

III. ANALYSE

# 10. Data Visualisation and Exploration

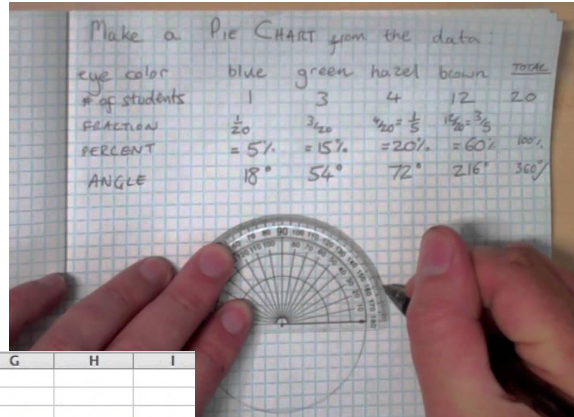
Prof. Dr. Martin Langner

Schreibman / Siemens / Unsworth (2004) Kap. 28;  
Jannidis / Kohle / Rehbein (2017) Kap. 23

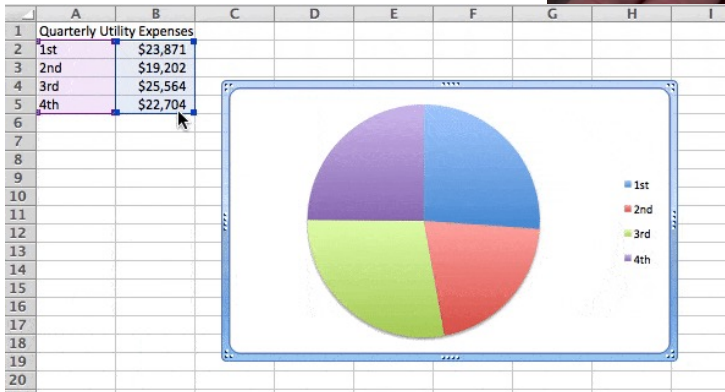




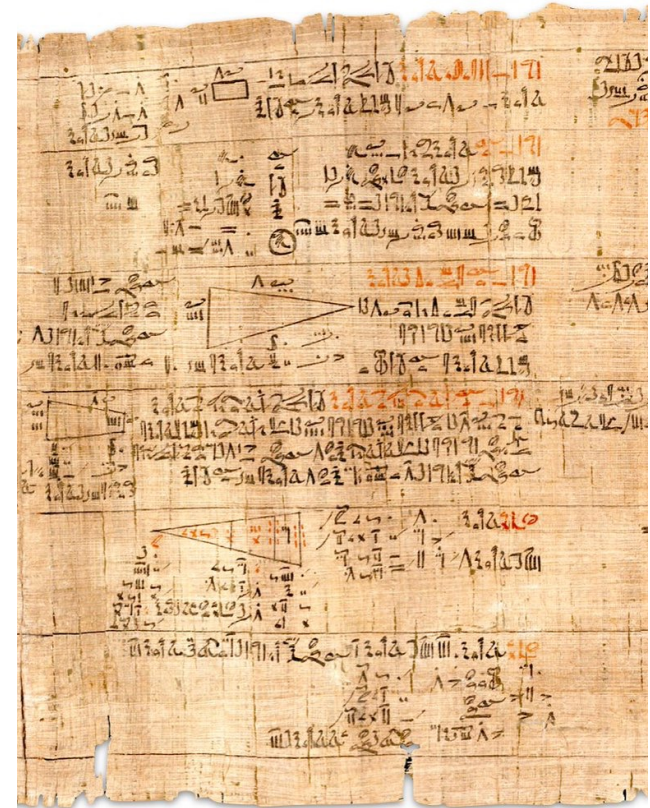
# EVERY VISUALISATION IS AN INTERPRETATION



<https://i.ytimg.com/vi/-nLg7oJ8Tzw/maxresdefault.jpg>



<https://www.smartsheet.com/sites/default/files/ic-excel-pie-charts-change->



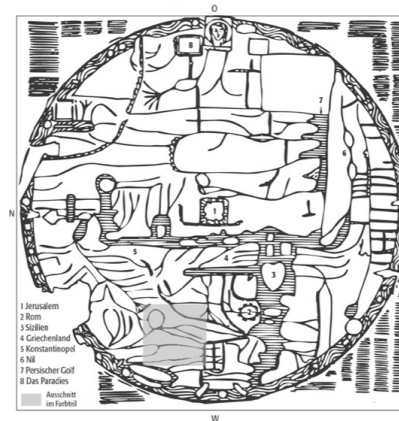
<https://pbs.twimg.com/media/ELMEbDaX0AUdhYQ?format=jpg&name=large>



[http://www.landschaftsmuseum.de/Bilder/Ebstorf/Ebstorf-neu\\_ganz-2.jpg](http://www.landschaftsmuseum.de/Bilder/Ebstorf/Ebstorf-neu_ganz-2.jpg)

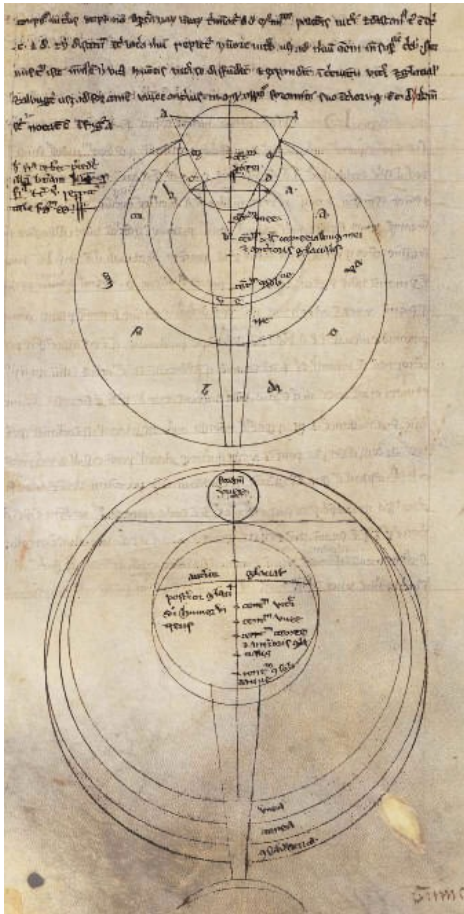
## Ebstorf world map, around 1300

- Diagram instead of geographical map
- Medieval conception of the world (divided into three continents, with Christ / Jerusalem in the centre of the world)

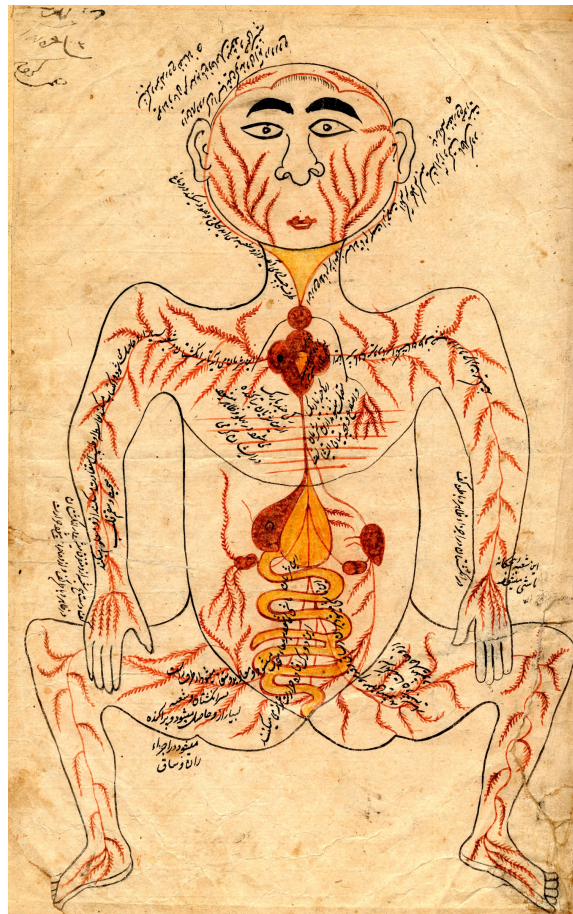


<https://www.spektrum.de/lexikon/kartographie-geomatik/ebstorfer-weltkarte/1106>





[https://upload.wikimedia.org/wikipedia/commons/b/bd/Roger\\_Bacon\\_optics01.jpg](https://upload.wikimedia.org/wikipedia/commons/b/bd/Roger_Bacon_optics01.jpg)



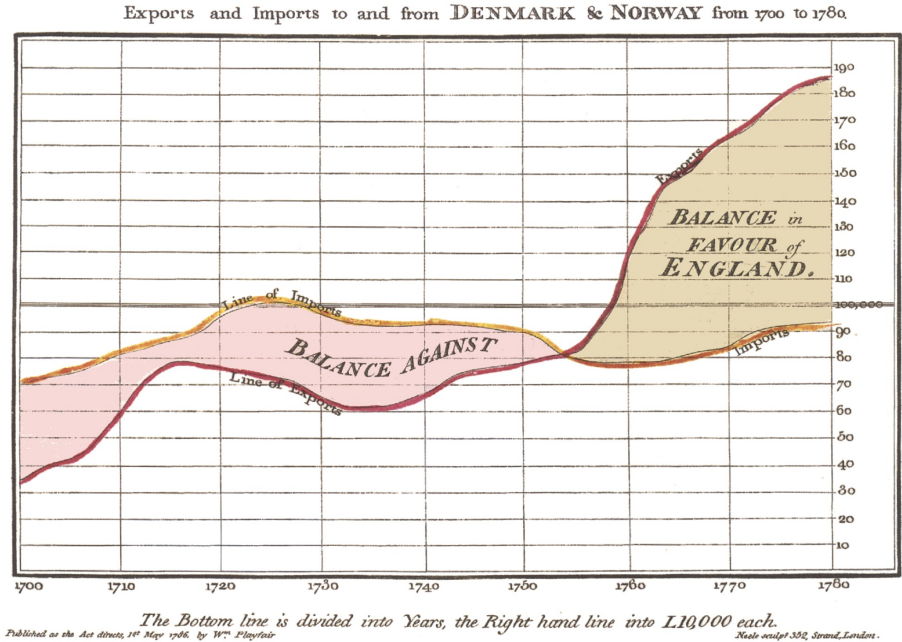
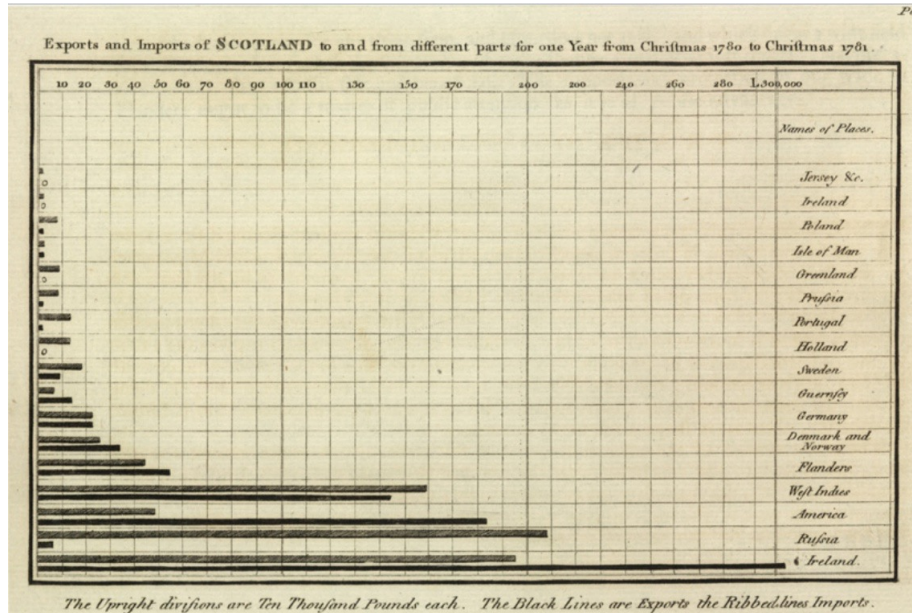
[https://en.wikipedia.org/wiki/Anatomy\\_Charts\\_of\\_the\\_Arabs#/media/File:Organs.png](https://en.wikipedia.org/wiki/Anatomy_Charts_of_the_Arabs#/media/File:Organs.png)

Technical drawings (Roger Bacon, Study of the Nature of Light, 1280; Anatomy of Mansur ibn Ilyas, c. 1400).

- Diagrams to illustrate and transmit knowledge



# Bar and Line Chart (William Playfair 1782/1786)

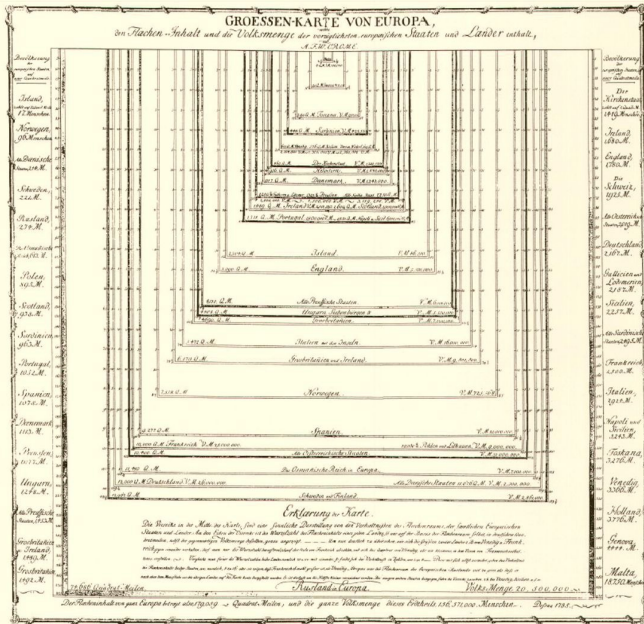


[https://upload.wikimedia.org/wikipedia/commons/5/52/Playfair\\_TimeSeries-2.png](https://upload.wikimedia.org/wikipedia/commons/5/52/Playfair_TimeSeries-2.png)

[https://upload.wikimedia.org/wikipedia/commons/e/e0/1786\\_Playfair\\_-\\_Exports\\_and\\_Imports\\_of\\_Scotland\\_to\\_and\\_from\\_different\\_parts\\_for\\_one\\_year\\_from\\_Christmas\\_1780\\_to\\_Christmas\\_1781.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e0/1786_Playfair_-_Exports_and_Imports_of_Scotland_to_and_from_different_parts_for_one_year_from_Christmas_1780_to_Christmas_1781.jpg)

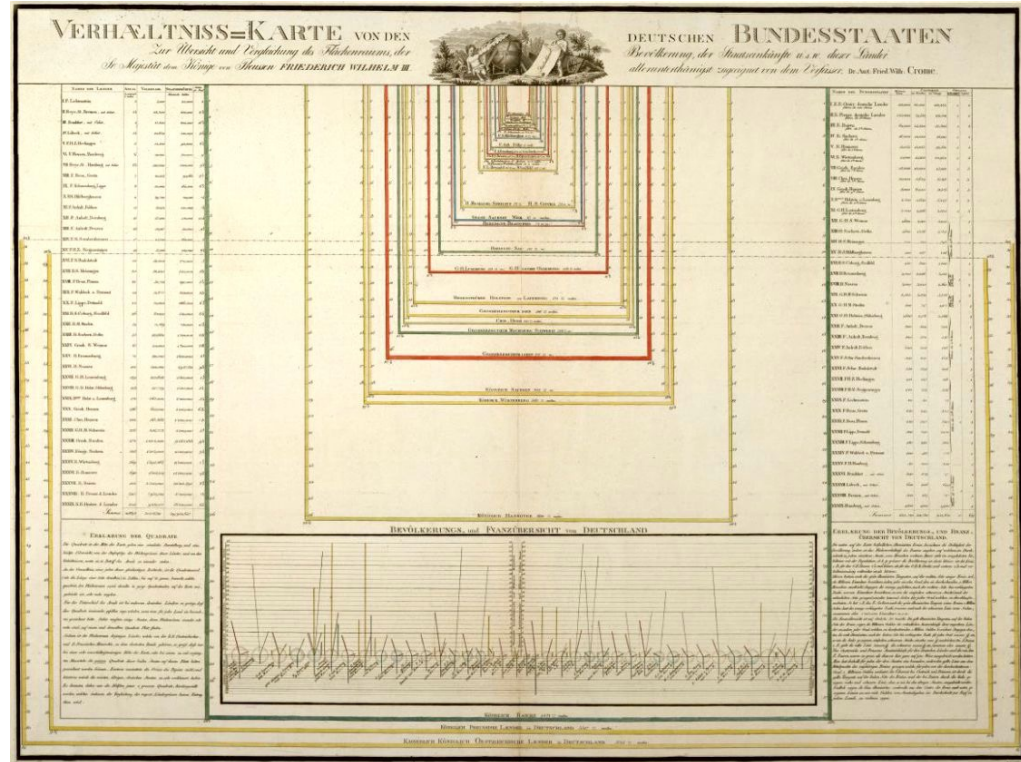


# Area Charts



Größenkarte von Europa (1785)

[https://upload.wikimedia.org/wikipedia/commons/d/d2/Groessen\\_Karte\\_von\\_Europa%2C\\_1785.jpg](https://upload.wikimedia.org/wikipedia/commons/d/d2/Groessen_Karte_von_Europa%2C_1785.jpg)

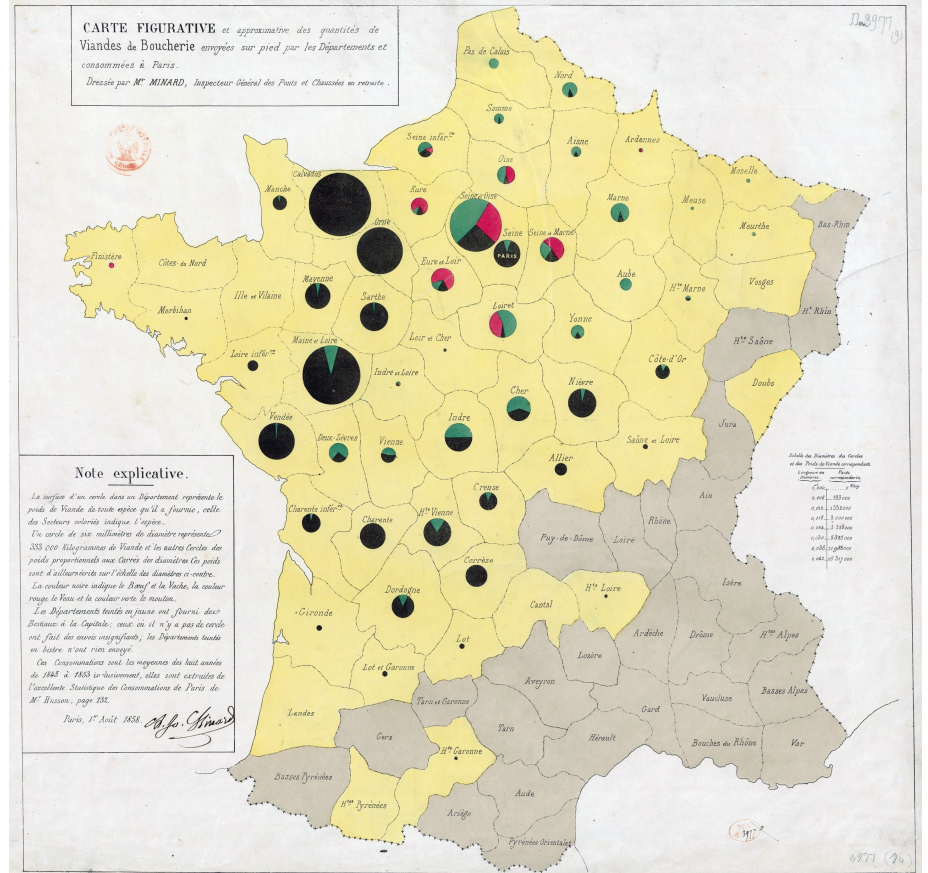


August Friedrich Wilhelm Crome, Verhältnisskarte von den deutschen Bundesstaaten (1820)

[https://upload.wikimedia.org/wikipedia/commons/4/44/Verhaeltniss\\_Karte\\_von\\_den\\_deutschen\\_Bundesstaaten%2C\\_1820.jpg](https://upload.wikimedia.org/wikipedia/commons/4/44/Verhaeltniss_Karte_von_den_deutschen_Bundesstaaten%2C_1820.jpg)



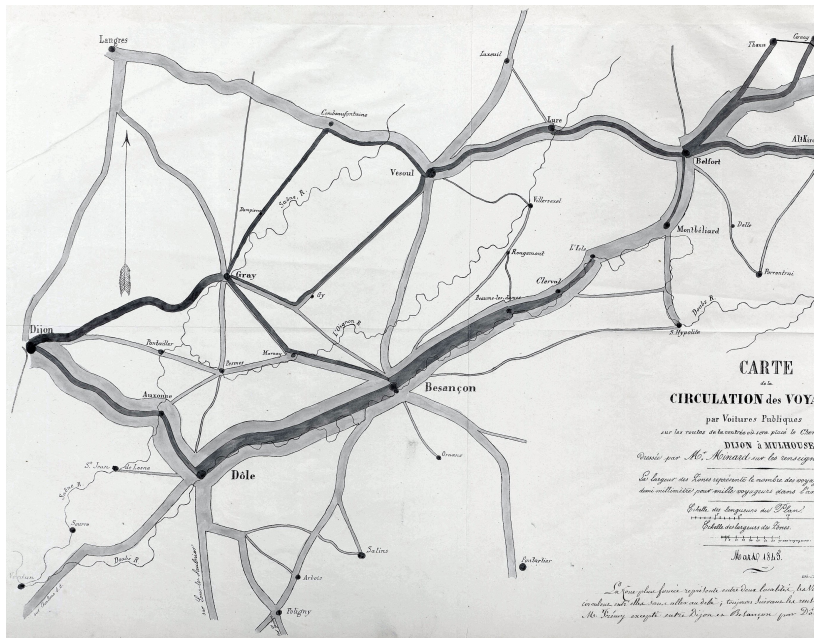
# Thematic maps and pie charts



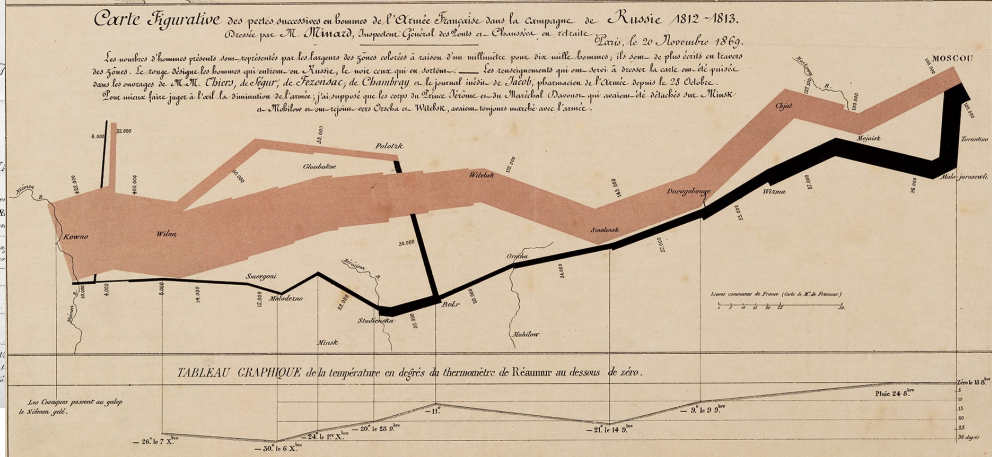
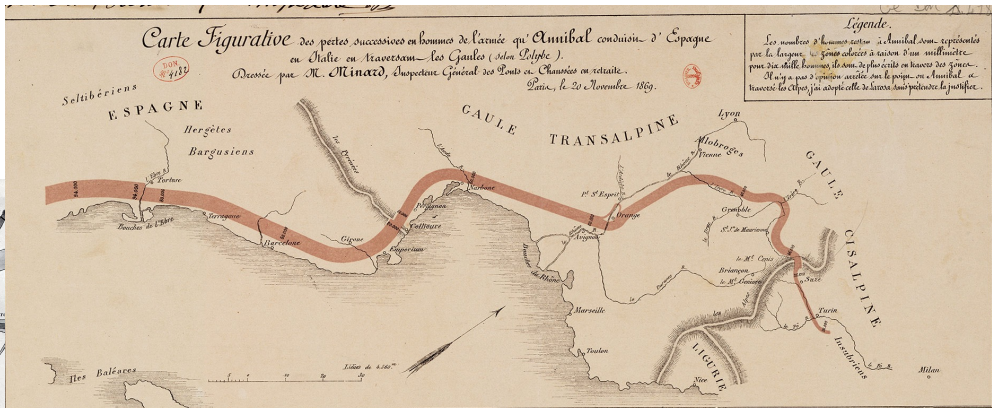
Charles Joseph Minard, "Carte figurative" mit der Darstellung des aus ganz Frankreich zum Verzehr nach Paris geschickten Viehs (1858)



# Mixed form of map and flow chart (Flow-Map)



[https://upload.wikimedia.org/wikipedia/commons/thumb/9/94/Carte\\_de\\_la\\_circulation\\_des\\_voyageurs\\_par\\_voitures\\_publicques\\_sur\\_les\\_routes\\_de\\_la\\_contrée\\_où\\_sera\\_placé\\_le\\_chemin\\_de\\_fer\\_de\\_Dijon\\_à\\_Mulhouse%2C\\_1845.jpg](https://upload.wikimedia.org/wikipedia/commons/thumb/9/94/Carte_de_la_circulation_des_voyageurs_par_voitures_publicques_sur_les_routes_de_la_contrée_où_sera_placé_le_chemin_de_fer_de_Dijon_à_Mulhouse%2C_1845.jpg)







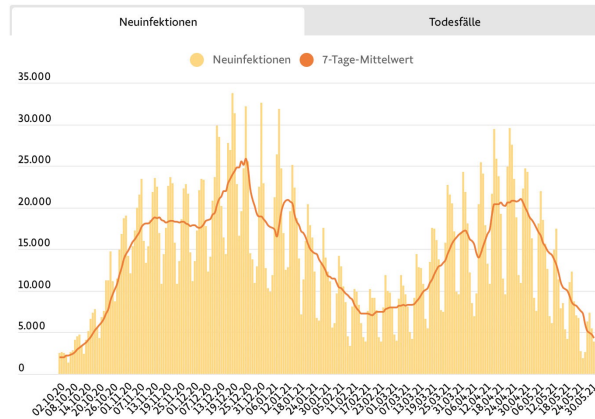
PODCASTS BLOGS THEMEN TICKER ARCHIV STELLENMARKT  
 Gesellschaft > Gesundheit > Coronavirus > Corona in Deutschland: Sieben-Tage-Inzidenz sinkt auf 35,2

**Frankfurter Allgemeine**  
 ZEITUNG ● FAZ.NET

Politik Wirtschaft Finanzen Feuilleton Karriere Sport **Gesellschaft** Stil Rhein-Main Technik Wissen Reise **Abo**

### Das Coronavirus in Deutschland

Covid-19 Neuinfektionen und Todesfälle, seit Oktober 2020



Zuletzt aktualisiert am 30.05.2021 / Grafik: Giesel / Quelle: Robert-Koch-Institut

Der bundesweite Sieben-Tage-R-Wert lag laut RKI-Lagebericht von Samstagnachmittag bei 0,75 (Vortag: 0,72). Das bedeutet, dass 100 Infizierte rechnerisch 75 weitere Menschen anstecken. Der R-Wert bildet jeweils das Infektionsgeschehen vor 8 bis 16 Tagen ab. Liegt er für längere Zeit unter 1, flaut das

The flood of information must be countered by an easily comprehensible visualisation of the facts. But this can only be done by concentrating on the main statements, i.e. by abstraction and information reduction.



