

情報可視化

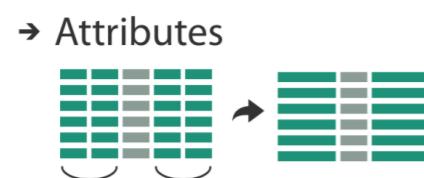
LX10: データ項目と属性の還元

Reducing Items and Attributes

④ Filter



④ Aggregate



数理・計算科学系

脇田 建

Filter

- filtering
- dynamic queries

→ Filter

→ Items



→ Attributes



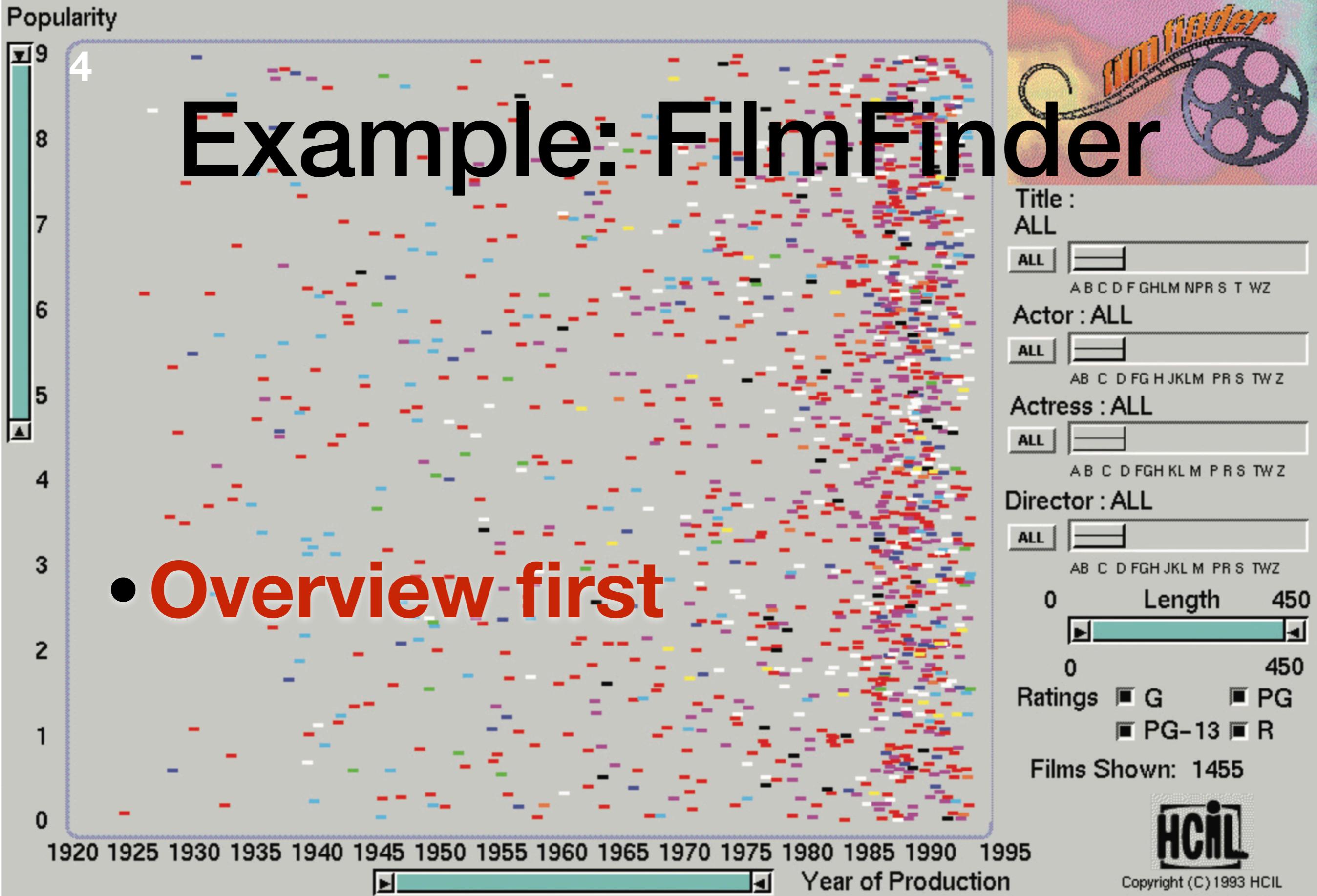
Item Filtering

- item filtering

→ Filter

→ Items





Popularity



5

Example: FilmFinder

Goldfinger

Indiana Jones & the Last Crusade

Name of the Rose, The

Thunderball

Murder on the Orient Express

Hunt for Red October, The

Never Say Never Again

Highlander

Red Tent, The

Untouchables, The

Great Train Robbery, The

Outland

From Russia with Love

Man Who Would Be King, The

