9,906	463	4.9	22,502	3.2	193	4.0	340	5.7	70	5.0
North America	114,607	4,061	3.7	417,694	2.7	3,334	3.6	1,353	3.8	626	3.8
World	360,603	9,087	2.6	70,849	1.2	4,319	2.0	6,666	3.7	1,898	4.0

Source: James Davies, Rodrigo Lluberas and Anthony Shorrocks, Global wealth databook 2019

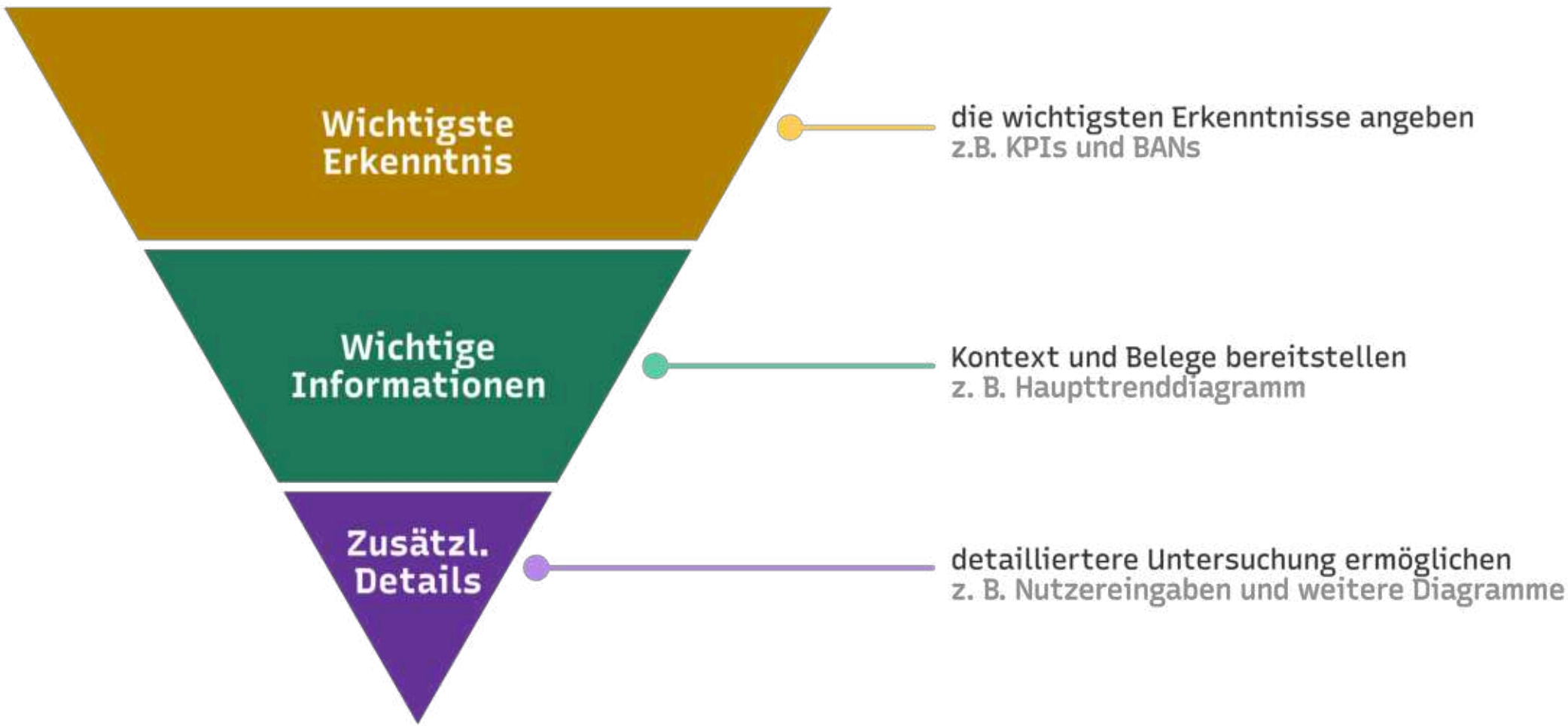
Table 1: Change in household wealth 2018–2019 by region

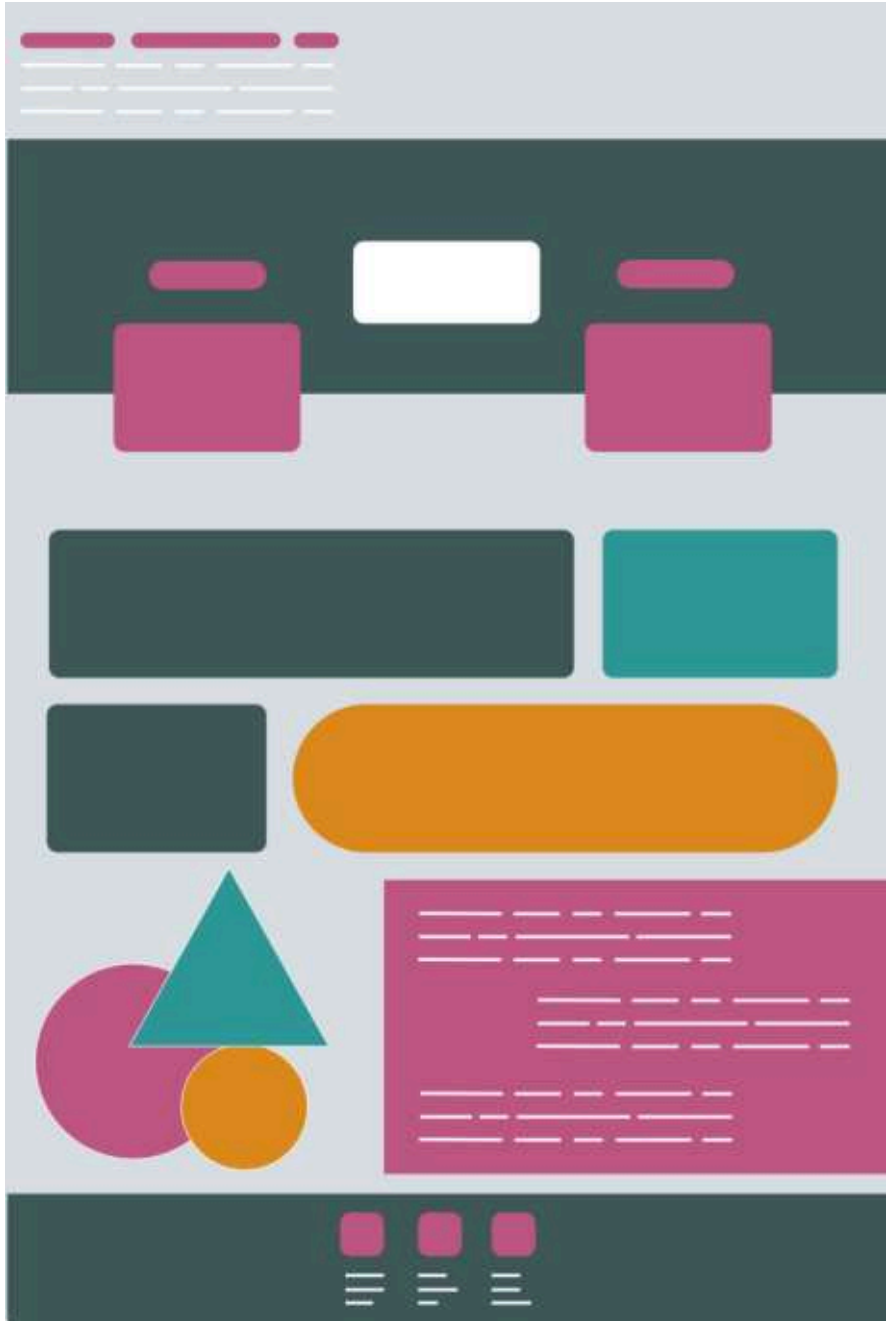
Overall total wealth and mean wealth per adult refer to 2019 only. Triangles pointing upwards indicate the highest proportional change per category triangles pointing downwards the lowest change.

