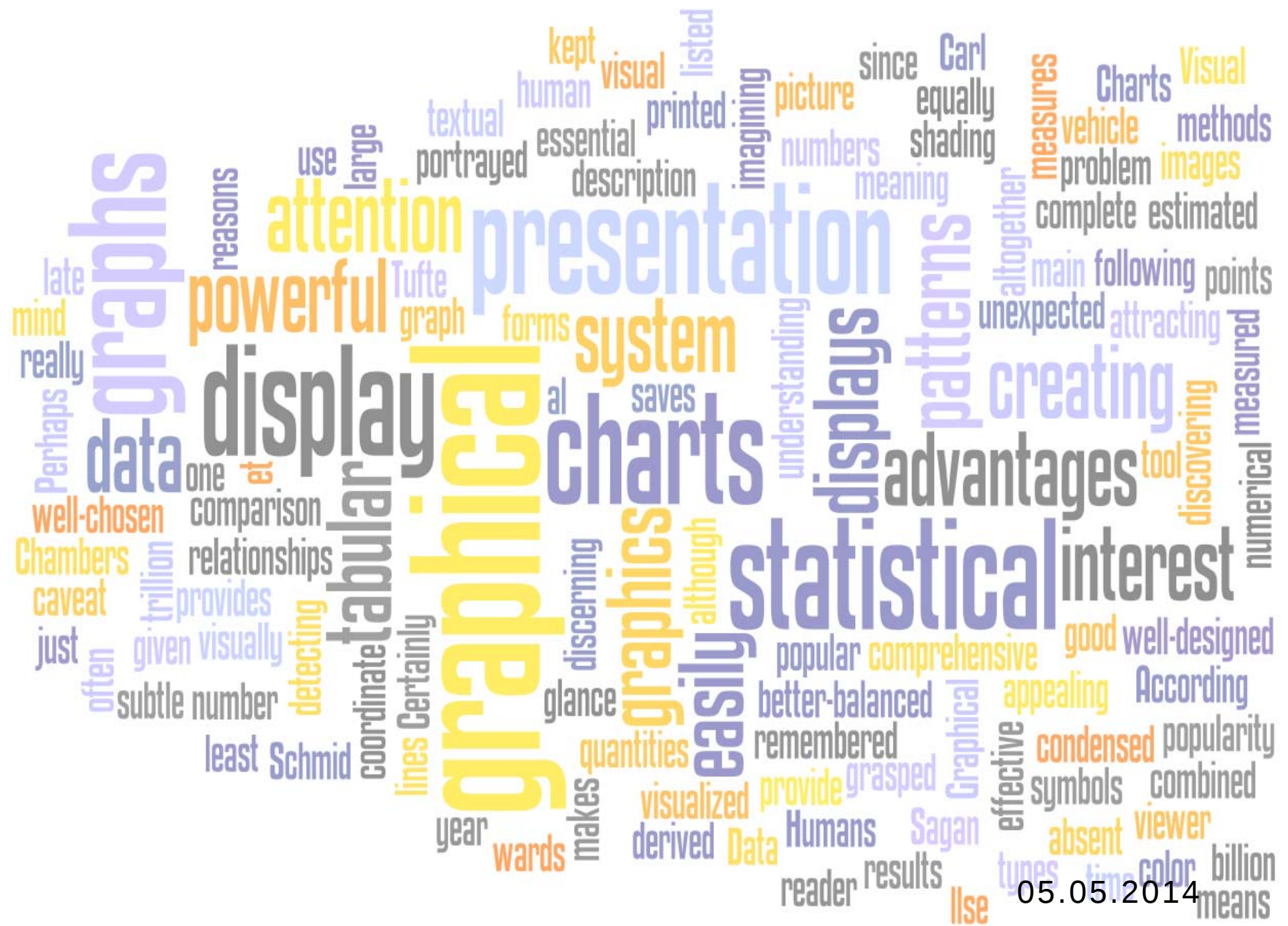




05.05.2014

Abbildungen

Überblick

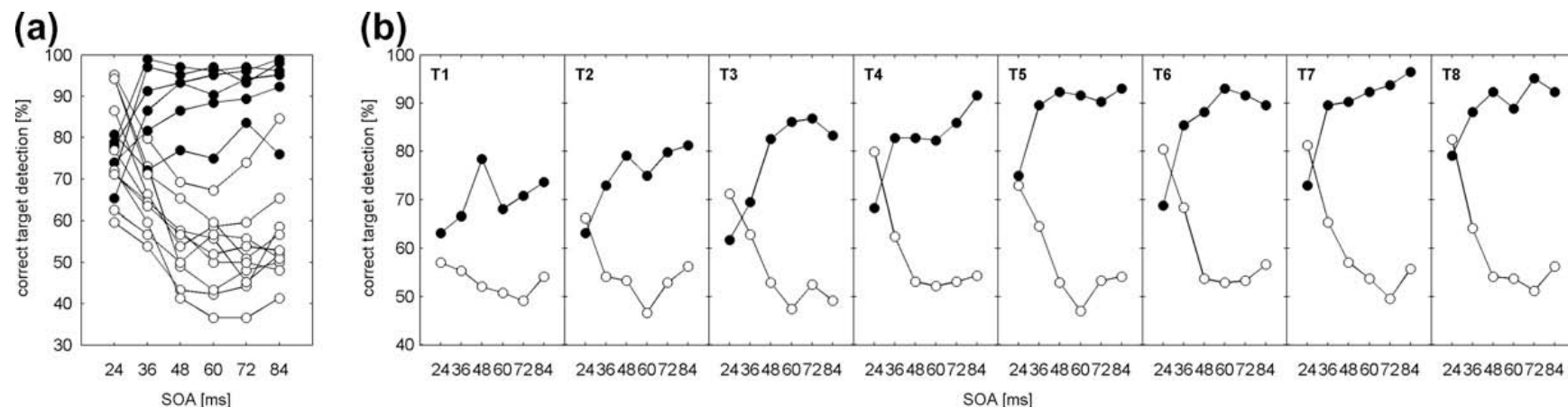
- Einleitung
- Einfache Graphiken
- Scatterplot
- Scatterplot Matrix
- Trellis Graphiken
- Irreführende Graphik
- Elaborierte Darstellungen

Einleitung

- **Vorteile einer guten Abbildung**
 - weckt Interesse und Aufmerksamkeit
 - lässt Beziehungen leichter erfassen und erinnern
 - erleichtert Kommunikation komplexer Datenmuster
 - erzeugt ein verständliches Bild eines Problems
 - kann verborgene Aspekte aufzeigen
und so zu neuer Sichtweise führen

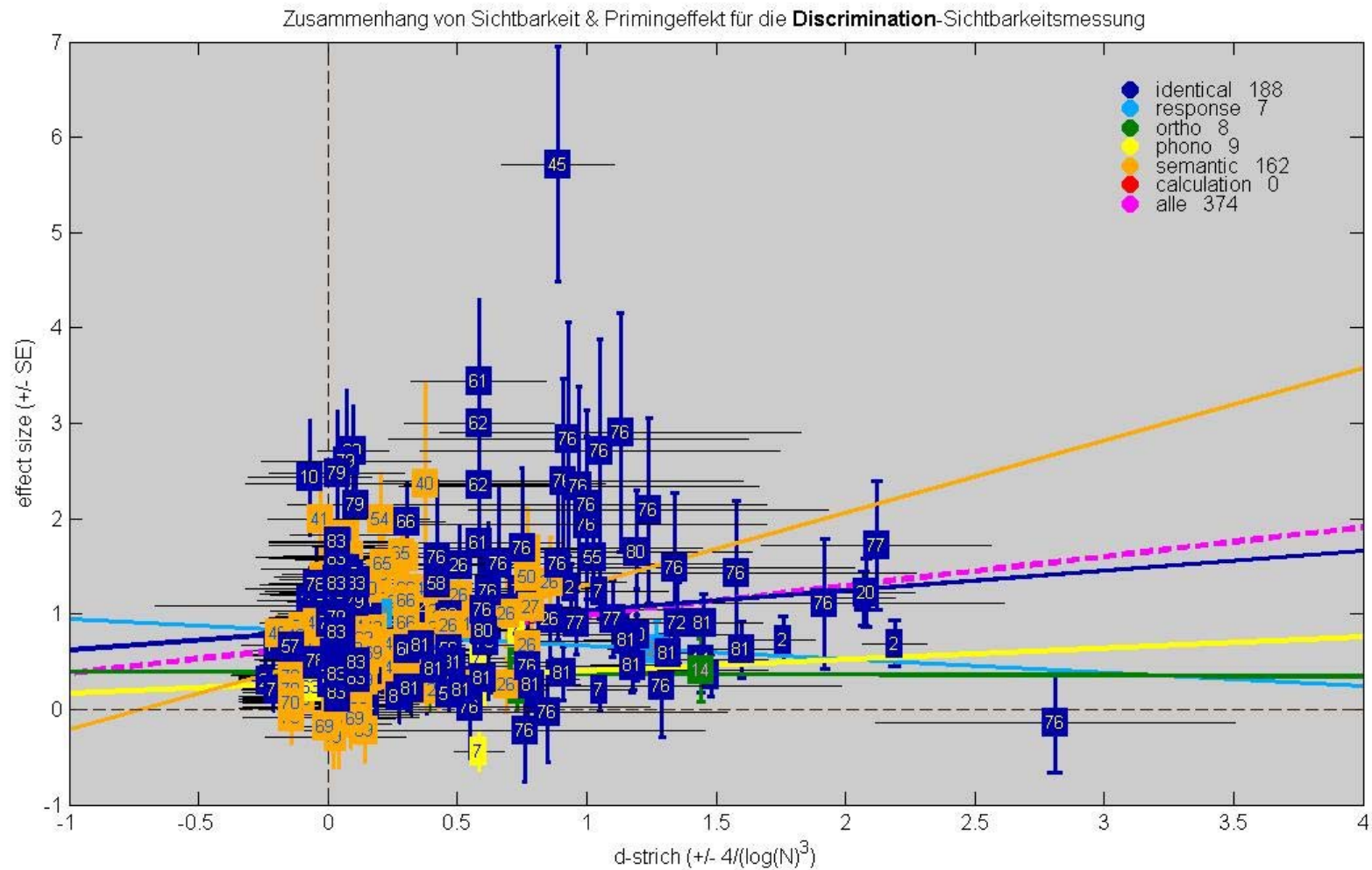
Einleitung

- **Ziel einer Abbildung**
 - Kommunikation für sich selbst und für andere
 - Verständnis von Zusammenhängen erzeugen
 - Überblick über Daten geben
 - Eine Geschichte über die Daten erzählen



Einleitung

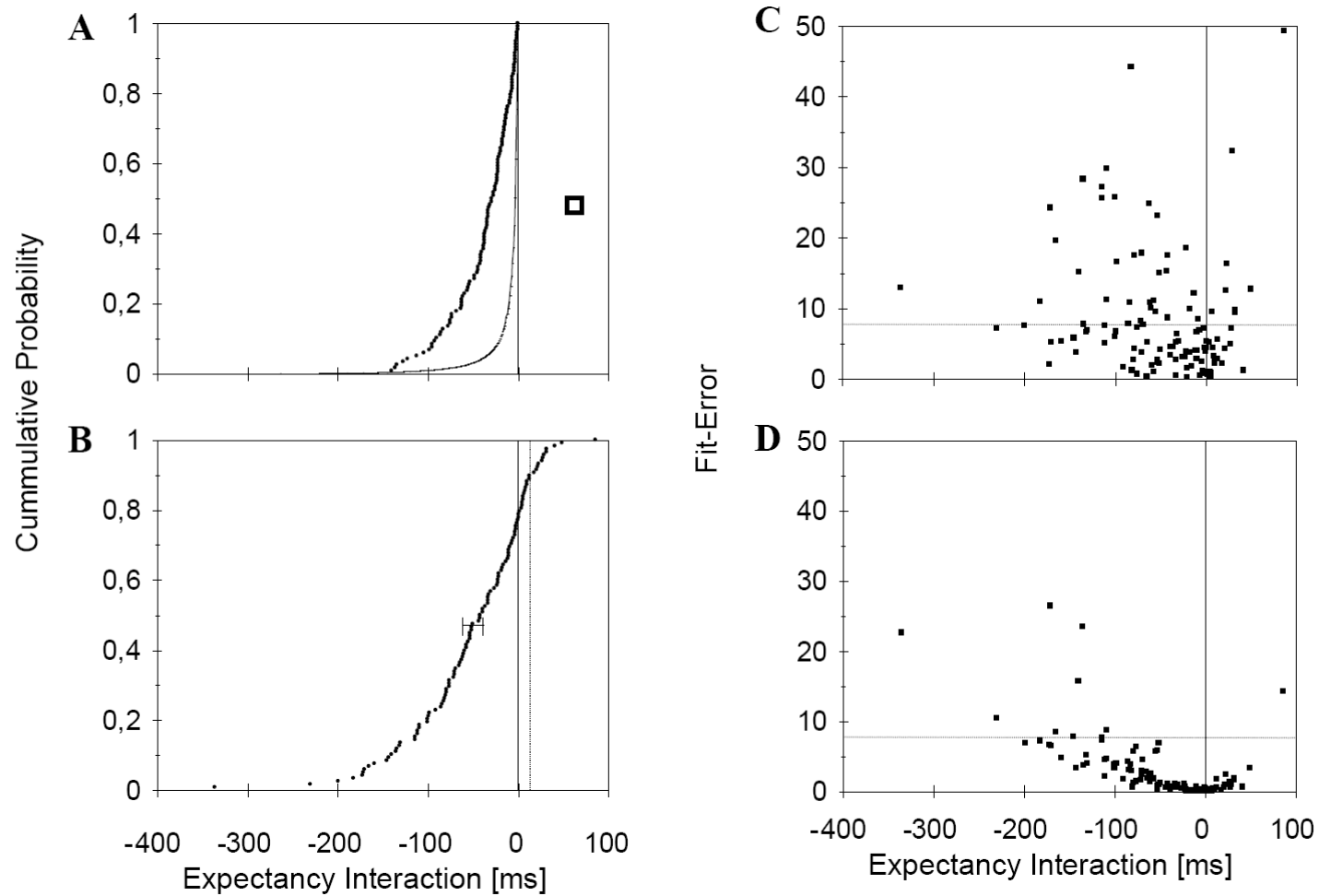
- Ziel einer Abbildung



Einleitung

- **Ziel einer Abbildung**
 - Kommunikation für sich selbst und für andere
 - Verständnis von Zusammenhängen erzeugen
 - Überblick über Daten geben
 - Eine Geschichte über die Daten erzählen
 - Hypothesen nahelegen
 - Übereinstimmung mit einem Modell zeigen
 - Abweichungen vom Modell zeigen

Einleitung



Mattler (2005)

Einfache Graphik

- **Häufige Abbildungen**
 - Tortengraphik
 - Balkengraphik
- **Drei Negativ-Beispiele**
 1. Häufigkeit von Verbrechen bei Trinkern
 2. Abschlüsse bei Frauen
 3. Lebenserwartung in Industriestaaten
 4. Überlebende der Titanic-Katastrophe
 5. Einen Film erzählen ...