Robin & Marian

Zardoz

Cuba

Offence, The

Sword of the Valiant

Family Business

Time Bandits

Meteor

• **Filter**

1960

1965

1970

1975

1980

1985

1990

1995

Year of Production



Title : ALL

ALL

A B C D F G H I M N P R S T W Z

Actor : Connery, Sean

ALL

A B C D F G H J K L M P R S T W Z

Actress : ALL

ALL

A B C D F G H K L M P R S T W Z

Director : ALL

ALL

A B C D F G H J K L M P R S T W Z

60 Length 269

0 450

Ratings G PG
 PG-13 R

Films Shown: 24

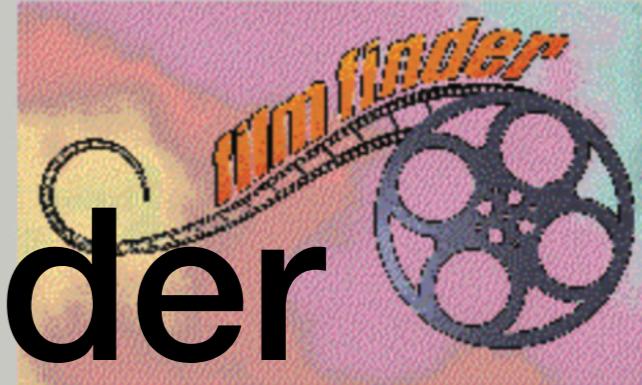
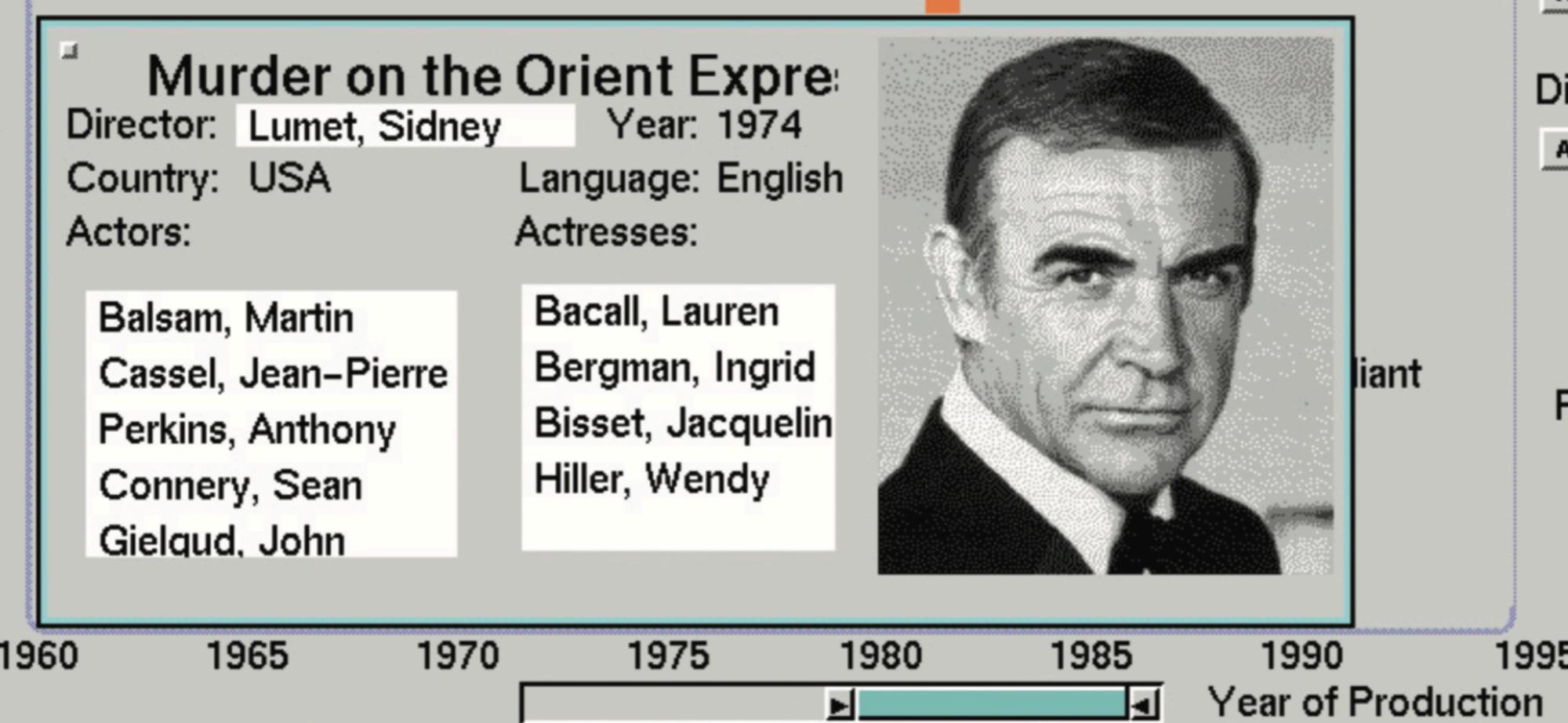
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Example: FilmFinder