	TOTAL WEALTH			WEALTH PER ADULT		FINANCIAL ASSETS		NON-FINANCIAL ASSETS		DEBTS	
	OVERALL	CHANGE*		MEAN	CHANGE	CHANGE		CHANGE		CHANGE	
	(USD bn)	(USD bn)	(prop.)	(USD)	(prop.)	(USD bn)	(prop.)	(USD bn)	(prop.)	(USD bn)	(prop.)
World	360,603	9,087	2.6%	70,849	1.2%	4,319	2.0%	6,666	3.7%	1,898	4.0%
North America	114,607	4,061	3.7%	417,694	2.7%	3,334	3.6%	1,353	3.8%	626	3.8%
Europe	90,752	1,093	1.2% ▽	153,973	1.2%	127	3.0%	1,156	2.0%	190	1.4% ▽
Asia-Pacific	64,778	825	1.3%	54,211	-0.3% ▽	539	1.5%	672	1.9% ▽	386	4.2%
China	63,827	1,889	3.1%	58,544	2.6%	88	2.0%	2,273	7.5% △	471	10.9%
India	12,614	615	5.2% △	14,569	3.3% △	37	1.4%	708	6.9%	120	11.5% △
Latin America	9,906	463	4.9%	22,502	3.2%	193	4.0% △	340	5.7%	70	5.0%
Africa	4,119	130	3.3%	6,488	0.4%	1	1.0% ▽	164	6.6%	35	7.7%

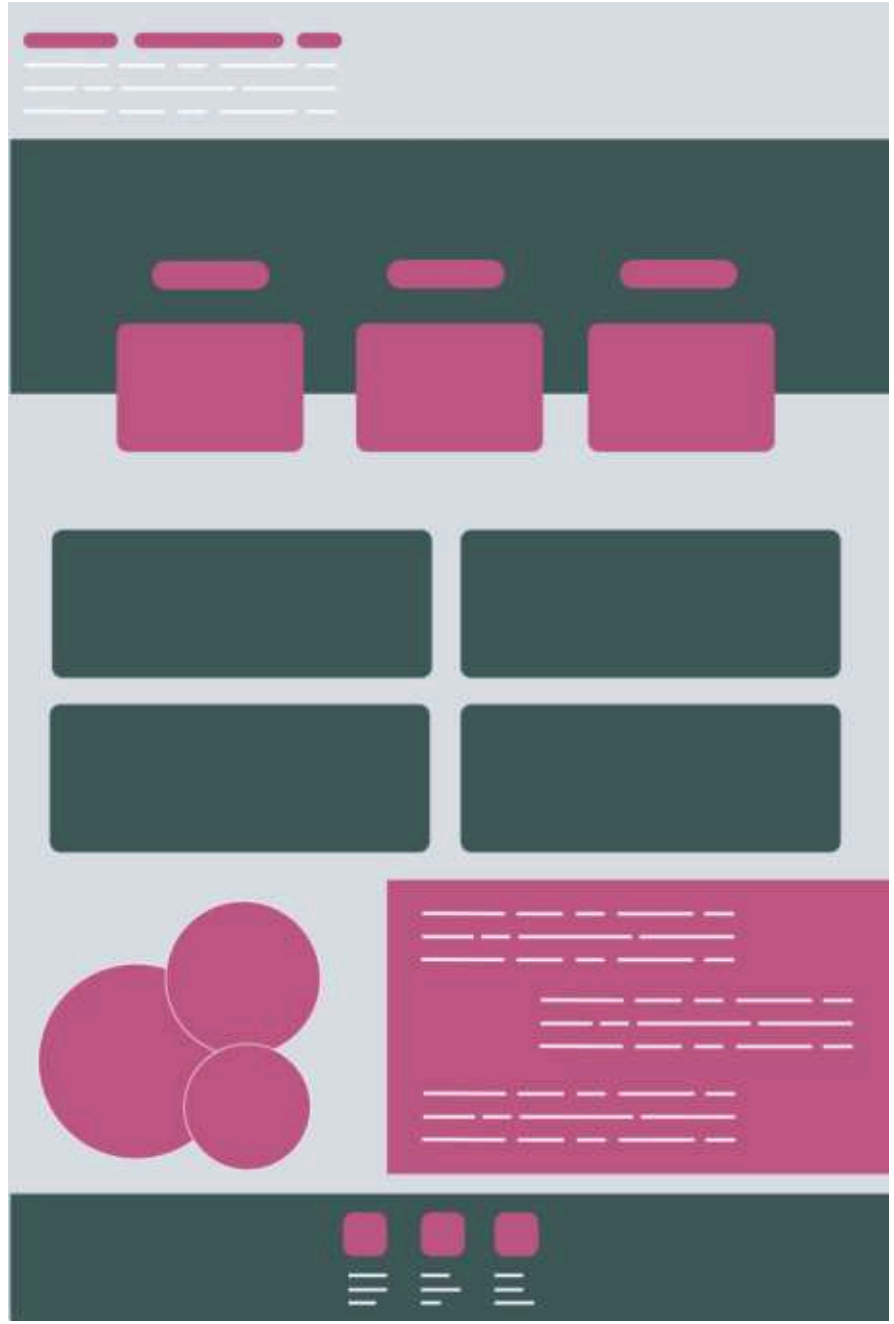
Source: James Davies, Rodrigo Lluberas and Anthony F. Shorrocks, Global Wealth Databook, 2019 | Makeover: Cedric Scherer, Frontpage Data