Einfache Graphik

Bsp. 1

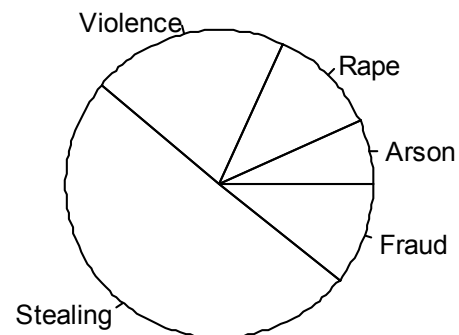
TABLE 2.1

Crime Rates for Drinkers and Abstainers

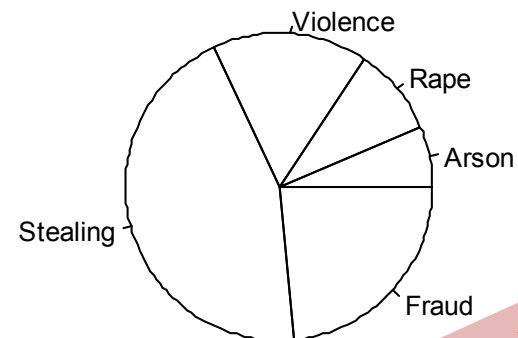
Crime	Drinkers	Abstainers
Arson	6.6	6.4
Rape	11.7	9.2
Violence	20.6	16.3
Stealing	50.3	44.6
Fraud	10.8	23.5

Note: Figures are percentages.

Drinkers



Abstainers



Schlecht !

Einfache Graphik

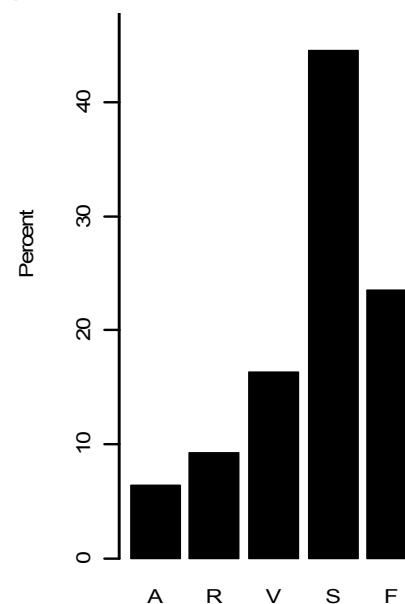
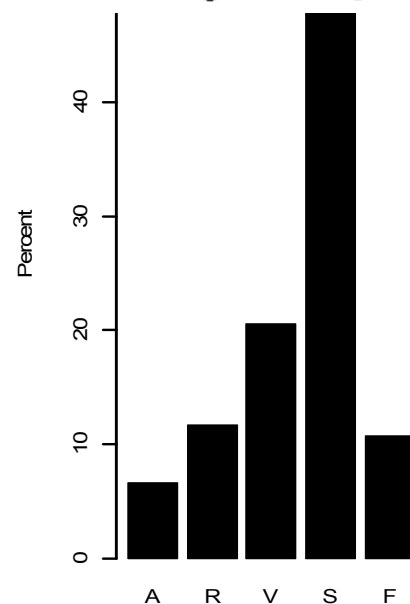
Bsp. 1

TABLE 2.1

Crime Rates for Drinkers and Abstainers

Crime	Drinkers	Abstainers
Arson	6.6	6.4
Rape	11.7	9.2
Violence	20.6	16.3
Stealing	50.3	44.6
Fraud	10.8	23.5

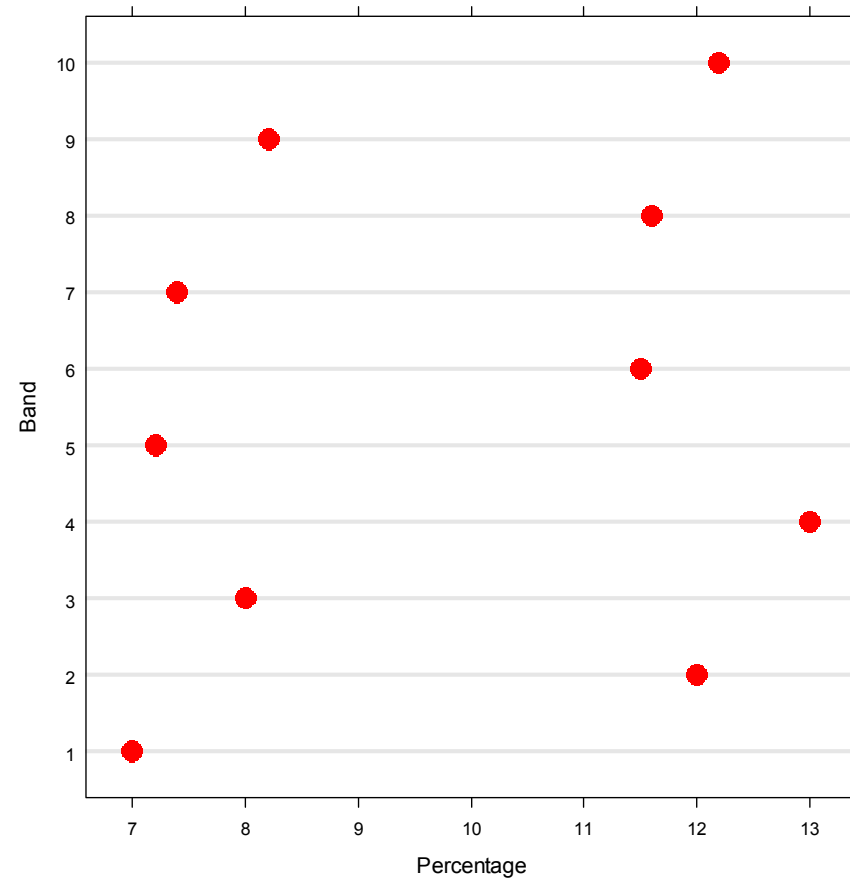
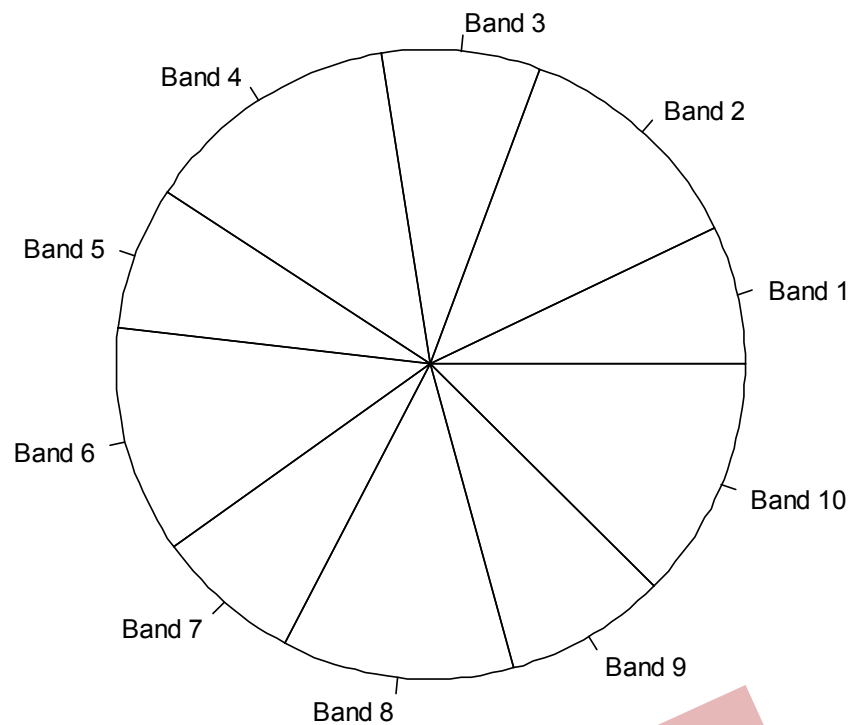
Note: Figures are percentages.



Schlecht !

Einfache Graphik

ad Bsp. 1



Schlecht !

Einfache Graphik

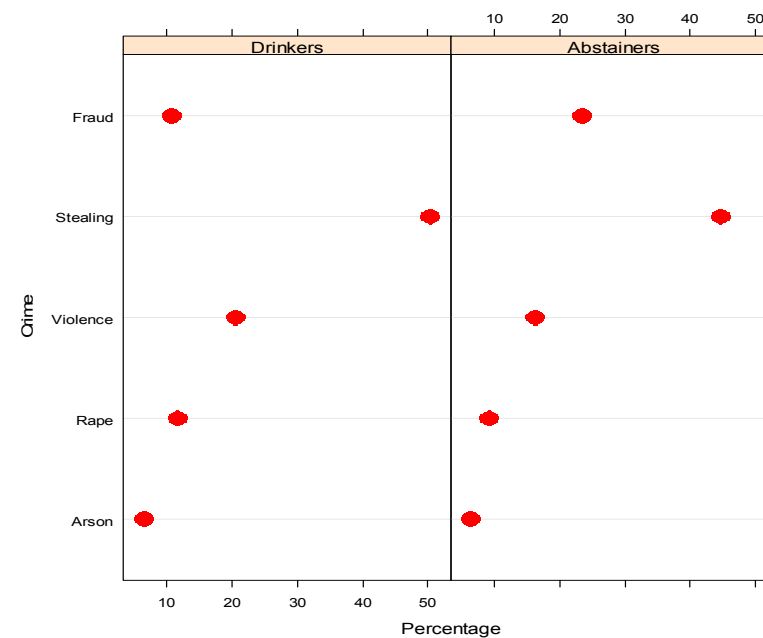
Bsp. 1

TABLE 2.1

Crime Rates for Drinkers and Abstainers

Crime	Drinkers	Abstainers
Arson	6.6	6.4
Rape	11.7	9.2
Violence	20.6	16.3
Stealing	50.3	44.6
Fraud	10.8	23.5

Note: Figures are percentages.



Einfache Graphik

Bsp. 2

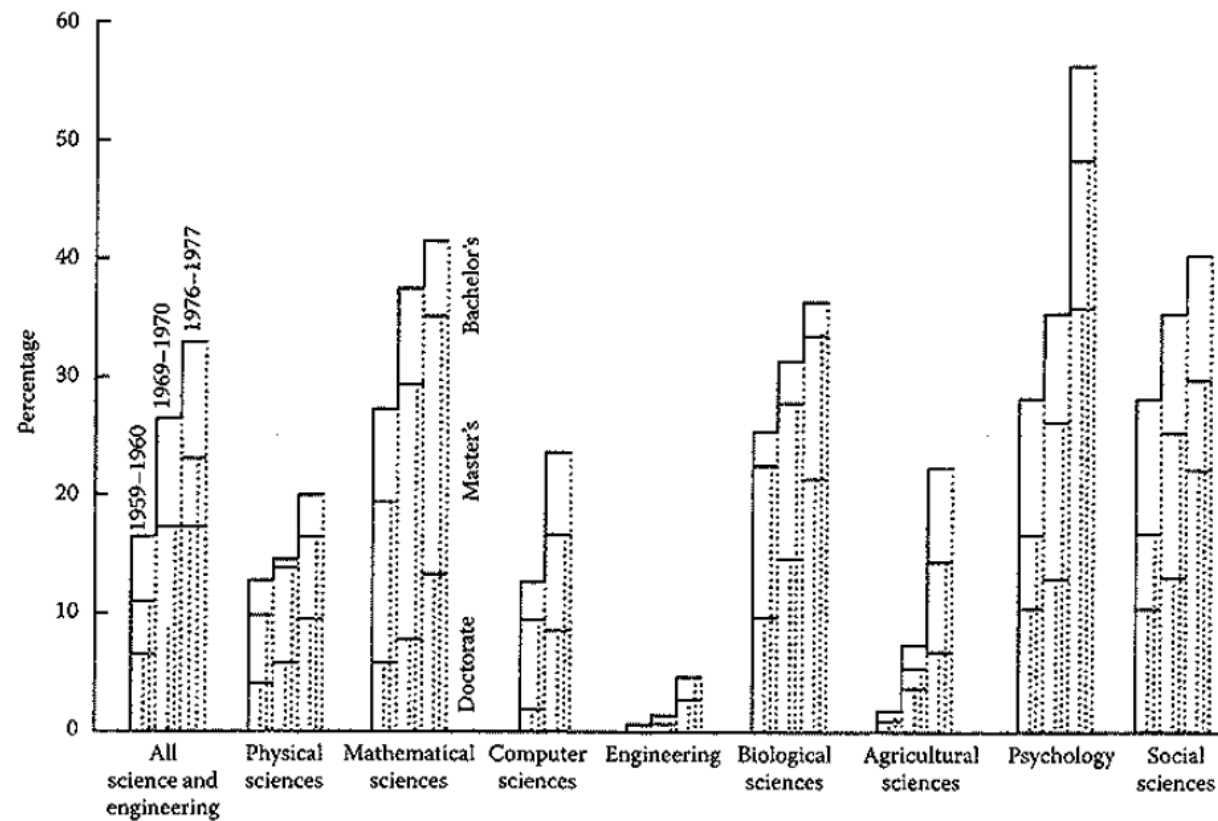


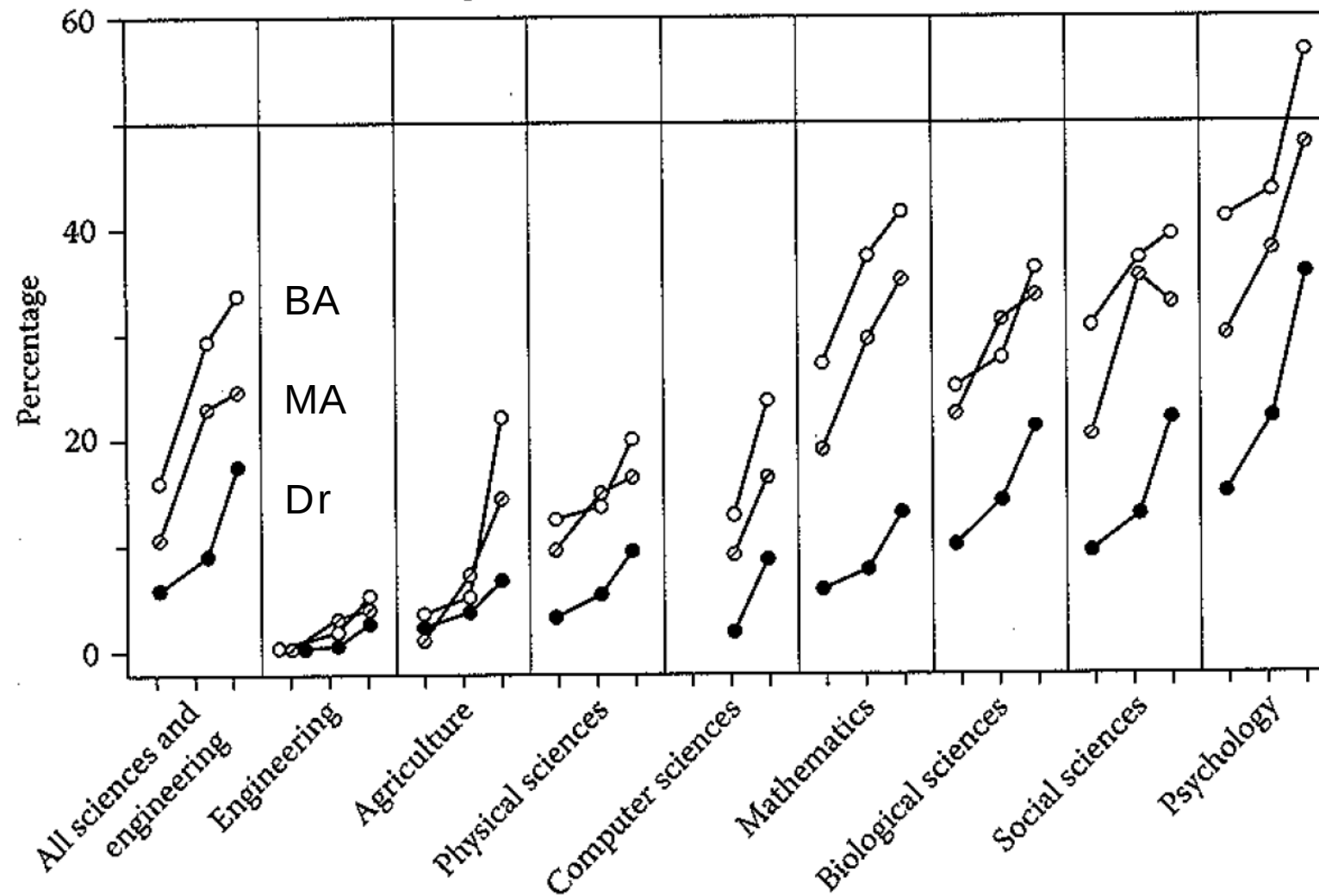
FIGURE 2.6

Proportion of degrees in science and technology earned by women in the periods 1959-1960, 1969-1970, and 1976-1977. (Reproduced with permission from Vetter, B. M., 1980, *Science*, 207, 28-34. © 1980 American Association for the Advancement of Society.)