<https://cdn4.vectorstock.com/images/1000x1000/06/48/23790648.jpg>



**IKEA IRELAND**  
BUSINESS PERFORMANCE FY17

**€167.1 million**  
Total sales in Ireland  
**+10%**  
growth on FY16  
**+0.5%**  
market share to 8.4%



**#1**  
IKEA Ireland is the  
**No. 1** brand in  
Ireland's Home  
Furnishing sector with  
**8.4%** market share



IKEA Ireland has **lowered the prices**  
of **250 products** in its range, including  
the three seat **STOCKSUND** sofa which  
is now **€549**



IKEA Ireland created **42 new jobs** in FY17  
**Total co-workers = 705**



Bedroom furniture was  
the biggest area of  
growth in IKEA

**14% INCREASE**  
IN SALES



Sustainability is a  
cornerstone of IKEA's  
growth agenda

IKEA's **wind farm** in  
Co. Leitrim produces  
more energy than IKEA  
uses in its Ballymun  
store and Carrickmines  
Order & Collection Point



Gender split across IKEA  
Ireland is **53% female**  
and **47% male**

**60%** of IKEA Managers  
are female  
**40%** are male

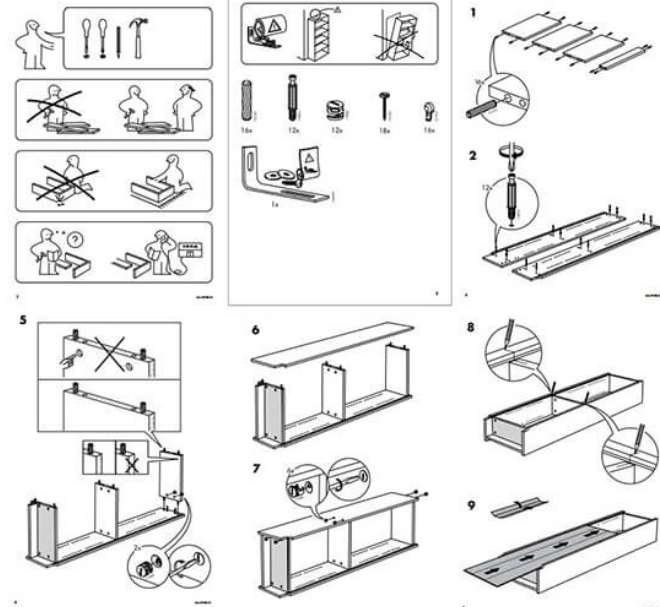


In FY17 IKEA continued  
its commitment to  
paying the **Living Wage** to all  
co-workers

Overall investment of  
**over €1.5 million** in  
IKEA co-workers since  
April 2016

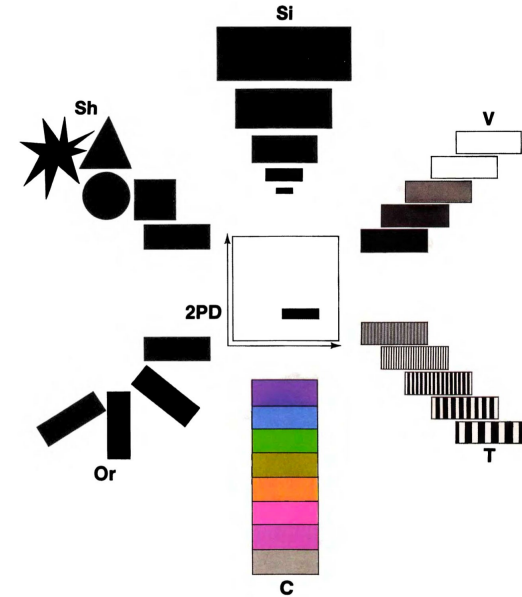
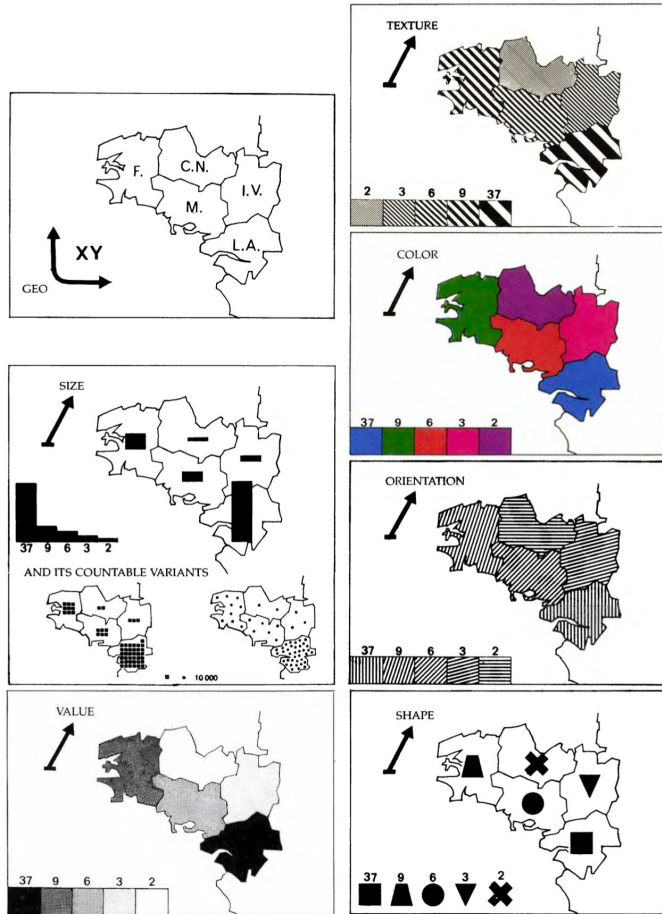
- quantified, non-figurative, abstract (charts)
- qualitative, figurative, schematic (diagrams)

**BILLY**



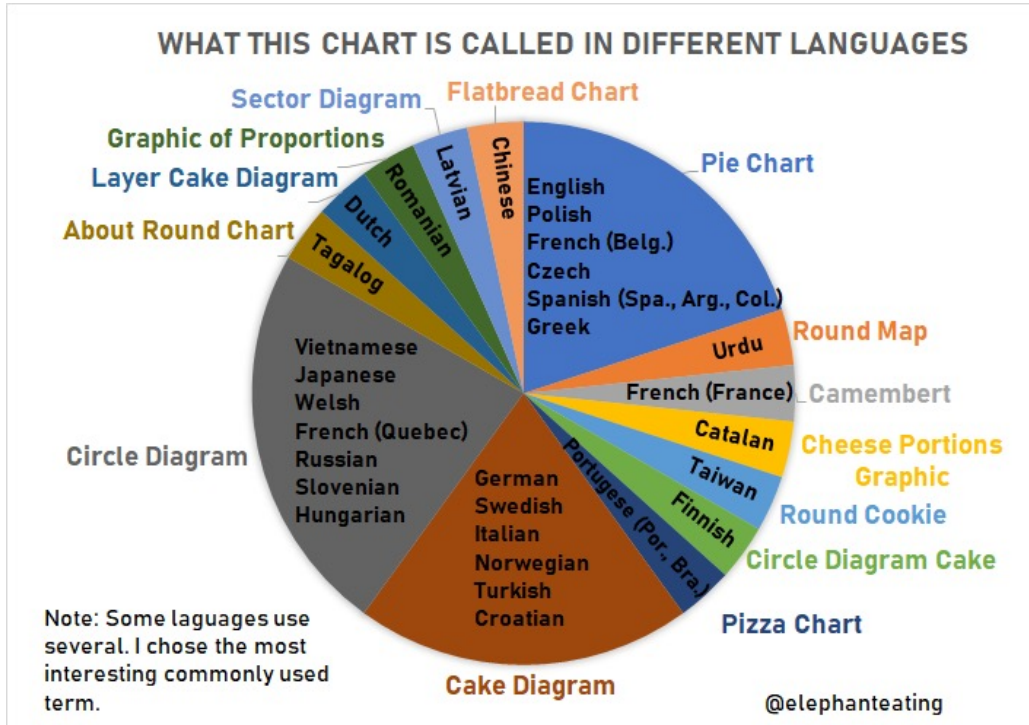
„Ce point est fondamental. C'est la mobilité interne de l'image qui caractérise la graphique moderne. On ne «dessine» plus un graphique une fois pour toutes. On le «construit» et on le reconstruit (on le manipule) jusqu'au moment où toutes les relations qu'il recèle ont été perçues.“

Jacques Bertin 1967

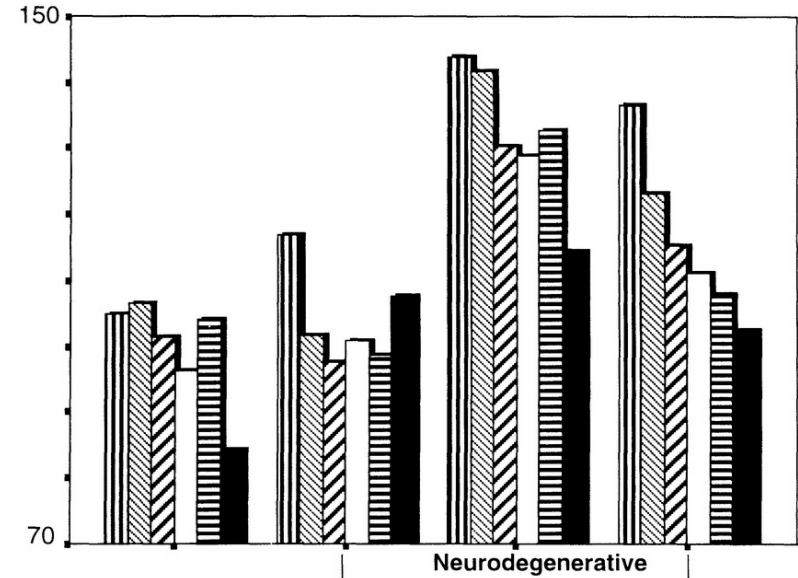


Jacques Bertin, Sémiologie graphique. Les diagrammes, les réseaux, les cartes (Paris, 1967) 16. 48. 60

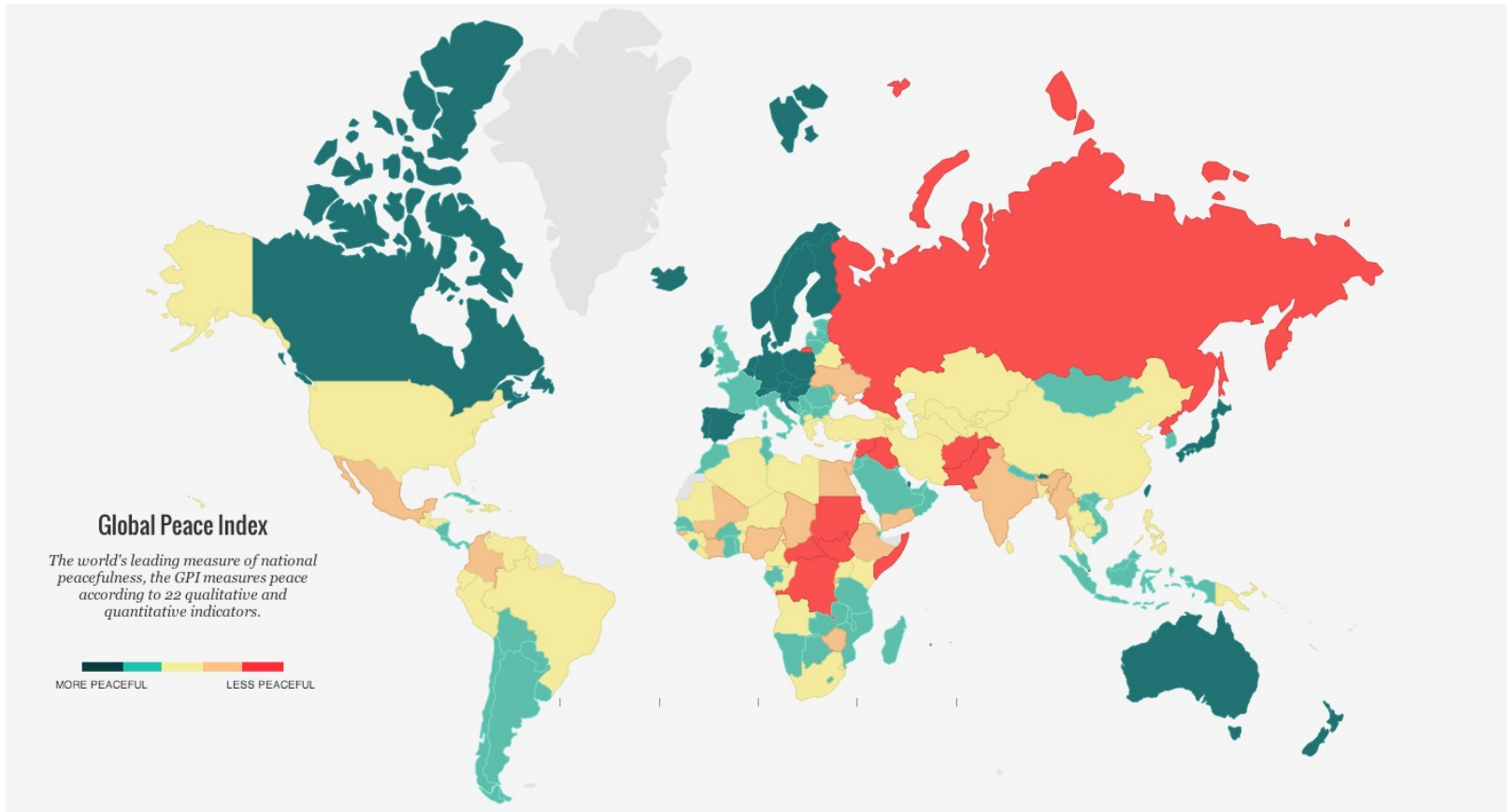




<https://pbs.twimg.com/media/EuMz15IVgAl4z04.png>



<https://www.researchgate.net/profile/Fatima-Shawkat/publication/14440023/figure/fig2/AS:601722665828367@1520473271699/Bar-chart-of-mean-pattern-and-flash-V-EP-latencies-for-the-different-diagnostic.png>



## 1. MULTIVARIATE METHODS

Exploratory Statistics

Principal Component  
Analysis

Correspondence Analysis  
and Seriation

## 2. NETWORK ANALYSIS

Basics

Complex Systems

Social Network Analysis

Historical Network Analysis

## 3. DATA VISUALISATION

Data Visualisation in  
Comparison

Chart types

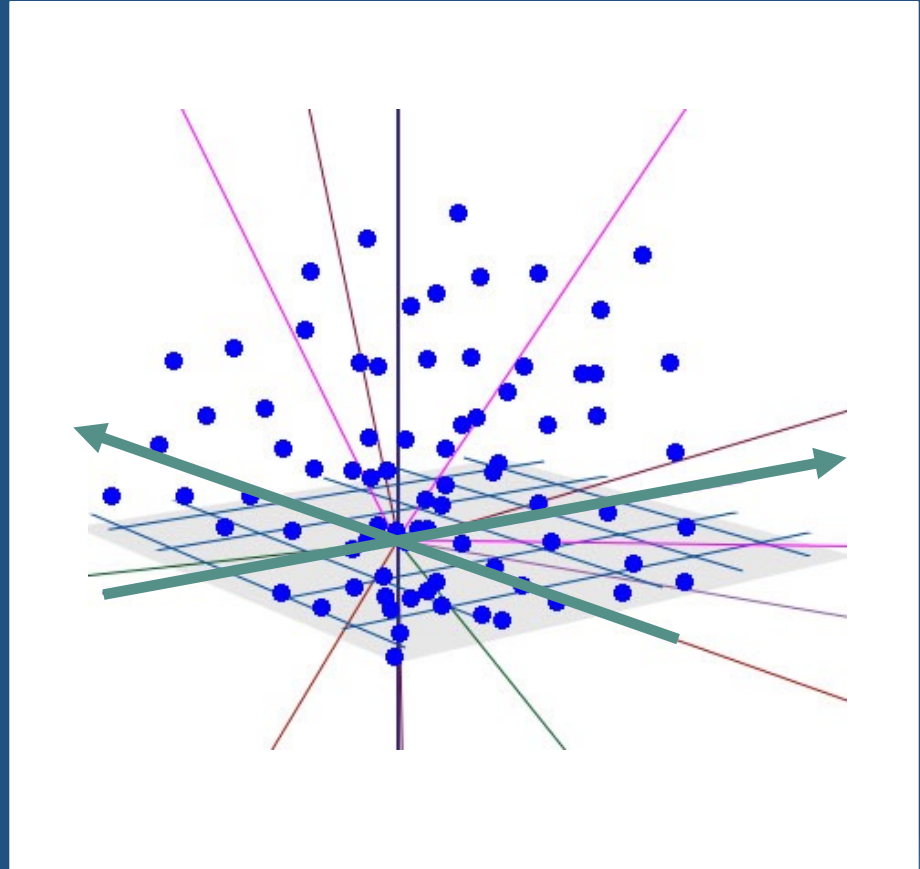
Basic Principles of  
Visualisation

Tools





# 1. MULTIVARIATE METHODS





## EXPLORATORY STATISTICS

**Descriptive** statistics sort the data according to certain criteria and illustrate this in simple key figures, tables and graphs.

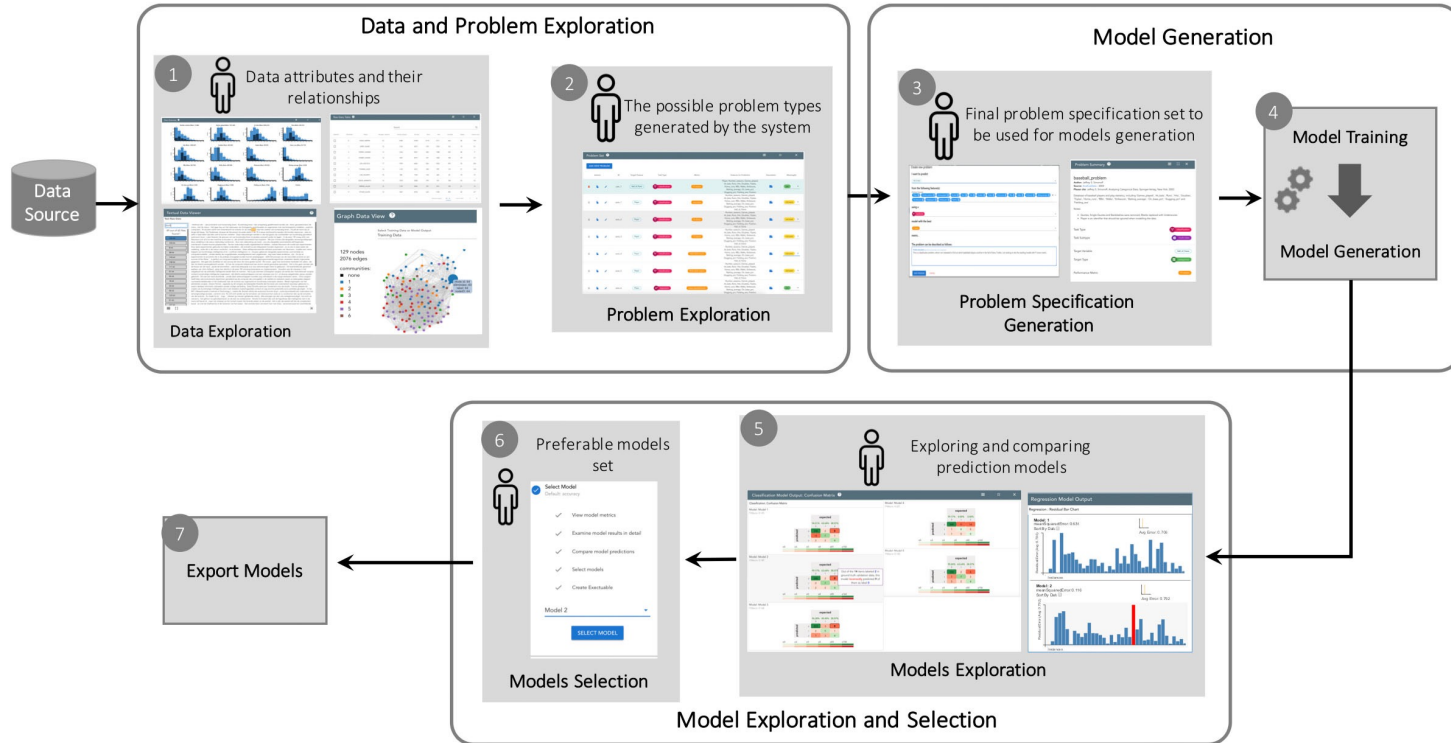
**Inductive** or inferential statistics, on the other hand, ask to what extent what is measured corresponds to reality by deriving properties of a population from the data of a sample.

Exploratory or hypothesis-generating statistics systematically searches for significant patterns in Big Data, i.e. for possible correlations and differences in the data.

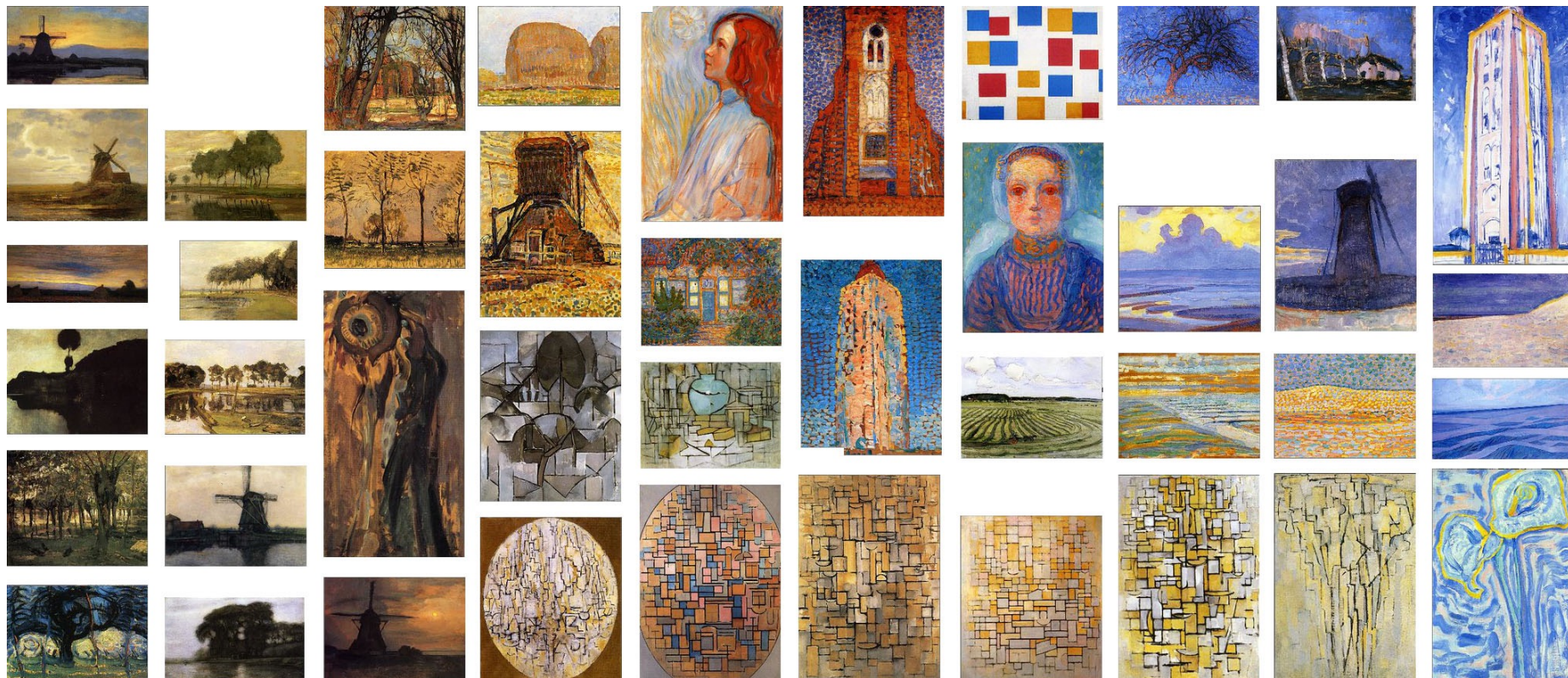
These initially hypothetical statements can only be considered certain after additional inductive investigations.



# VISUAL ANALYTICS



J. J. Thomas, K. A. Cook (Hrsg.),  
 Illuminating the path.  
 The research and development agenda  
 for visual analytics  
 (IEEE Computer Society 2005):  
[https://ils.unc.edu/courses/2017\\_fall/inls641\\_001/books/RD\\_Agenda\\_VisualAnalytics.pdf](https://ils.unc.edu/courses/2017_fall/inls641_001/books/RD_Agenda_VisualAnalytics.pdf)

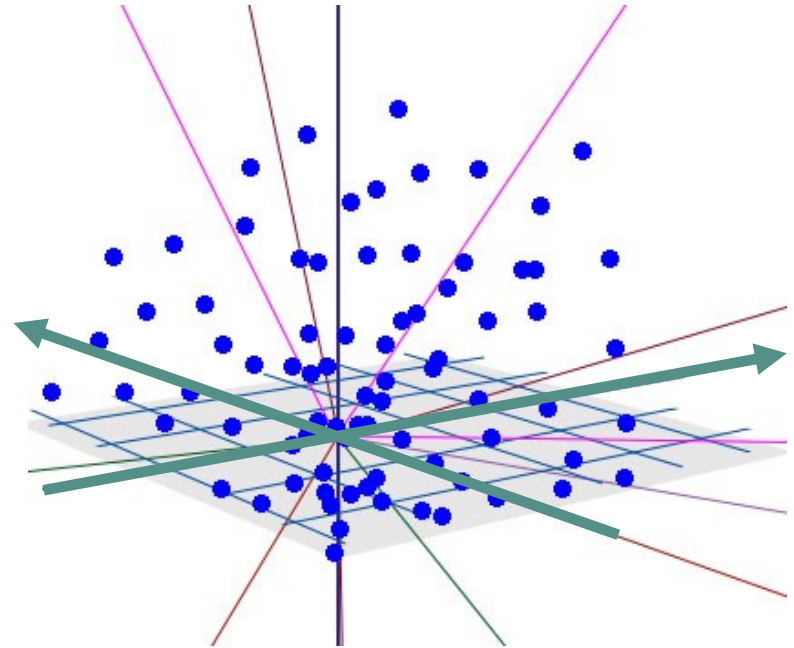


Mondrian's paintings of his early period 1905-1917, sorted according to subjective criteria



## PRINCIPAL COMPONENT ANALYSIS (PCA)

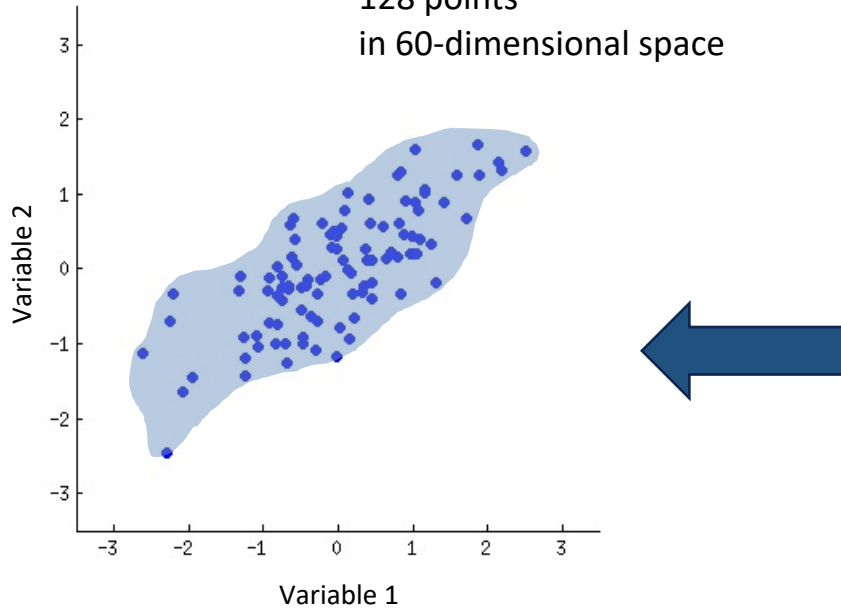
summarises a large number of statistical variables (using mathematical approximation) in a smaller number of linear combinations that are as meaningful as possible. A group of components thus becomes a principal component and is illustrated in a coordinate system.