Hierarchy

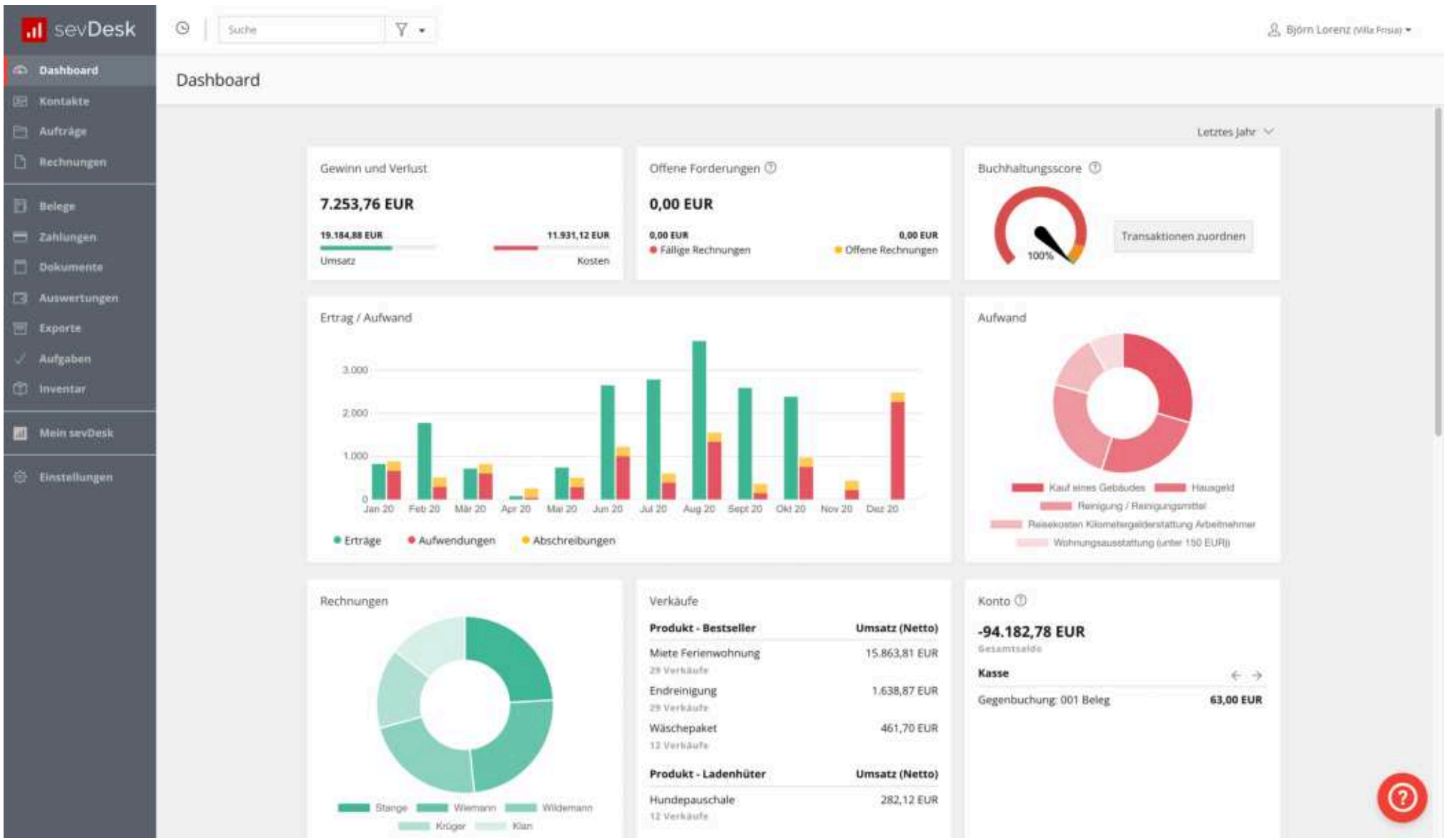

Wichtigste Erkenntnis
die wichtigsten Erkenntnisse angeben
z.B. KPIs und BANs
Wichtige Informationen
Kontext und Belege bereitstellen
z. B. Haupttrenddiagramm
Zusätzl. Details
detailliertere Untersuchung ermöglichen
z. B. Nutzereingaben und weitere Diagramme