Einfache Graphik

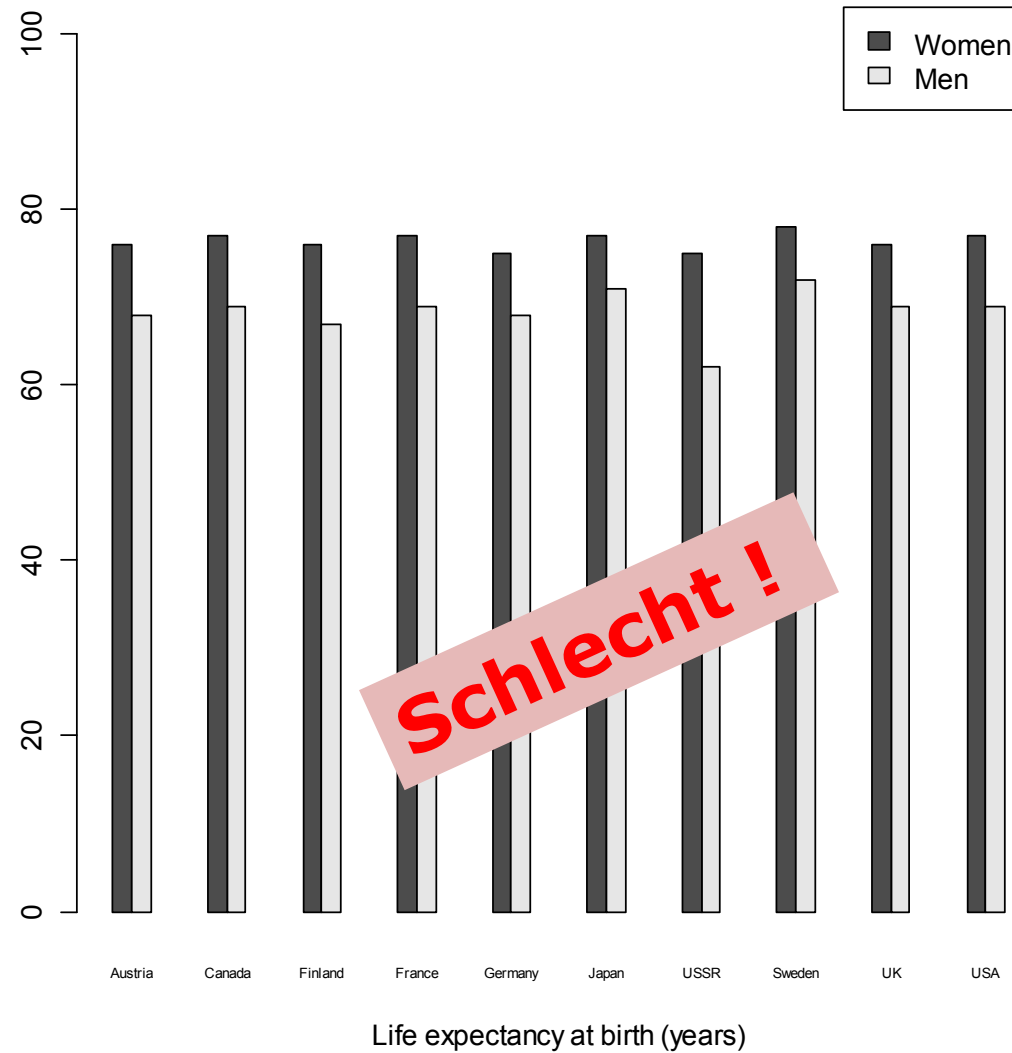
Bsp. 2

Histograms, Stem-and-Leaf Plots and Box Plots



Einfache Graphik

Bsp. 3



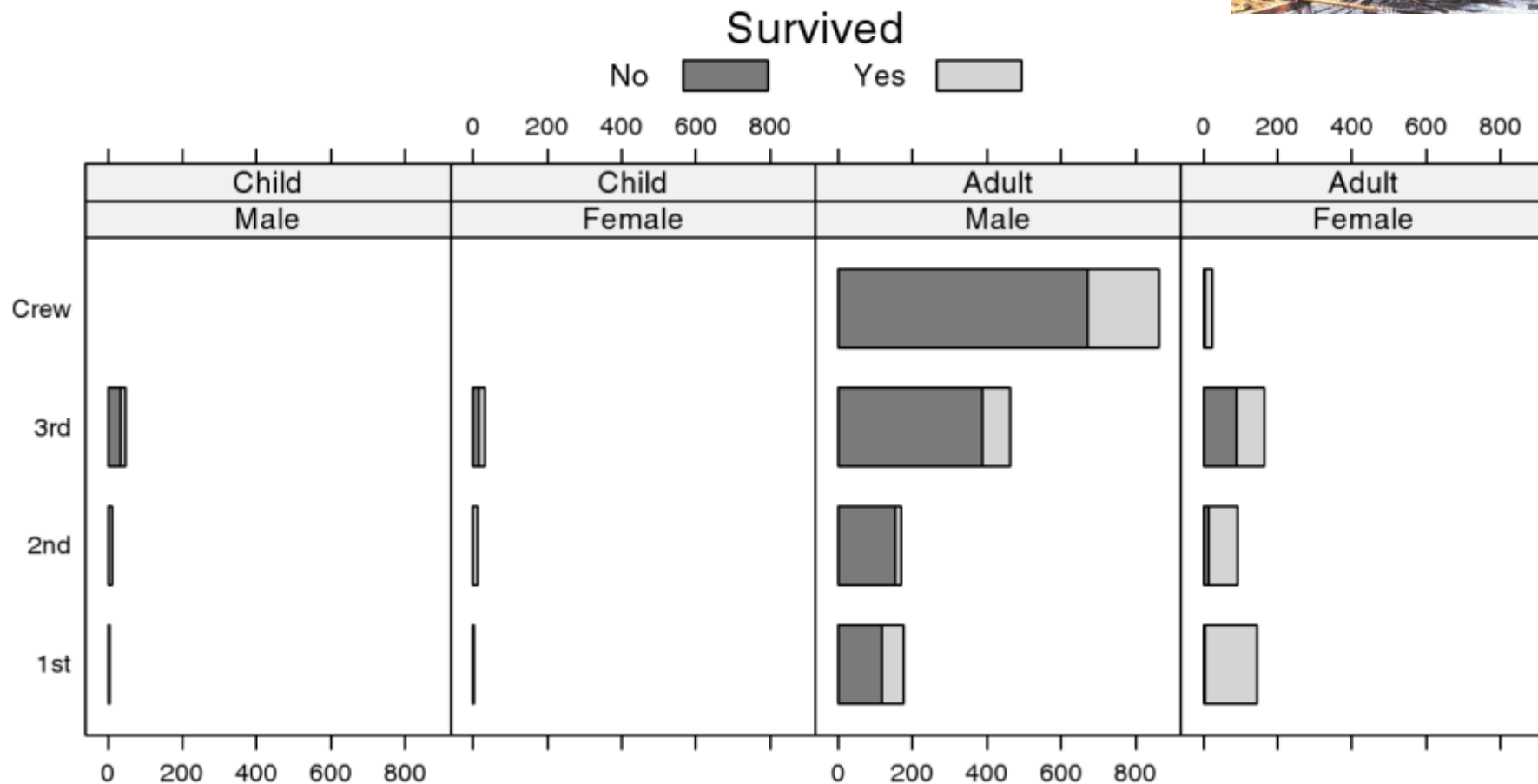
Einfache Graphik

Bsp. 3

Women	Age	Men
Sweden	78	
France, US, Japan, Canada	77	
Finland, Austria, UK	76	
USSR, Germany	75	
	74	
	73	
	72	Sweden
	71	Japan
	70	
	69	Canada, UK, US, France
	68	Germany, Austria
	67	Finland
	66	
	65	
	64	
	63	
	62	USSR

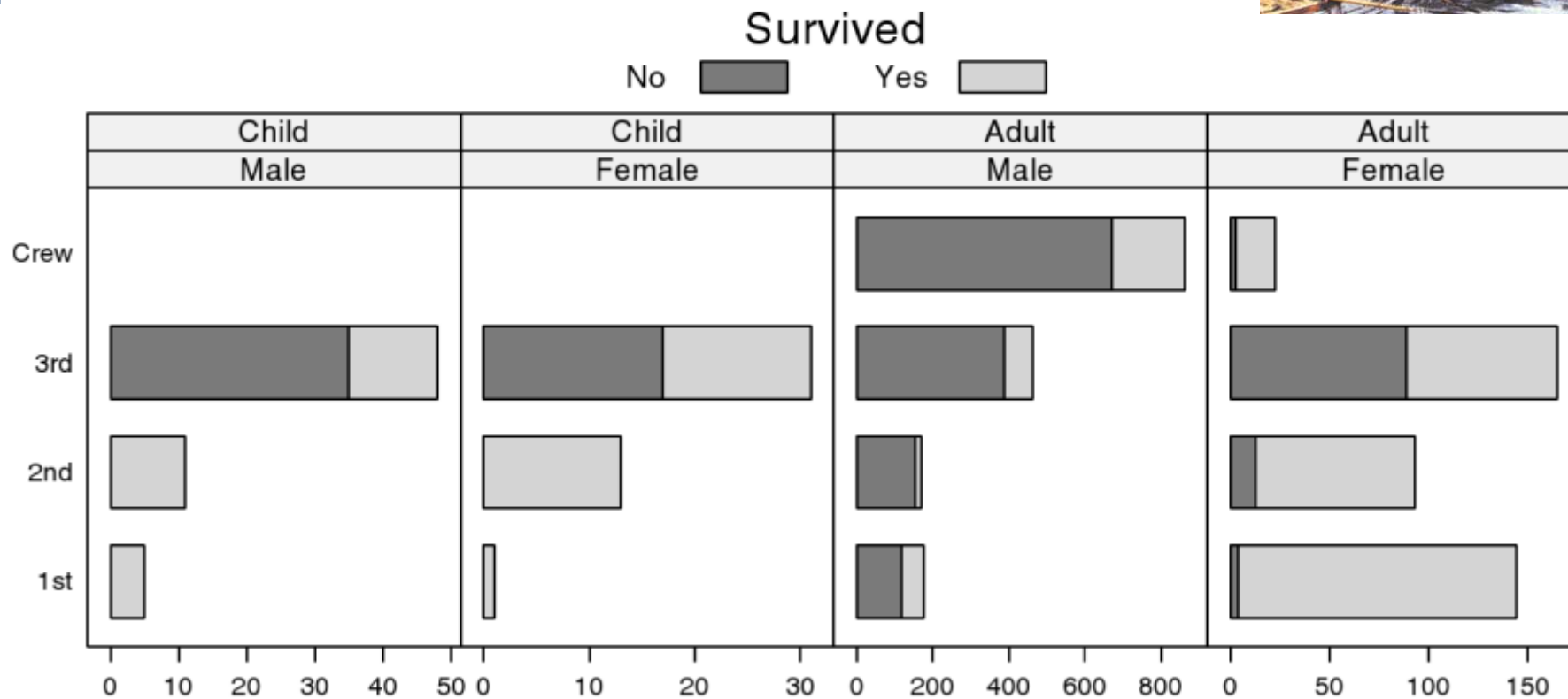
Einfache Graphik

Beispiel 4: Überlebende Titanic-Passagiere (Sarkar, 2008)



Einfache Graphik

Beispiel 4: Überlebende Titanic-Passagiere (Sarkar, 2008)



Einfache Graphik

Beispiel 5: Einen Film erzählen (Howell & Huesy, 1981, 1985)

TABLE 2.2

Number of "and Then ..." Statements Made by 50 Children Recalling the Story of a Movie They Had Just Seen

18	15	22	19	18	17	18	20	17	12	16	16	17	21	23	18	20	21	20	20	15	18	17	19	20
23	22	10	17	19	19	21	20	18	18	24	11	19	31	16	17	15	19	20	18	18	40	18	19	16

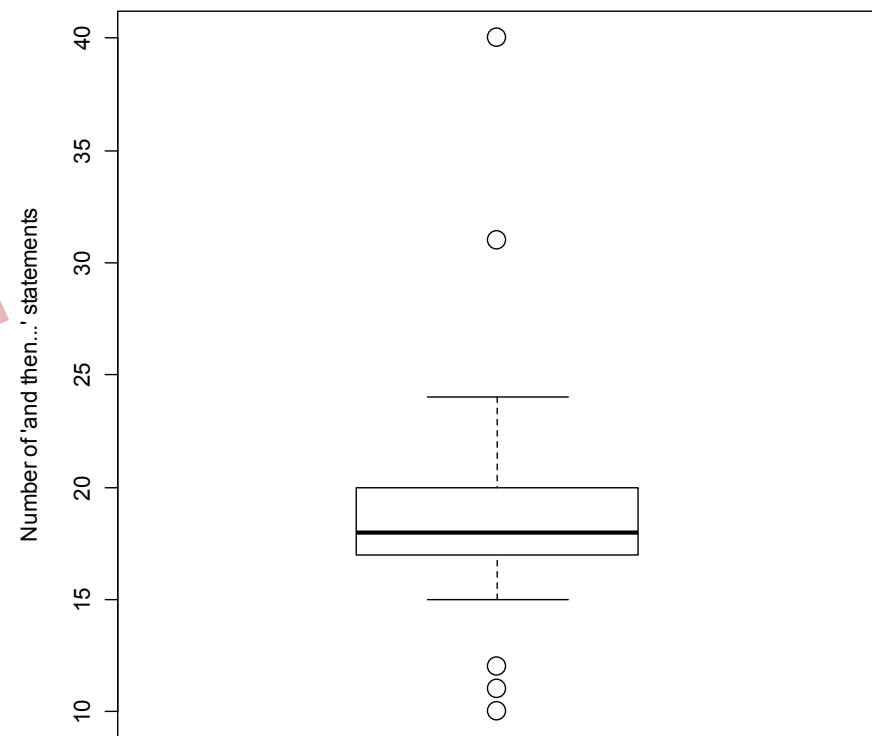
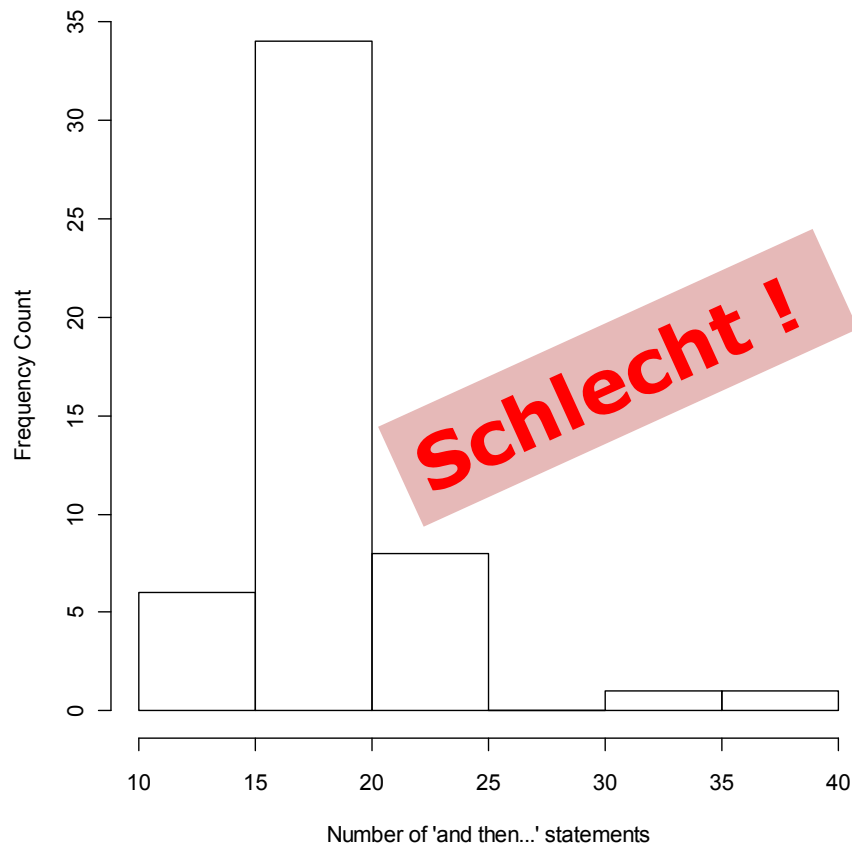
TABLE 2.3