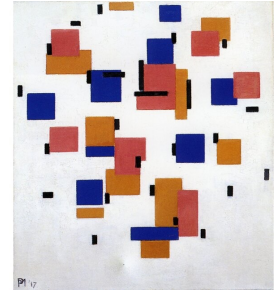
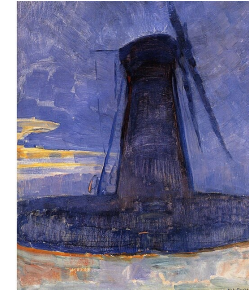


# PRINCIPAL COMPONENT ANALYSIS

128 points  
in 60-dimensional space



[https://ichi.pro/assets/images/max/724/1\\*T7CqIFV5aRm6MxO5nJt7Qw.gif](https://ichi.pro/assets/images/max/724/1*T7CqIFV5aRm6MxO5nJt7Qw.gif)



128 paintings by Piet Mondrian (1905–1917)

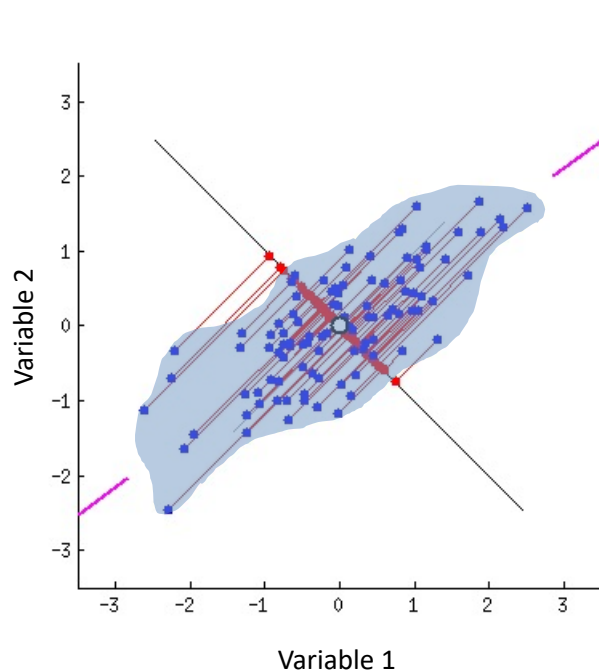
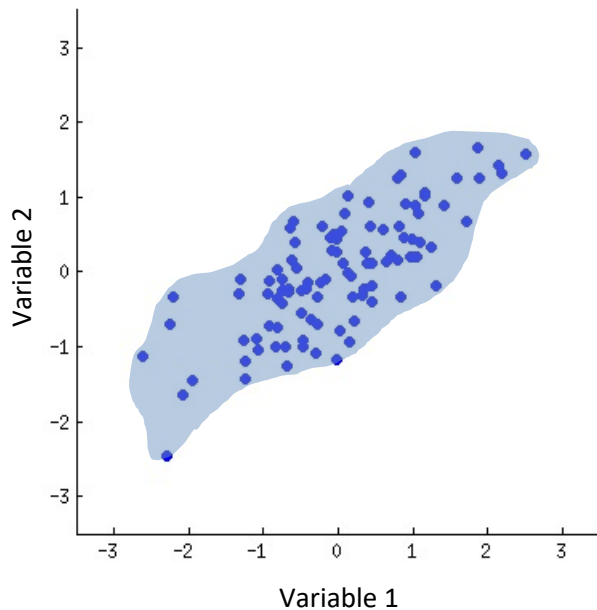
	A	B	C	A	B	C	A	B	C
2	1905	73	41	1907,5	120	80	1909,5	94	
3	1905	99	42	1907,5	148	81	1909,5	95	
4	1905	105	43	1908	73	82	1909,5	101	
5	1905	132	44	1908	74	83	1909,5	111	
6	1905,5	52	45	1908	83	84	1909,5	121	
7	1905,5	70	46	1908	87	85	1909,5	129	
8	1905,5	88	47	1908	89	86	1909,5	178	
9	1905,5	98	48	1908	91	87	1910	52	
10	1905,5	117	49	1908	118	88	1910	154	
11	1905,5	120	50	1908	116	89	1910	170	
12	1905,5	130	51	1908	129	90	1911	111	
13	1905,5	135	52	1908	133	91	1911	123	
14	1905,5	137	53	1908	151	92	1911	132	
15	1906	91	54	1908	166	93	1911	140	
16	1906	108	55	1908,5	72	94	1911	141	
17	1906,5	72	56	1908,5	89	95	1912	108	
18	1906,5	83	57	1908,5	97	96	1912	111	
19	1906,5	85	58	1908,5	118	97	1912	119	
20	1906,5	100	59	1908,5	164	98	1912	146	
21	1906,5	104	60	1909	98	99	1912	158	
22	1906,5	107	61	1909	101	100	1912	163	
23	1906,5	116	62	1909	106	101	1912	164	
24	1906,5	140	63	1909	120	102	1913	130	
25	1906,5	157	64	1909	145	103	1913	138	
26	1907	70	65	1909	150	104	1913	164	
27	1907	88	66	1909	151	105	1913	167	
28	1907	93	67	1909	152	106	1913	175	
29	1907	105	68	1909	159	107	1913	177	
30	1907	119	69	1909	165	108	1914	118	
31	1907	122	70	1909	168	109	1914	155	
32	1907	135	71	1909	175	110	1914	164	
33	1907	138	72	1909	179	111	1914	172	
34	1907	158	73	1909	184	112	1914	184	
35	1907,5	72	74	1909	185	113	1914	200	
36	1907,5	75	75	1909	187	114	1914	104	
37	1907,5	90	76	1909	191	115	1917	170	
38	1907,5	96	77	1909	193	116	1917	188	
39	1907,5	106	78	1909	194	117	1917	186	
40	1907,5	106	79	1909	216	118	1917	200	

60 features =  
7680 measured values

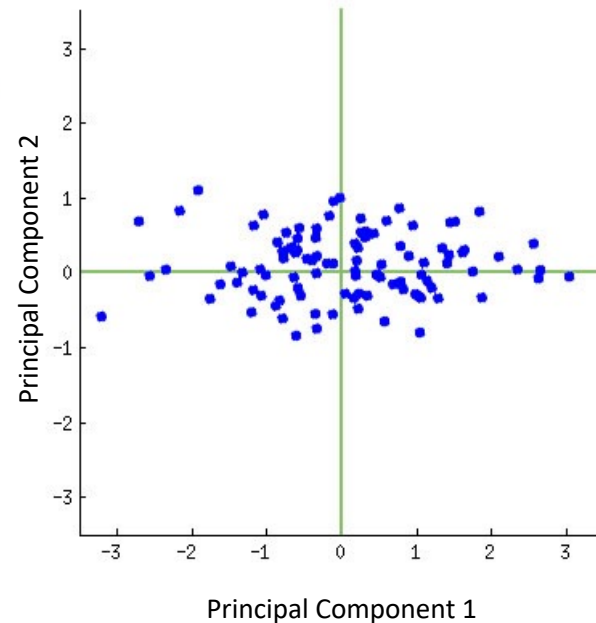


# PRINCIPAL COMPONENT ANALYSIS

Scatter plot (unrotated)



Scatter plot (rotated)





# PRINCIPAL COMPONENT ANALYSIS

Komponent	Anfangliche Eigenwerte			Summen von quadrierten Faktorladungen für Extraktion			Rotierte Summe der quadrierten Ladungen		
	Gesamt	% der Varianz	Kumulierte %	Gesamt	% der Varianz	Kumulierte %	Gesamt	% der Varianz	Kumulierte %
1	8,511	42,553	42,553	8,511	42,553	42,553	6,484	32,421	32,421
2	3,579	17,897	60,450	3,579	17,897	60,450	3,792	18,960	51,381
3	1,156	5,780	66,230	1,156	5,780	66,230	2,238	11,189	62,569
4	1,055	5,274	71,504	1,055	5,274	71,504	1,787	8,934	71,504
5	,888	4,373	75,877						
6	,773	3,864	80,143						
7	,593	2,963	83,106						
8	,501	2,507	85,613						
9	,493	2,467	88,080						
10	,423	2,114	90,193						
11	,364	1,819	92,013						
12	,314	1,569	93,581						
13	,254	1,272	94,853						
14	,226	1,131	95,984						
15	,224	1,121	97,105						
16	,190	,952	98,057						
17	,132	,662	98,720						
18	,105	,527	99,247						
19	,084	,418	99,664						
20	,067	,336	100,000						

Anfangliche Eigenwerte		
Gesamt	% der Varianz	
8,511	42,553	
3,579	17,897	
1,156	5,780	
1,055	5,274	

Eigenvalues > 1  
(Kaiser-Guttman criterion)





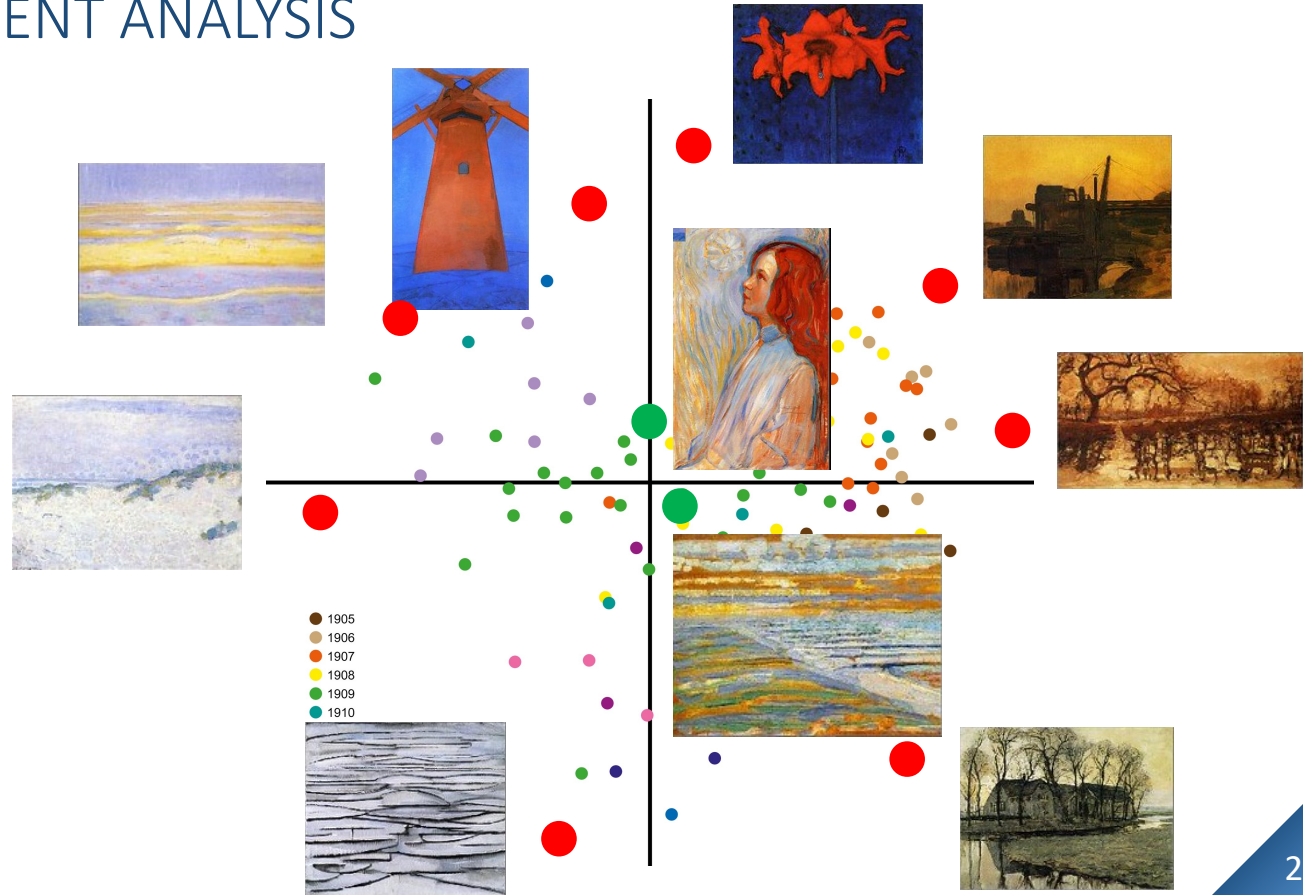
# PRINCIPAL COMPONENT ANALYSIS

- a good method to search exploratively for common features in large image sets or complex groups of objects by modelling the degree of variance differently accordingly.



# PRINCIPAL COMPONENT ANALYSIS

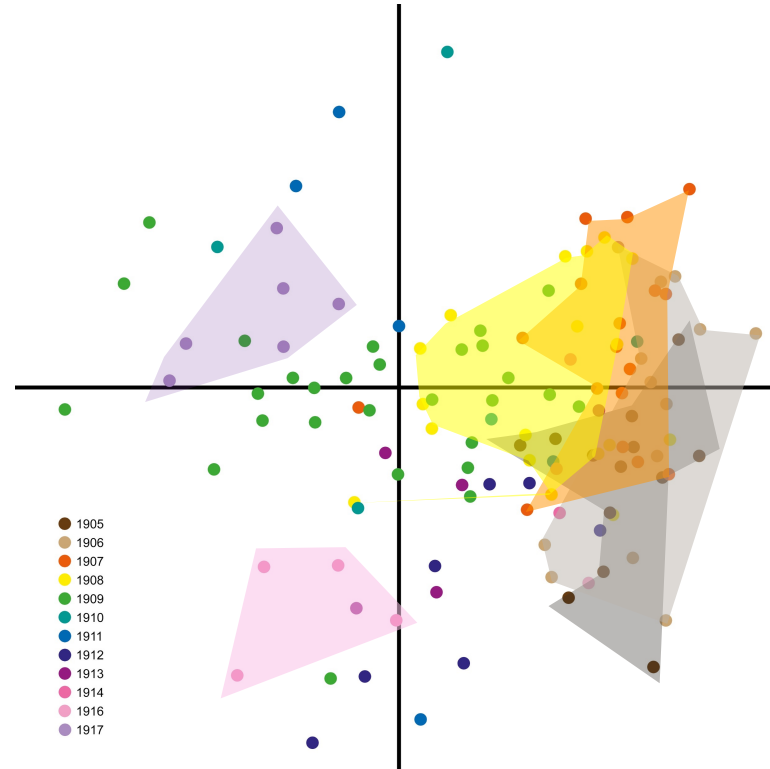
The two axes divide the points into four quadrants, which roughly divide the data into four groups. The further two points are from the centre of the coordinate system, the more dissimilar they are.





# PRINCIPAL COMPONENT ANALYSIS

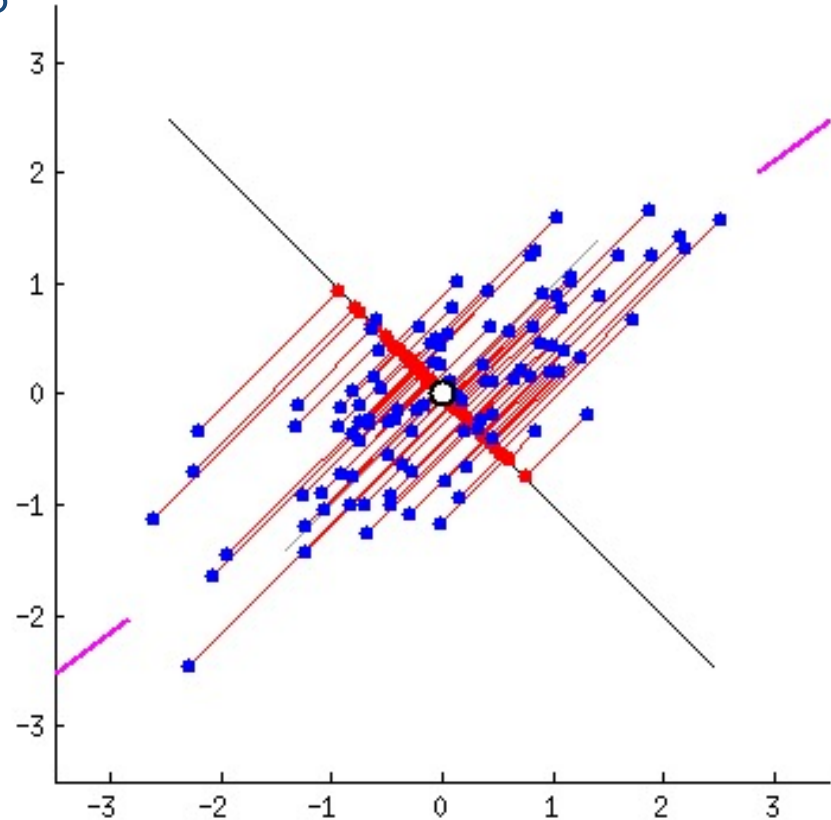
The two axes divide the points into four quadrants, which roughly divide the data into four groups. The further two points are from the centre of the coordinate system, the more dissimilar they are.





# PRINCIPAL COMPONENT ANALYSIS

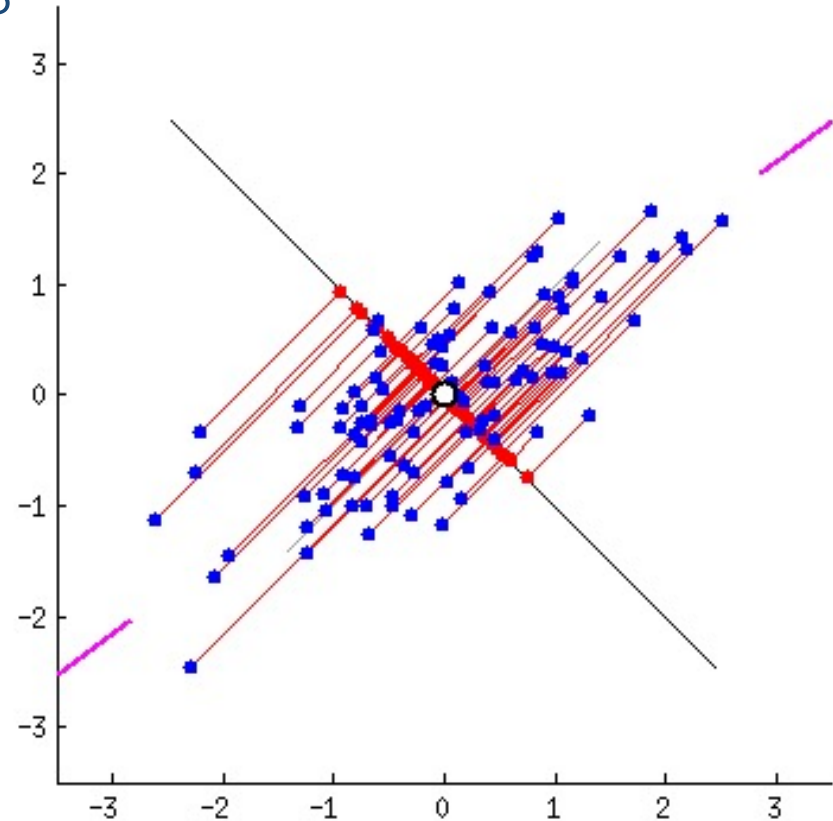
uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components.





# PRINCIPAL COMPONENT ANALYSIS

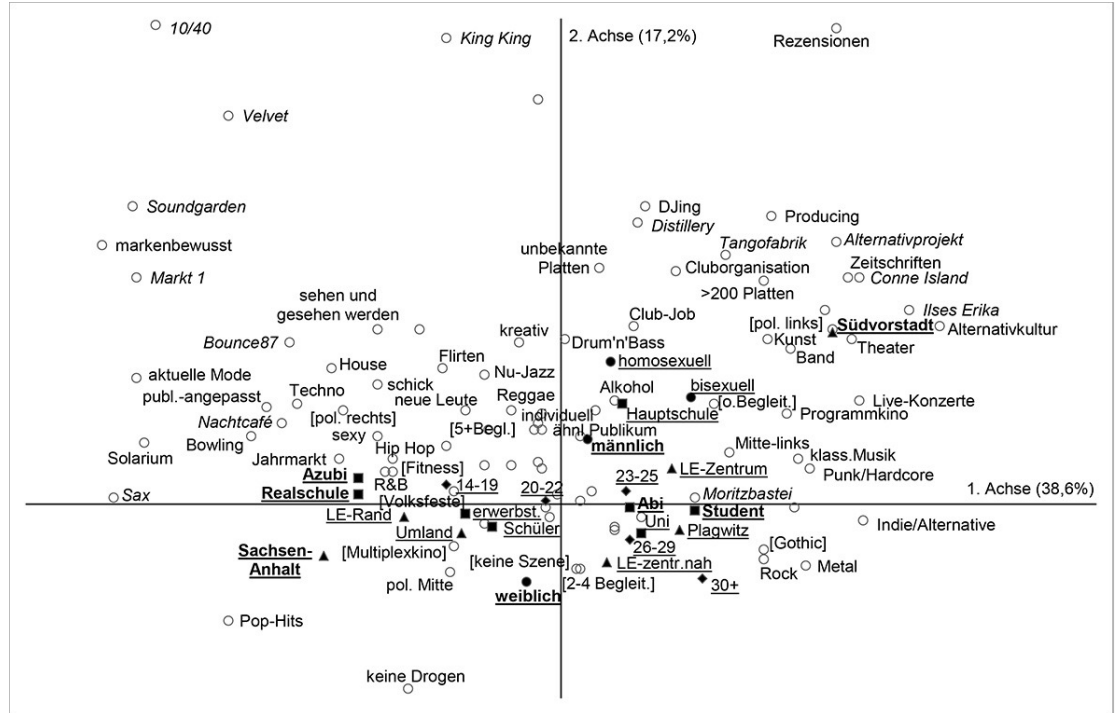
This transformation is defined in such a way that the first principal component has the largest possible variance (that is, accounts for as much of the variability of the data as possible) and each subsequent component in turn has the largest possible variance under the constraint that it is orthogonal to the previous components.