• Detail on demand



Title : ALL

Actor : Connery, Sean

Actress : ALL

Director : ALL

Ratings

Films Shown: 24

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Example: Scented widget

- Scented widget / information scent
 - Dynamic query の存在をデータがほのめかす

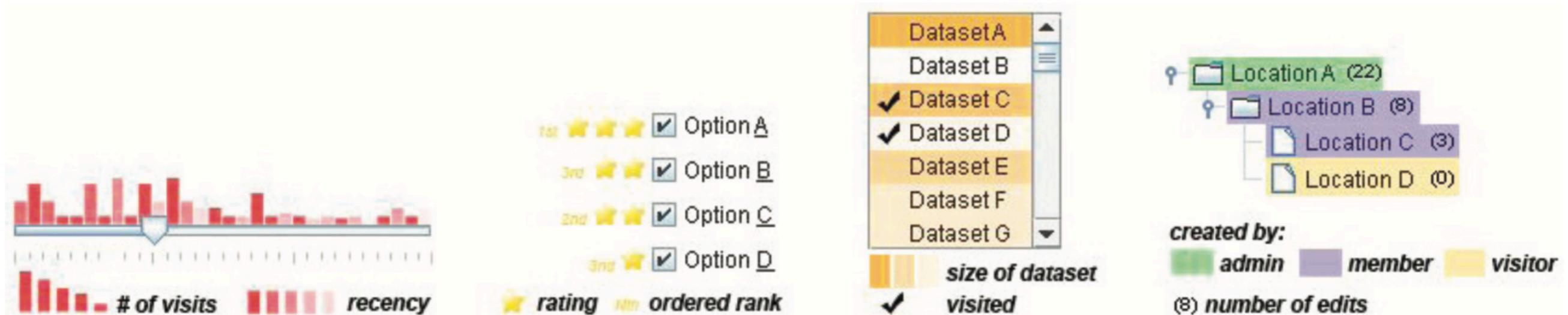
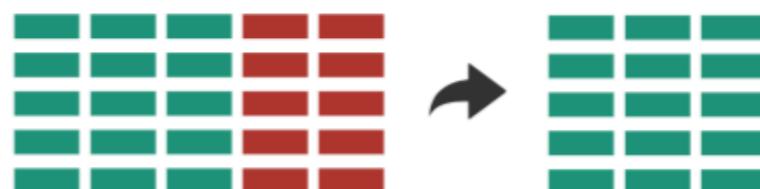


Figure 13.3. The scented widget idiom adds visual encoding information directly to standard graphical widgets to make filtering possible with high information density displays. From [Willett et al. 07, Figure 2].