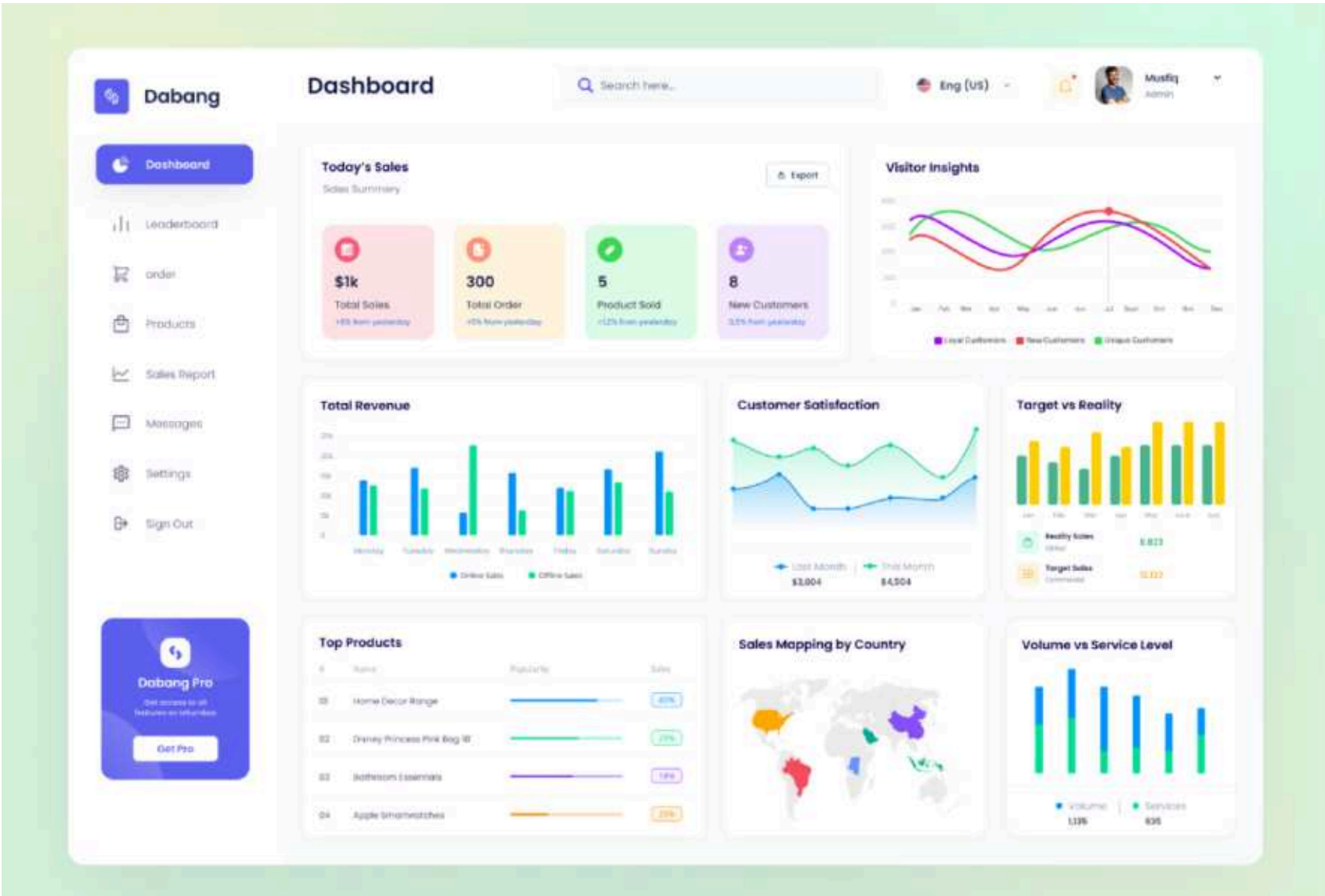
Quelle: Lindsay Betzendahl



Quelle: Lindsay Betzendahl

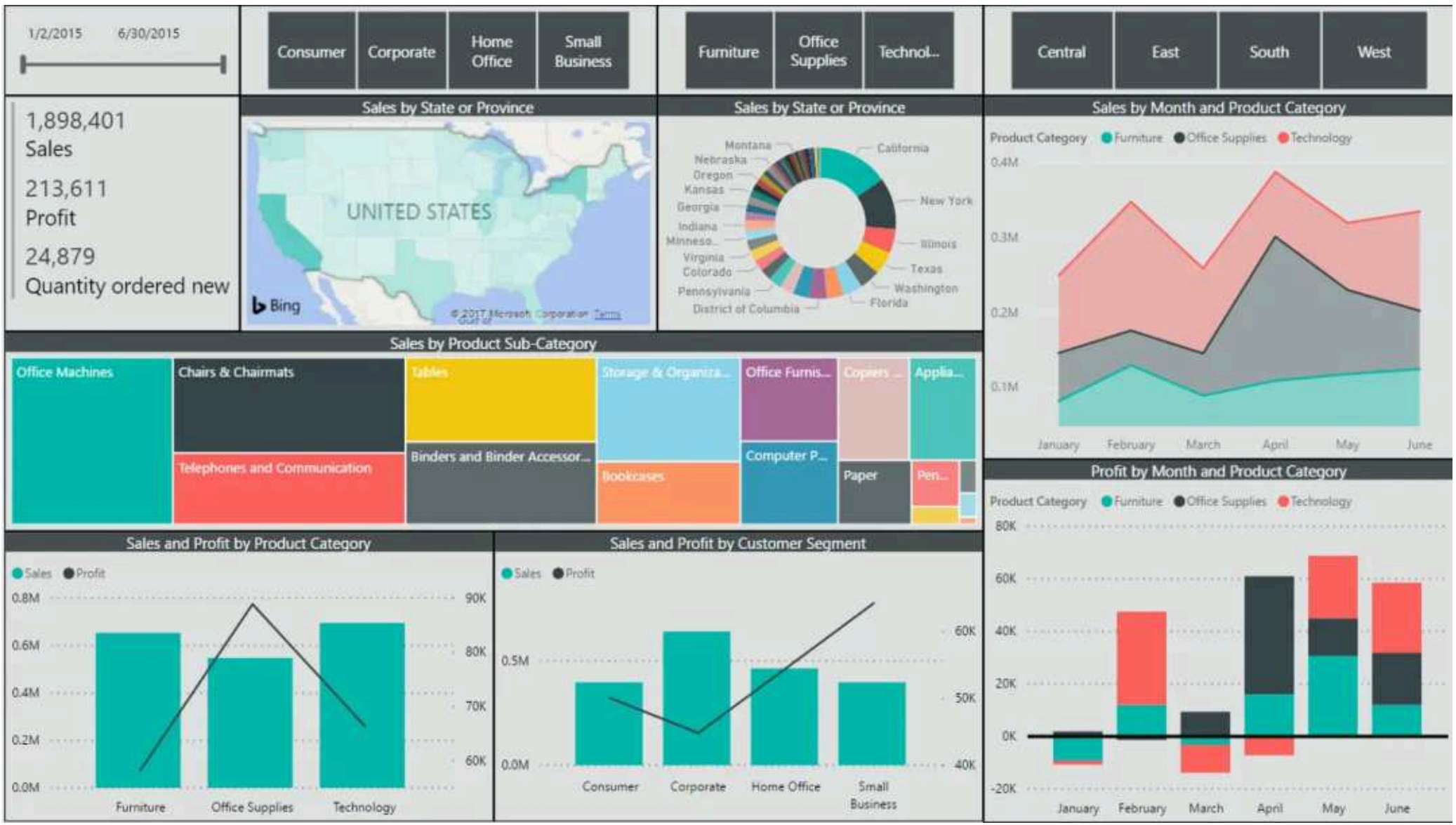


Quelle: sevDesk



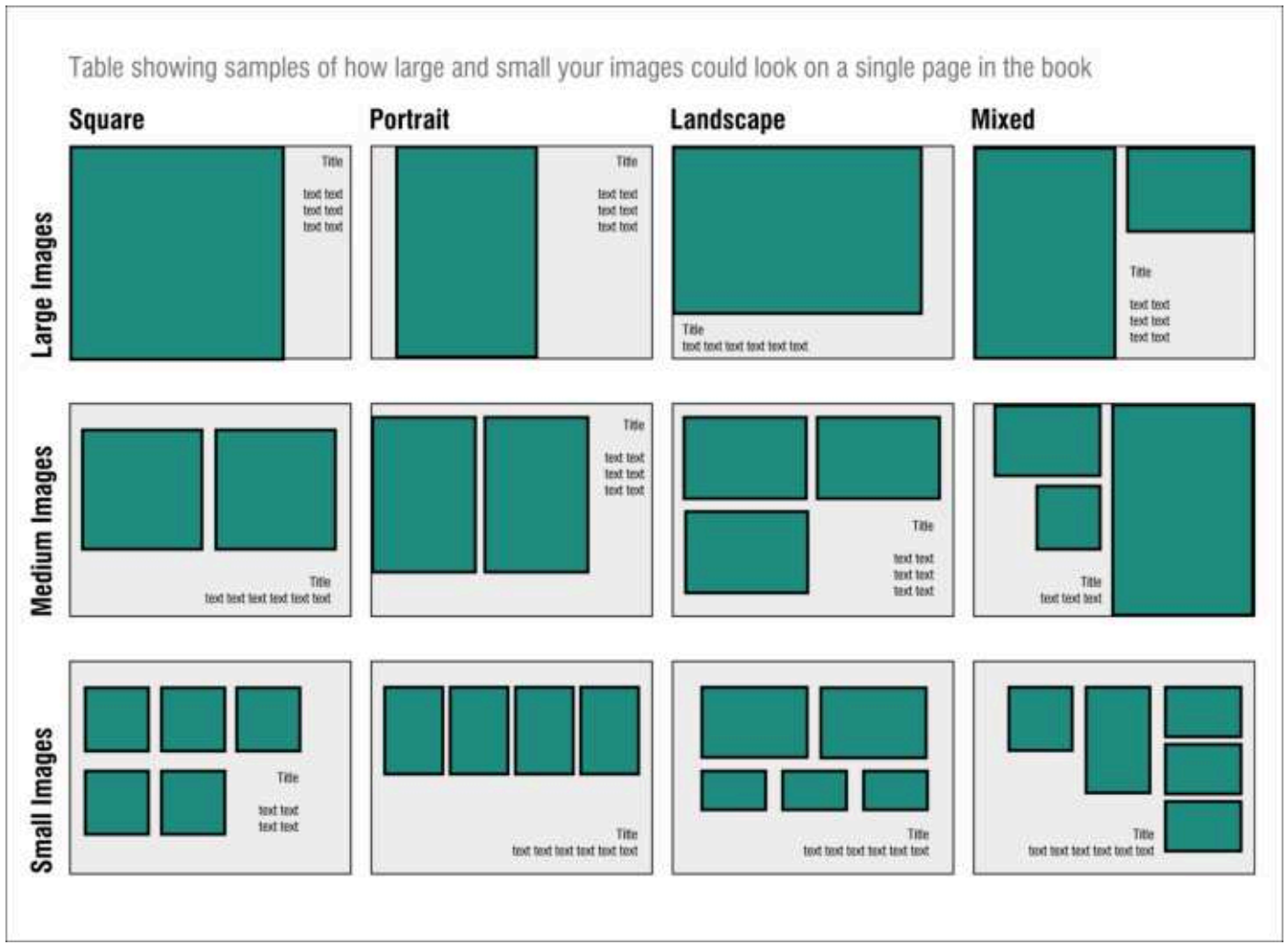
Quelle: unbekannt (via Uday Chilukuri)