# CORRESPONDENCE ANALYSIS

## Principal component analysis of categorical data



Milieu study on the German music scene

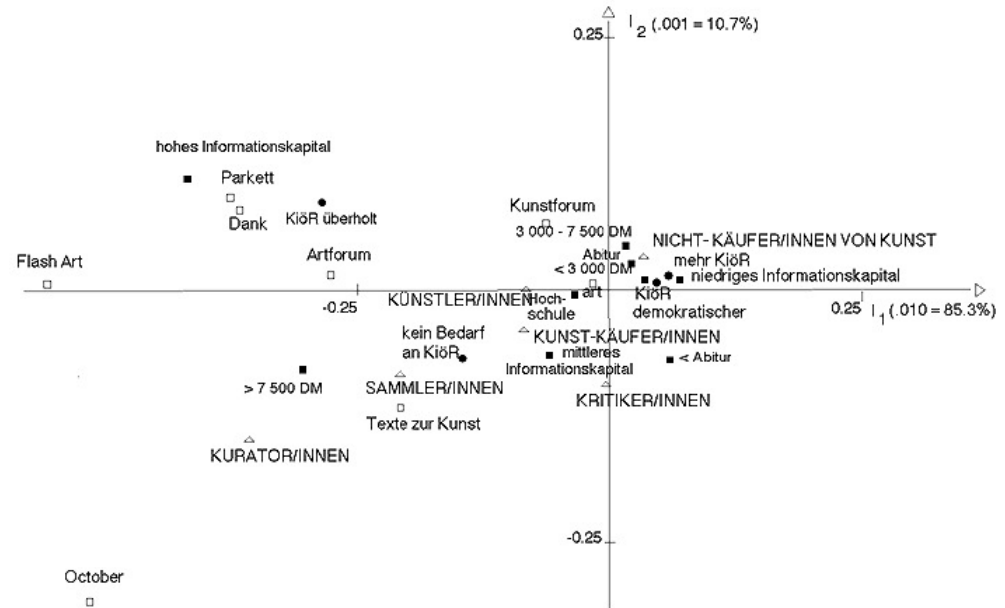
[https://kaput-mag.com/stories-de/gunnar-otte\\_fuehlst-du-dich-einer-musikszene-zugehoerig/](https://kaput-mag.com/stories-de/gunnar-otte_fuehlst-du-dich-einer-musikszene-zugehoerig/)



# CORRESPONDENCE ANALYSIS

Two-dimensional representation  
of tables with more than one  
dependency on each other as a  
graph

Graphik 2: Bewertung von Kunst im öffentlichen Raum (KiöR), nach Informationskapital, ökonomischem und kulturellem Kapital, Kunstweltgruppen und Kunstzeitschriften. Hamburg 1993 / 1994 (Korrespondenzanalyse, Q = 96%)



<https://www.visarteost.ch/-/andereorte/texte/uwuggenig/images/graphik2.gif>

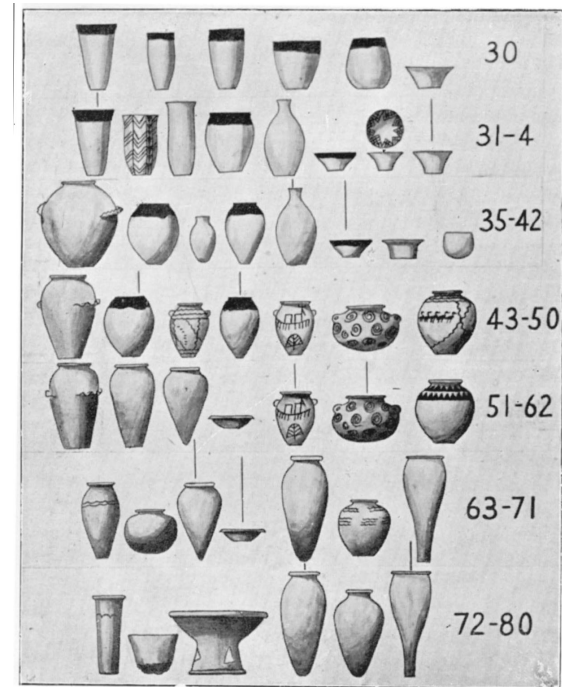
# CONTEXTUAL SERiation

of the named vessel types and graves 1-7:

1 = Context contains the vessel type

0 = Context does not contain the vessel type

	ABCDEF G			ABCDEF G		FEAGDBC	
beaker	0000110	beaker	beaker	* *	beaker	**	beaker
blackrim	1000110	blackrim	blackrim	* **	blackrim	***	blackrim
bottle	1000100	bottle	bottle	* *	bottle	**	bottle
handle	0101000	handle	handle	* *	handle	***	handle
spirals	1001001	spirals	spirals	* * *	spirals	**	spirals
flatpot	0111000	flatpot	flatpot	***	flatpot	**	flatpot
pointed	0001001	pointed	pointed	* *	pointed	***	pointed
	ABCDEF G			ABCDEF G		FEAGDBC	



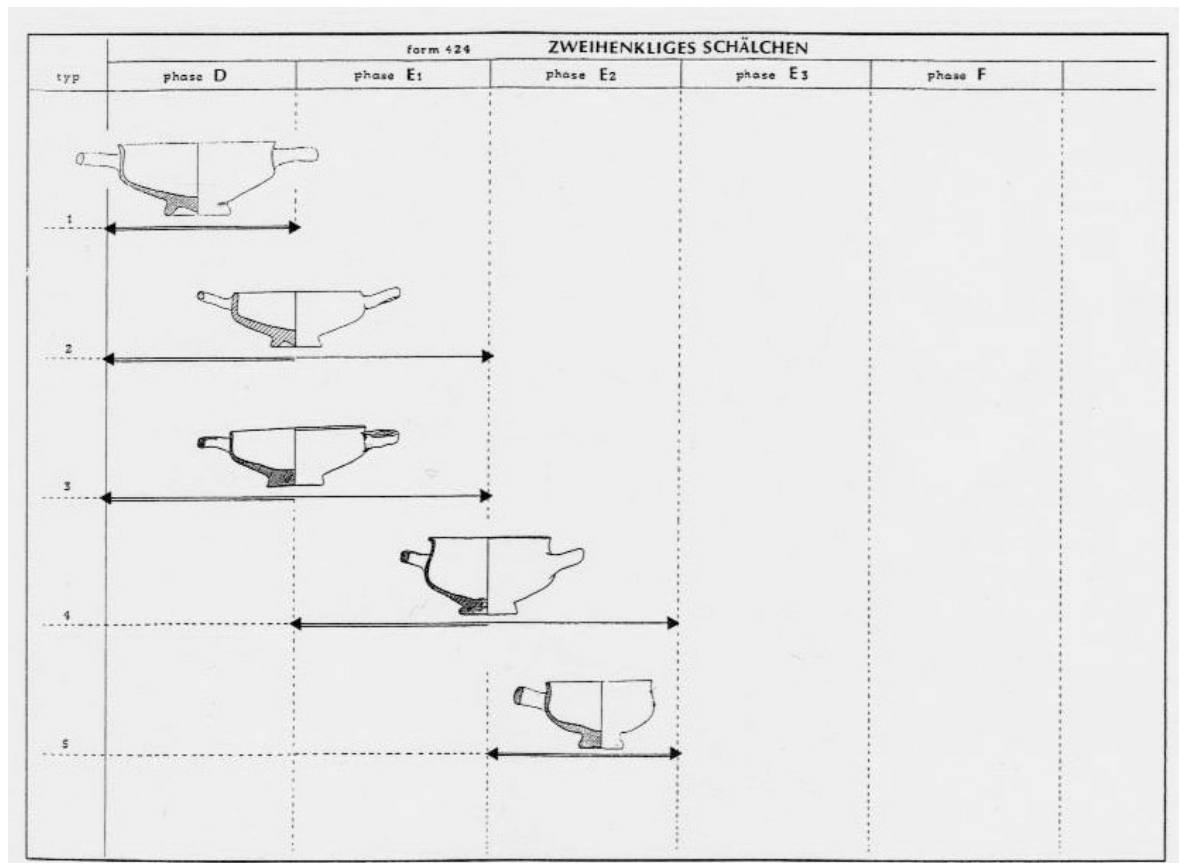
Flinders W. M. Petrie, Sequences in prehistoric remains. *Journal of the Anthropological Institute* 29, 1899, 295–301;  
 C. Renfrew – P. Bahn, *Archaeology. Theories, Methods, and Practice* (London 1996) 117; Johannes Müller – Andreas Zimmermann (Hrsg.), *Archäologie und Korrespondenzanalyse. Beispiele, Fragen, Perspektiven* (Rahden/Westf. 1997);  
 K. Kris Hirst, *An Introduction to Seriation* (<http://archaeology.about.com/od/dating/ss/seriation.htm>)



# SERIATION

of grave goods using  
the example of  
Taranto

Daniel Graepler,  
Relativchronologische Ordnung  
hellenistischer Keramik aus der  
Nekropole von Tarent mit Hilfe der  
Korrespondenzanalyse, in:  $\Delta'$   
επιστημονικη συναντηση για την  
ελληνιστικη κεραμικη, Mytilene  
1994, Praktika (Athen 1997) 170  
Vgl. auch D. Graepler, Tonfiguren  
im Grab (München 1997) 67 f. und  
76 f. zum Typenbegriff.

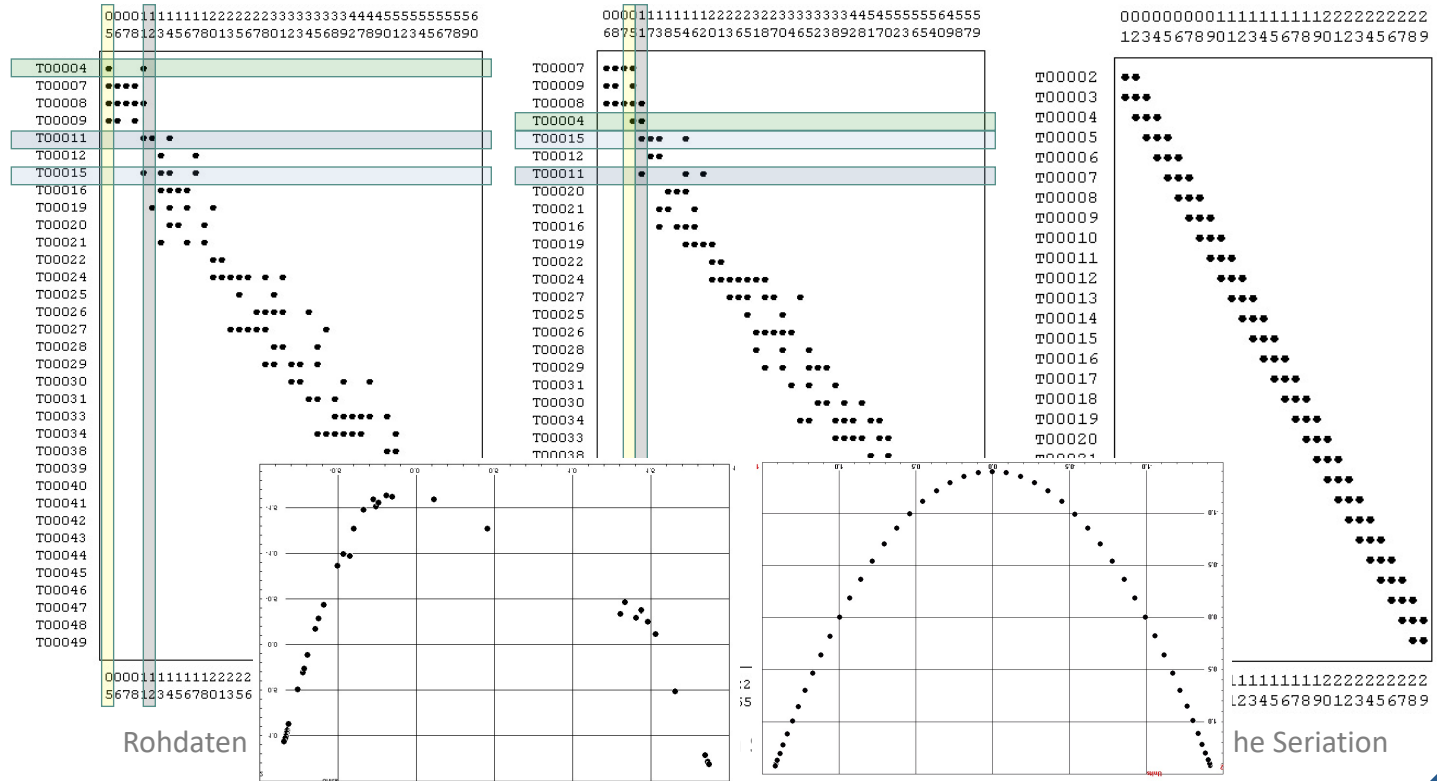




# SERIATION

reordering rows and columns of the table to form a diagonal in the table

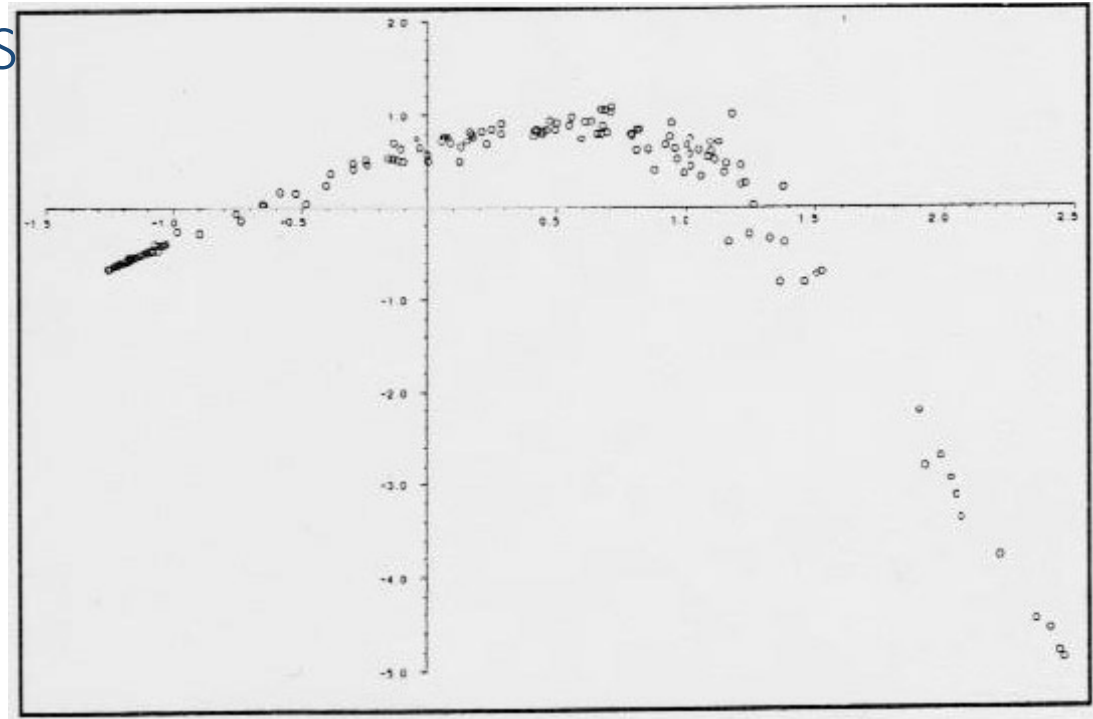
C. K. Jensen, K. Høilund Nielsen (eds.) Burial and Society: The Chronological and Social Analysis of Archaeological Burial Data (Aarhus University Press, 1997), 29–61





## CORRESPONDENCE ANALYSIS

Regional deviations, gender-specific or e.g. ethnic differences distort the result (best to use data from one location!)



Graph der Korrespondenzanalyse, Gräber der Phasen D–F in Tarent

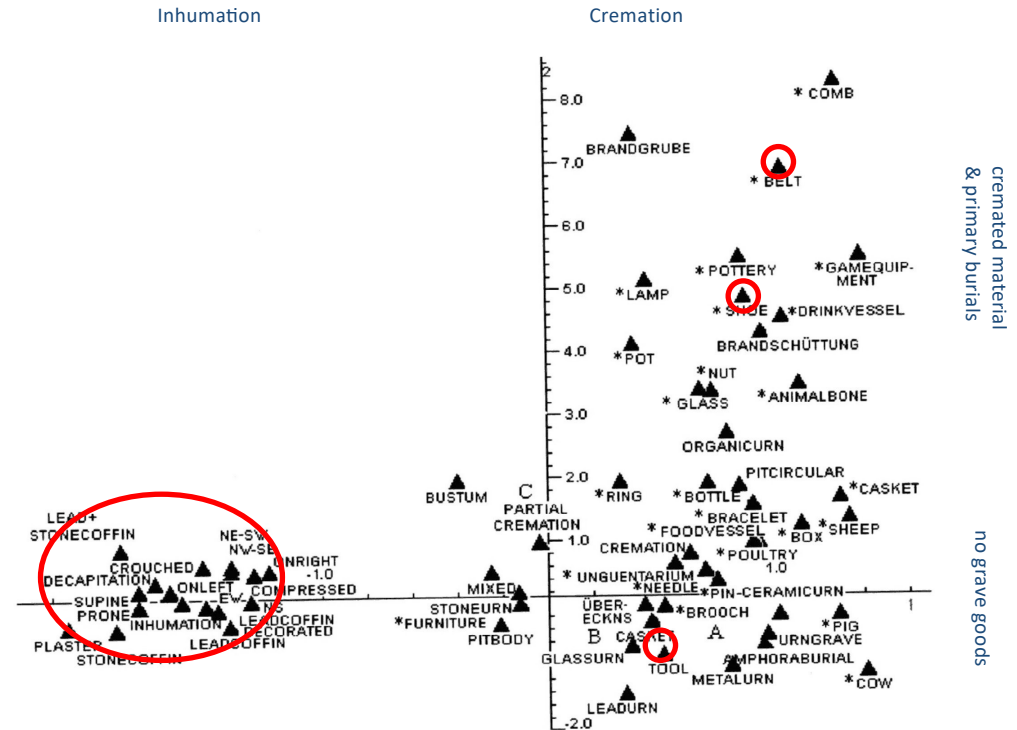
K.G. Hempel, Keramik des 2. und 1. Jhs. v.Chr. aus der Nekropole von Tarent (<http://www.uni-koeln.de/~al001/basp.html>)



## MULTIVARIATE SERIATION

The simultaneous observation and analysis of more than one outcome variable

e.g. grave goods and customs in Britain under Roman rule

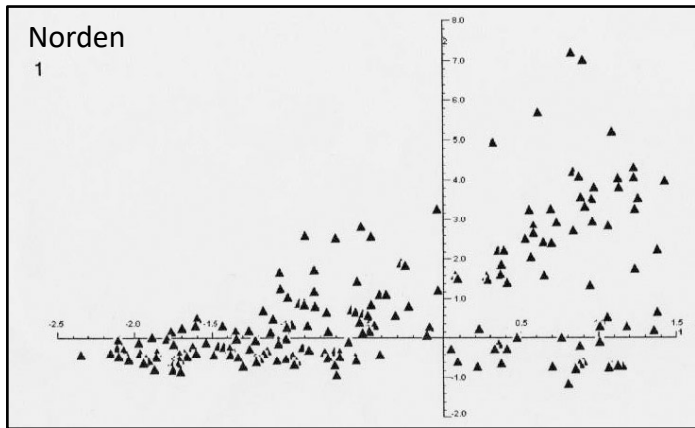


M. Struck, Der Einsatz der Korrespondenzanalyse bei der Untersuchung römischer Gräber aus Britannien (Rahden 2002)



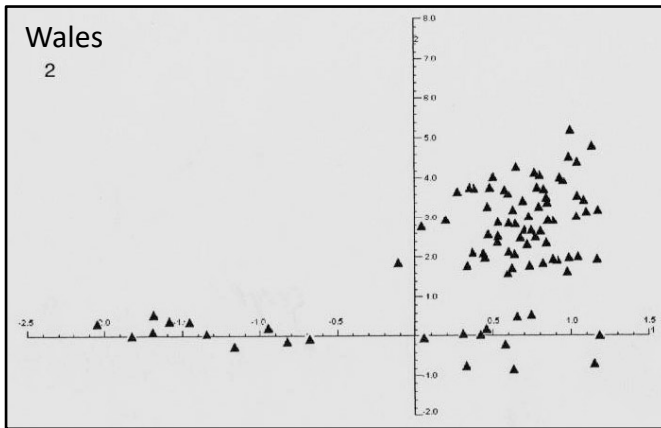
## Norden

1



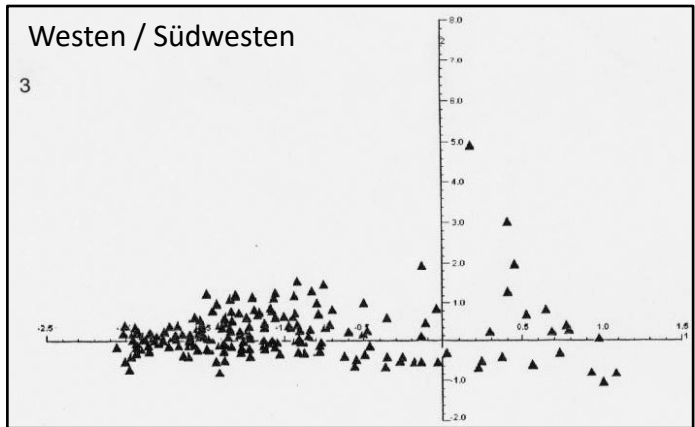
## Wales

2



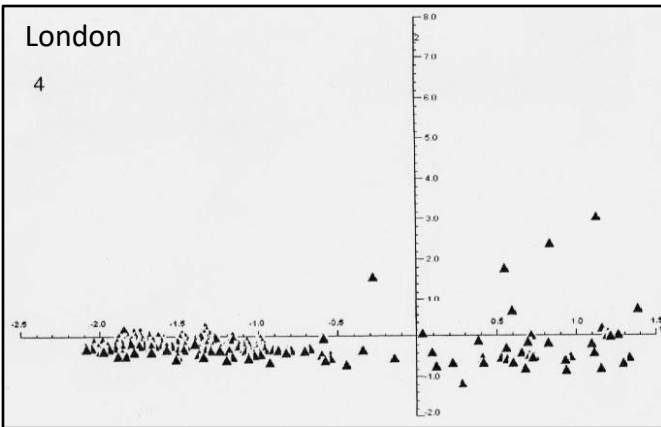
## Westen / Südwesten

3



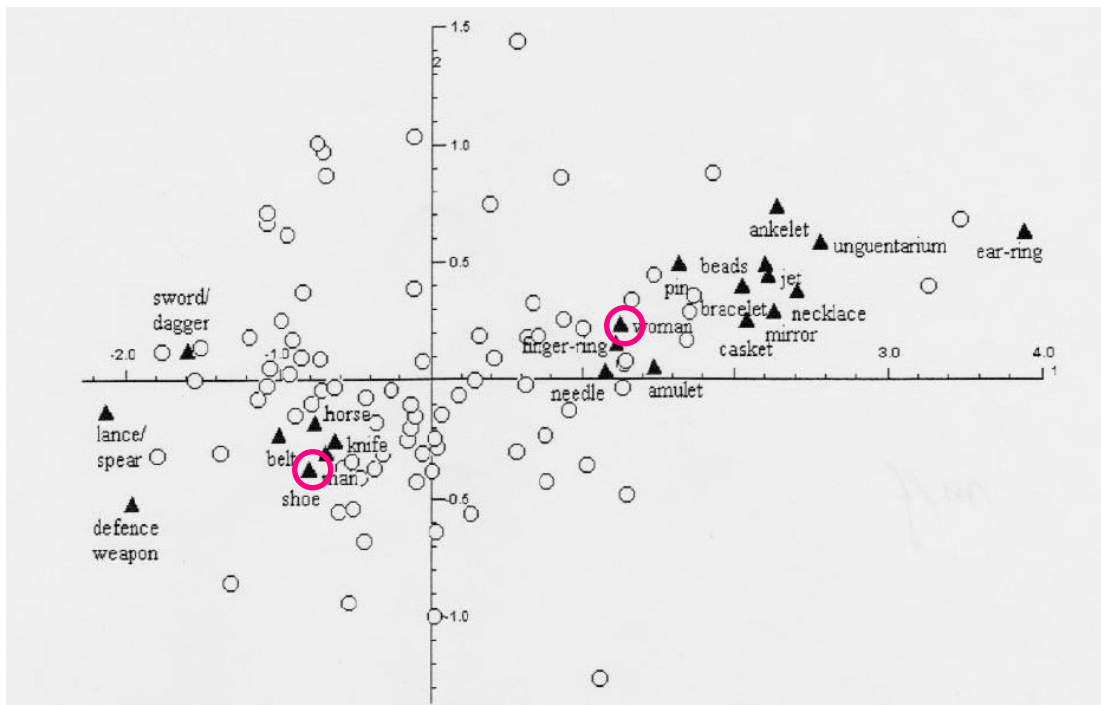
## London

4





## Evaluation according to gender



Romano-British inhumations of the 1st-3rd century: grave goods and mores.

Triangle: female-specific features, square: male-specific features.



## CORRESPONDENCE ANALYSIS

„Correspondence analysis is an explorative procedure for the graphical and numerical representation of rows and columns of any contingency table. [...] (There is) a distance interpretation between the variables in this procedure – and likewise one between the objects.“

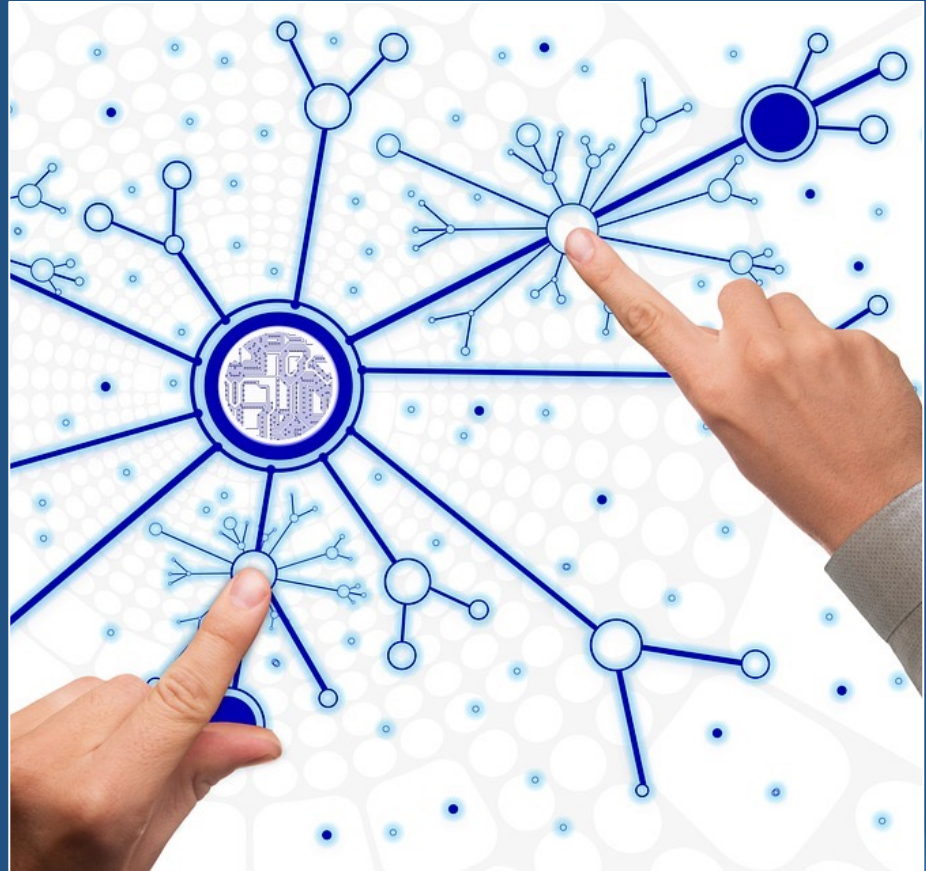
Jörg Blasius, Die Korrespondenzanalyse (München 2001) 6

Software:

- The Bonn Archaeological Software Package zur Kartierung, Seriation und Korrespondenzanalyse (WINBASP, Windows, <http://www.uni-koeln.de/~al001/>)
- Correspondence Analysis. Principal Components Analysis (CAPCA, Windows für Excel, <http://www.archaeoinfo.dk/>) mit Übungsblättern der UFG Kiel ([ftp://ftp.rz.uni-kiel.de/pub/ufg/dateien\\_studium/Uebungsblaetter\\_Kneisel/](ftp://ftp.rz.uni-kiel.de/pub/ufg/dateien_studium/Uebungsblaetter_Kneisel/))
- R-package seriation (Windows/Linux/OS X, <http://cran.r-project.org/web/packages/seriation/index.html>)



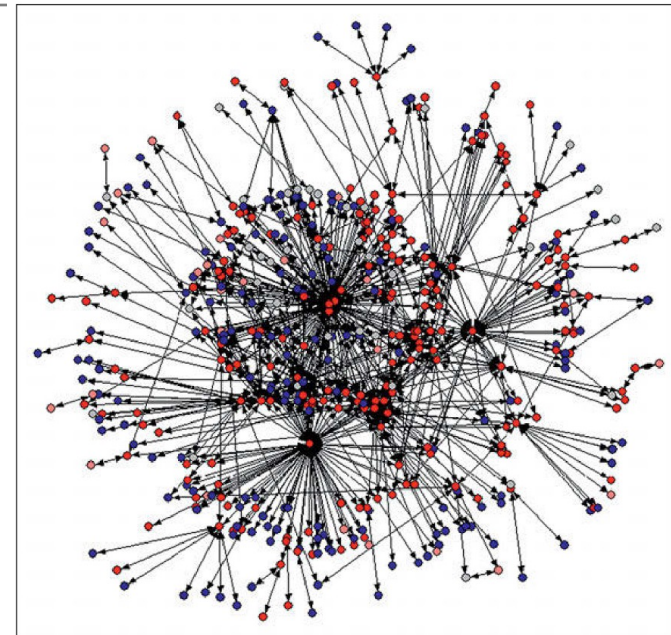
## 2. NETWORK ANALYSIS



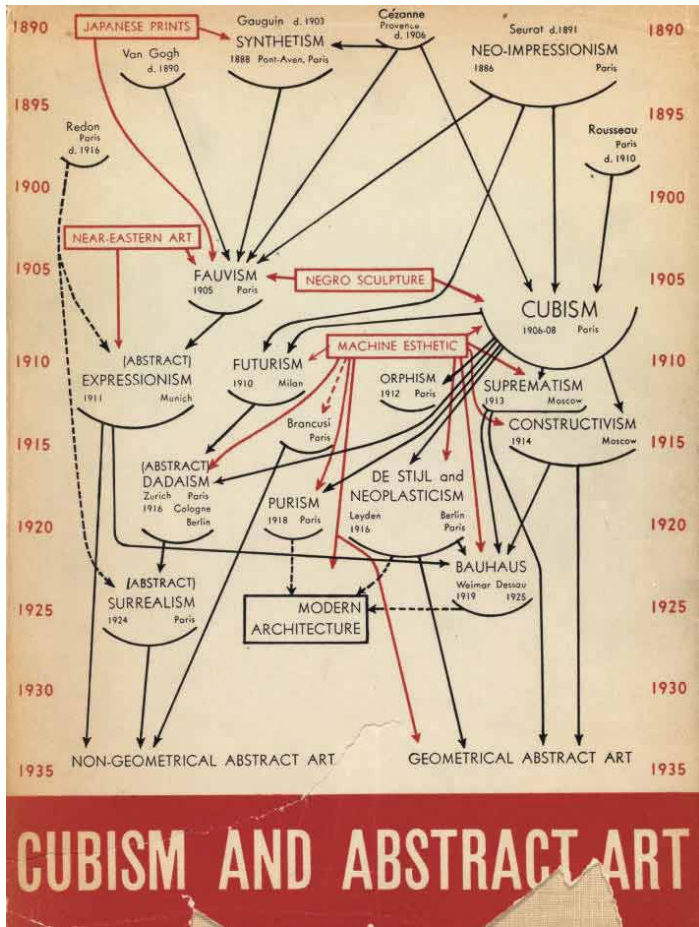


## NETWORK ANALYSIS

Archaeological or historical network analysis has evolved from quantitative network analysis in the social sciences, where it is widely used. Its aim is to capture and analyse complex social structures by diagramming and assessing social actors (i.e. individuals as well as groups and societies) and their relationships to each other.