Attribute Filtering

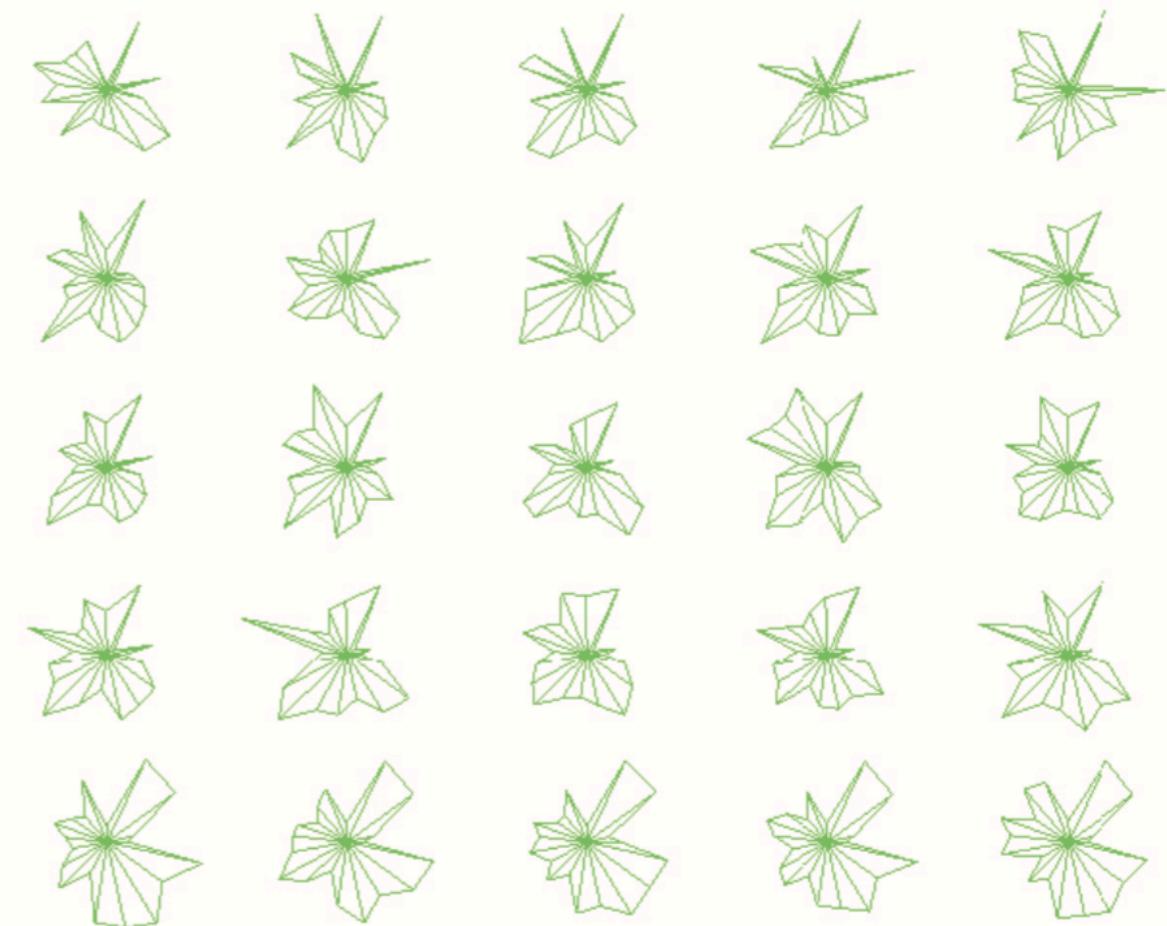
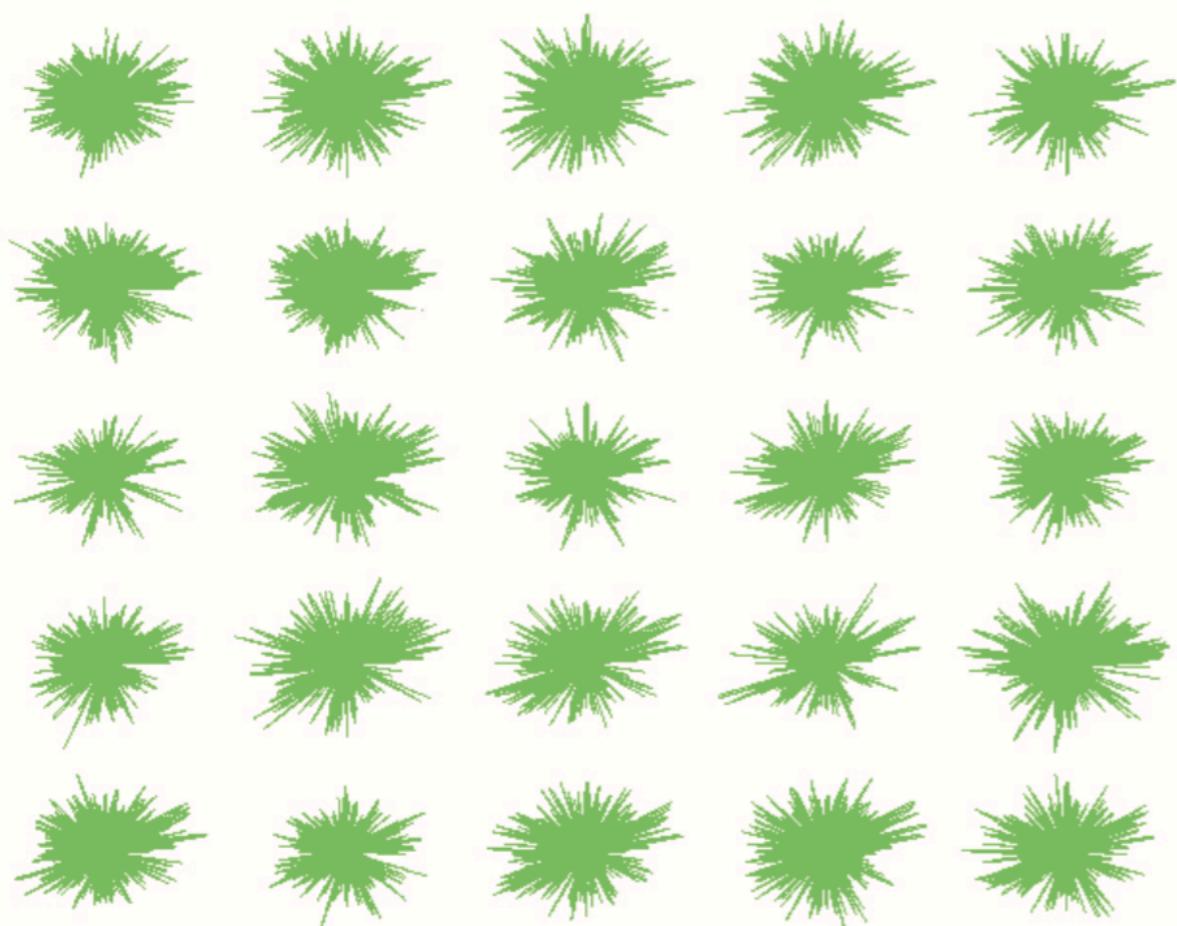
④ **Filter**