Quelle: Apptio

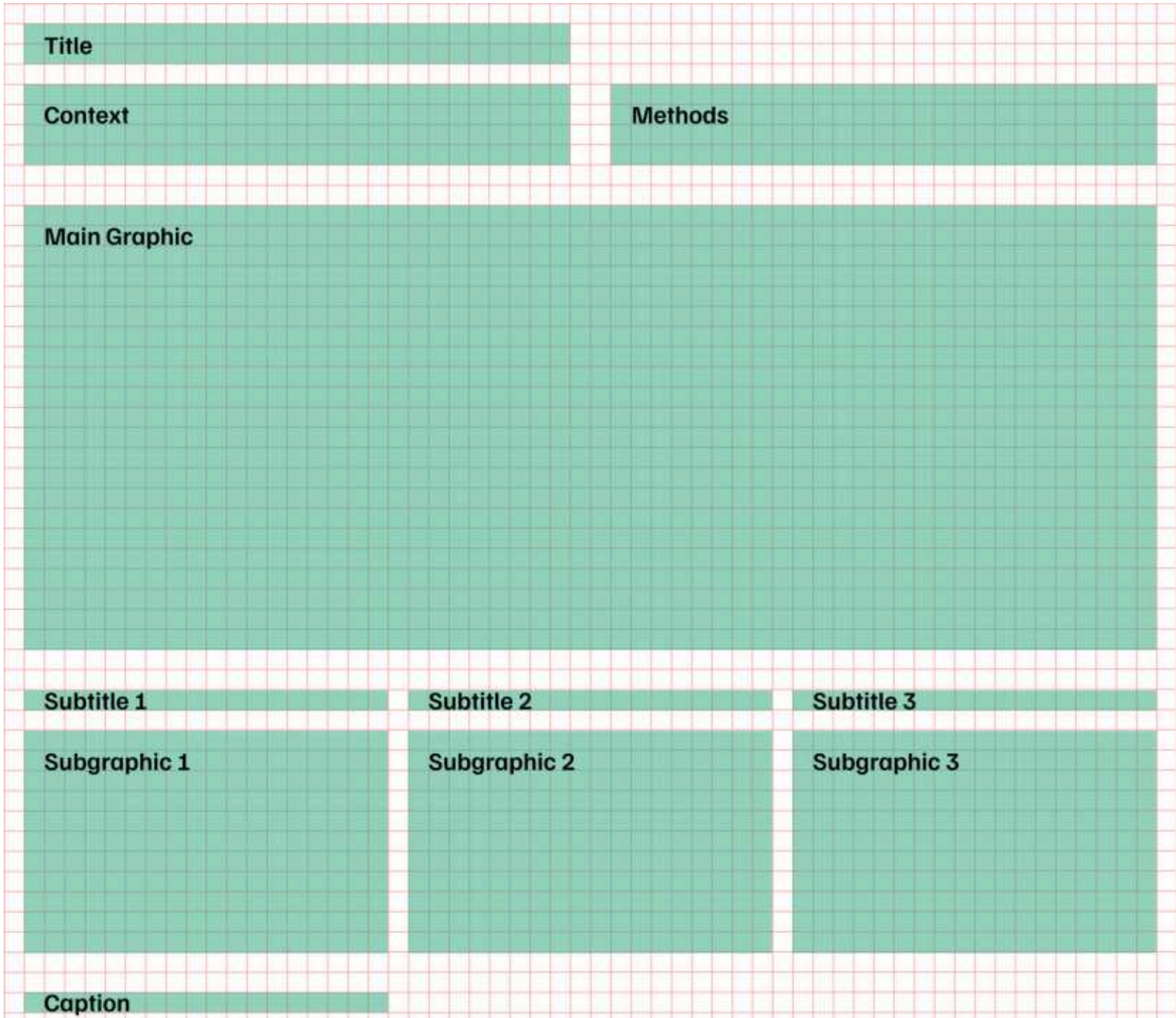


Quelle: Zebra.bi

Modular Design



Quelle: londonphotography.org.uk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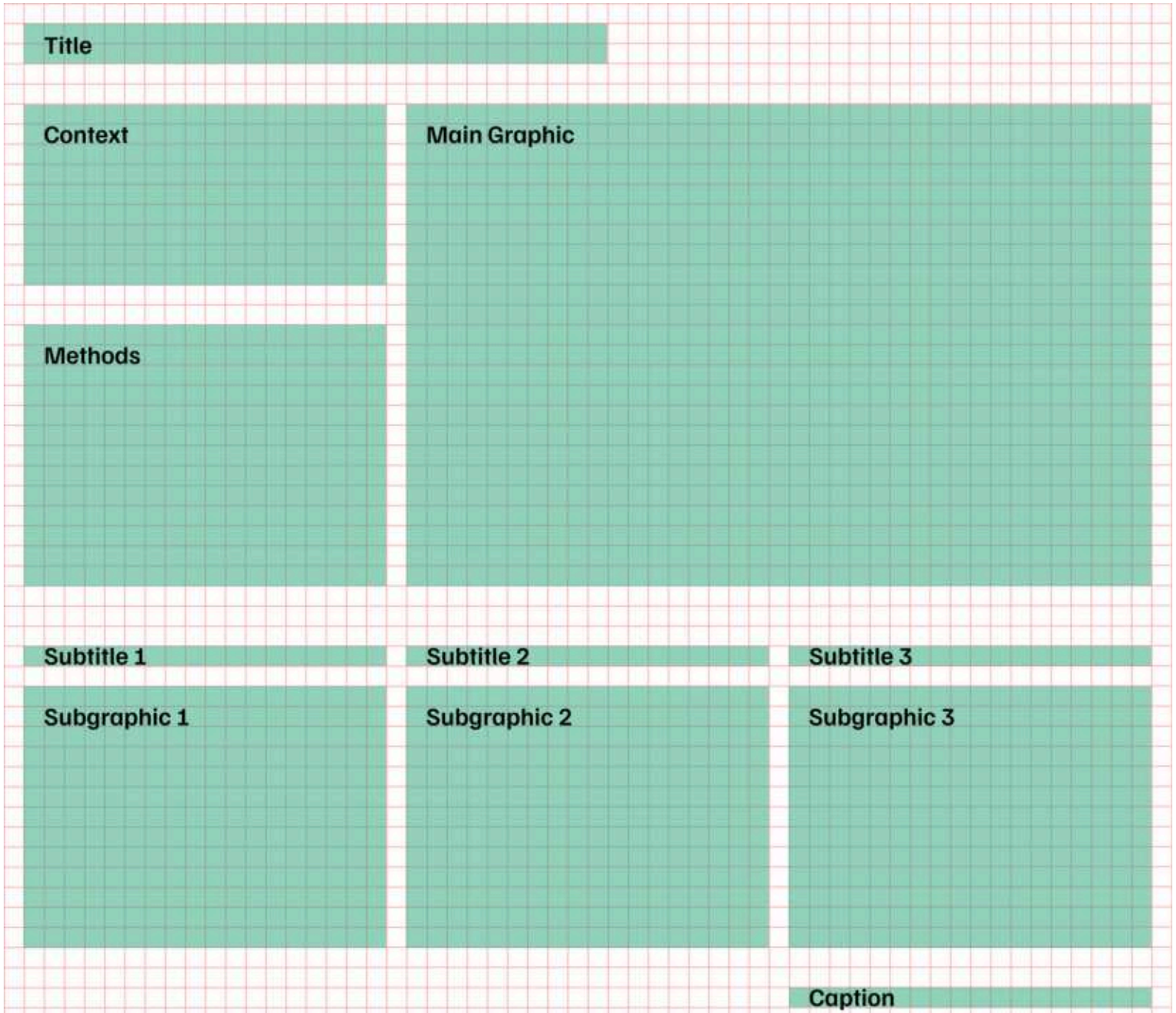
Context
Methods
Main Graphic
Subtitle 1
Subtitle 2
Subtitle 3
Subgraphic 1
Subgraphic 2
Subgraphic 3