Christian Nitschke – Christian Rollinger, “Network Analysis is performed”. Die Analyse sozialer Netzwerke in den Altertumswissenschaften: Rückschau und aktuelle Forschungen, in: Markus Gamper – Linda Reschke – Marten Düring (Hrsg.), Knoten und Kanten III. Soziale Netzwerkanalyse in Geschichts- und Politikforschung (Bielefeld 2015) 213–260.



<https://www.christies.com/en/lot/lot-53886669>

## Historical processes and relationships as a network

that shows patterns of relationships (edges) between a set of actors (nodes). We can describe these patterns mathematically by calculating, for example, the density of social networks, the number and relationship between individual components (path distances) or the position of key points.

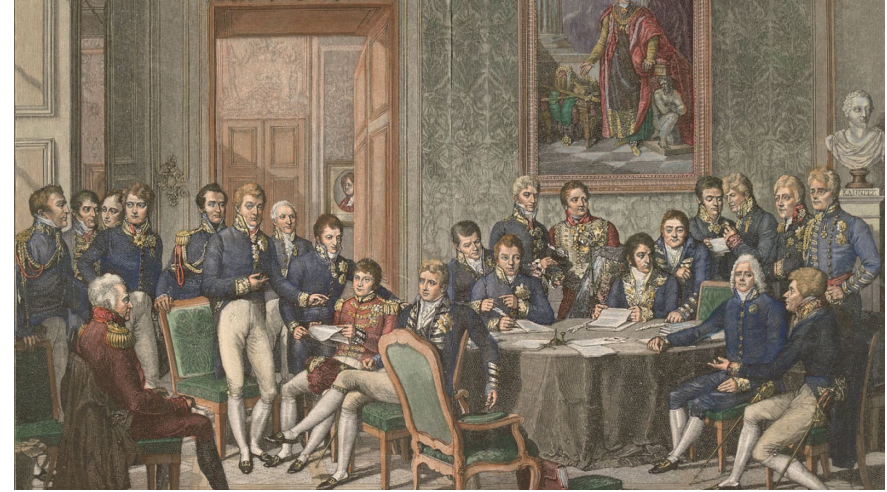
Alfred H Barr, Cubism and Abstract Art (New York: The Museum of Modern Art, 1936)



Network analysis defines culture as a (regular) **network of relationships**. All other aspects (such as individuals, resources or norms) are subordinate to the relations between entities.

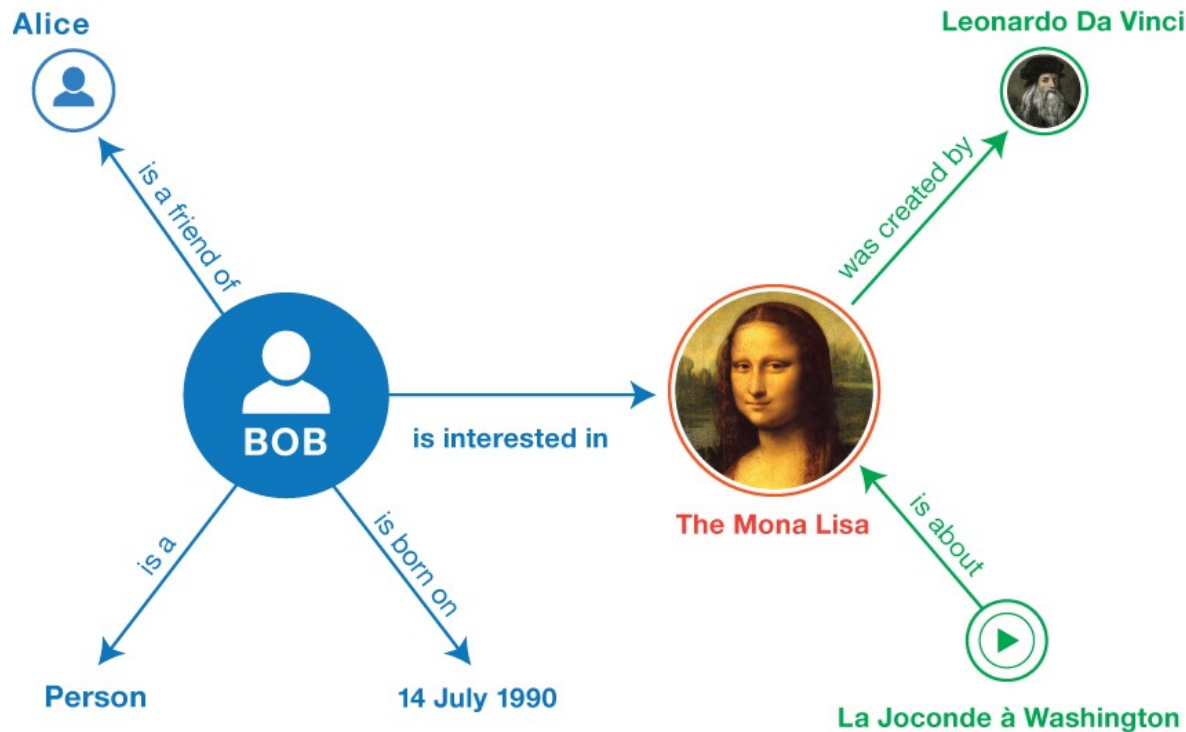
Accordingly, the individual is defined by his or her position in the network and not by gender, ethnos, age, education, wealth, ideology or behaviour.

Network analysis is therefore particularly suitable for a macroscopic view of complex networks of relationships with a multitude of actors and relationships.



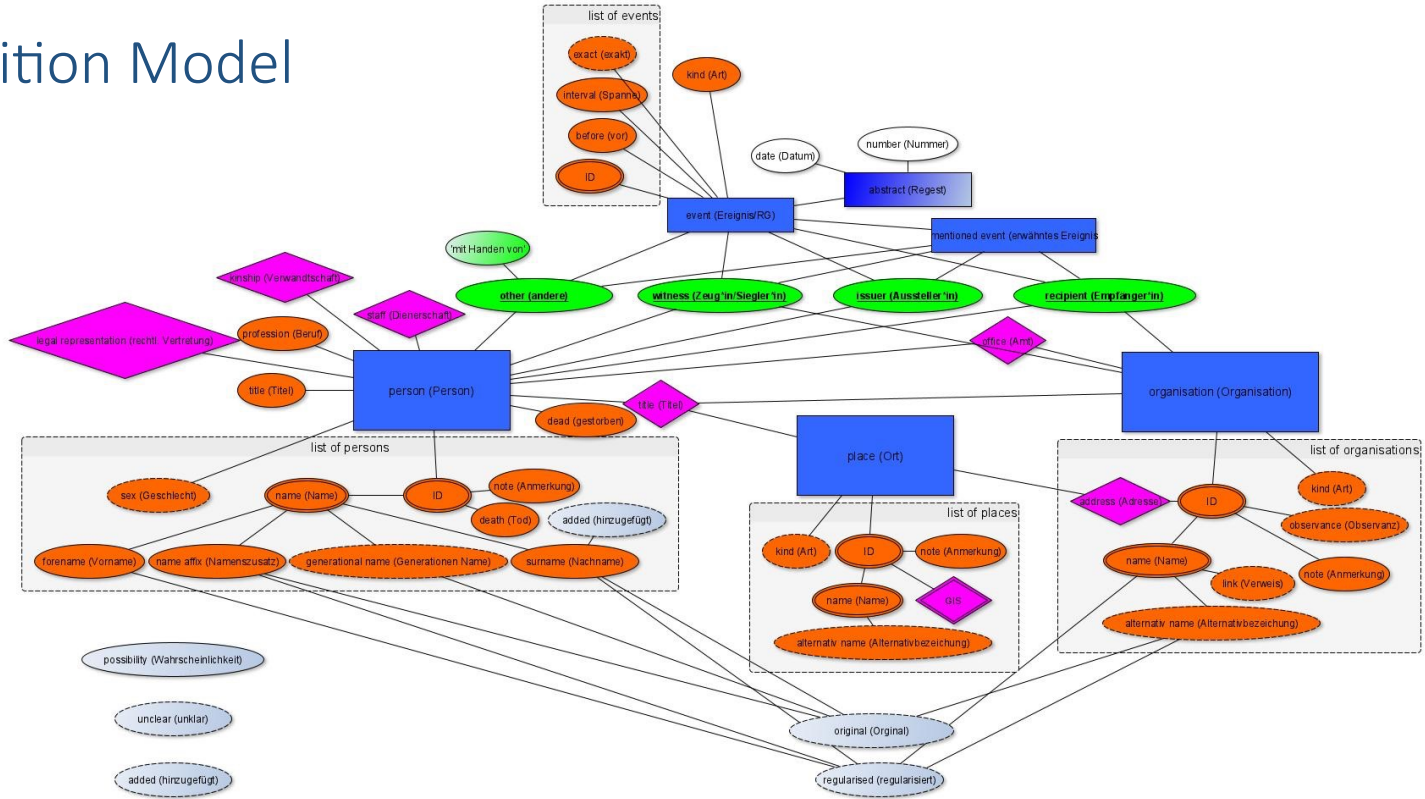


# Semantic Networks and RDF Triple



<https://www.w3.org/TR/rdf11-primer/>

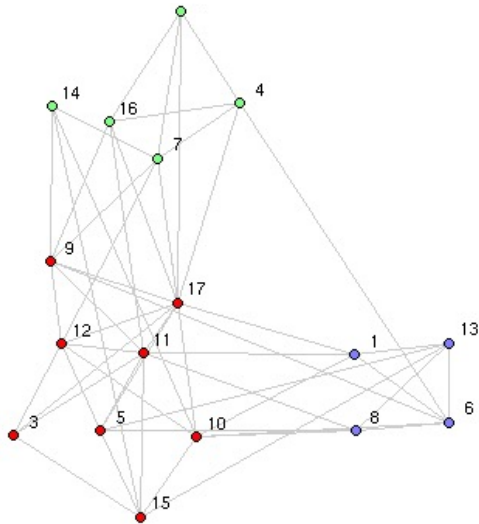
# Data Acquisition Model



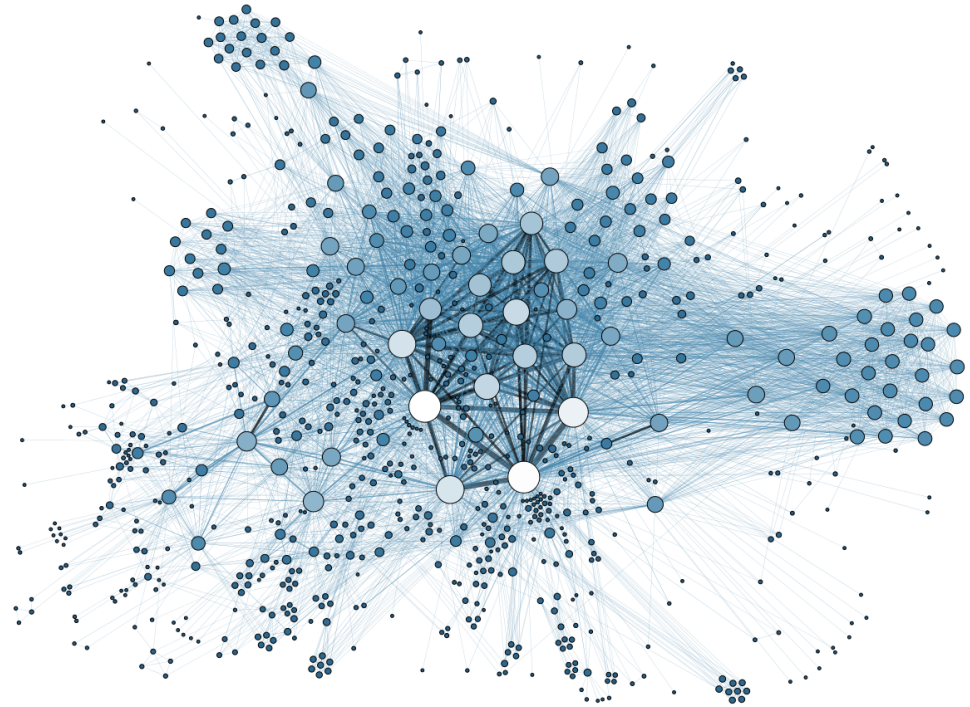
Grau = Register (List of events, persons, organisations, places); Blau = Entitäten; Grün = Rolle/Funktion im Rechtsgeschäft; Violett = Relationen; Orange = Attribute; Blaugrau = zusätzliche Auszeichnungsoptionen



# Complex systems and flexible networks



<https://i.gifer.com/Bx3t.gif>

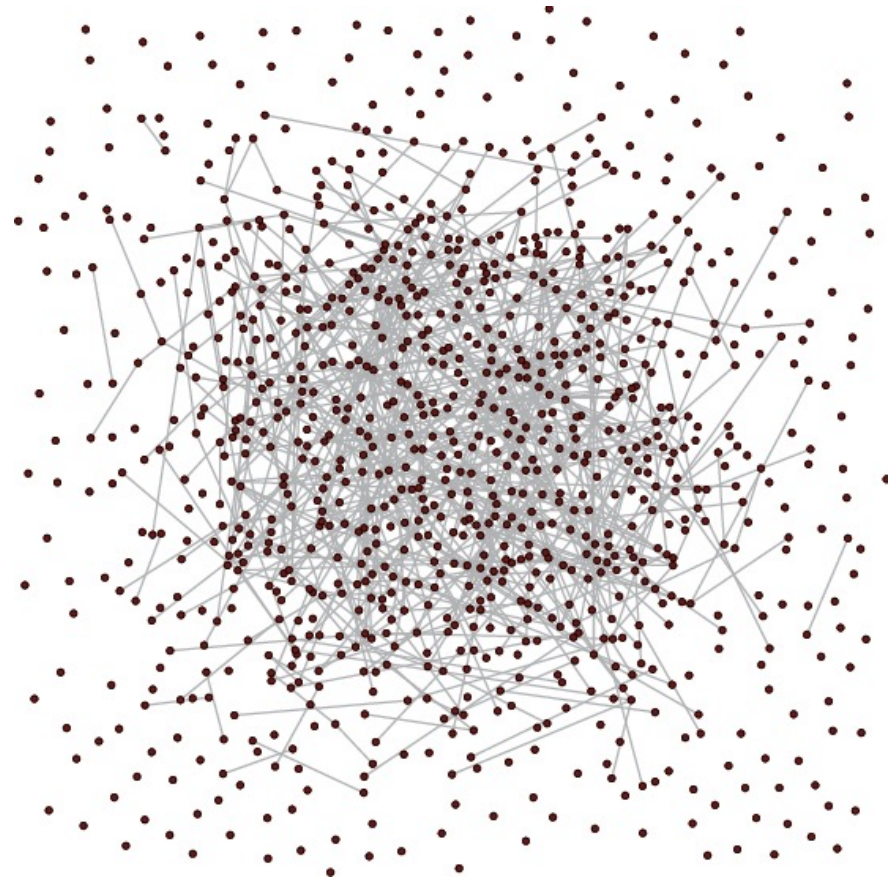


Graph, der die Metadaten von Tausenden von Archivdokumenten darstellt und das soziale Netzwerk von Hunderten von Mitgliedern im Völkerbund dokumentiert: Martin Grandjean, *La connaissance est un réseau*, *Les Cahiers du Numérique* 10.3 (2014), 37–54



## Network analysis based on graph theory

The number of edges grows quadratically with the number of nodes





# The Rise of the Medici in Florence at the Beginning of the 15th Century

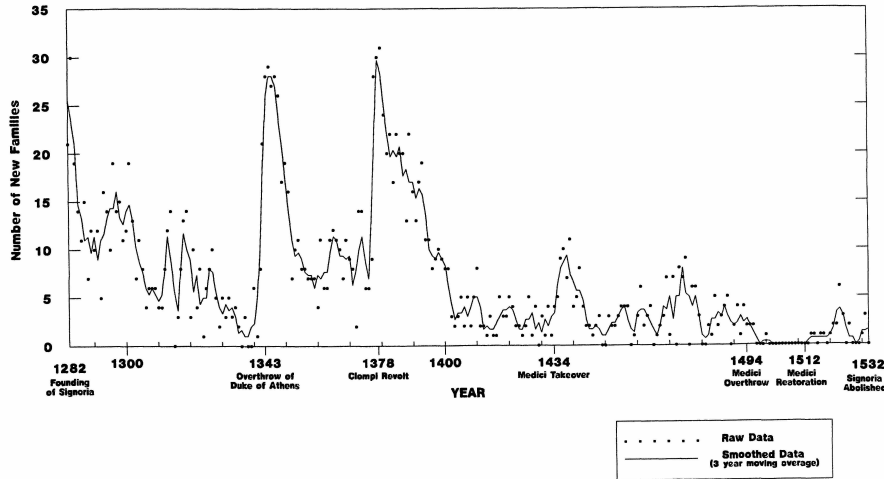
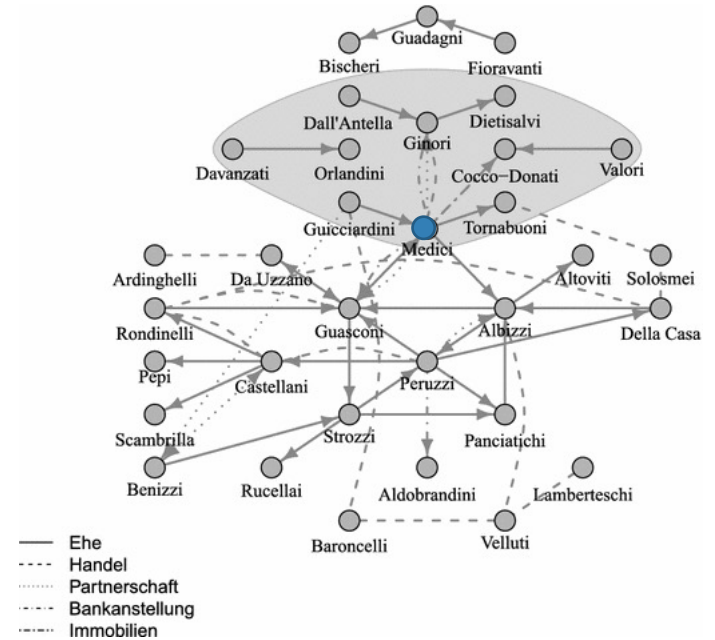


FIG. 1.—New families admitted to the Signoria, 1282–1532 (Source: Najemy 1982, pp. 320–22).



https://media.springernature.com/original/springer-static/image/chp%3A10.1007%2F978-3-658-17189-6\_8/MediaObjects/352691\_1\_De\_8\_Fig4\_HTML.gif

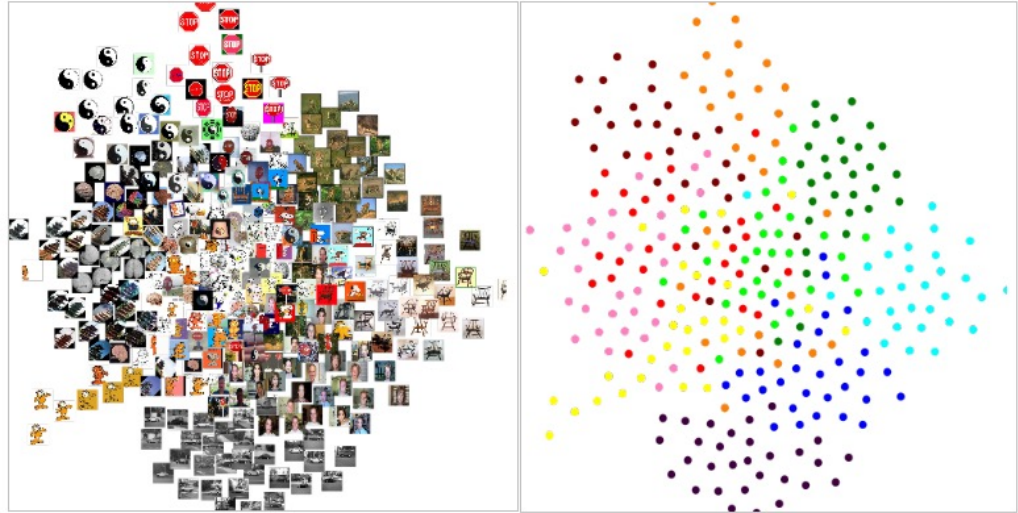
John Padgett, Christopher Ansell, Robust Action and the Rise of the Medici, 1400-1434, The American Journal of Sociology 98, 1993, 1276 Abb. 2a (<http://www.stats.ox.ac.uk/~snijders/PadgettAnsell1993.pdf>)

Der Datensatz ist zu finden unter: [http://www.casos.cs.cmu.edu/computational\\_tools/datasets/sets/padgett/](http://www.casos.cs.cmu.edu/computational_tools/datasets/sets/padgett/)

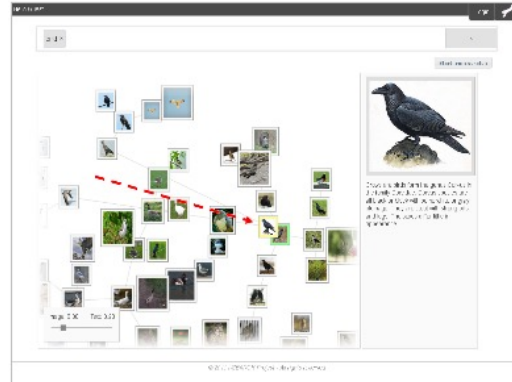




# Visual Networks



<https://vanlab.it.igf/content/research/visualization>



Clique	Siedlungen der älteren Bandkeramik				
1	Kück	LB 7	LW 2	LW 8	LW 16
2	Kück	LB 7	LW 8	LW 9	LW 16
3	Kück	LB 7	LM 2	LW 8	LW 16
4	LN 3	LW 8	LW 16		
5	LB 8	LN 3	LW 8		

Clique	Siedlungen der mittleren Bandkeramik								
1	HA 21	Kö 12	Kö 14	Kück	LB 7	LM 2	LW 2	LW 8	LW 9
2	HA 21	Kö 14	Kück	LB 7	LM 2	LW 2	LW 8	LW 9	LW 16
3	ALD 3	Kö 12	Kö 14	Kück	LB 7	LM 2	LW 2	LW 8	LW 9
4	ALD 3	Kö 14	Kück	LB 7	LM 2	LW 2	LW 8	LW 9	LW 16
5	LB 7	LM 2	LN 3	LW 2	LW 8				
6	LB 7	LM 2	LW 2	LW 8	WW 17				
7	HA 21	Kö 9	Kö 14	Kück	LB 7	LM 2	LW 8		

Clique	Siedlungen der jüngeren Bandkeramik										
1	ALD 3	HA 21	Kö 14	Kück	LB 7	LM 2	LW 2	LW 8	LW 9	NM 4	WW 17
2	HA 8	HA 21	Kö 14	Kück	LB 7	LM 2	LW 2	LW 8	LW 9	NM 4	
3	ALD 3	HA 21	Kück	LB 7	LM 2	LW 2	LW 3	LW 8	LW 9	NM 4	
4	HA 8	HA 21	Kück	LB 7	LM 2	LW 2	LW 3	LW 8	LW 9	NM 4	
5	Kö 7	Kück	LB 7	LM 2	LW 2	LW 8	LW 9				
6	Kück	LB 7	LM 2	LW 3	LW 8	LW 9	NM 4	WW 29			
7	Kö 14	Kück	LB 7	LM 2	LW 8	LW 9	NM 4	WW 29			
8	ALD 3	HA 21	Kö 13	Kück	LB 7	LM 2	LW 8	WW 17			
9	ALD 3	Kö 14	LB 7	LW 2	LW 8	LW 9	NM 4	WW 6	WW 17		
10	Kö 1	Kö 14	LW 8								

Thus, similarities in the form and decoration of artefacts are seen as indicators of communication processes between workshops and described as a network.

Erich Claßen, Verfahren der ‘Sozialen Netzwerkanalyse’ und ihre Anwendung in der Archäologie, Archäologische Informationen 27 Nr. 2, 2004, 219–226:

<http://journals.ub.uni-heidelberg.de/index.php/arch-inf/article/view/12683/6515>

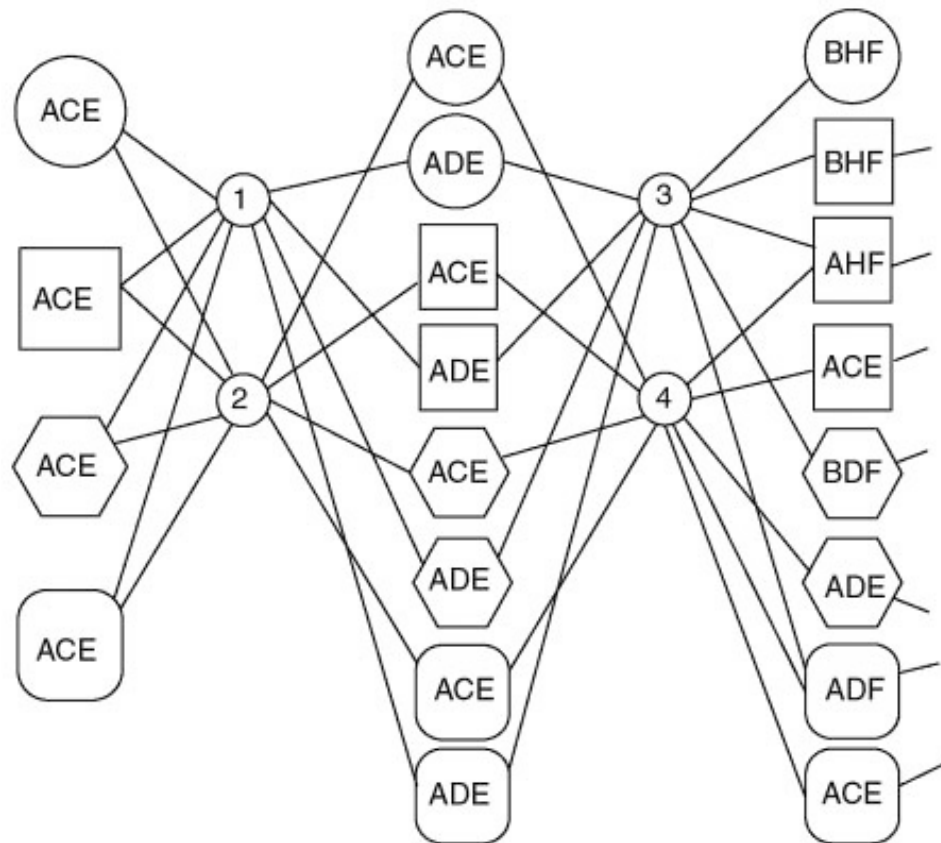


Figure 4.14. Imagined consumption network

*Micro-networks: Proximate Interactions*

Material	A	Clay
Material	B	Metal
Quality	C	Low
Quality	D	High
Locale	E	Household
Locale	F	Palace

Carl Knappett, *An archaeology of interaction. Network perspectives on material culture and society* (Oxford 2011).