Number of "and Then ..." Statements Made by 50 Adults Recalling the Story of a Movie They had Just Seen

10	12	5	8	13	10	12	8	7	11	11	10	9	9	11	15	12	17	14	10	9	8	15	16	10
14	7	16	9	1	4	11	12	7	9	10	3	11	14	8	12	5	10	9	7	11	14	10	15	9

Einfache Graphik

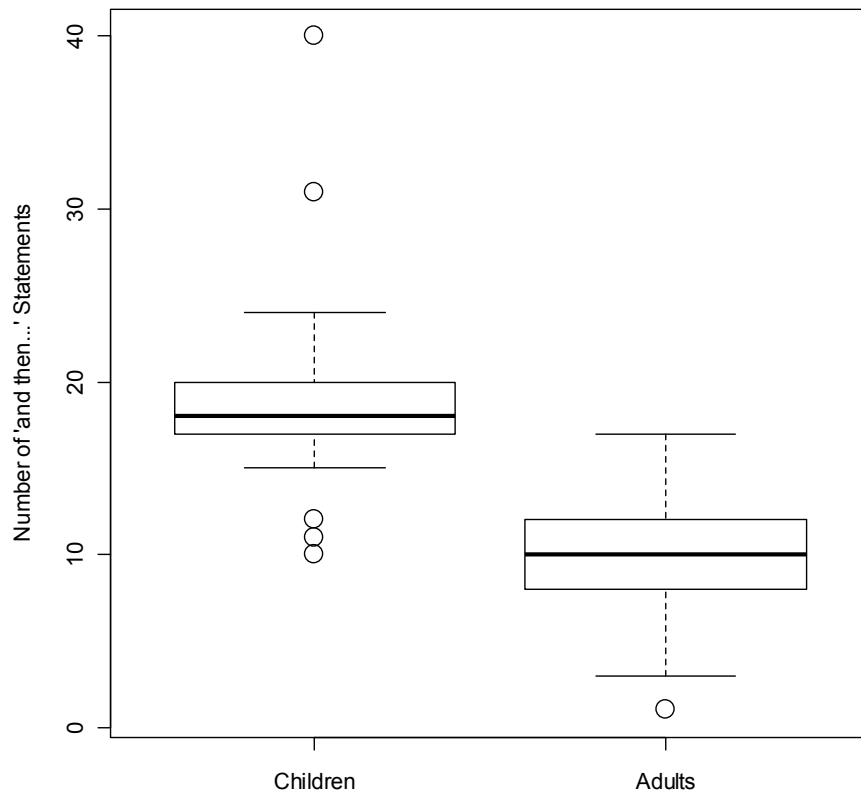
Beispiel 5: Einen Film erzählen (Howell & Huessey, 1981, 1985)



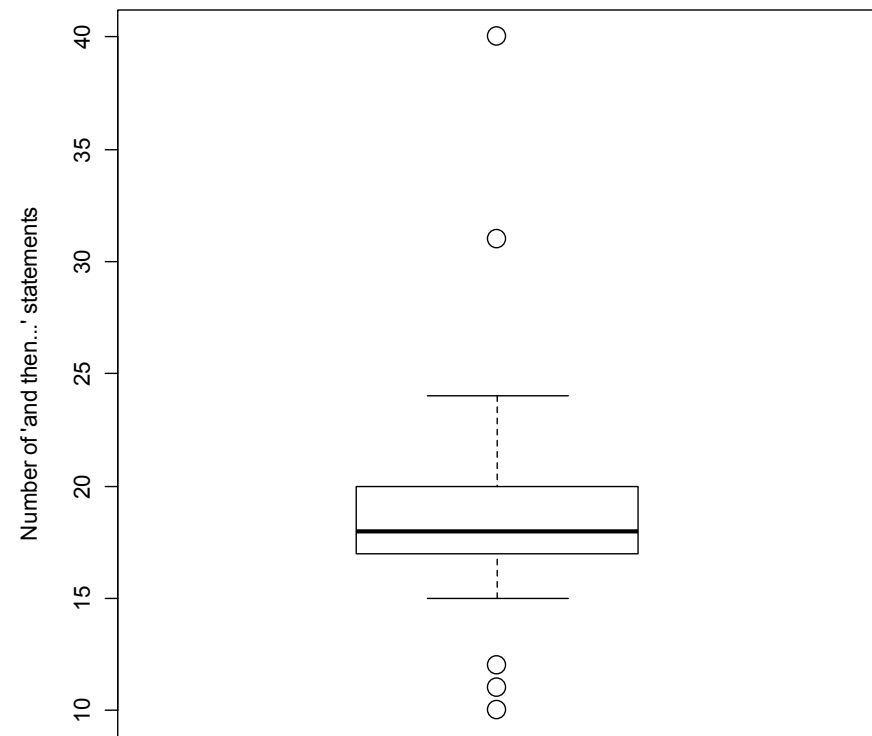
Box-Plot

Einfache Graphik

Beispiel 5: Einen Film erzählen (Howell & Huessey, 1981, 1985)



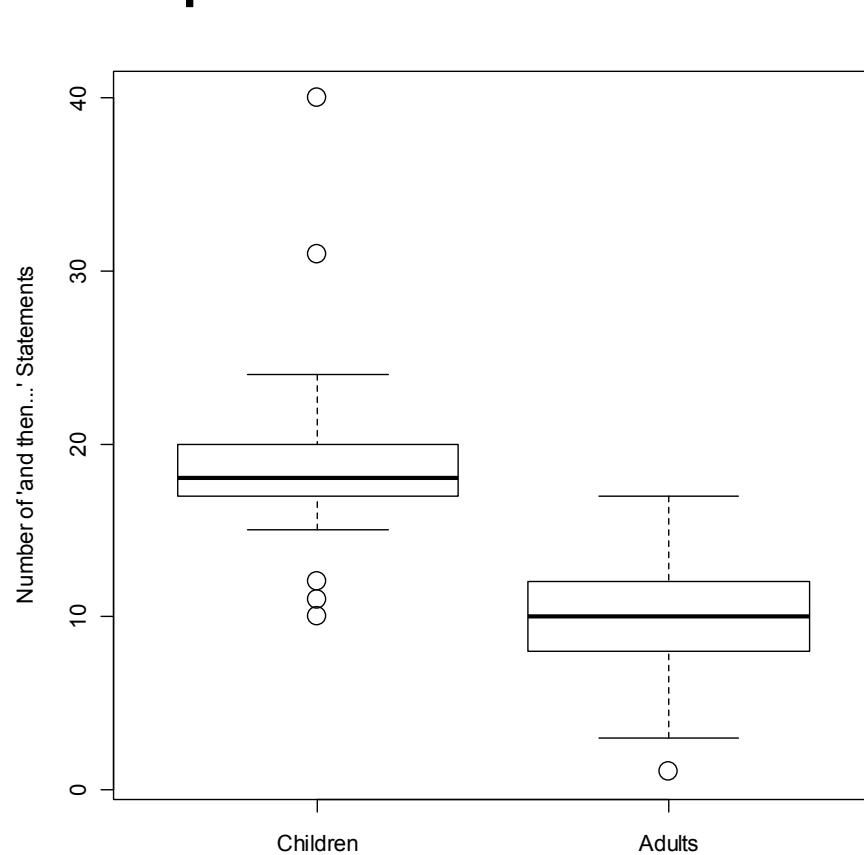
Box-Plots für Gruppenvergleich



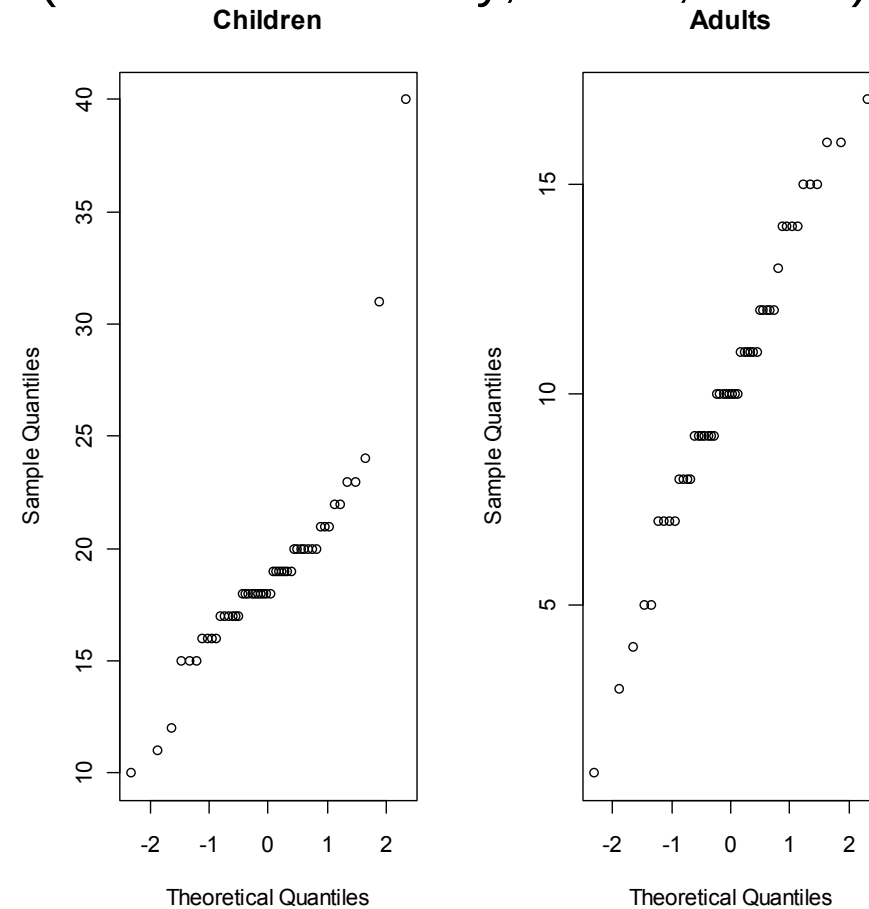
Box-Plot

Einfache Graphik

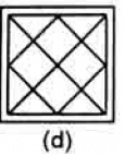
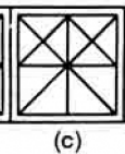
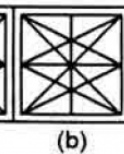
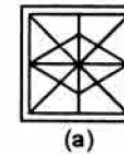
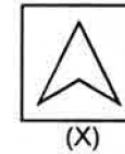
Beispiel 5: Einen Film erzählen (Howell & Huessey, 1981, 1985)



Box-Plots für Gruppenvergleich



Probability-Plots über NV



Scatterplots

- **Zur ersten Analyse der Daten !**
- **Beispiel:** Feldabhängigkeit und Instruktion

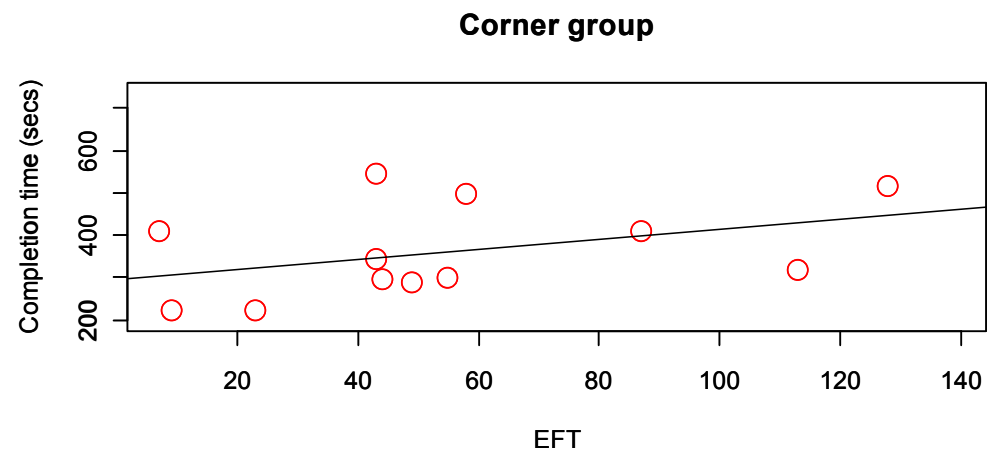
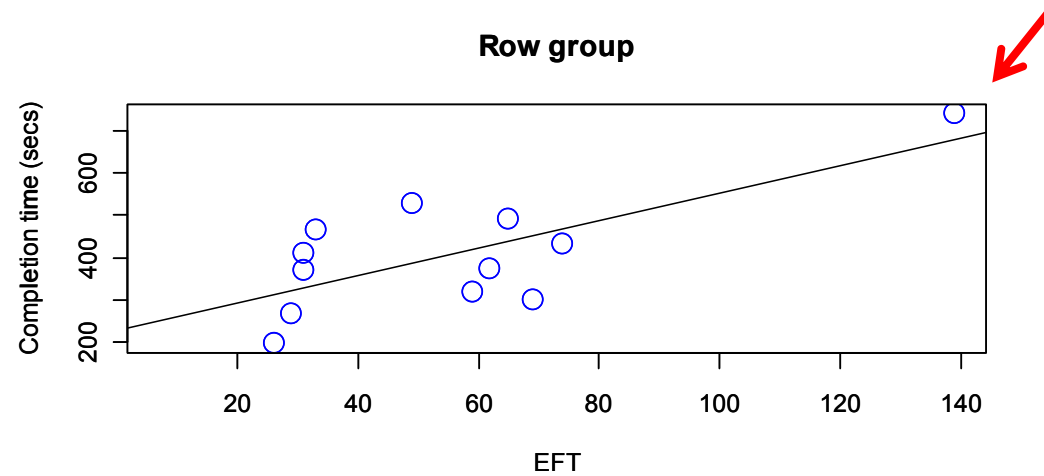
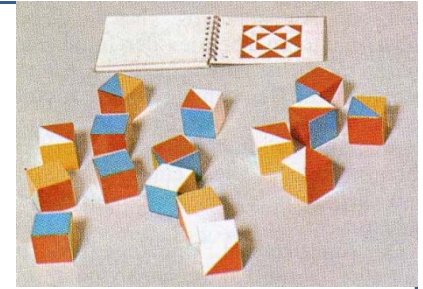
TABLE 2.4

Field Dependence Measure and Time to Complete a Task from the WISC for Children in Two Experimental Groups