→ Attributes



Example: DOSFA

- 215次元298項目 → star plot, small multiples, matrix align.
- Attribute filtering

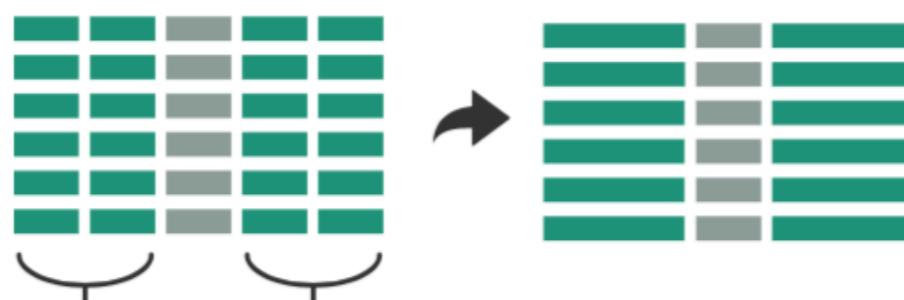


④ Aggregate

→ Items



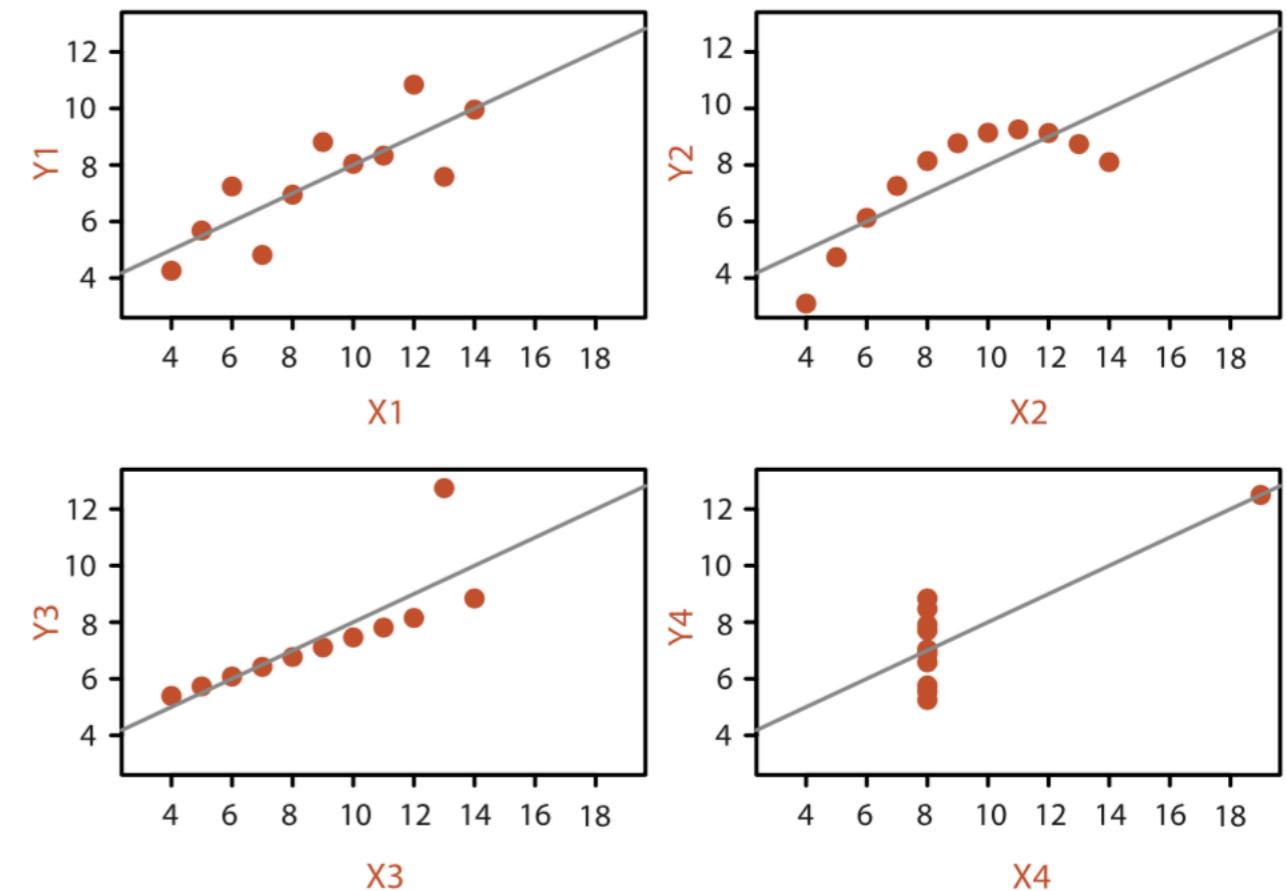
→ Attributes



Anscombe's Quartet

Anscombe's Quartet: Raw Data

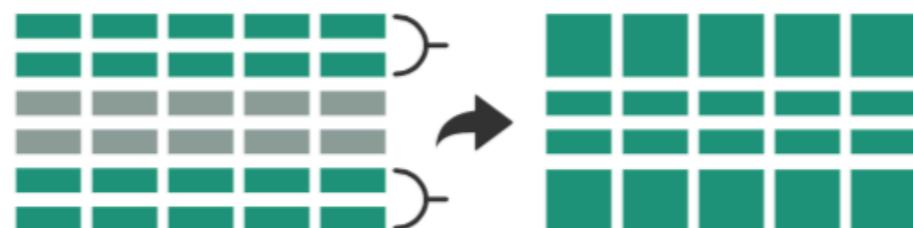
	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
	10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
	8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
	13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
	9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
	11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
	14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
	6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
	4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
	12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
	7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
	5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89
Mean	9.0	7.5	9.0	7.5	9.0	7.5	9.0	7.5
Variance	10.0	3.75	10.0	3.75	10.0	3.75	10.0	3.75
Correlation	0.816		0.816		0.816		0.816	