Other examples are trade relations, dissemination of social or technical innovations, transfer of resources, but also interpersonal relations and role patterns.

Anna C. F. Collar, *Religious networks in the Roman Empire. The spread of new ideas* (Cambridge 2013).

The possibilities and problems of historical analysis that can arise from the network models are discussed intensively, since network analysis does not provide a uniform interpretation of the results.

s.a. wikipedia s.v. Soziale Netzwerkanalyse

s.a. wikipedia s.v. Graph.

Ulrike Baumöl – Henrik Ickler, Soziale Netzwerkanalyse, Enzyklopädie der Wirtschaftsinformatik. Online-Lexikon: <http://www.enzyklopaedie-der-wirtschaftsinformatik.de/lexikon/daten-wissen/Wissensmanagement/Soziales-Netzwerk/Soziale-Netzwerkanalyse/index.html>

Gabriel Wurzer, Kerstin Kowarik, Hans Reschreiter (Hrsg.), Agent-based Modeling and Simulation in Archaeology, Advances in Geographic Information Science (Heidelberg / New York 2014).

Anna Collar, Fiona Coward, Tom Brughmans, Barbara J. Mills, Networks in Archaeology. Phenomena, Abstraction, Representation, Journal of Archaeological Method and Theory 22/1, 2015, 1–32 mit ausführlicher Literaturliste.



## Tools for Network analysis

- **Gephi** (<https://gephi.org>): free open-source software for analysing and visualizing networks and complex systems in dynamic or hierarchical graphs. ▀ Windows, Linux and Mac OS X.
- **Sci2 Tool** (<https://sci2.cns.iu.edu>): The Science of Science Tool is a modular set of applications for time, space, topic, and network analysis and visualization of data on the micro, meso and macro level. ▀ Windows, Linux and Mac OS X manuals and tutorials: <https://sci2.cns.iu.edu/user/documentation.php>
- **RSiena** (<http://www.stats.ox.ac.uk/~snijders/siena>): allows the statistical analysis of network data in R with all functions obtained in SIENA. ▀ Windows, Linux and MacOS X.
- **GRASS GIS** (<http://grass.osgeo.org>): The free open source software is used for data management of spatial data and enables the output of data as a graphic, map or 3D space model. Network analyses of spatial data are also possible to a certain extent.



## Tools for Network analysis

- **Palladio** (<http://hdlab.stanford.edu/palladio/>)
- **nodegoat** (<http://nodegoat.net>): web-based data management system that allows you to analyse and visualise any number of records. Tutorials: [https://www.youtube.com/channel/UC\\_bgsLe-CjhyrSC2c\\_clb7Q](https://www.youtube.com/channel/UC_bgsLe-CjhyrSC2c_clb7Q)
- **Quadrigram** (<http://www.quadrigram.com>): a "visual programming environment" for the publication of own data as simple charts and graphs, networks, scalable pedigrees with division into multiple branches and geodata.
- **SylvaDB** (<http://sylvadb.com>): is a graph-oriented database system that creates, manages and analyses data in network structures without prior knowledge of graph theory.
- **Lynks** (<http://lynksoft.com>): an EU-funded, Leiden University campus (on The Hague campus), easy-to-use tool to create and manage your own networks online or with uploaded data.



# 3. DATA VISUALISATION

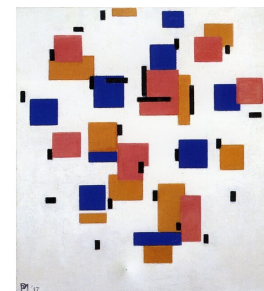
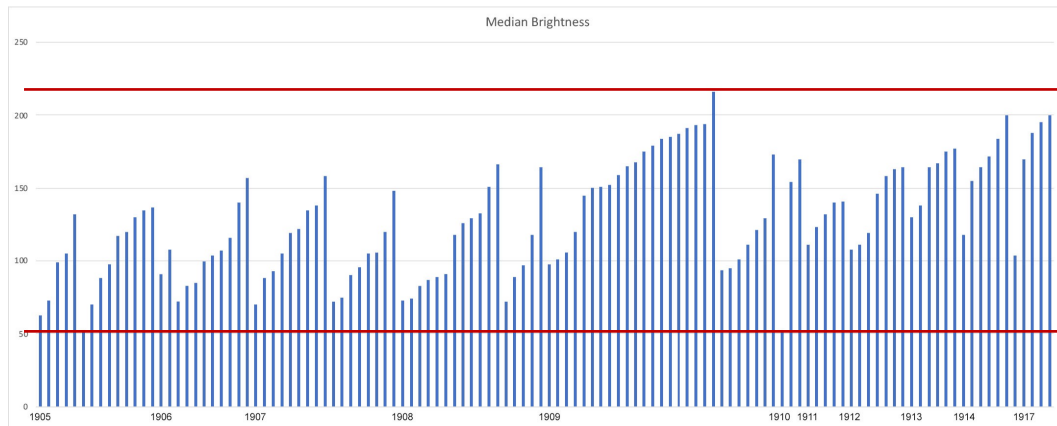






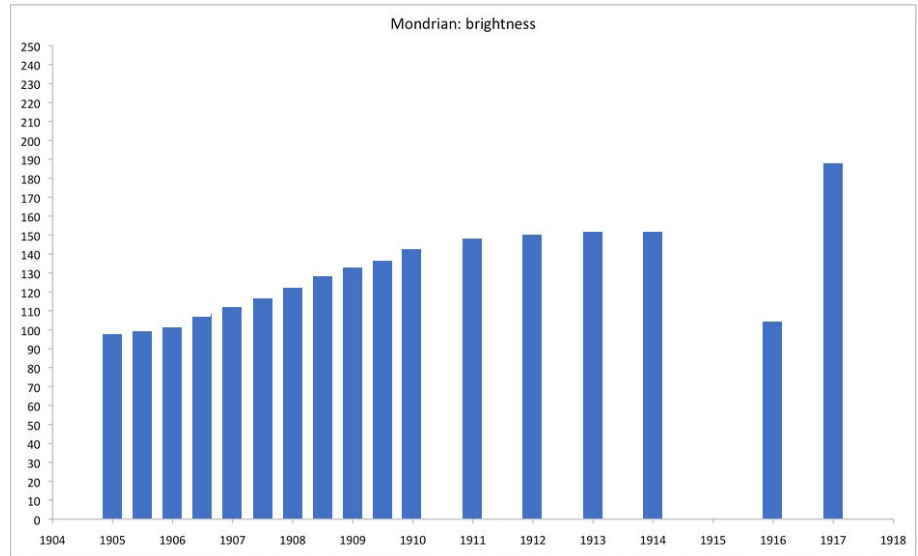
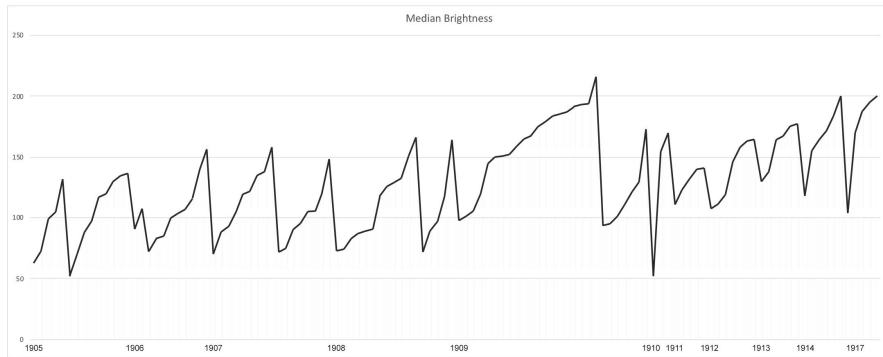
# BENEFITS OF VISUALISATION

	A	B	C		A	B	C		A	B	C
2	1905	73	41	1907,5	120	80	1909,5	94			
3	1905	99	42	1907,5	148	81	1909,5	95			
4	1905	105	43	1908	73	82	1909,5	101			
5	1905	132	44	1908	74	83	1909,5	111			
6	1905,5	52	45	1908	83	84	1909,5	121			
7	1905,5	70	46	1908	87	85	1909,5	129			
8	1905,5	88	47	1908	89	86	1909,5	173			
9	1905,5	98	48	1908	91	87	1910	52			
10	1905,5	117	49	1908	118	88	1910	154			
11	1905,5	120	50	1908	126	89	1910	170			
12	1905,5	130	51	1908	129	90	1911	111			
13	1905,5	135	52	1908	133	91	1911	123			
14	1905,5	137	53	1908	151	92	1911	132			
15	1906	91	54	1908	166	93	1911	140			
16	1906	108	55	1908,5	72	94	1911	141			
17	1906,5	72	56	1908,5	89	95	1912	108			
18	1906,5	83	57	1908,5	97	96	1912	111			
19	1906,5	85	58	1908,5	118	97	1912	119			
20	1906,5	100	59	1908,5	164	98	1912	146			
21	1906,5	104	60	1909	98	99	1912	158			
22	1906,5	107	61	1909	101	100	1912	163			
23	1906,5	116	62	1909	106	101	1912	164			
24	1906,5	140	63	1909	120	102	1913	130			
25	1906,5	157	64	1909	145	103	1913	138			
26	1907	70	65	1909	150	104	1913	164			
27	1907	88	66	1909	151	105	1913	167			
28	1907	93	67	1909	152	106	1913	175			
29	1907	105	68	1909	159	107	1913	177			
30	1907	119	69	1909	165	108	1914	118			
31	1907	122	70	1909	168	109	1914	155			
32	1907	135	71	1909	175	110	1914	164			
33	1907	138	72	1909	179	111	1914	172			
34	1907	158	73	1909	184	112	1914	184			
35	1907,5	72	74	1909	185	113	1914	200			
36	1907,5	75	75	1909	187	114	1916	104			
37	1907,5	90	76	1909	191	115	1917	170			
38	1907,5	96	77	1909	193	116	1917	188			
39	1907,5	105	78	1909	194	117	1917	195			
40	1907,5	106	79	1909	216	118	1917	200			



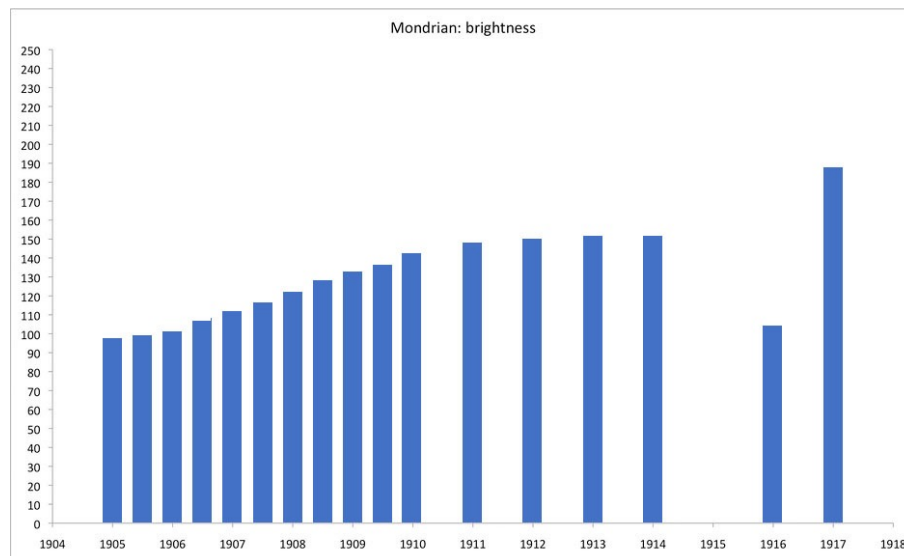
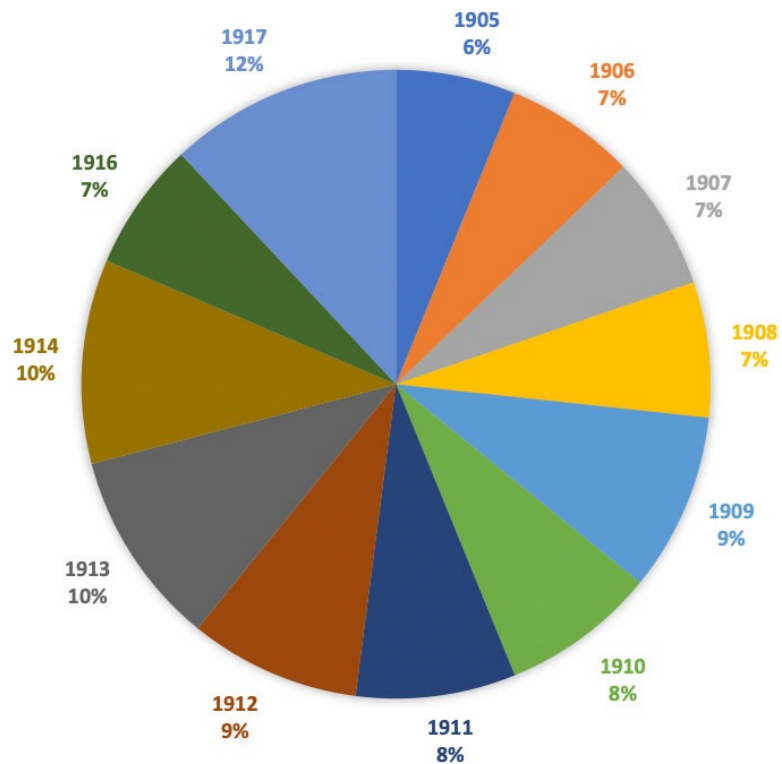


# NEGATIVE EXAMPLES OF VISUALISATION





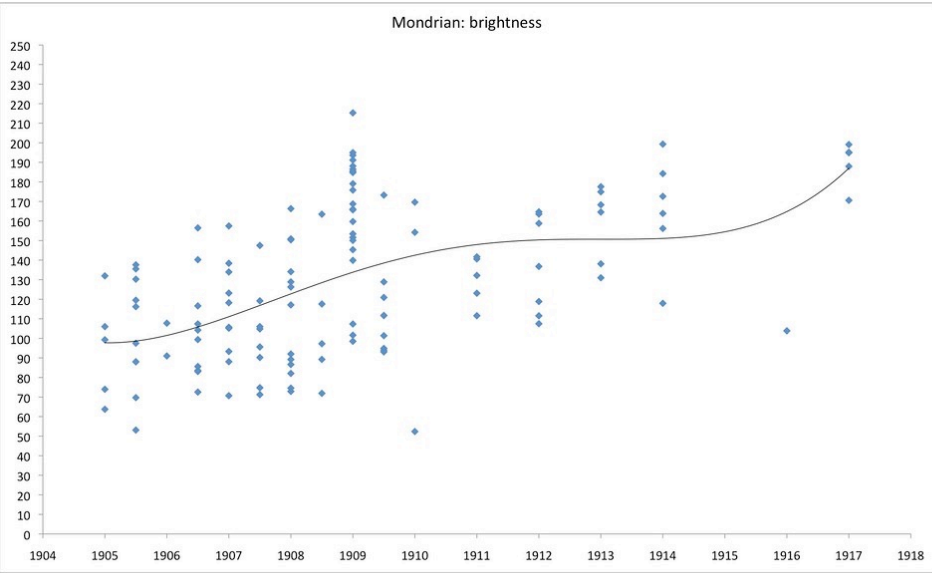
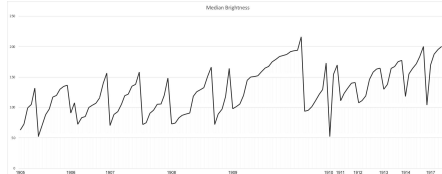
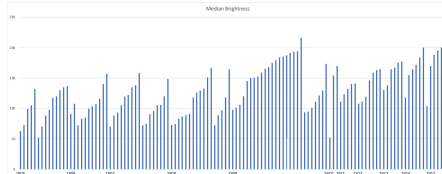
# NEGATIVE EXAMPLES OF VISUALISATION



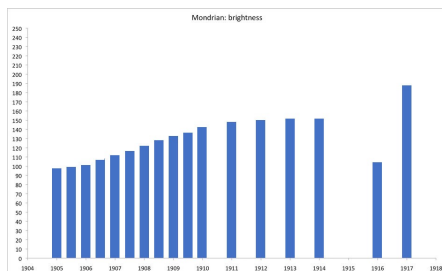
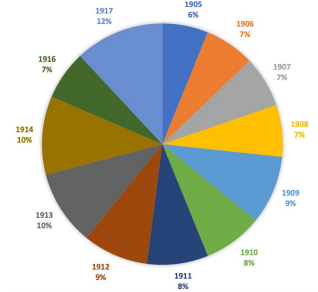


## EXAMPLES OF VISUALISATION

A	B	C	A	B	C	A	B	C
1	1905	73	41	1905.5	120	80	1905.5	94
2	1906	99	42	1907.5	148	81	1906.5	96
3	1905	205	43	1906	73	82	1905.5	101
4	1905	132	44	1908	24	83	1905.5	111
5	1905.5	52	45	1906	85	84	1905.5	121
6	1905.5	70	46	1908	87	85	1905.5	129
7	1905.5	88	47	1906	89	86	1905.5	178
8	1905.5	98	48	1908	75	87	1910	52
9	1905.5	117	49	1906	118	88	1910	164
10	1905.5	120	50	1908	126	89	1910	170
11	1905.5	130	51	1906	129	90	1911	111
12	1905.5	135	52	1908	133	91	1911	123
13	1905.5	137	53	1906	133	92	1911	132
14	1906	161	54	1908	196	93	1911	140
15	1906	168	55	1906	153	94	1911	148
16	1905.5	72	56	1905.5	86	95	1912	108
17	1905.5	83	57	1905.5	97	96	1912	111
18	1905.5	93	58	1905.5	118	97	1912	119
19	1905.5	100	59	1905.5	164	98	1912	146
20	1905.5	104	60	1906	26	99	1912	208
21	1905.5	107	61	1906	101	100	1912	169
22	1905.5	104	62	1906	104	101	1912	166
23	1905.5	140	63	1906	120	102	1913	130
24	1905.5	137	64	1906	109	103	1913	136
25	1907	70	65	1906	150	104	1913	164
26	1907	88	66	1906	151	105	1913	167
27	1907	93	67	1906	152	106	1913	175
28	1907	105	68	1906	151	107	1913	177
29	1907	119	69	1906	165	108	1914	118
30	1907	127	70	1906	166	109	1914	122
31	1907	135	71	1906	176	110	1914	164
32	1907	138	72	1906	179	111	1914	172
33	1907	158	73	1906	184	112	1914	184
34	1907.5	72	74	1906	195	113	1914	200
35	1907.5	75	75	1906	187	114	1916	104
36	1907.5	89	76	1906	191	115	1917	170
37	1907.5	96	77	1906	193	116	1917	188
38	1907.5	146	78	1906	194	117	1917	196
39	1907.5	106	79	1906	225	118	1917	200



[https://live.staticflickr.com/4007/5109314913\\_8ffa356fd5\\_k.jpg](https://live.staticflickr.com/4007/5109314913_8ffa356fd5_k.jpg)

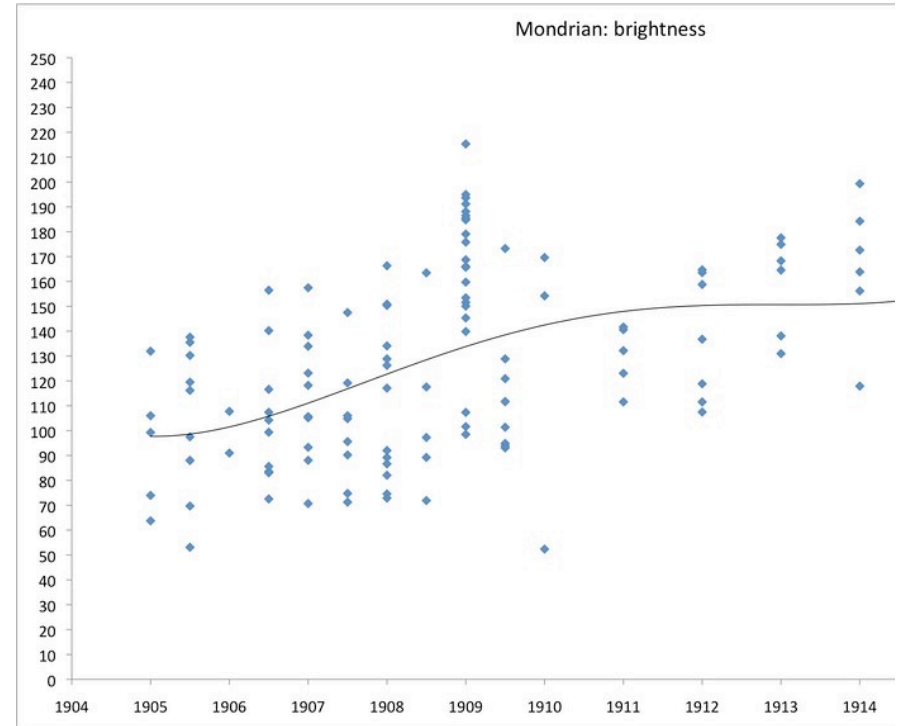
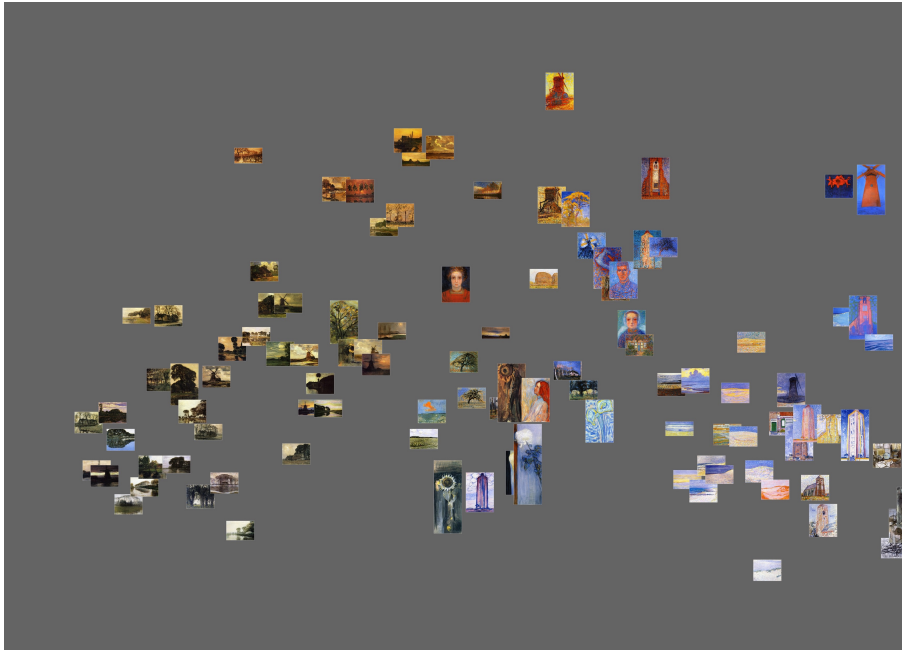


Lev Manovich, Style Space: How to compare image sets and follow their evolution (2011):

<http://manovich.net/index.php/projects/style-space>



## EXAMPLES OF VISUALISATION



[https://live.staticflickr.com/4007/5109314913\\_8ffa356f05\\_k.jpg](https://live.staticflickr.com/4007/5109314913_8ffa356f05_k.jpg)

Lev Manovich, *Style Space: How to compare image sets and follow their evolution* (2011):

<http://manovich.net/index.php/projects/style-space>

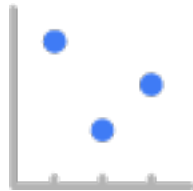
# COMPARISONS



Bar Chart



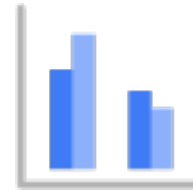
Column Chart



Dot Graph



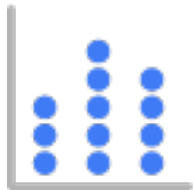
Lollipop Chart



Grouped Bar Chart



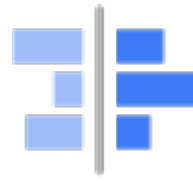
Pictogram Chart



Unit Chart



Stacked Bar Chart



Side by Side Bar Chart



Bullet Graph



Slopegraph



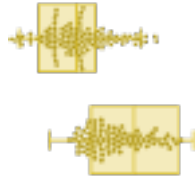
Radial Column Chart



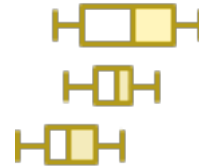
Barcode Plot



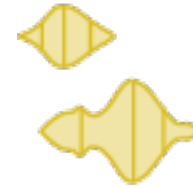
Bean Plot



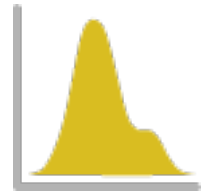
Bee Swarm Box Plot



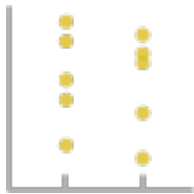
Box Plot



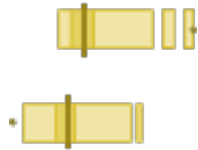
Box-Percentile Plot



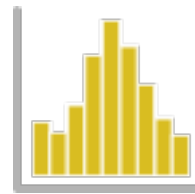
Density Plot



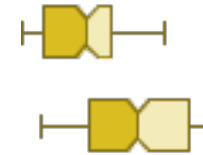
Dot Distribution Plot



HDR Box Plot



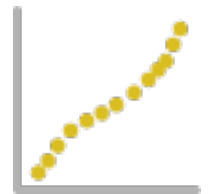
Histogram



Notched Box Plot



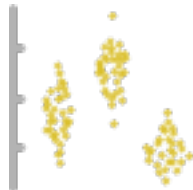
Population Pyramid



Q-Q Plot



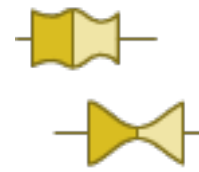
Ridgeline Plot



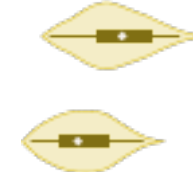
Sina Plots



Stem & Leaf Plot



Vase Plot



Violin Plot



# DATA OVER TIME



Line Graph



Run Chart



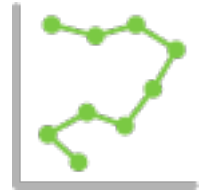
Control Chart



Area Graph



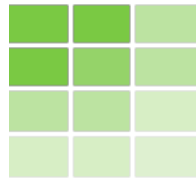
Stacked Area Graph



Connected Scatterplot



Streamgraph



Heatmap



Horizon Plot



Spiral Plot



Gantt Chart

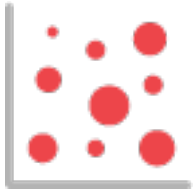


Timeline





# PROPORTIONS



Bubble Chart



Bubble Map



Dorling Map



Demers  
Cartogram



Proportional  
Area Chart



Unit Chart  
(Area)