Caption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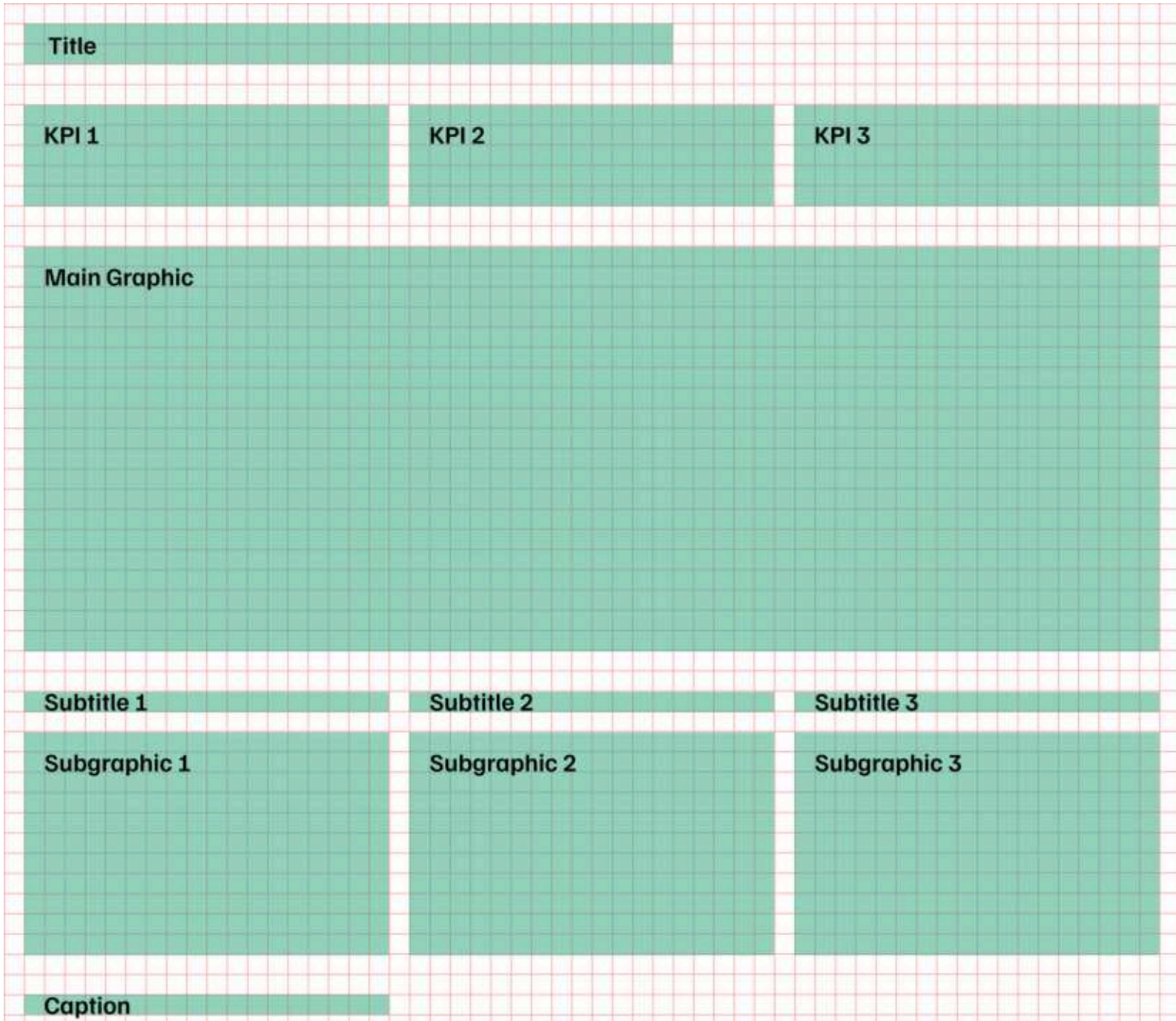

Title
KPI 1
KPI 2
KPI 3
Main Graphic
Subtitle 1
Subtitle 2
Subtitle 3
Subgraphic 1
Subgraphic 2
Subgraphic 3
Caption

Dashboards effektiv gestalten

Cédric Scherer Data Visualization & Information Design

Das Schwierigste am Design von Dashboards ist nicht das Erstellen von Diagrammen.