Item aggregation

➔ Aggregate

➔ Items



Example: Histogram

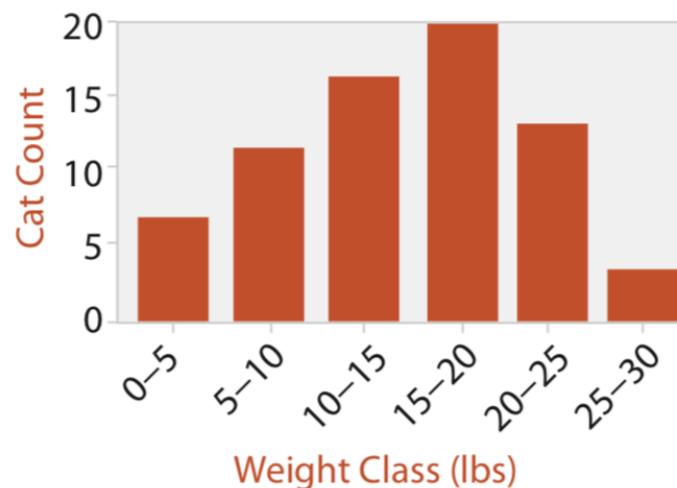
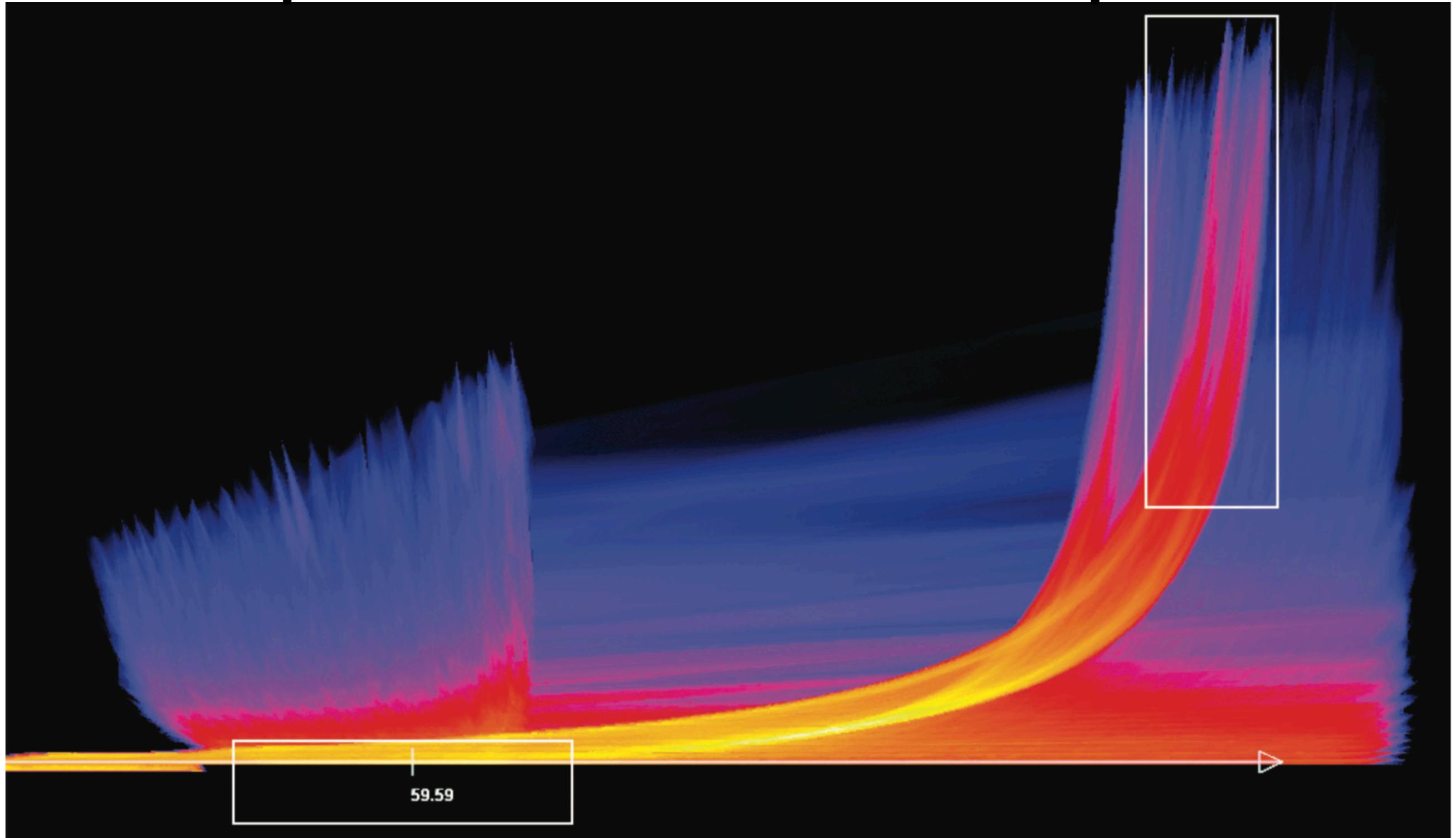