Parallel Sets



Circle Packing

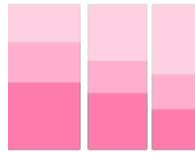


Sankey  
Diagram

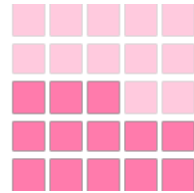
# PARTS TO A WHOLE



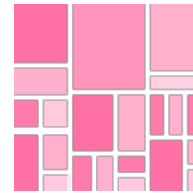
100% Stacked  
Bar Chart



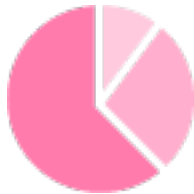
Marimekko  
Chart



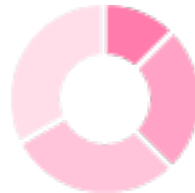
Waffle Chart



Treemap



Pie Chart



Donut Chart



# GEOGRAPHICAL



Bubble Map



Cartogram



Choropleth Map



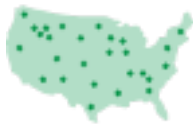
Connection Map



Demer Cartogram



Dorling Map



Dot Map



Flow Map



Isochrone Map



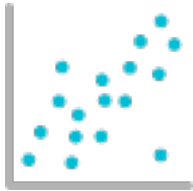
Non-contiguous Cartogram



Tile Grid Map



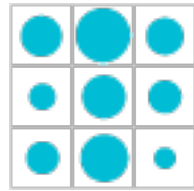
# CORRELATIONS



Scatterplot



Bubble Chart



Correlation  
Matrix



Heatmap

# CONNECTIONS



Arc Diagram



Circular Tree Diagram



Hive Plot



Network Diagram



Non-ribbon Chord Diagram



Connection Map



# HIERARCHY



Circular Tree Diagram



Circular Treemap



Tree Diagram



Treemap

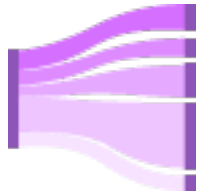


Icicle Chart

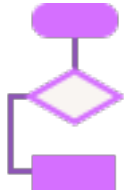


Sunburst Diagram

# FLOW



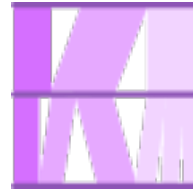
Alluvial  
Diagram



Flow Diagram



Flow Map

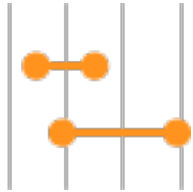


Parallel Sets

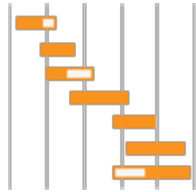


Sankey  
Diagram

# RANGES



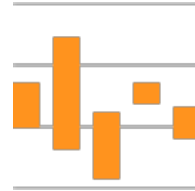
Barbell Plot



Gantt Chart



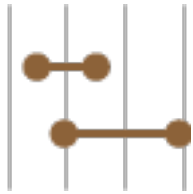
Ranged Area Graph



Span Chart



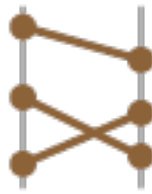
# SHOWING CHANGE BETWEEN TWO POINTS



Barbell Plot



Change Bar Chart

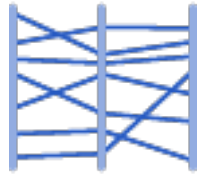


Slopegraph

# MULTI-VARIABLE ANALYSIS



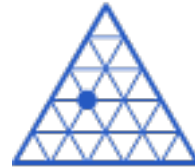
Chernoff Faces



Parallel  
Coordinates



Radar Chart



Ternary Graph



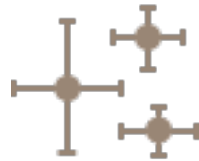
# UNCERTAINTY AND ERROR



Area Bands



Confidence Strips



Error Bars



Graded Error Bars



# BASIC PRINCIPLES OF VISUALISATION I (DATA)

- Good graphics are based on good data!

Johanna Drucker, Humanities Approaches to Graphical Display, Digital Humanities Quarterly 5.1, 2011:

<http://www.digitalhumanities.org/dhq/vol/5/1/000091/000091.html>

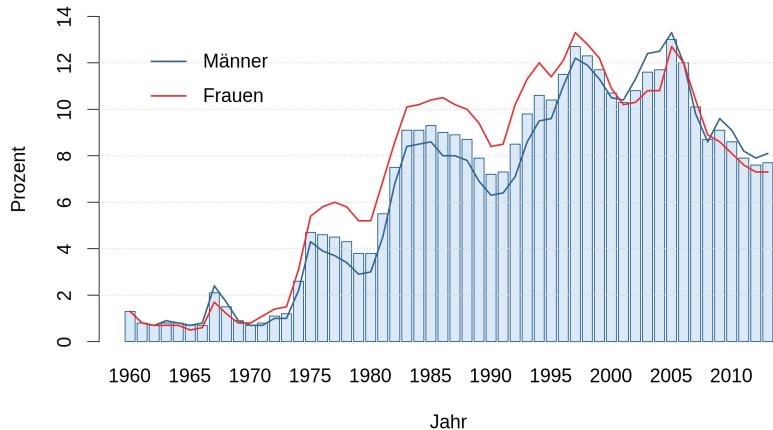


<https://suxeedo.de/wp-content/uploads/2018/08/Infografik-Hamburg.png>

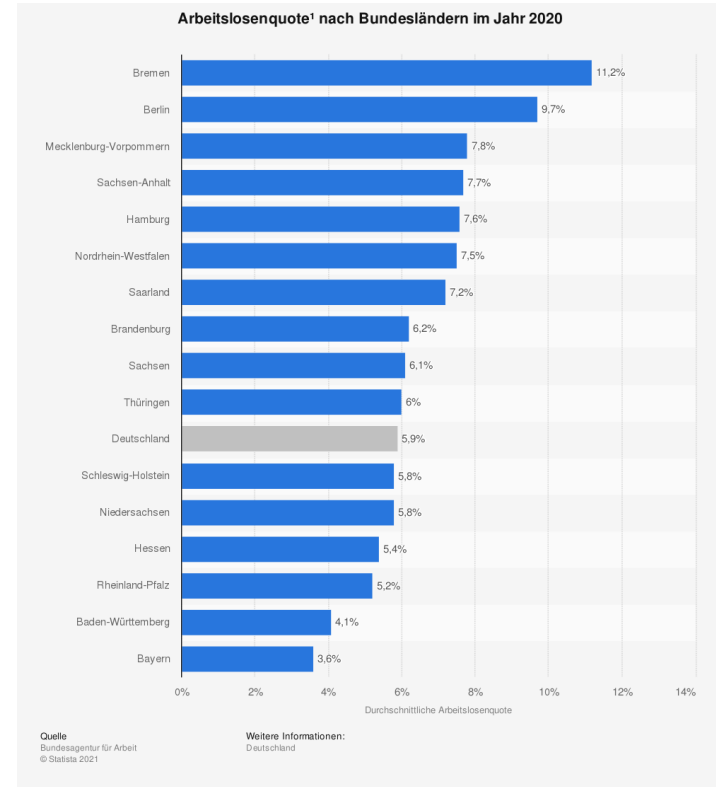


# BASIC PRINCIPLES OF VISUALISATION I (DATA)

- Good graphics are based on good data!
- Distinguish between discrete measured values and constantly changing data!



<https://upload.wikimedia.org/wikipedia/commons/thumb/9/97/GermanUnemploymentRate.svg/2560px-GermanUnemploymentRate.svg.png>

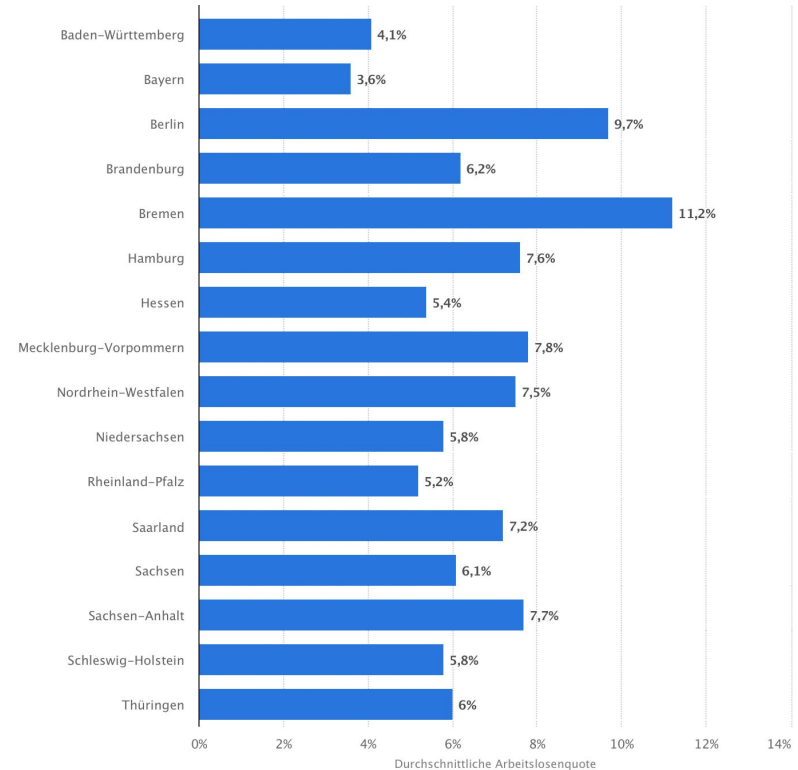


<https://de.statista.com/graphic/1/2192/durchschnittliche-arbeitslosenquote-nach-bundeslaendern.jpg>



## BASIC PRINCIPLES OF VISUALISATION I (DATA)

- Good graphics are based on good data!
- Distinguish between discrete measured values and constantly changing data!
- Arrange the data in a sensible order!

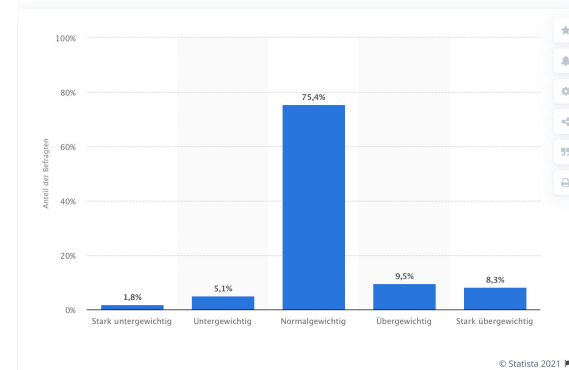




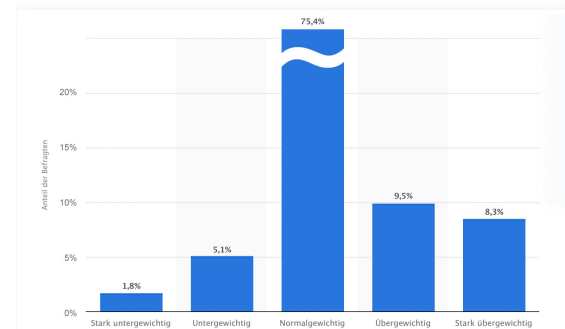
# BASIC PRINCIPLES OF VISUALISATION I (DATA)

- Good graphics are based on good data!
- Distinguish between discrete measured values and constantly changing data!
- Arrange the data in a sensible order!
- Choose the right dimensions for the visualisation!

Gewicht von Mädchen zwischen 11 und 17 Jahren laut BMI



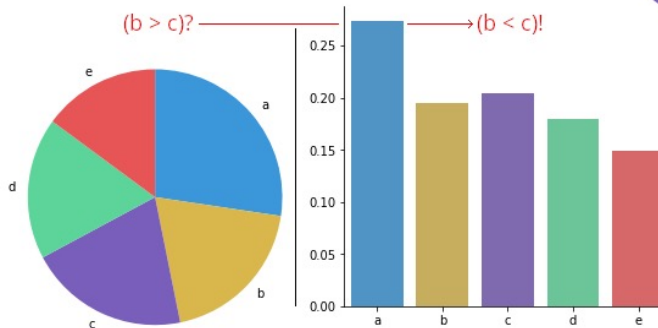
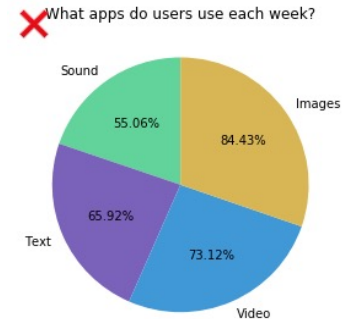
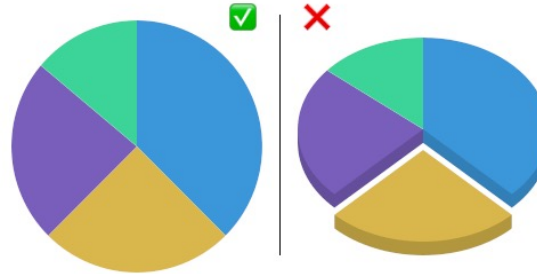
Gewicht von Mädchen zwischen 11 und 17 Jahren laut BMI





# BASIC PRINCIPLES OF VISUALISATION I (DATA)

- Good graphics are based on good data!
- Distinguish between discrete measured values and constantly changing data!
- Arrange the data in a sensible order!
- Choose the right dimensions for the visualisation and avoid distortions!







# BASIC PRINCIPLES OF VISUALISATION I (DATA)

- Good graphics are based on good data!
- Distinguish between discrete measured values and constantly changing data!
- Arrange the data in a sensible order!
- Choose the right dimensions for the visualisation and avoid distortions!
- Always state the size of the sample (n)!

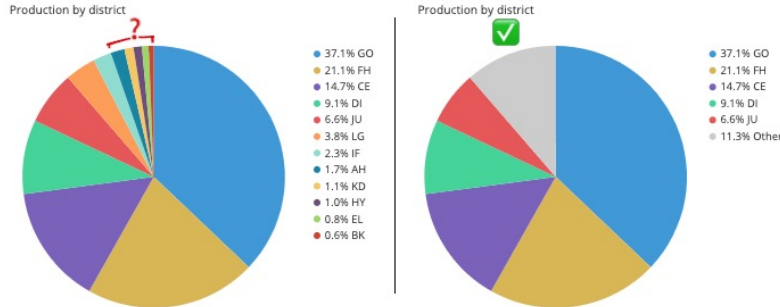


Quelle: Im Oktober 2020 führte Wechselpilot mit Civey eine bundesweite, repräsentative Meinungsumfrage durch. Die Teilnehmer\*innen wurden nach ihren Sparmaßnahmen (Stichprobengröße: 2.503), ihrem mtl. Sparbetrag (5.012), ihrer Sparmotivation (2.501) sowie danach gefragt, inwiefern der Satz „Ich habe meine Finanzen im Griff“ (2.501) auf sie zutrifft.

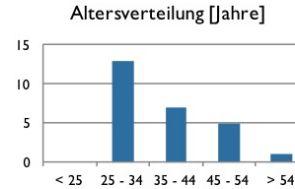


# BASIC PRINCIPLES OF VISUALISATION II (DESIGN)

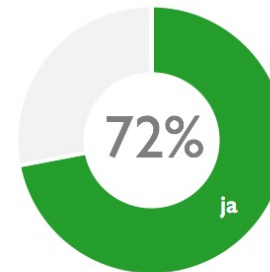
- Make it easy for the viewer to assign information! Increase the readability of your diagrams through information reduction and appropriate labelling!



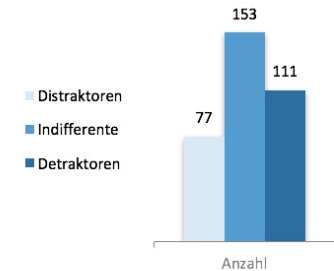
<https://chartio.com/learn/charts/pie-chart-complete-guide/>



Würden Sie das Produkt kaufen?



NPS

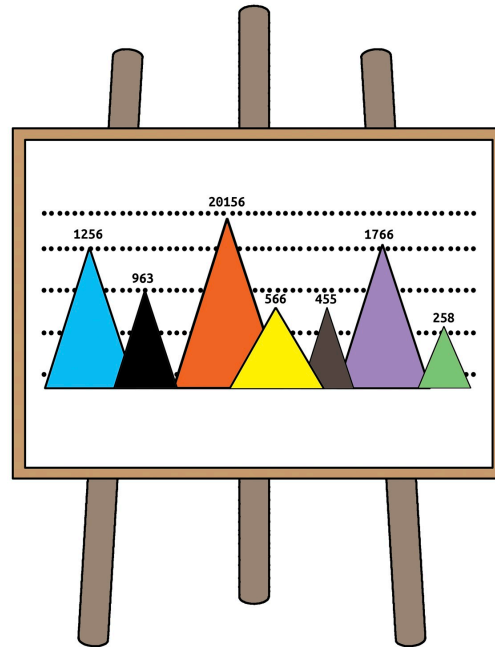


https://www.usabilityblog.de/wp-content/uploads/2017/07/Diagramme-Beispiele.png



## BASIC PRINCIPLES OF VISUALISATION II (DESIGN)

- Make it easy for the viewer to assign information! Increase the readability of your diagrams through information reduction and appropriate labelling!
- Avoid superfluous design elements!



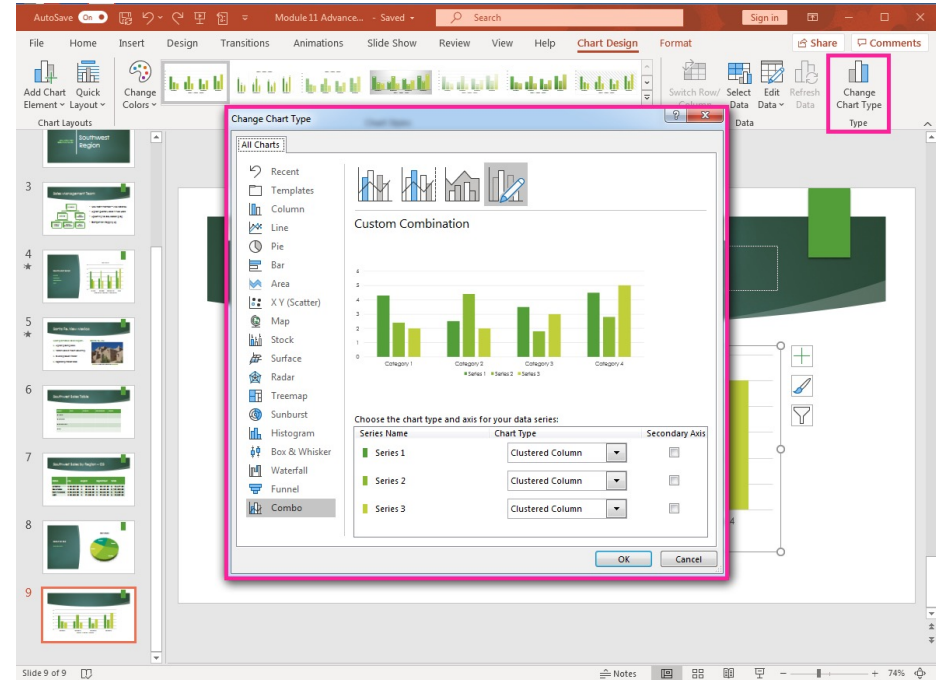
www.flickr.com/photos/laurenmanning/5658951917/

[https://www.clipartfree.de/images/joomgallery/originals/office\\_clipart\\_download\\_77/clip\\_art\\_chart\\_20141221\\_1879042728.png](https://www.clipartfree.de/images/joomgallery/originals/office_clipart_download_77/clip_art_chart_20141221_1879042728.png)



## BASIC PRINCIPLES OF VISUALISATION II (DESIGN)

- Make it easy for the viewer to assign information! Increase the readability of your diagrams through information reduction and appropriate labelling!
- Avoid superfluous design elements!
- Revise the presentation to highlight your thesis even better!

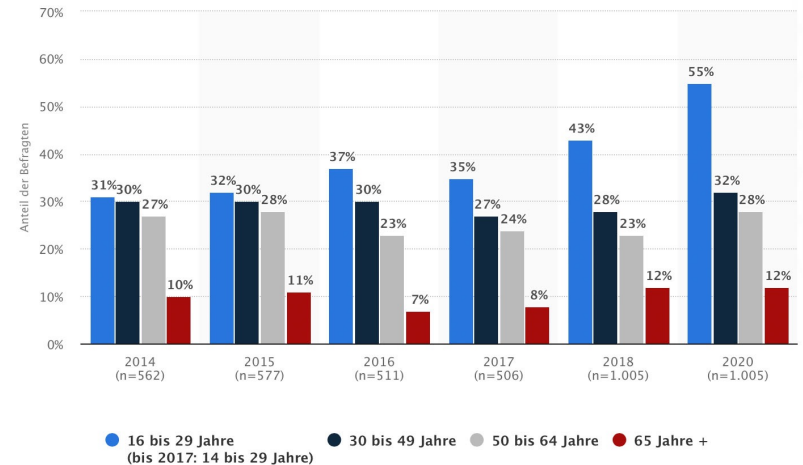




## BASIC PRINCIPLES OF VISUALISATION II (DESIGN)

- Make it easy for the viewer to assign information! Increase the readability of your diagrams through information reduction and appropriate labelling!
- Avoid superfluous design elements!
- Revise the presentation to highlight your thesis even better!
- Document your decisions in a study!

Anteil der E-Book-Leser nach Altersgruppen in Deutschland in den Jahren 2014 bis 2020



[Details zur Statistik](#)

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[Quellen anzeigen](#)



# SPREADSHEET PROGRAMMES ETC.

Diagramm einfügen

Empfohlene Diagramme | Alle Diagramme

**Gestapelte Säulen**

Diagrammtitel

35.000 €  
30.000 €  
25.000 €  
20.000 €  
15.000 €  
10.000 €  
5.000 €  
-

Jul Aug Sep Okt Nov

■ Werbung ■ Digitaler Marketing ■ Ereignisse ■ Öffentlichkeitsarbeit ■ Werbesaktionen

Mit einem gestapelten Säulendiagramm können Sie Teile eines Ganzen vergleichen. Verwenden Sie diesen Diagrammtyp, um zu zeigen, wie sich Segmente eines Ganzen im zeitlichen Verlauf ändern.

OK Abbrechen

infogram dashboards

Slides  
Social media graphics  
Posters  
Instagram posts  
Facebook posts  
LinkedIn posts  
Twitter posts  
Pinterest posts  
Email headers  
YouTube thumbnails

Browse chart types

- All
- Bar
- Column
- Column & Line
- Radial

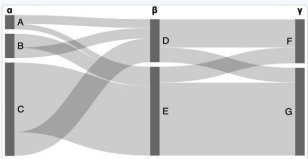
Examples: Startup Heavens Outside the US, Minecraft Gameplay Highlights, Mazda car sales, Corruption Perceptions Index 2016, Fitness thumbnail, 2020 Pattern Trends, Pattern trends, Obesity in the US, Mobile divide, It's a bird's world, US cities with the highest IT salaries.



# RAWGRAPHS

<https://app.rawgraphs.io>






















RAWGraphs 2.0 beta About GitHub Report Issue



**Alluvial Diagram**

It shows correlations between categorical dimensions representing them as flows, visually linking categories with shared items. Each rectangle represents a unique value in the selected dimension, its height is proportional to its value. Correlations are represented with curved lines whose width is proportional to their value.

[Code](#) [Tutorial](#)

 <p><b>Alluvial Diagram</b> Correlations, proportions</p>	 <p><b>Arc Diagram</b> Networks</p>	 <p><b>Bar chart</b> Correlations</p>
 <p><b>Multi-set bar chart</b> Correlations, proportions</p>	 <p><b>Stacked bar chart</b> Correlations, proportions</p>	 <p><b>Beeswarm plot</b> Distributions, time series, proportions</p>
 <p><b>Box plot</b> Distributions</p>	 <p><b>Bubble chart</b> Correlations, proportions</p>	 <p><b>Bumpchart</b> Time series, correlations, proportions</p>
 <p><b>Circle Packing</b> Hierarchies, proportions</p>	 <p><b>Circular dendrogram</b> Hierarchies, proportions</p>	 <p><b>Contour plot</b> Correlations, distributions</p>
 <p><b>Convex hull</b> Correlations, proportions</p>	 <p><b>Linear dendrogram</b> Hierarchies, proportions</p>	 <p><b>Hexagonal binning</b> Correlations, distributions</p>
 <p><b>Line chart</b> Time series, correlations</p>	 <p><b>Matrix Plot</b> Correlations, time series, proportions</p>	 <p><b>Radar Chart</b> Correlations</p>
 <p><b>Sankey Diagram</b> Networks</p>	 <p><b>Streamgraph (area chart)</b> Time series, correlations, proportions</p>	 <p><b>Sunburst diagram</b> Hierarchies, proportions</p>



# MAPSCHOLAR

<http://viseyes.org/mapscholar/>

The screenshot displays the Mapscholar interface. The main map shows a historical map of North America with several yellow bounding boxes highlighting specific regions. The sidebar on the right contains a search results panel titled "A sample information panel" with the following entries:

- A New Discription of Carolina 1671
- A New Map of Carolina 1682
- New Map of Cheif Rivers 1695
- Carolina in America 1709

Below the search results, there is a "Visibility" slider and a list of categories: Crisp and Moll, Charlestown, Remapping America, Altamaha, and Native Geographies. At the bottom of the sidebar is a circular navigation tool with labels "address", "context", and "spaces". The bottom of the interface features a search bar with the text "Find: Geben Sie einen Richard Blome" and a "Play speed" control.