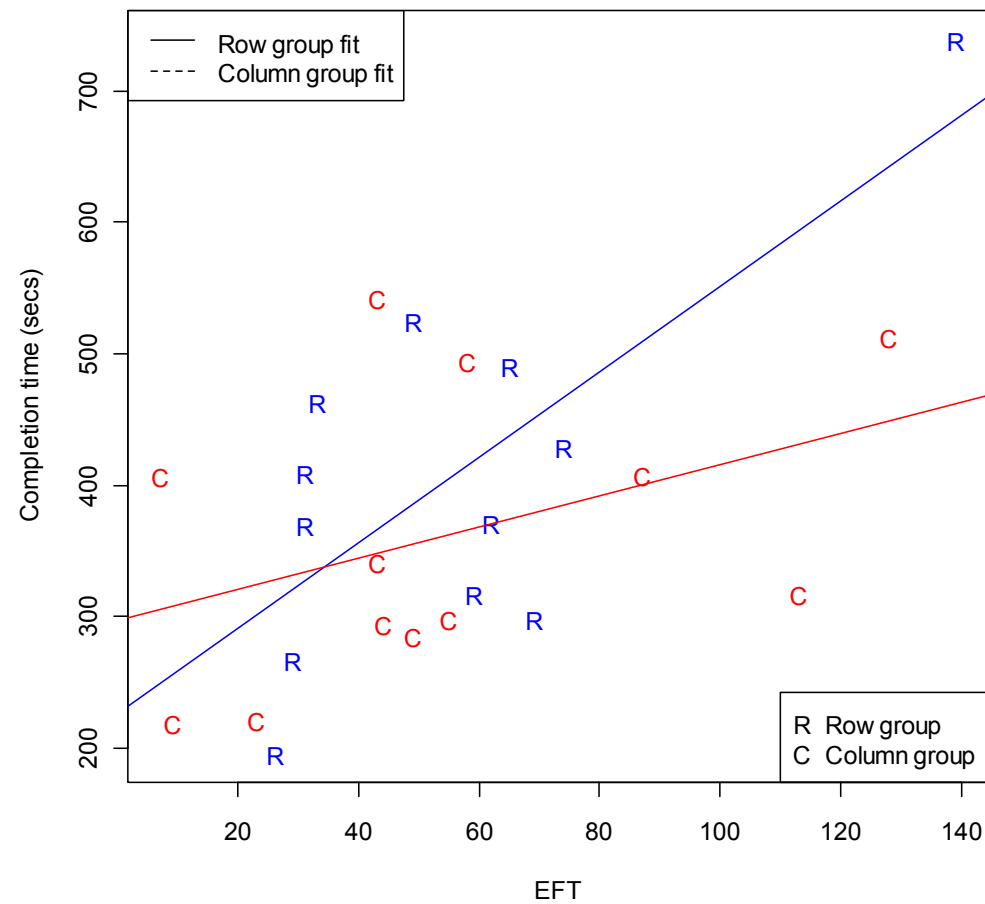
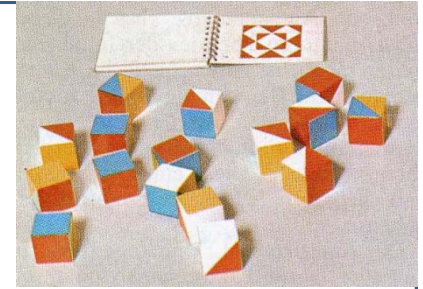
Row Group			Corner Group		
Child	Time	EFT	Child	Time	EFT
1	317	59	1	342	43
2	464	33	2	222	23
3	525	49	3	219	9
4	298	69	4	513	128
5	491	65	5	295	44



Scatterplots



Scatterplots



Scatterplots

Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)

TABLE 2.5

Data Collected About Time Spent Looking After Car for First Five Subjects Out of 40

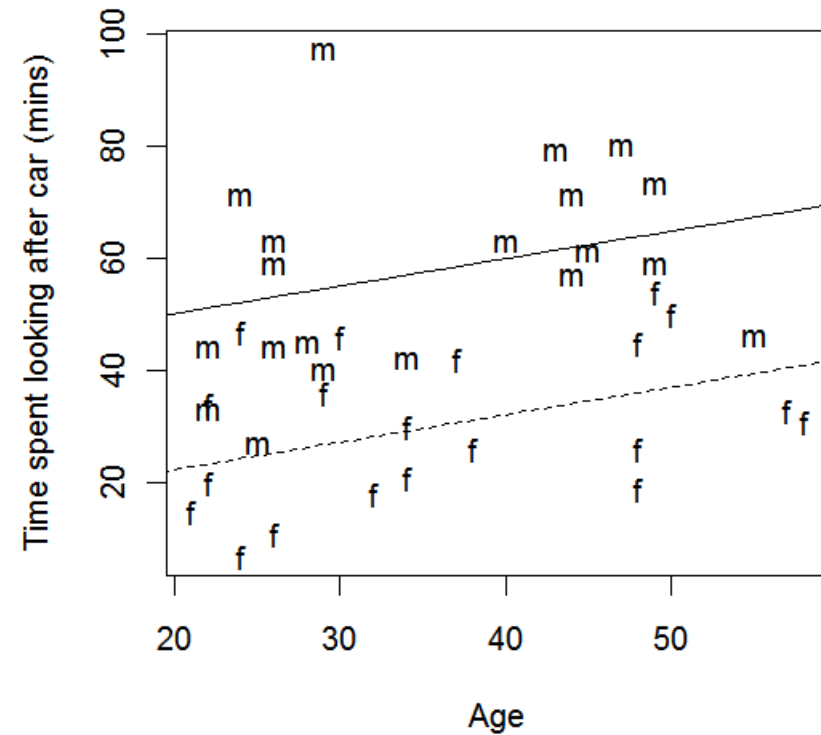
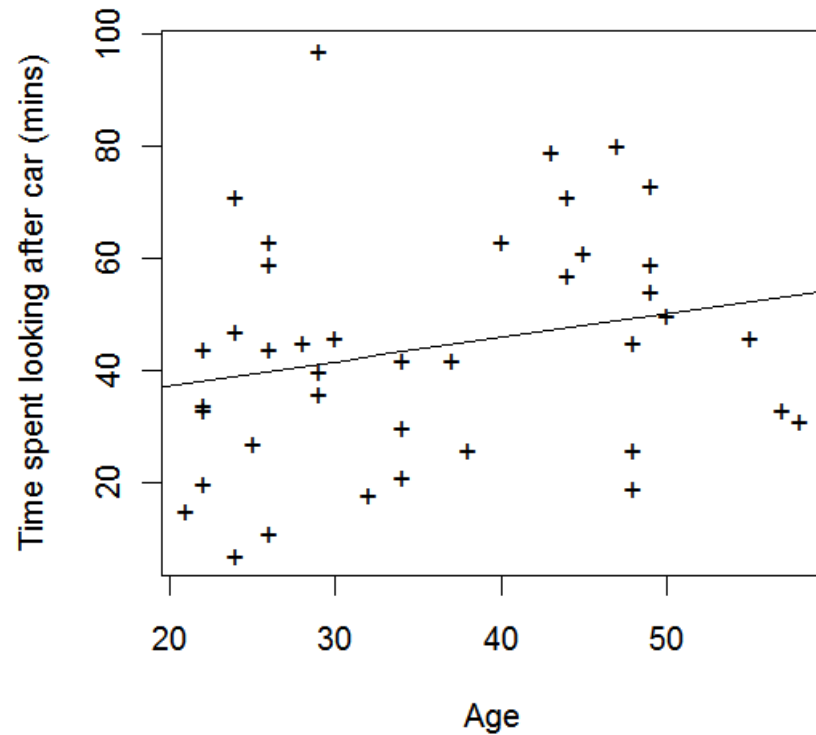
Subject	Sex	Age	Extro	Time
1	Male	55	40	46
2	Male	43	45	79
3	Female	57	52	33
4	Male	26	62	63
5	Female	22	31	20



Scatterplots



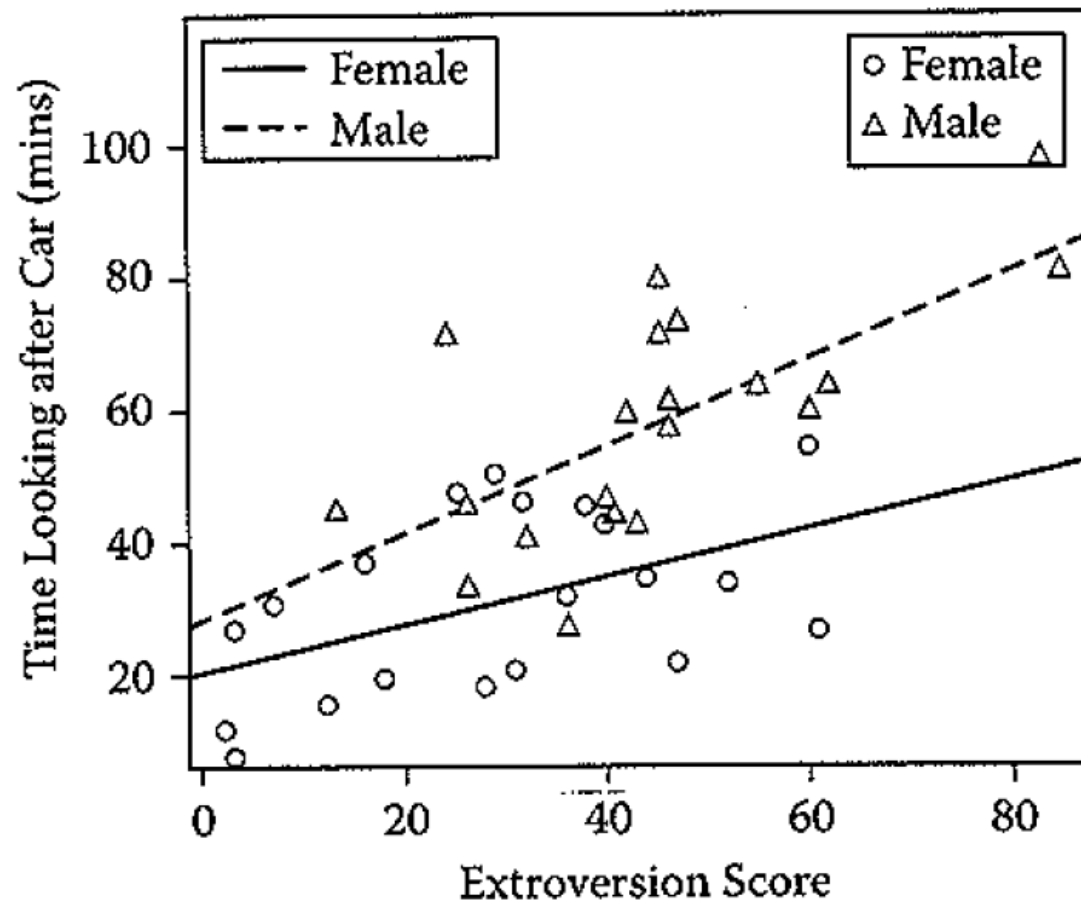
Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)



Scatterplots



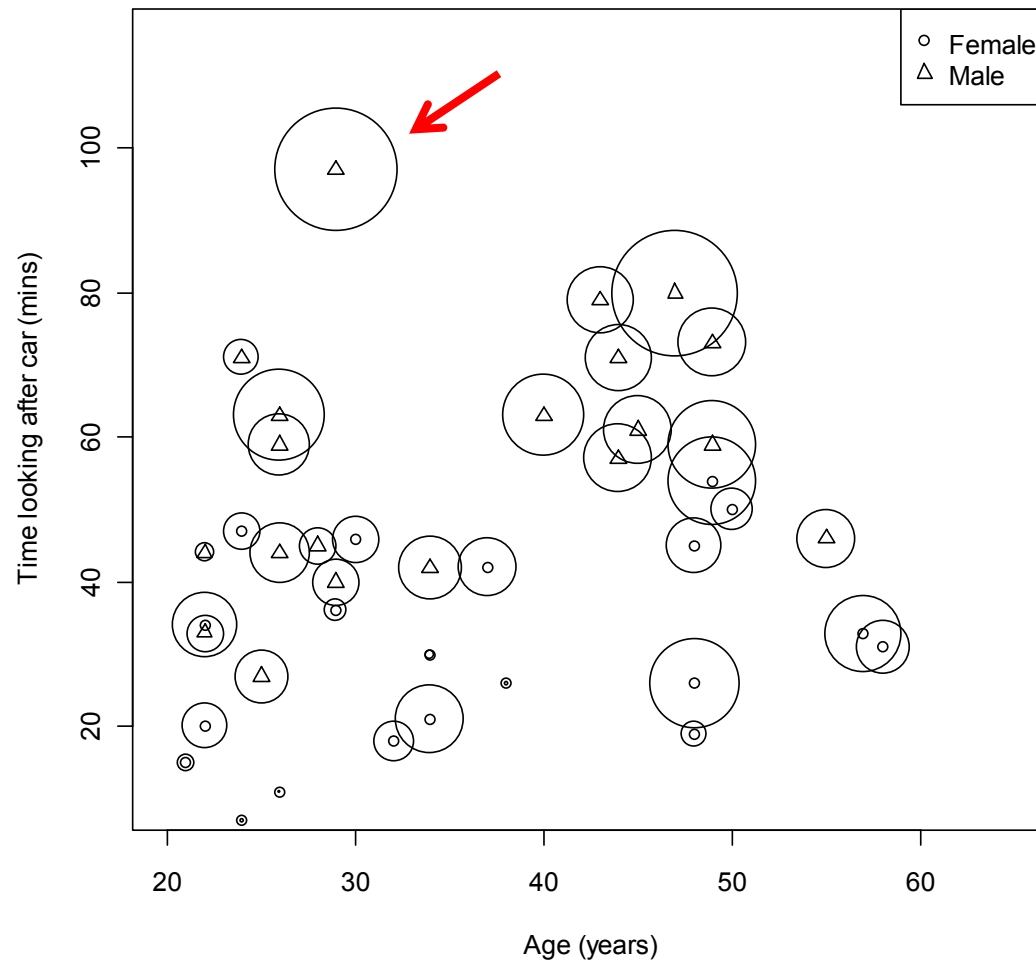
Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)



Scatterplots



Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)