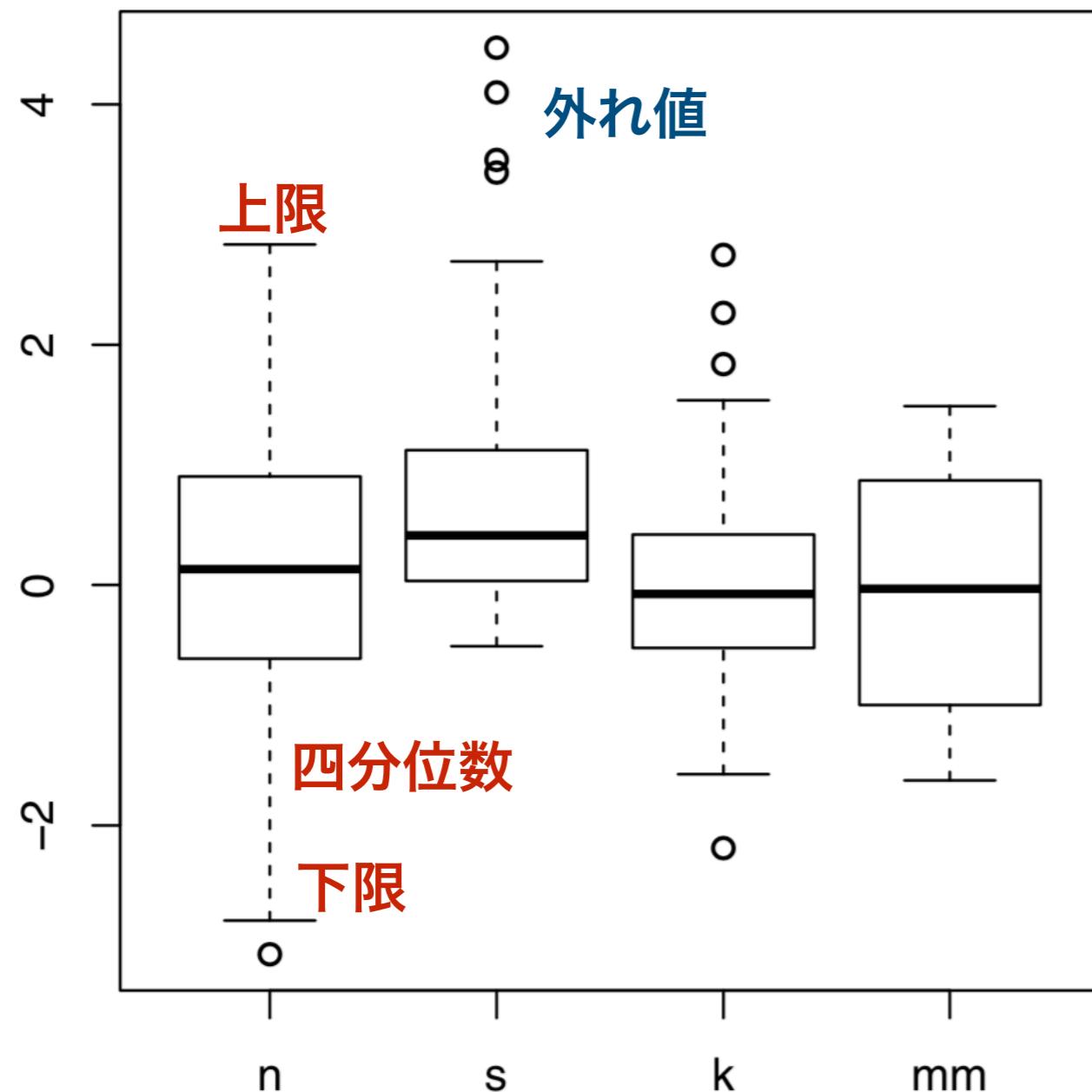
Figure 13.5. The histogram idiom aggregates an arbitrary number of items into a concise representation of their distribution.

Idiom	Histograms
What: Data	Table: one quantitative value attribute.
What: Derived	Derived table: one derived ordered key attribute (bin), one derived quantitative value attribute (item count per bin).
How: Encode	Rectilinear layout. Line mark with aligned position to express derived value attribute. Position: key attribute.