# SHIVA

<http://www.viseyes.org/shiva/>



Charts | Maps | Timelines | Videos | Images | **Graphs** | Subway | Words | Text | About

Network ▾

Data source URL

Height

Width

Background color  fffffff

Node distance

Node charge

Node gravity (0-100)

Node strength (0-100)

Node shape  ▾

Popup show time

Node size

Node color  none

Link line width

Link color  cccccc

Font size

Font color  000000

Enable user draw?  ▾

Share as:  ▾

Powered by D3  
Built by SHANTI  
The University of Virginia



# WORDSEER

<https://wordseer.berkeley.edu>

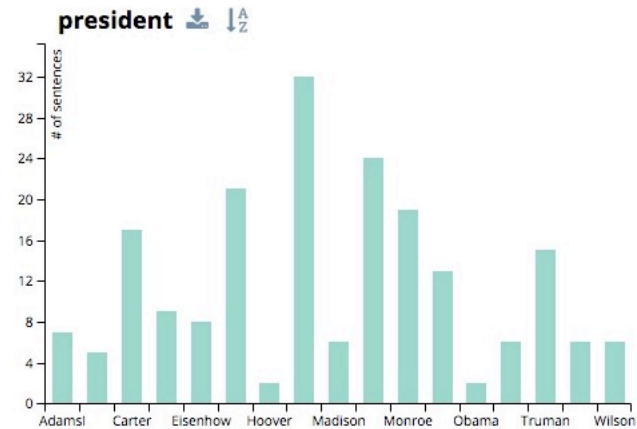
Search:   search for... search lemmas:  Metadata Profile in new tab Go

**CO-OCCURRING TERMS** **FILTERS** Metadata Profile

great  
any match

### METADATA PROFILE

PROPERTIES:  president  year  
DISPLAY AS:  Raw Counts  % of Total

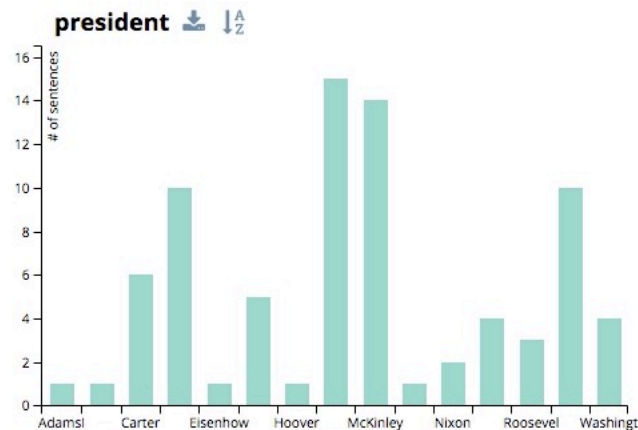


**CO-OCCURRING TERMS** **FILTERS** Metadata Profile

good  
any match

### METADATA PROFILE

PROPERTIES:  president  year  
DISPLAY AS:  Raw Counts  % of Total





# VOYANT

<https://voyant-tools.org>

The screenshot displays the Voyant Tools interface for a corpus containing one document with 39,393 total words and 6,717 unique word forms. The interface is divided into several sections:

- Word Cloud:** A word cloud on the left side, with the most prominent words being "mensch", "herz", "seele", "mutter", "vater", "mutter", "vater", "mutter", "vater", "mutter", "vater". Other visible words include "albert", "tränen", "zeit", "herz", "leben", "langes", "herzen", "gott", "stimm", "liebe", "augen", "wilt", "hel", "kinder", "sah", "werther", "wiel", "thand", "mutter", "vater", "mutter", "vater", "mutter", "vater".
- Reader:** A central text viewer showing the beginning of the document, "Erstes Buch Was ich von der Geschichte des arme...". The text includes the opening of Goethe's "Die Leiden des jungen Werther".
- Line Graph:** A line graph on the right titled "Trends" showing the frequency of five terms: "lotte", "seele", "herz", and "mensch" across document segments. The y-axis is labeled "Term Frequencies" and ranges from 0 to 24. The x-axis is labeled "Document Segments" and ranges from 1 to 10. The "mensch" series (purple) shows a significant peak at segment 9.
- Concordance Table:** A table at the bottom right showing the context of the word "mensch". The table has columns for "Document", "Left", "Term", and "Right".

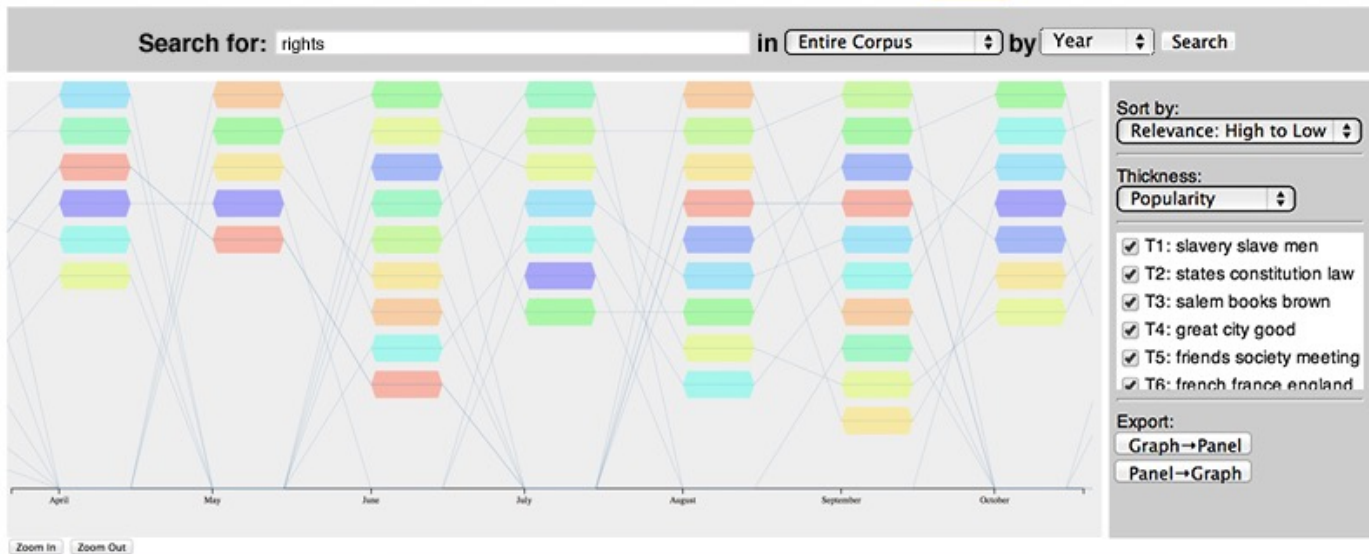
Document	Left	Term	Right
1) Erste...	selbst ergetzt? Hab' ich nicht –	o	was ist der Mensch, daß
1) Erste...	und Quellen wohlthätige Geister schweben.	o	der muß nie nach einer
1) Erste...	ward rot über und über –	»	nein, Herr! sagte sie – »Ohne
1) Erste...	um es los zu werden.	o	Bestimmung des Menschen! Aber eine
1) Erste...	Künstler ist, mit seiner Kunst.	o	meine Freunde! Warum der Strom
1) Erste...	mit Ihnen verwandt zu sein?« –	»	«, sagte sie mit einem leichtfertigen
1) Erste...	geketteten Hügel und vertraulichen Taler! –	o	könnte ich mich in Ihnen
1) Erste...	nicht gefunden, was ich hoffte.	o	es ist mit der Feme
1) Erste...	Daß ich mich schonen sollt! –	o	der Engel! Um deinetwillen muß
1) Erste...	mir umgesehen! Vielleicht! – Gute Nacht!	o	« was ich ein Kind bin
1) Erste...	meinem Herzen trauen, daß sie –	o	darf ich, kann ich den

<https://fortext.net/ressourcen/videos/tutorials/textvisualisierung-und-digitale-literaturanalyse>



# TOME: INTERACTIVE TOPIC MODEL AND METADATA VISUALIZATION

<https://dhlabs.lmc.gatech.edu/tome/>



**Topic 40** states state law constitution the government power united laws congress rights people con ohio tion act union question property

Prevalence



Related Topics



Geographic Distribution





# NARRATIONS

<https://uclab.fh-potsdam.de/narrations/>

Import  Keine Datei ausgewählt

Lili

Das waren unbeständige Frühlingstage, die ich im Mai des Jahres 1873 in der Heimat antraf. Ich kam aus dem Süden, dem Land der Sonne und der Sorglosigkeit, daheim hingen Wolken am Himmel, umlagerte die Sorge das Leben. Und doch war es Mai. Aber alle bösen Eigenschaften, welche der Volksmund dem oft so lieblichen April nachsagt, hatte diesmal der vielbelobte Wonnemond entfesselt und dabei herrschte sommerliche Schwüle, die sich dann und wann in Gewitterschauern über der blühenden, kaum zu frohem Dasein erwachten Erde entlud.

Eine Gewitterstimmung fand ich auch in den Kreisen meiner Bekannten und Freunde und bald sollte ich erfahren, daß solche Schwüle auch im Leben der Gesellschaft gar oft Entladungen von vernichtender Wirkung zur Folge hat. Das Gewitter hieß Krisis des Geldmarktes. Das Spekulationsfieber hatte damals Menschen ergriffen, deren Gedanken- und Gesprächskreise sonst weitab von der Welt der Geldgeschäfte gelegen hatten, und mit aufgeregter Spannung verfolgte plötzlich der sonst so bedächtige Rentner das Steigen und Fallen der Course, die Erscheinungen und Bewegungen an der Börse, für die er vorher nur wenig Verständniß gehabt. Und in jenen Tagen war nur vom Sinken der Wertpapiere, nur von erschütternden Katastrophen an der Börse die Rede. An dem Morgen, der mir heute mit greifbarer Lebendigkeit in der Erinnerung auftaucht, ließ freilich die Sonne und ihr lichtiges Spiegelbild auf der Erde nichts von solchen Betrachtungen aufkommen. Wie die Jugend unter dem Gruß des Glücks, schnell und lebensfroh, das momentan durch einen Mißerfolg gebeugte Haupt



## NARRATIVE LEVELS

### Speakers

- »Ich«
- Erich
- Lili
- Anton
- Portier
- Geschäftsführer
- Kinder

### Transgression

#### Illocutionary boundary

- Actually crossed
- Not crossed
- Virtually crossed
- Non

#### Ontological boundary

- Not crossed
- Virtually crossed
- Non

## TEMPORAL PHENOMENA

- Order
- Frequency (repetitive)
- Duration



# PALLADIO

<https://hdlab.stanford.edu/palladio/>

v. 1.0.0 [Download](#)

**P** Data Map Graph Table Gallery

Name	Arrival Point	Place	Place of Death	Pic
Winaretta Singer	Monaco	London, Yonkers, Monaco	London	<a href="http://2.bp.blogspot.com/_dHMUKWjWjNM/SxV9UDvITCI/AAAAAAAC3">http://2.bp.blogspot.com/_dHMUKWjWjNM/SxV9UDvITCI/AAAAAAAC3</a>
Grimaldi Princesse Marie Caroline Gilbert de Larnetz	Monaco	Monaco, Coulommiers	Monaco	<a href="http://upload.wikimedia.org/wikipedia/commons/f/fd/Caroline_gib">http://upload.wikimedia.org/wikipedia/commons/f/fd/Caroline_gib</a>
Sarah Bernhardt				
Sara Murphy				
Roland Bonaparte				
Rene Leon				
Raoul Gunsbourg				
Pierre Polovtsov				
Pierre Auguste Daval				
Pablo Picasso				
Napoleon Langlois				
Mata Hari				
Marie Therese Blanc				
Marie Juliette Louvet				
Marie Félix Blanc				
Marie Blanc				
Magdeleine-Victoire Huguelin				
Ludwig Jacobi				
Louise Blanc				
Louis-Philippe				
Louis Blanc				
Leopold II				

Map layers

**P** Data Map Graph Table Gallery

Facet Timeline Timespan You have no active filters

v. 1.0.0 [Download](#)

**P** Data Map Graph Table Gallery

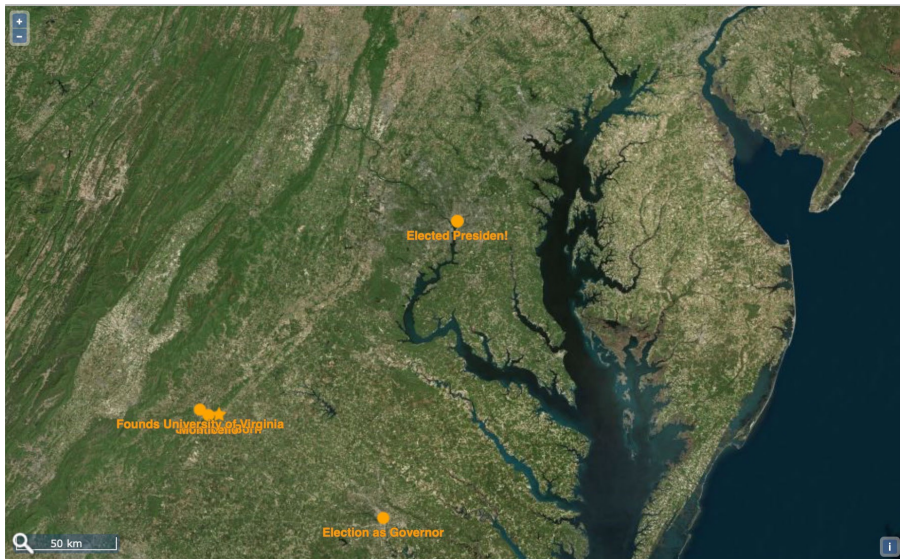
	<b>Grimaldi Princesse Marie Caroline Gilbert de Larnetz</b> Aristocrat Select a text dimension		<b>Aga Khan III</b> Aristocrat Select a text dimension		<b>Albert Aubert</b> Financier Select a text dimension		<b>Alice Heine</b> Aristocrat Select a text dimension
	<b>Anton Dolin</b> Artist Select a text dimension		<b>Antony Noghes</b> Monegasque Select a text dimension		<b>Basil Zaharoff</b> Financier Select a text dimension		<b>Camille Blanc</b> Financier Select a text dimension
	<b>Carey Grant</b> Actor Select a text dimension		<b>Charles Garnier</b> Artist Select a text dimension		<b>Charles Wells</b> Gambler Select a text dimension		<b>Claude Blanc</b> Aristocrat Select a text dimension
	<b>Coco Chanel</b> Artist Select a text dimension		<b>Colette</b> Artist Select a text dimension		<b>Constantin Radzwill</b> Financier Select a text dimension		<b>Consuelo Vanderbilt</b> Aristocrat Select a text dimension
	<b>Duc de Valmy</b> Financier Select a text dimension		<b>Edith Wharton</b> Artist Select a text dimension		<b>Edmond Blanc</b> Financier Select a text dimension		<b>Edward VII</b> Aristocrat Select a text dimension

Facet Timeline Timespan You have no active filters



# VISUALEYES

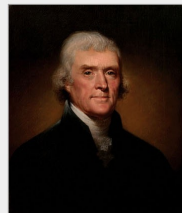
<http://www.viseyes.org/visualeyes/>



## Introducing VisualEyes 5

2. The Life of Thomas Jefferson

### The Life of Thomas Jefferson



Thomas Jefferson (April 13, 1743 – July 4, 1826) was an American Founding Father who was principal author of the Declaration of Independence (1776). He was elected the second Vice President of the United States (1797–1801), serving under John Adams and in 1800 was elected third President (1801–09).

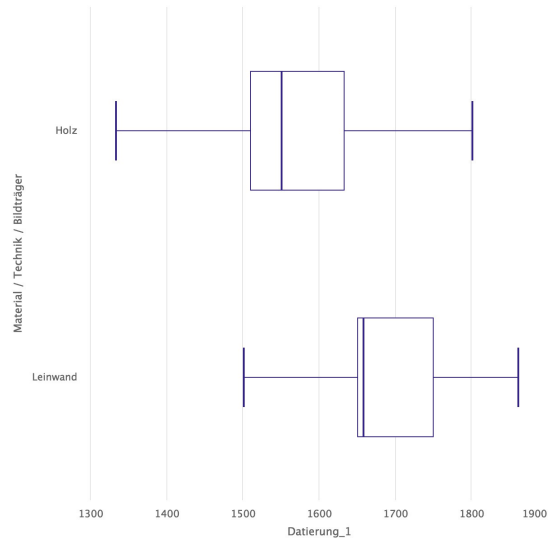
This visualization highlights a few events in Thomas Jefferson's life. They show up on the timeline, the map, and the story panel to the right of the two. Clicking on an event will move the timeline there, and highlight its location on the map, as will clicking on the title in the story panel and also show additional information. Clicking on a picture will enlarge it.

Some locations (Williamsburg, Philadelphia, Richmond, and DC) have historical maps overlaid on the map. Some events bring up webpages (Notes) and zoomable hi-res images (Death). An animated line follows the timeline through the locations. The grey segment bars allow you to zoom in on a particular era.



# MAX

<https://www.max.gwi.uni-muenchen.de>



Ein Online-Tool zur vergleichenden Analyse musealer Datenbestände

● Alte Pinakothek ● Neue Pinakothek ● Pinakothek der Moderne

Museum	Bestand
Joconde	590962
National Library of Denmark	421563
Riksantikvarieämbetet	204157
Rijksmuseum	189827
Rijksdienst voor het Cultureel Erfgoed	152616
Zeeuwse Bibliotheek	105411





1905



<https://www.youtube.com/watch?v=xIWPZ5jhvx4&t=10s>

## IMAGEPLOT

<http://lab.softwarestudies.com/p/imageplot.html>

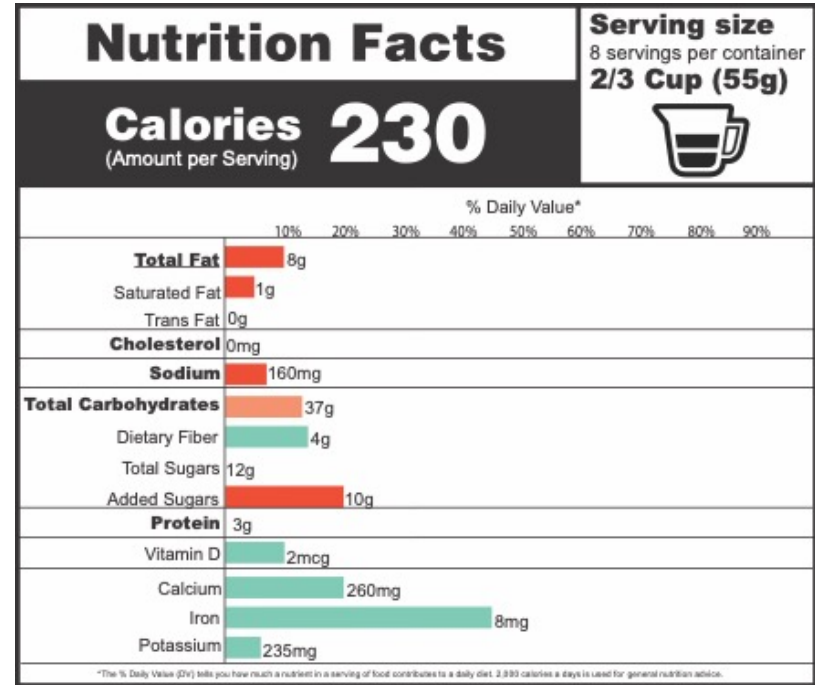


<b>Nutrition Facts</b>	
8 servings per container	
<b>Serving size</b>	<b>2/3 cup (55g)</b>
Amount per serving	
<b>Calories</b>	<b>230</b>
% Daily Value*	
<b>Total Fat</b> 8g	<b>10%</b>
Saturated Fat 1g	<b>5%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 160mg	<b>7%</b>
<b>Total Carbohydrate</b> 37g	<b>13%</b>
Dietary Fiber 4g	<b>14%</b>
Total Sugars 12g	
Includes 10g Added Sugars	<b>20%</b>
<b>Protein</b> 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

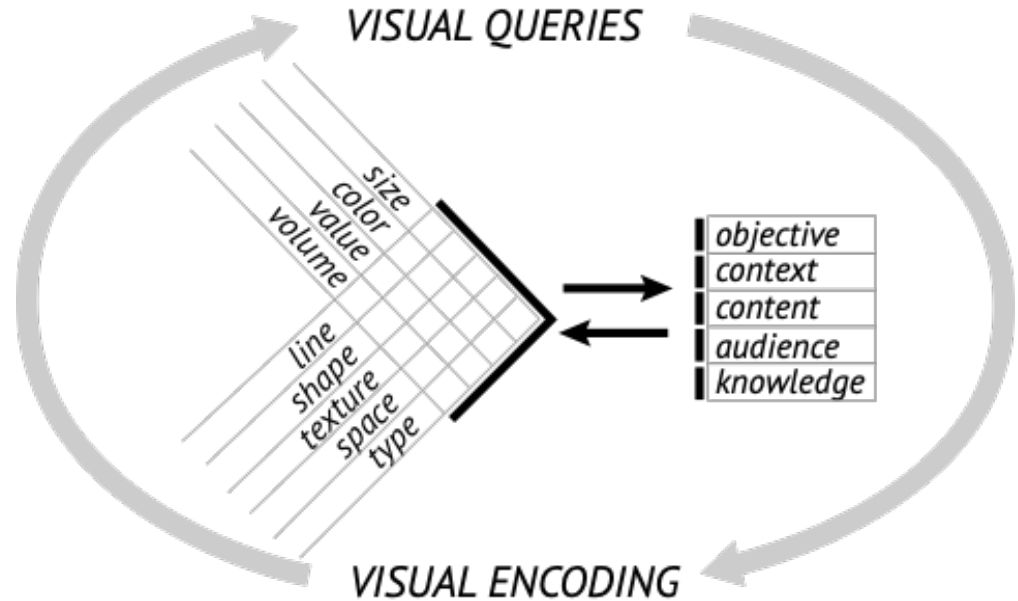
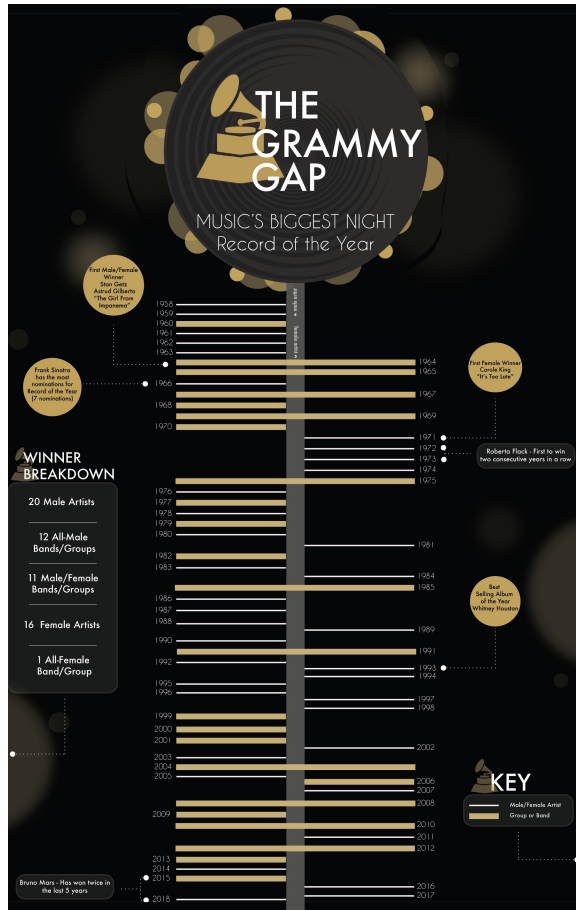
\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

<b>Nutrition Facts</b>	
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Iron 8mg	45%
Potassium 240mg	6%

\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Redesigning nutrition labels as a typical task for graphic design students to visually present quantifiable information while paying attention to font, space and colour relationships.



Modular approach to address design concerns in visualisation

Yvette Shen, Placing Graphic Design at the Intersection of Information Visualization Fields, DH Quarterly 12.4, 2018:

<http://www.digitalhumanities.org/dhq/vol/12/4/000406/000406.html>

## CHALLENGES

- Reflection on the appropriate form of visualisation in each case
- Developing new forms of scientific discourse in the exploratory analysis of cultural data
- Representation of image-to-image relations and spatial relationships in visual networks and virtual spaces



- Various quantitative methods and multivariate procedures
- Basics of exploratory statistics
- Concepts and theories of network analysis
- Analysis procedures and visualisation methods of common measures and structures
- Basic principles of information visualisation
- Data collections and tools for data analysis and visualisation



- Structural and relational analysis, dealing with relational issues, selecting suitable analysis software (e.g. R, Python, PAST, gephi, Palladio)
- Reproducing / checking diagrams and other forms of visualisation
- Analyse common measures and structures and output the results as a suitable visualisation



How could the results of a multivariate analysis of large image sets be visualised?

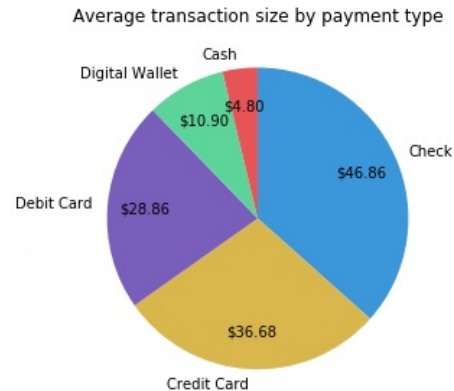
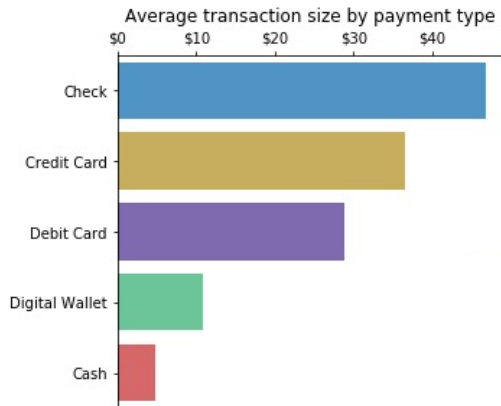
Folie 20–26. 57–61. 97

On which mathematical methods is correspondence analysis based? What can it be used for?

Folie 30–39

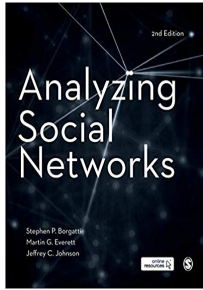
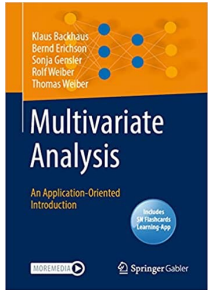
Give an example of the convincing use of historical network analysis.

Folie 48–52



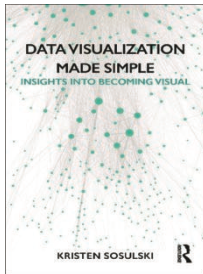
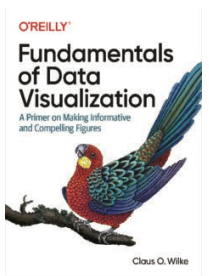
Which of the two visualisations would you choose? Please justify your answer.

Folie 57–60. 80–82



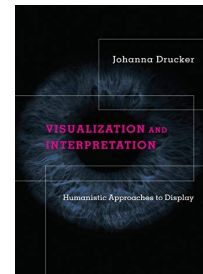
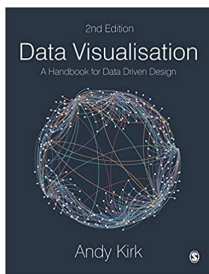
Klaus Backhaus et al., *Multivariate Analysis: An Application-Oriented Introduction* (Springer, 2021)

Stephen P. Borgatti, Martin G. Everett, Jeffrey C. Johnson, *Analyzing Social Networks*, 2nd Ed. (SAGE, 2018)



Claus O. Wilke, *Fundamentals of Data Visualization. A Primer on Making Informative and Compelling Figures* (O'Reilly, 2019)

Kristen Sosulski, *Data Visualization Made Simple\_ Insights Into Becoming Visual* (Routledge, 2019)



Andy Kirk, *Data Visualisation: A Handbook for Data Driven Design* 2nd ed. (SAGE, 2019)

Johanna Drucker, *Visualization and Interpretation: Humanistic Approaches to Display* (MIT Press 2020)



# *Royksopp*

*Remind Me*

Folie 1:

Folie 2:

Folie 3:

Folie 4:

Folie 5:

Folie 6:

Folie 7:

Folie 8:

Folie 9:

Folie 10:

Folie 11:

Folie 12:

Folie 13:

Folie 14:

Folie 15:

Folie 16:

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<https://www.uni-goettingen.de/digitalhumanities>

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