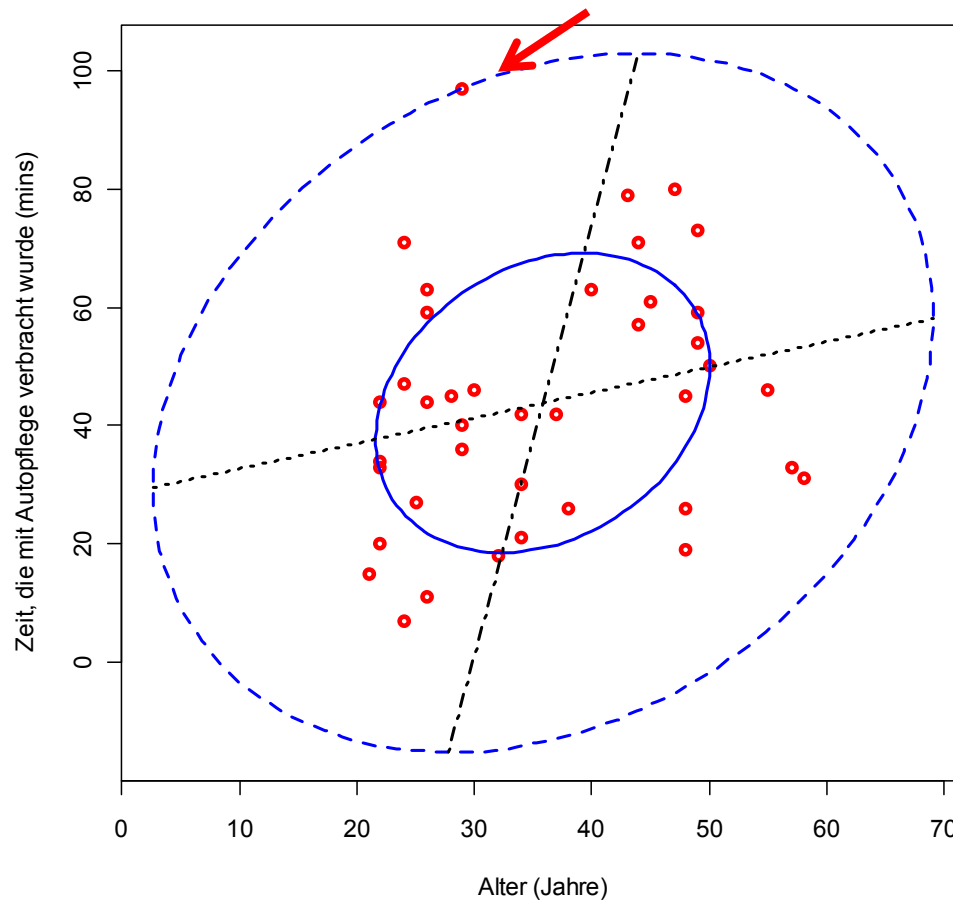


Bubbleplot

Scatterplots



Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)



hinge = 50%

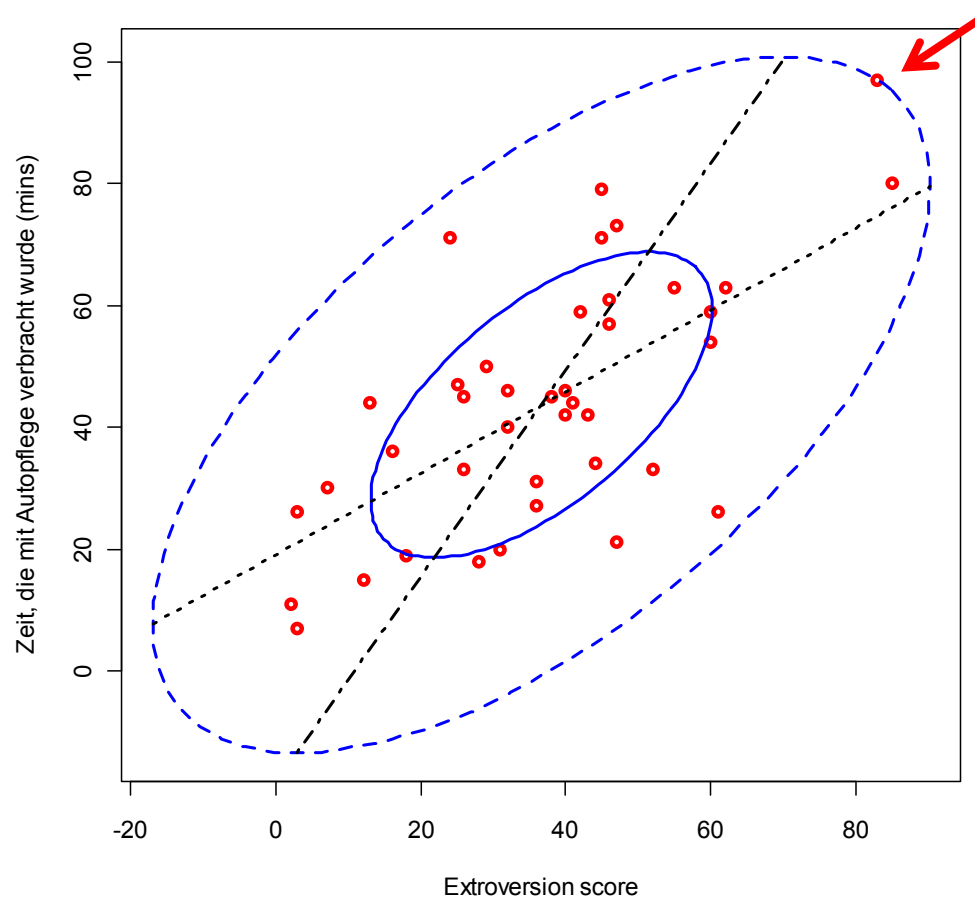
fence = 99%

Bivariate Boxplot

Scatterplots

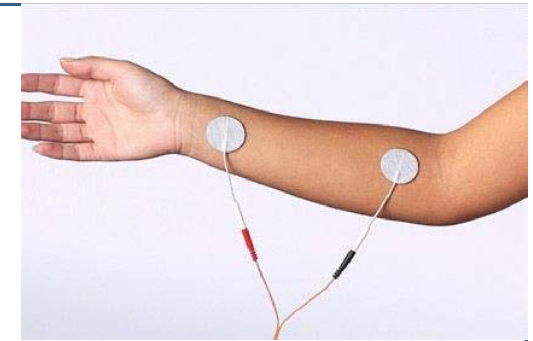


Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)



Bivariate Boxplot

Scatterplot Matrix



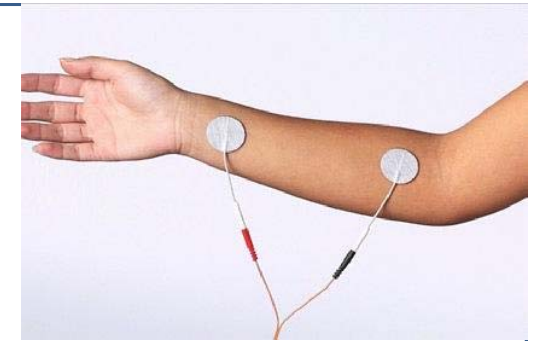
Beispiel: Messung der Hautleitfähigkeit

TABLE 2.6

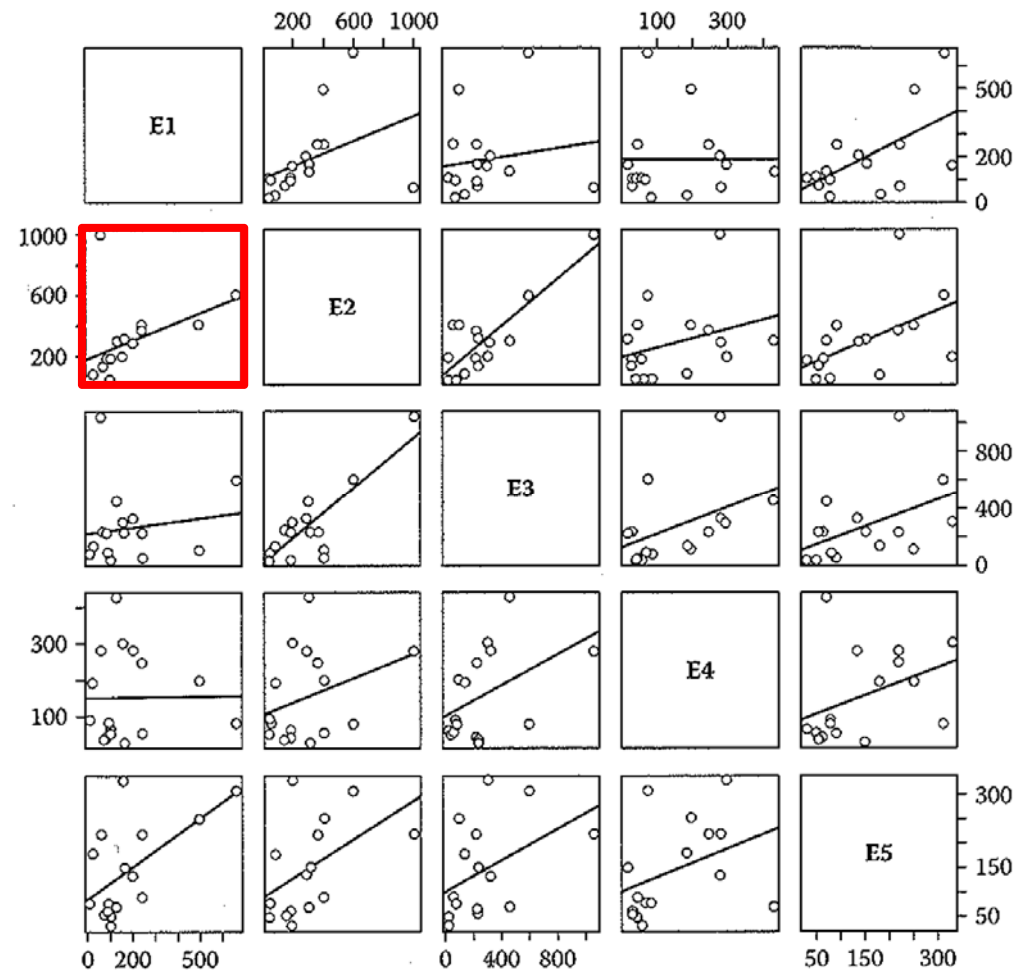
Measure of Resistance (Kilohms) Made on Five Different Types of Electrode for Five of the 16 Subjects

Subject	E1	E2	E3	E4	E5
1	500	400	98	200	250
2	660	600	600	75	310
3	250	370	220	250	220
4	72	140	240	33	54
5	135	300	450	430	70

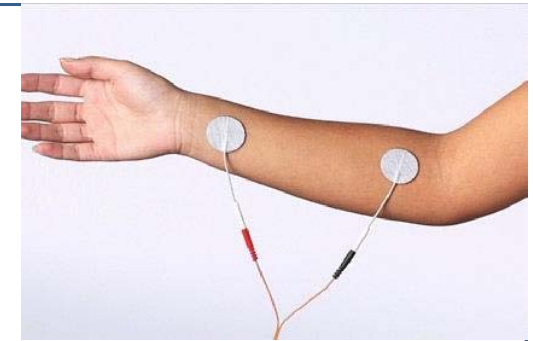
Scatterplot Matrix



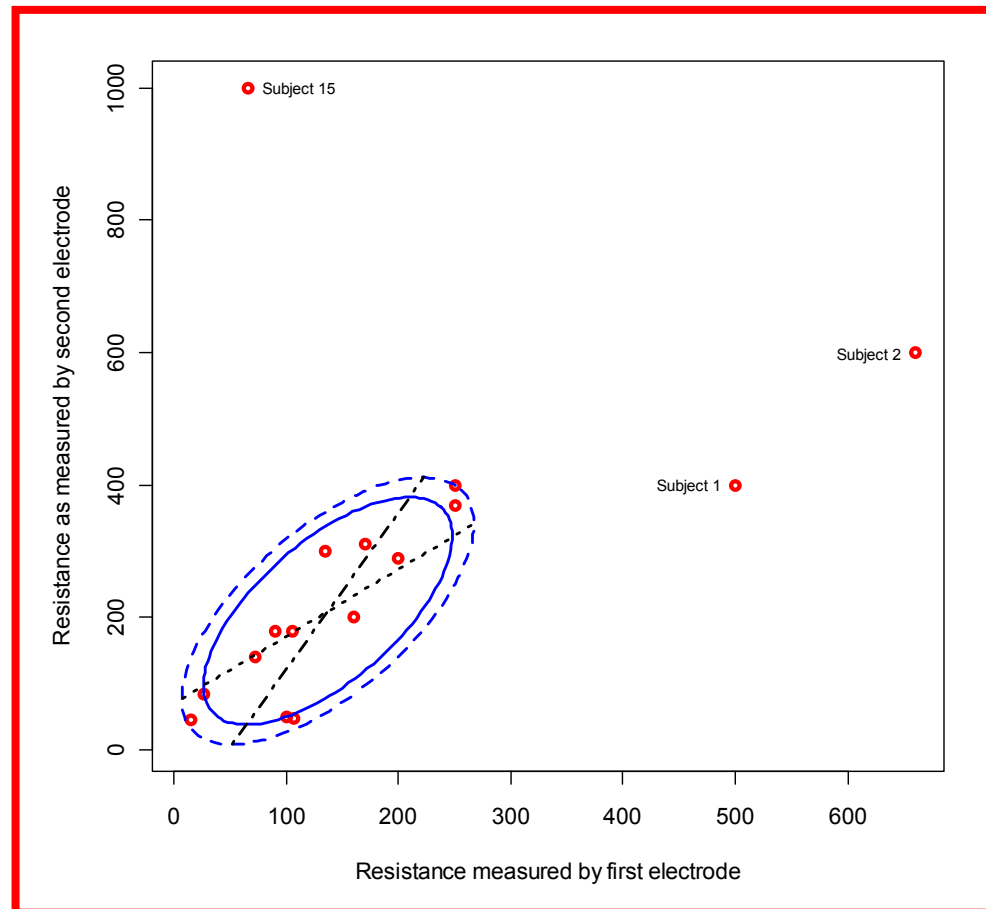
Beispiel: Messung der Hautleitfähigkeit



Scatterplot Matrix

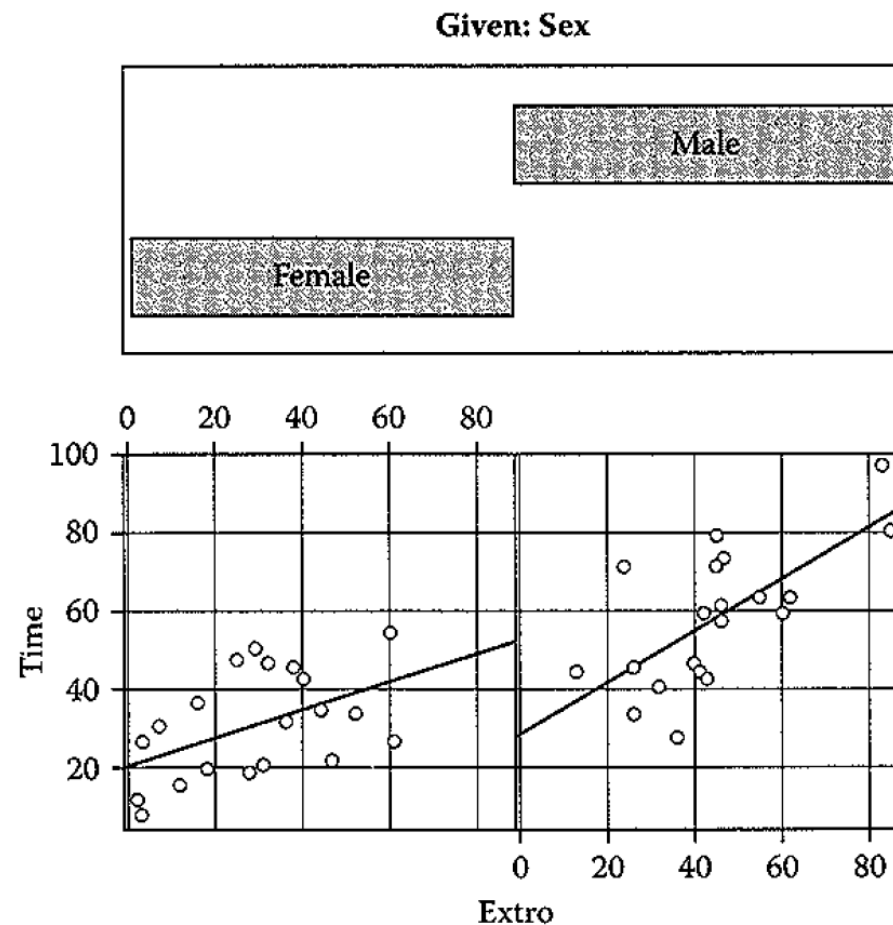


Beispiel: Messung der Hautleitfähigkeit



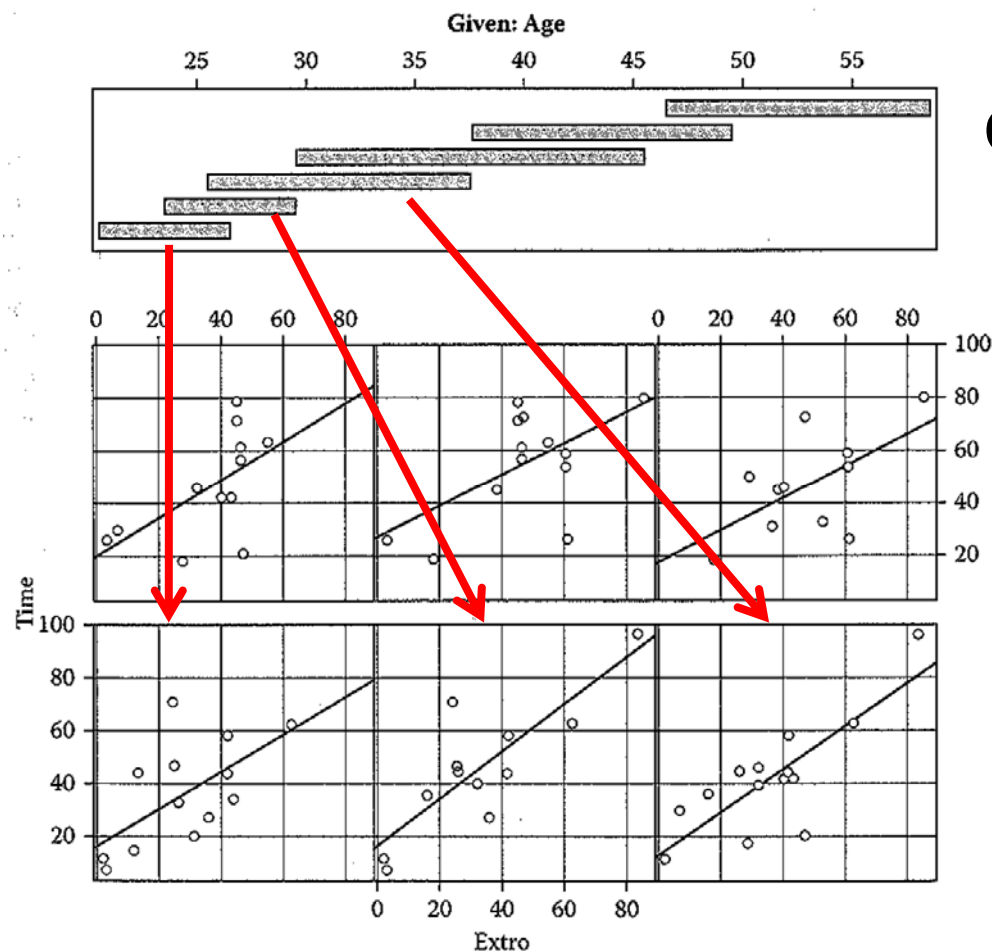
Bedingte Graphik und Trellis Graphik

Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)