Das Schwierigste am Design von Dashboards ist nicht das Erstellen von Diagrammen – **sondern zu entscheiden, welche Diagramme man weglässt.**

Suboptimale Dashboards...

- ✗ ragen über den Bildschirm hinaus
- liefern nur unzureichend Kontext
- zeigen alle Informationen gleichberechtigt
- nutzen unnötige Vielfalt ohne Zweck
- verwenden ungeeignete Darstellungsformen
- stellen Kennzahlen nur indirekt dar
- kodieren quantitative Daten ungenau oder falsch
- zeigen zu viele Details
- ✗ setzen Farben und Text übermäßig ein

Effektive Dashboards...

- ✅ zeigen alle relevanten Informationen auf einen Blick
  ermöglichen Vergleiche (Erwartungen, Vorjahre, ...)
  ordnen Informationen nach Relevanz und Inhalt
  setzen Vielfalt nur zweckmäßig ein
  nutzen geeignete Diagramme mit direkter Beschriftung
  wählen eine passende und korrekte Kodierung
  zeigen Kennzahlen und deren Änderungen auf
  begrenzen Detailgrad und Präzision auf das Wesentliche
- ✅ schaffen Fokus mit gezieltem Nutzen von Farbe und Text

Intern genutztes KPMG-Dashboard

Wrap-Up

Was macht eine „gute" Datenvisualisierung aus?

- **Information** (Integrität)
- **Erzählung** (Bedeutsamkeit)
- **Ziel** (Zweckmäßigkeit)
- **Eleganz** (Visuelle Form)

Publikum (wer)

- An wen richtet sich die Kommunikation?
- Wie hoch ist die Datenkompetenz der Betrachtenden?

Inhalt (was)

- Welche Erkenntnisse sollen die Betrachtenden mitnehmen?
- Auf welchem Weg findet die Kommunikation statt?

Grundlage (wie)

- Sind die Kodierung und der Diagrammtyp geeignet?
- Welchen Detailgrad benötige ich für meine Aussage?

G.R.A.P.H.I.C. Guidelines

entwickelt für Infografiken im Allgemeinen von Stones & Gent (2015)

- **G** – Get to know your audience
- **R** – Restrict use of colours
- **A** – Align elements
- **P** – Prioritise parts
- **H** – Highlight the heading
- **I** – Invest in imagery (wisely)
- **C** – Choose charts carefully

From Zero to figure hero: A Checklist for figures with data

Helena Jambor, https://orcid.org/0000-0003-3397-1842

Use this checklist to design & improve your figures or review others. When starting from scratch, make sure that you know the key message and target audiences of each figure you create.

Basics

Choose chart

- Suitable for data and message?
- Suitable for audiences? Consult resources for chart types, e.g., Datavizcatalogue.com, Python-graph-gallery.com, Datavizproject.com

Simplify charts: Too much data

- Split data across 2 charts
- Consider small multiples for many categories/observations
- Present complex charts gradually reveal different aspects in successive charts e.g., with color

Simplify charts: Uncommon chart type

- Include help on how-to-read e.g., in title, subtitle, legend,..
- Use intuitive guides e.g., direct data labels, color similarity, regions-of-interest

Text

- Label axes
- Label tick marks, choose easy intervals 0, 5, 10, 15 > 0, 8, 16, 24
- Explain colors, marks, shades e.g. legends
- Use title, subtitle to orient readers
- Avoid abbreviations if necessary: test
- Typography: choose legible font and style regular > bold, italic

Design

Layout

- Aim for horizontal text, avoid text rotation
- Label data directly. Otherwise place legend close to data
- Align text elements title best: top left/center
- Use white space to visually separate panel elements

Color schemes, Encode data with color

- Are colors necessary?
- Pick color palettes for data type. Sequential data: 1 color, vary saturation/lightness; Diverging data: 2 colors with neutral center; Categorical data: vary color.
- Use consistent color schemes
- Ensure high contrast of data to background color, use darker shares for smaller data points
- Ensure colors are accessible. Color-blind safe, high contrast foreground/background. Double encode color information. Best, information is also visible in greyscale.
- Explain all colors e.g., legend

On beauty

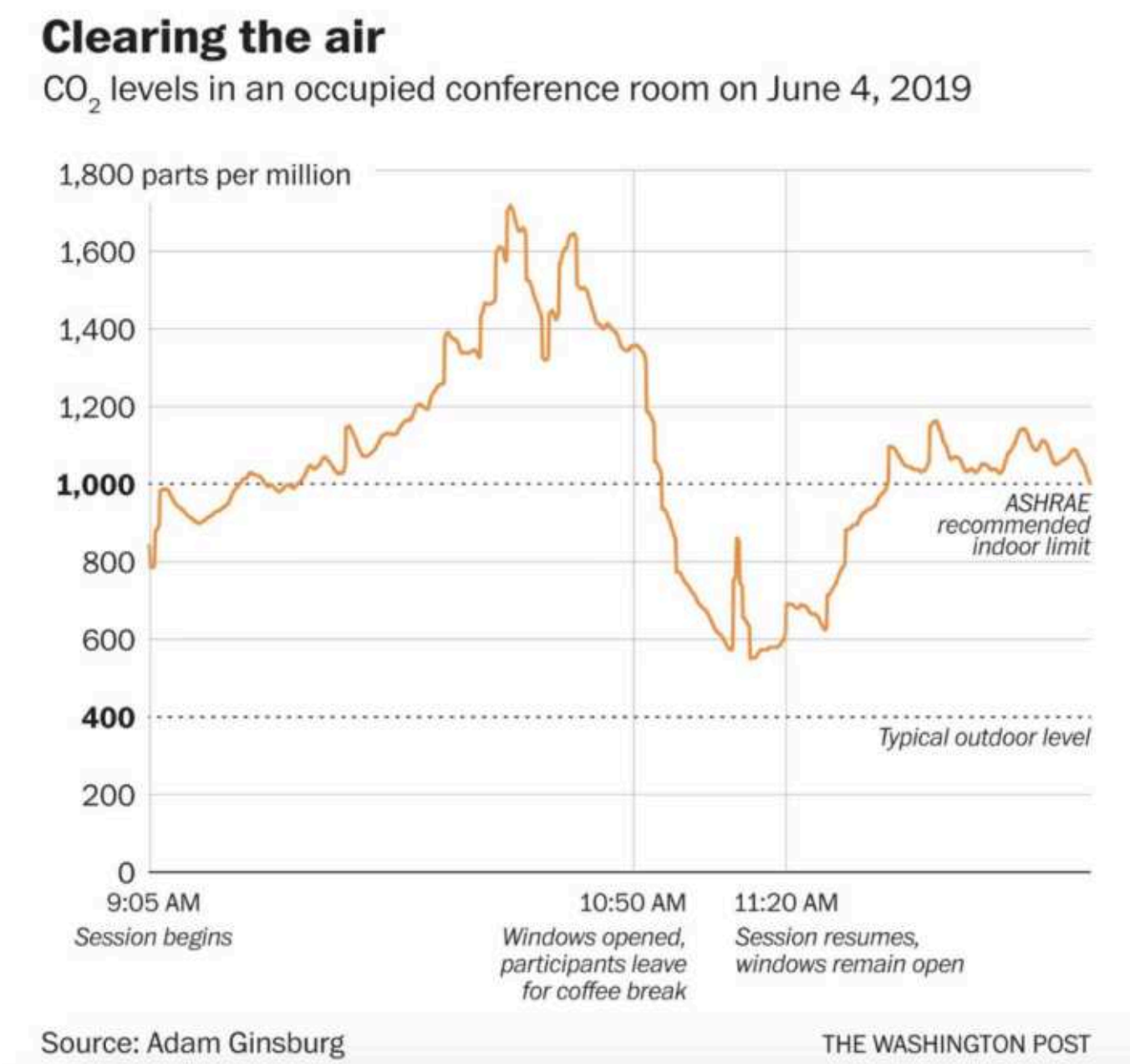
- Align and organize with a grid
- Use white space to separate elements
- Strive for symmetry
- Consider using icons for memorability