Bedingte Graphik und Trellis Graphik

Beispiel: Selbstbild + Autopflege (Miles & Shevlin, 2001)



Given Panel



Dependence Panels

Bedingte Graphik und Trellis Graphik

Beispiel: Jobs für Post-Docs in USA (Sarkar, 2008)

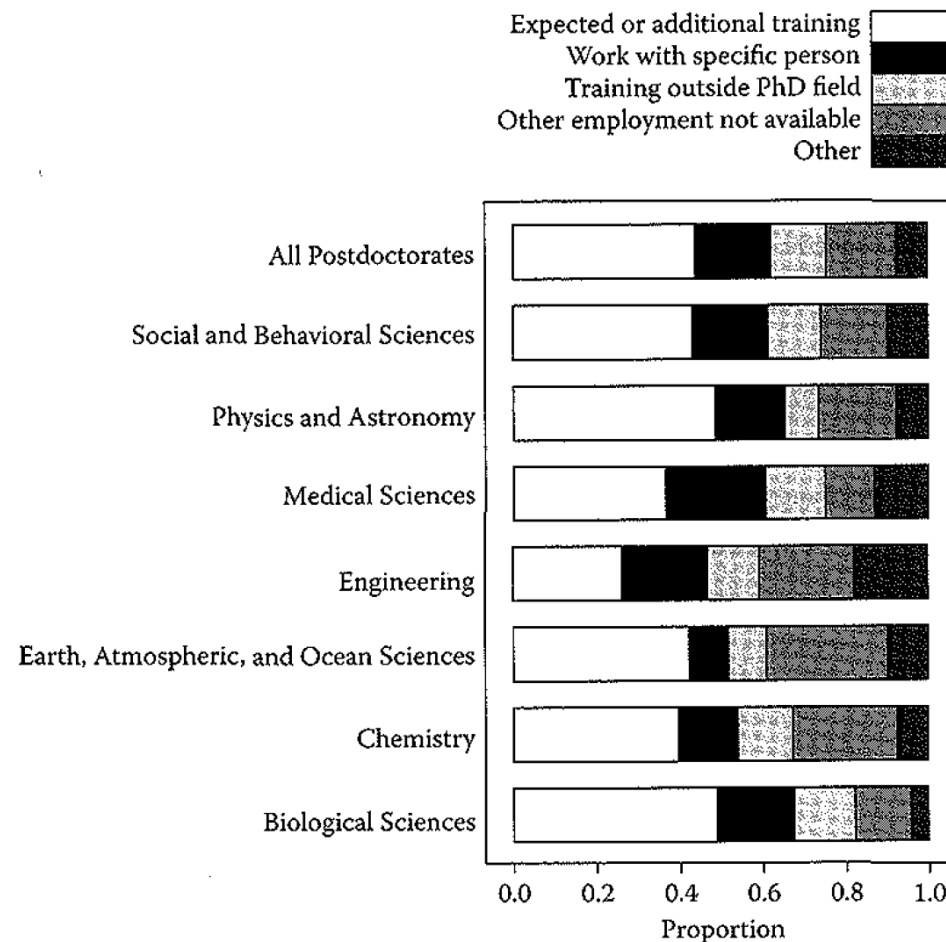
TABLE 2.7

Reasons for Choosing a Postdoctoral Position After Graduating from U.S. Universities by Area of Study

Subject	Expected or Additional Training	Work with Specific Person	Training Outside PhD Field	Other Employment not Available	Other
Biological sciences	6404	2427	1950	1779	602
Chemistry	865	308	292	551	168
Earth, Atmospheric, and Ocean Sciences	343	75	75	238	80
Engineering	586	464	288	517	401
Medical sciences	205	137	82	68	74
Physics and astronomy	1010	347	175	399	162
Social and behavioral sciences	1368	564	412	514	305
All postdoctorates	11197	4687	3403	4406	1914

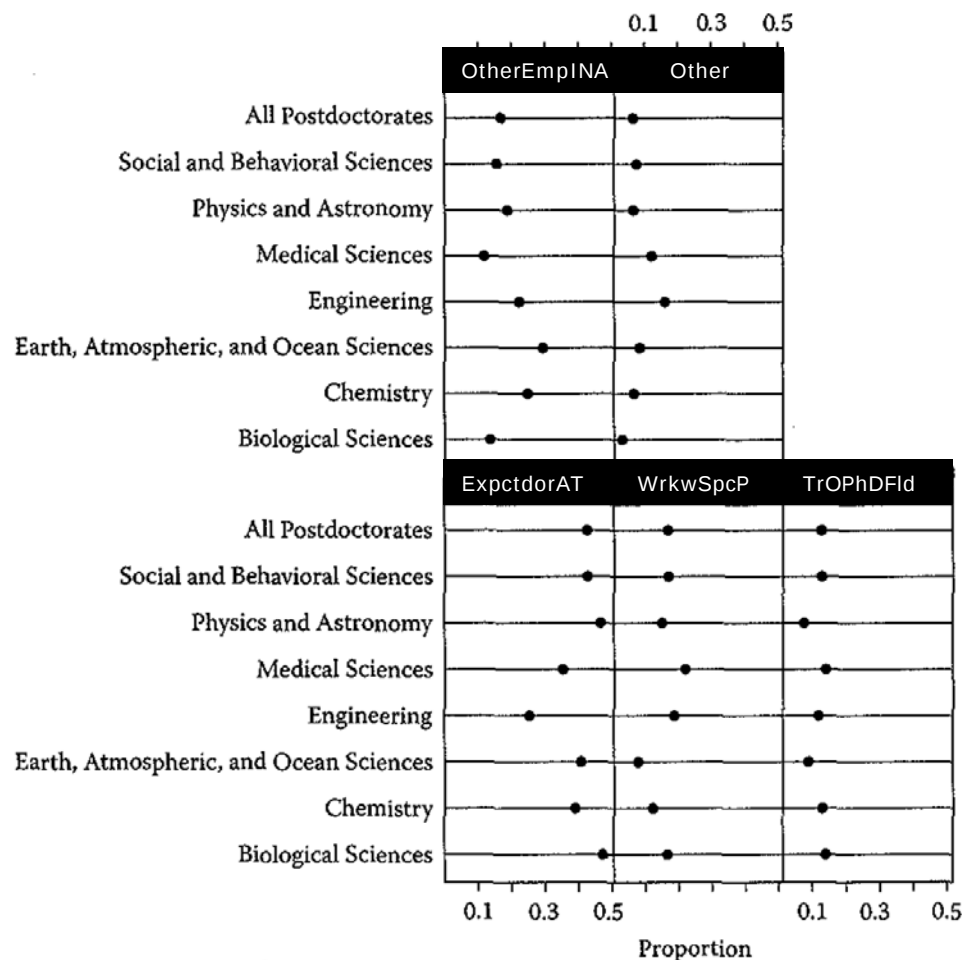
Bedingte Graphik und Trellis Graphik

Beispiel: Jobs für Post-Docs in USA (Sarkar, 2008)



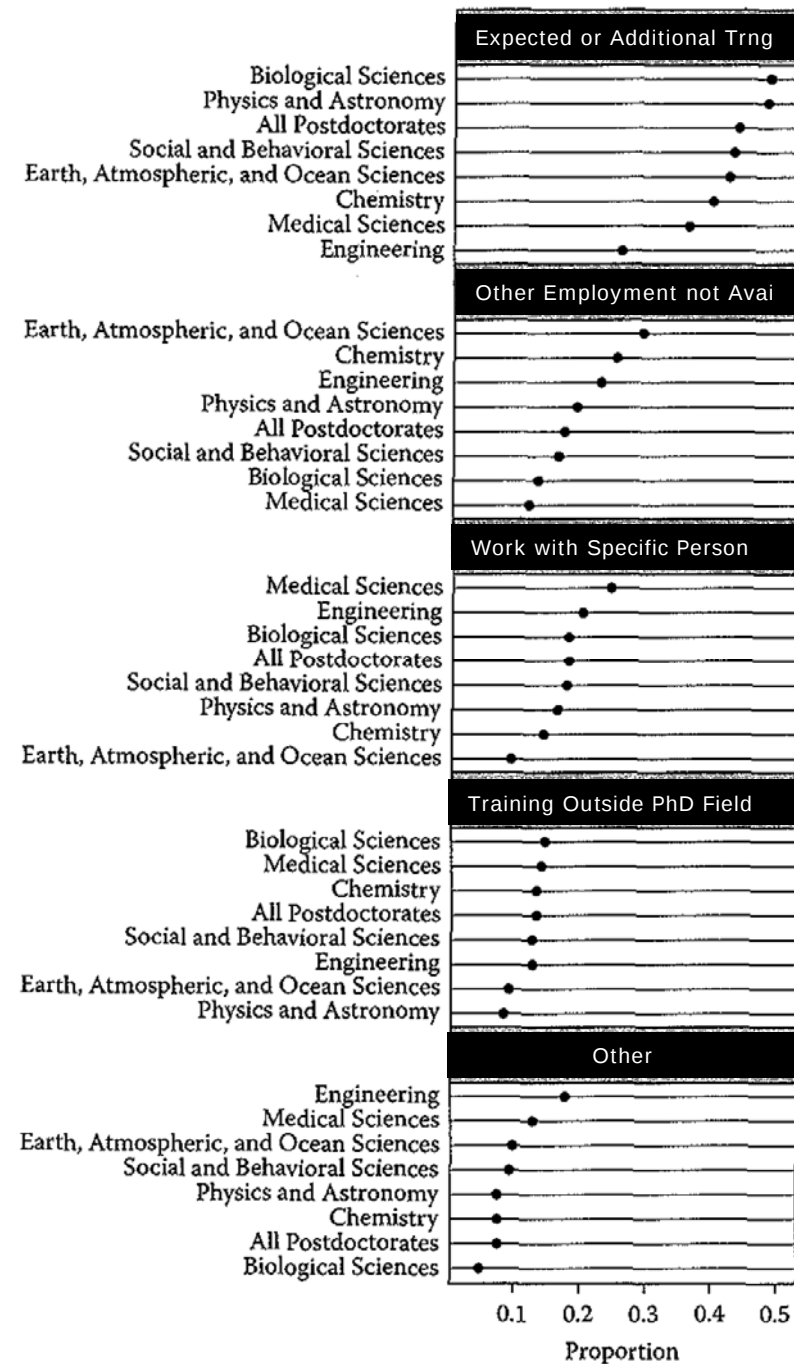
Bedingte Graphik und Trellis Graphik

Beispiel: Jobs für Post-Docs in USA (Sarkar, 2008)



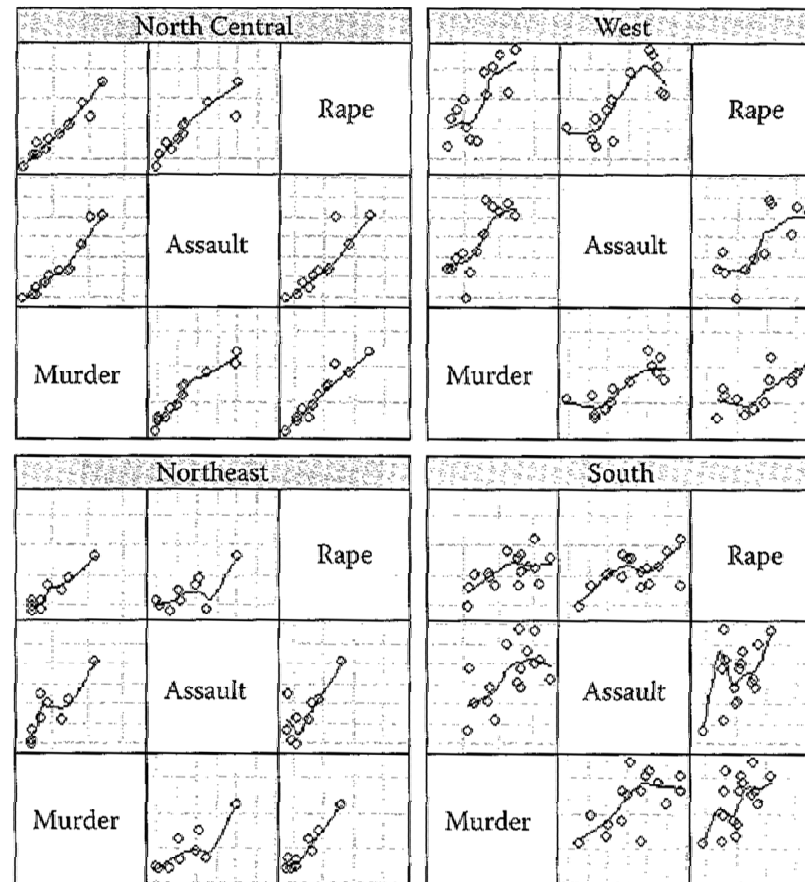
Bedingte Graphik

Beispiel: Jobs für Post-Doc



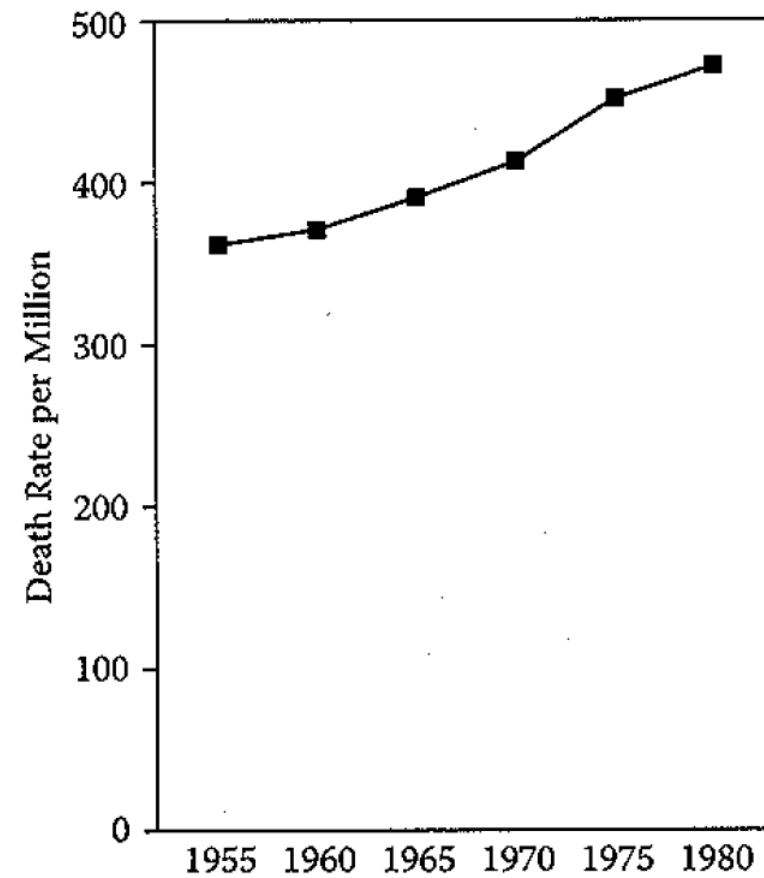
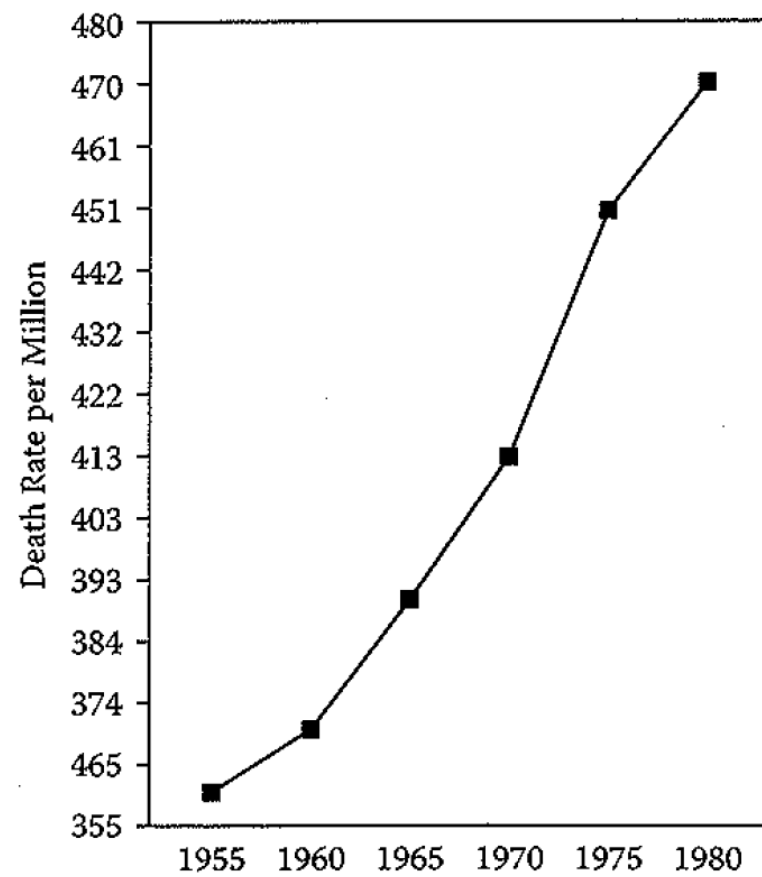
Bedingte Graphik und Trellis Graphik

Beispiel: Verbrechen in USA 1973 (Sarkar, 2008)

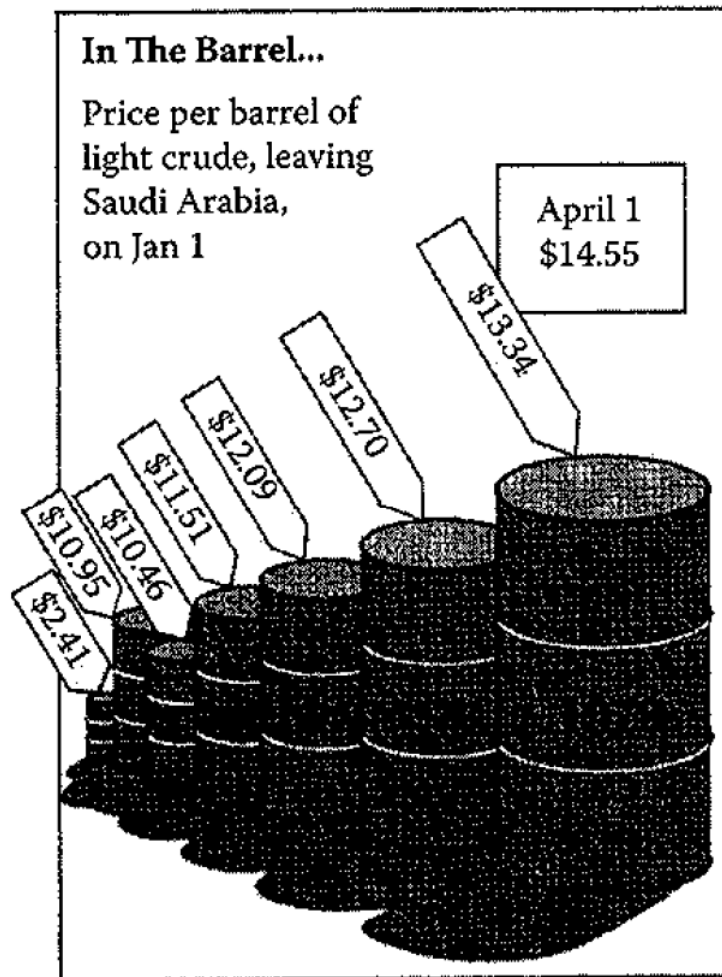


Scatter Plot Matrix

Irreführende Graphik



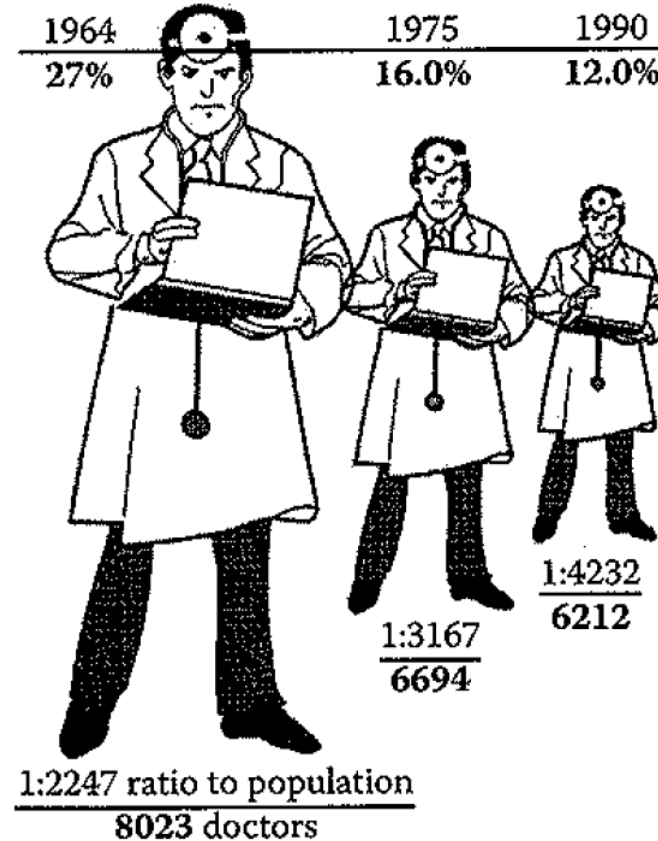
Irreführende Graphik



(a)

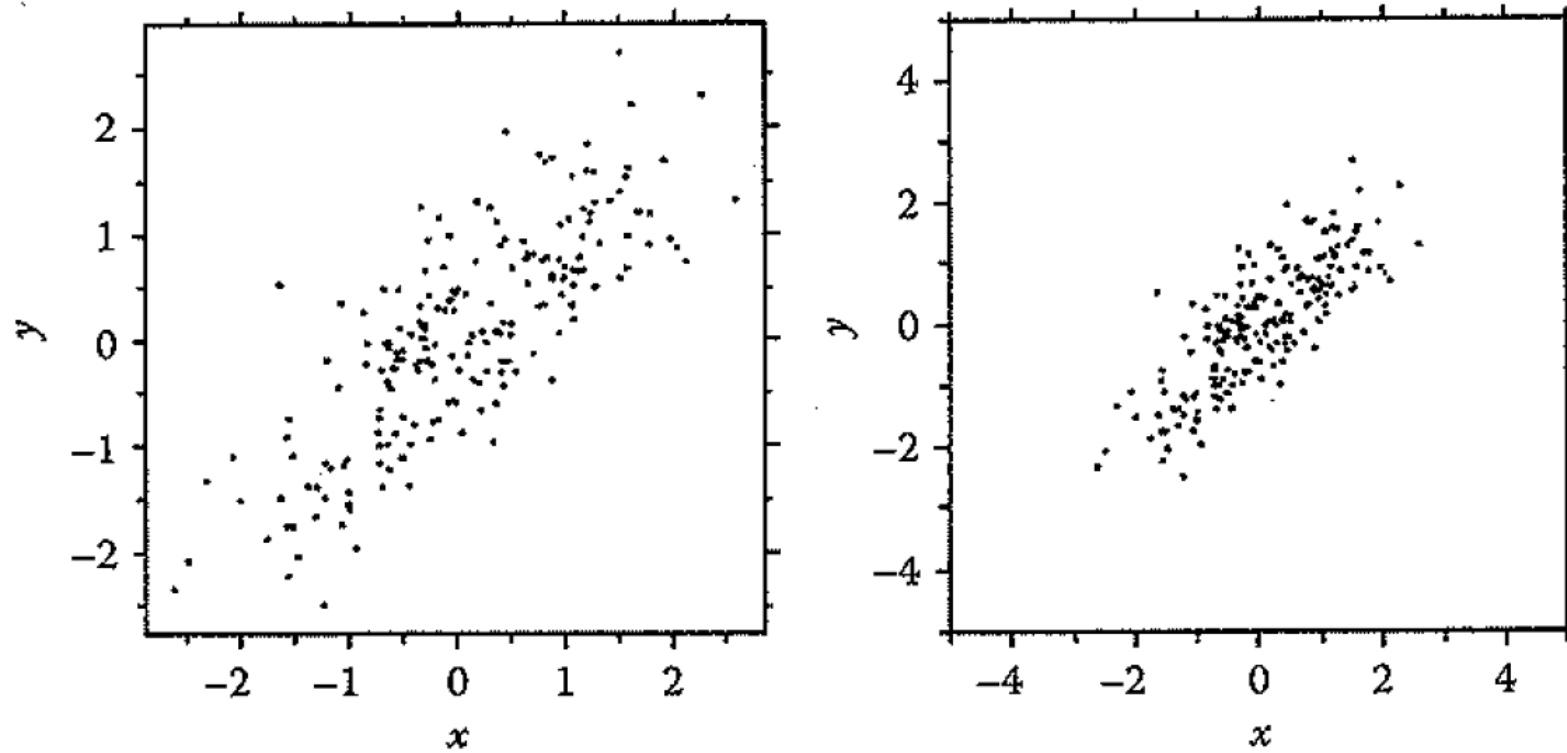
The Shrinking Family Doctor in California

Percentage of doctors
devoted solely to family practice

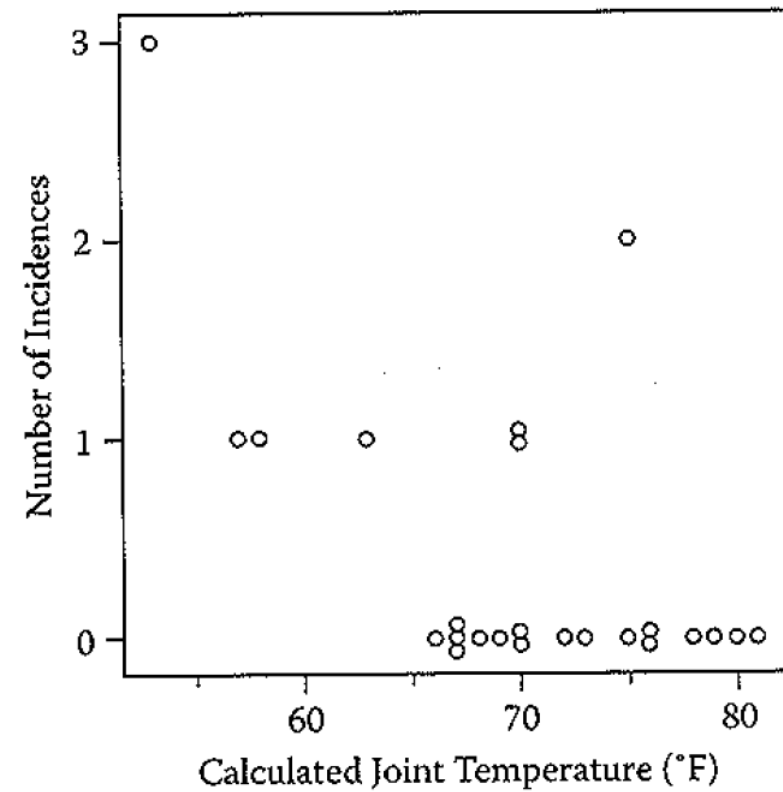
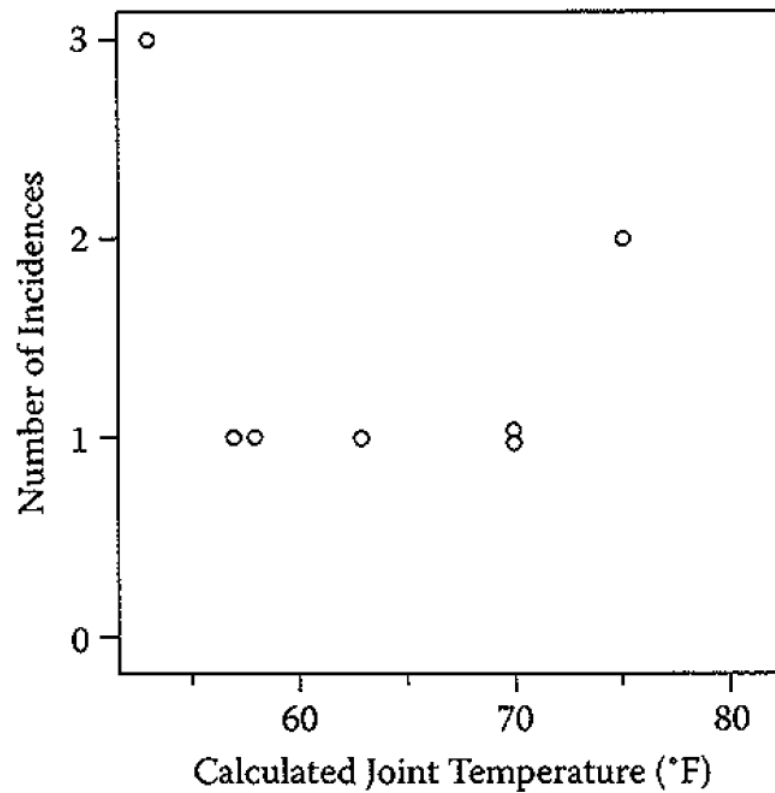


(b)

Irreführende Graphik



Irreführende Graphik



Elaobrierte Darstellungen

Beispiel: Hans Rosling und Gapminder

http://www.ted.com/talks/lang/eng/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html

Elaobrierte Darstellungen

Beispiel „We feel fine“



<http://www.wefeelfine.org/>