Feedback

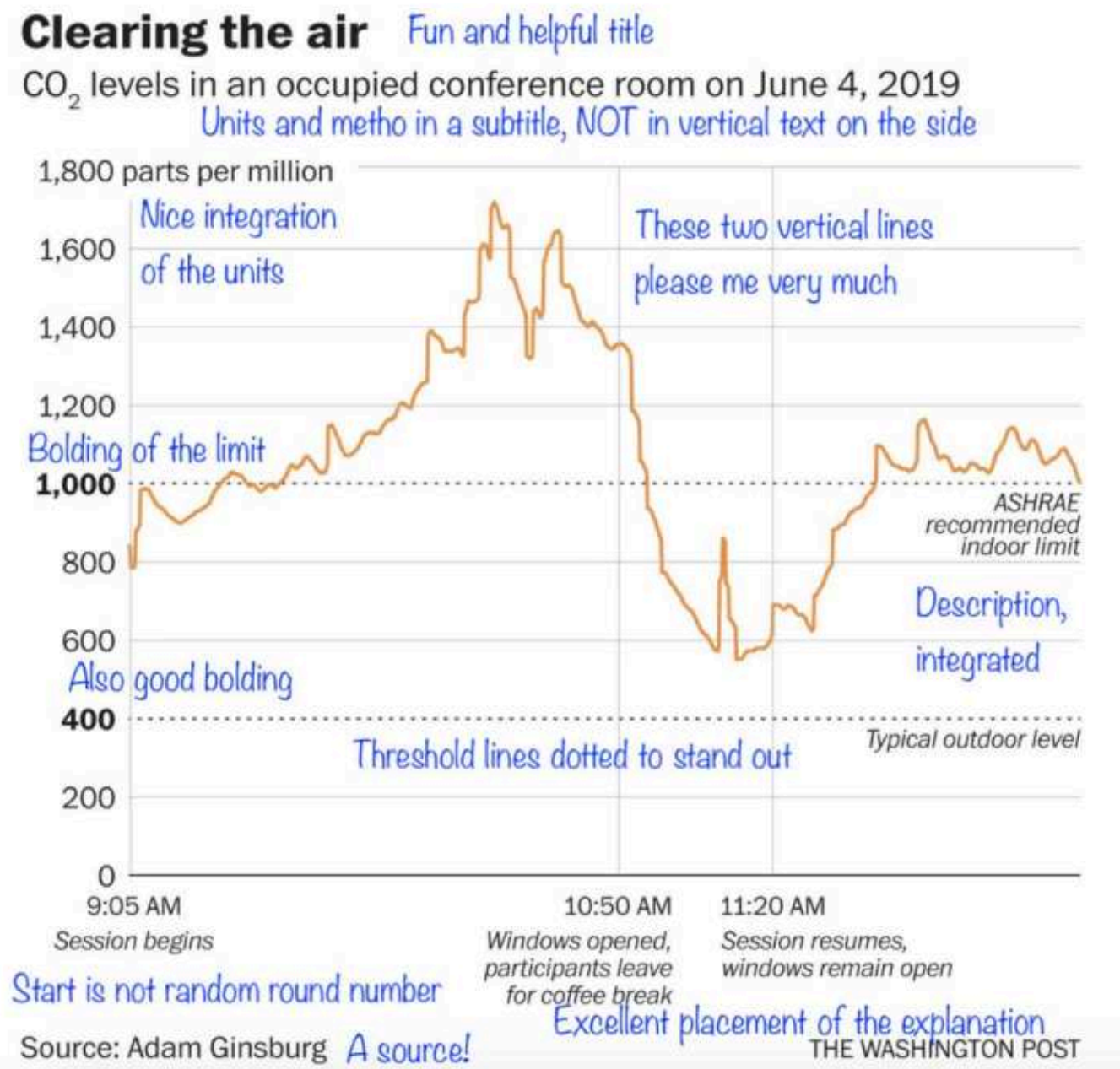
The 1-second test. Ask "What do you see first?" Evaluates if data is visible at first glance
Reverse feedback. Ask: "Explain to me what you see." Get feedback on chart type, text, layout, colors
Then focus the attention

- Axes, boxes, tick marks. Remove or mute?
- Legend necessary? Direct data label or title possible?
- Gridlines. Remove or mute? Necessary for log-scales/ precise values
- Use color sparingly. Remove unnecessary colors, use grey instead of black
- Align chart elements and multi-panel figures ticks, text, titles, legends, axes, labels
- Aim for symmetry, evenly filled space, separate elements in multi-panel figures gaps/white space

Quelle: Helena Jambor



Quelle: „Clearing the Air" von Adam Ginsburg (Washington Post)



Quelle: „Clearing the Air" by Adam Ginsburg (Washington Post) | (mit Kommentaren von Francis Gagnon

Dankeschön!

CÉDRIC SCHERER
Data Visualization & Information Design

www.cedricscherer.com