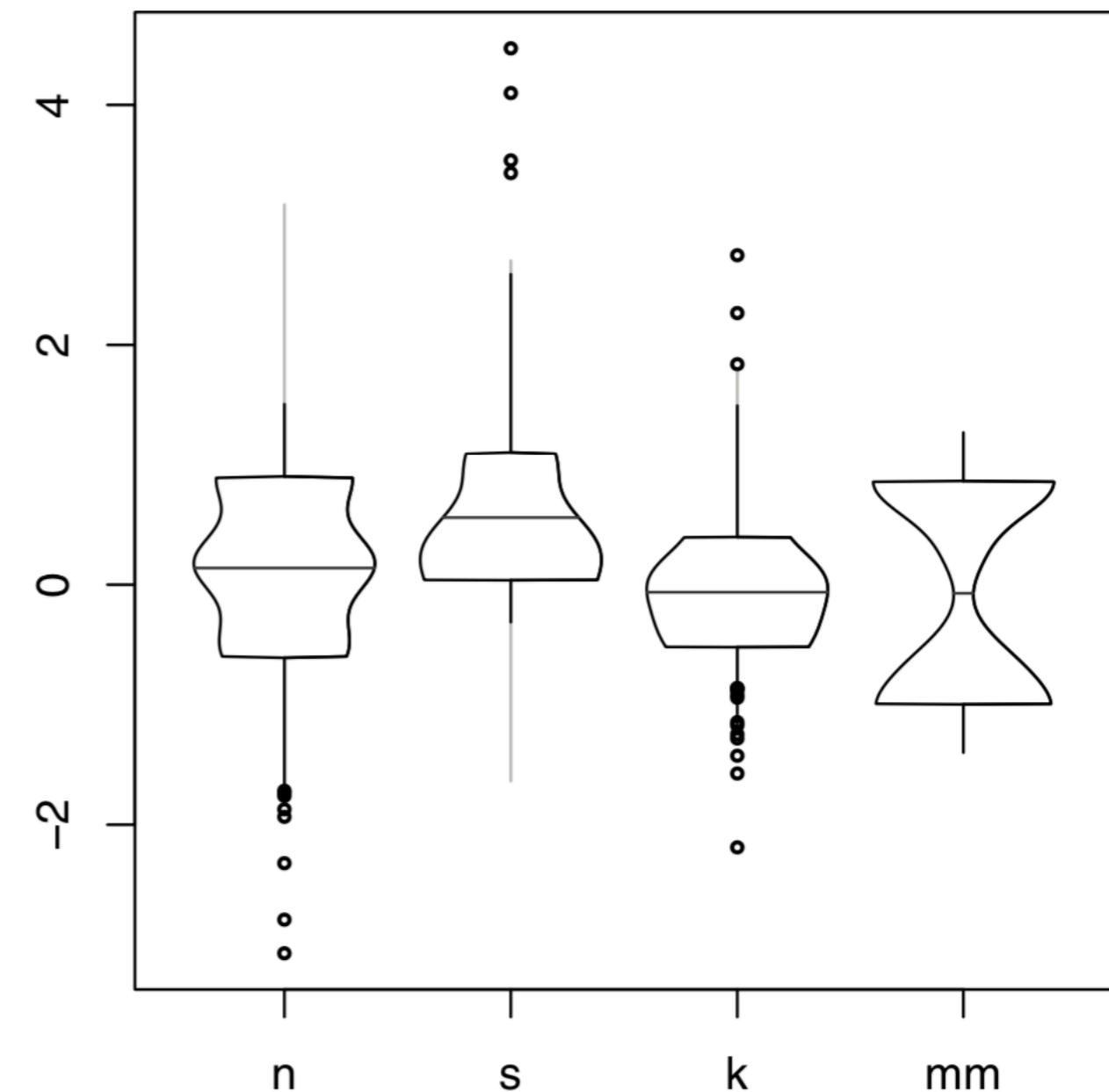
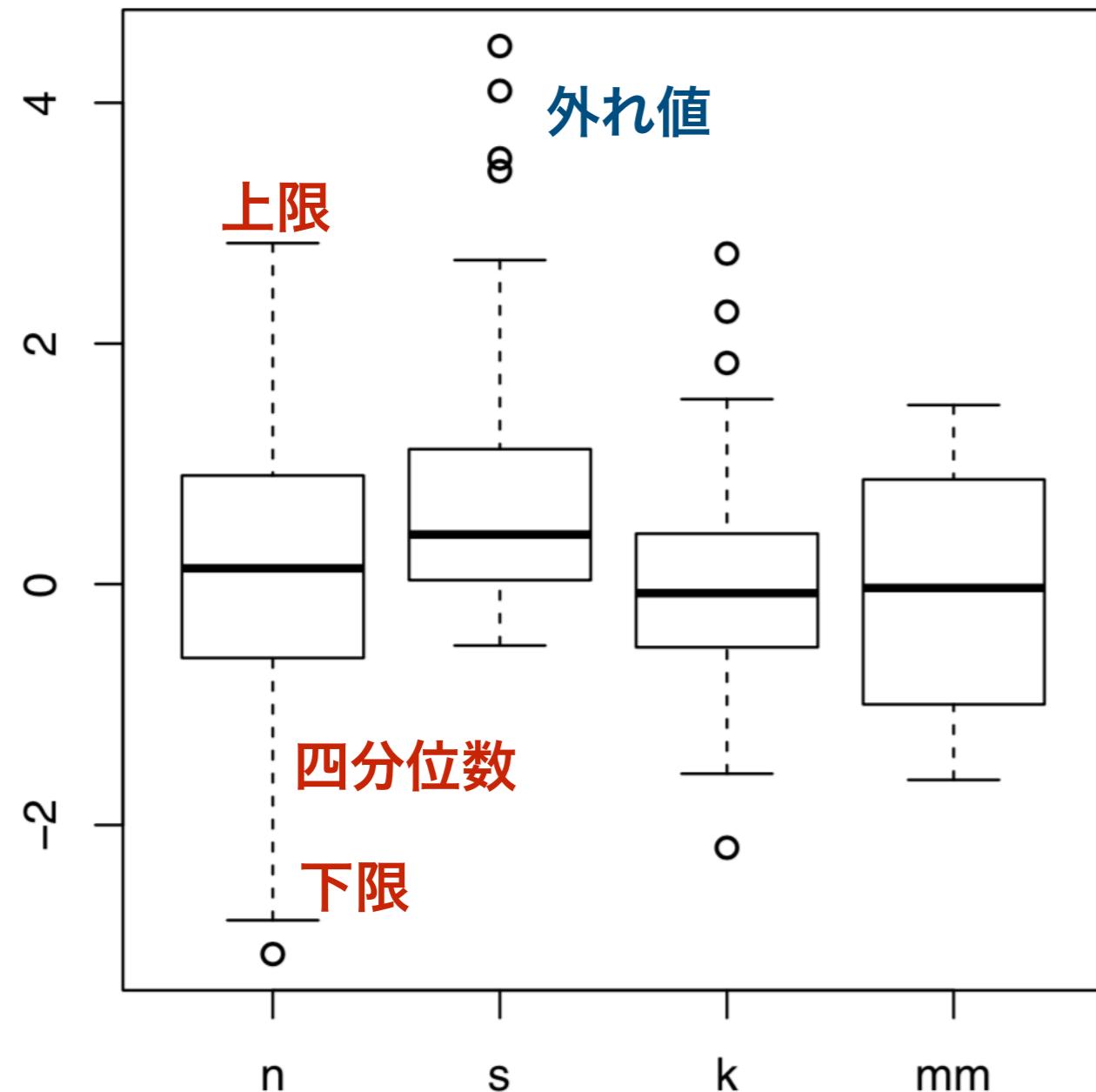
Example: Continuous Scatterplots



Example: Box-plots



Example: Box-plots



Example: Solar plots

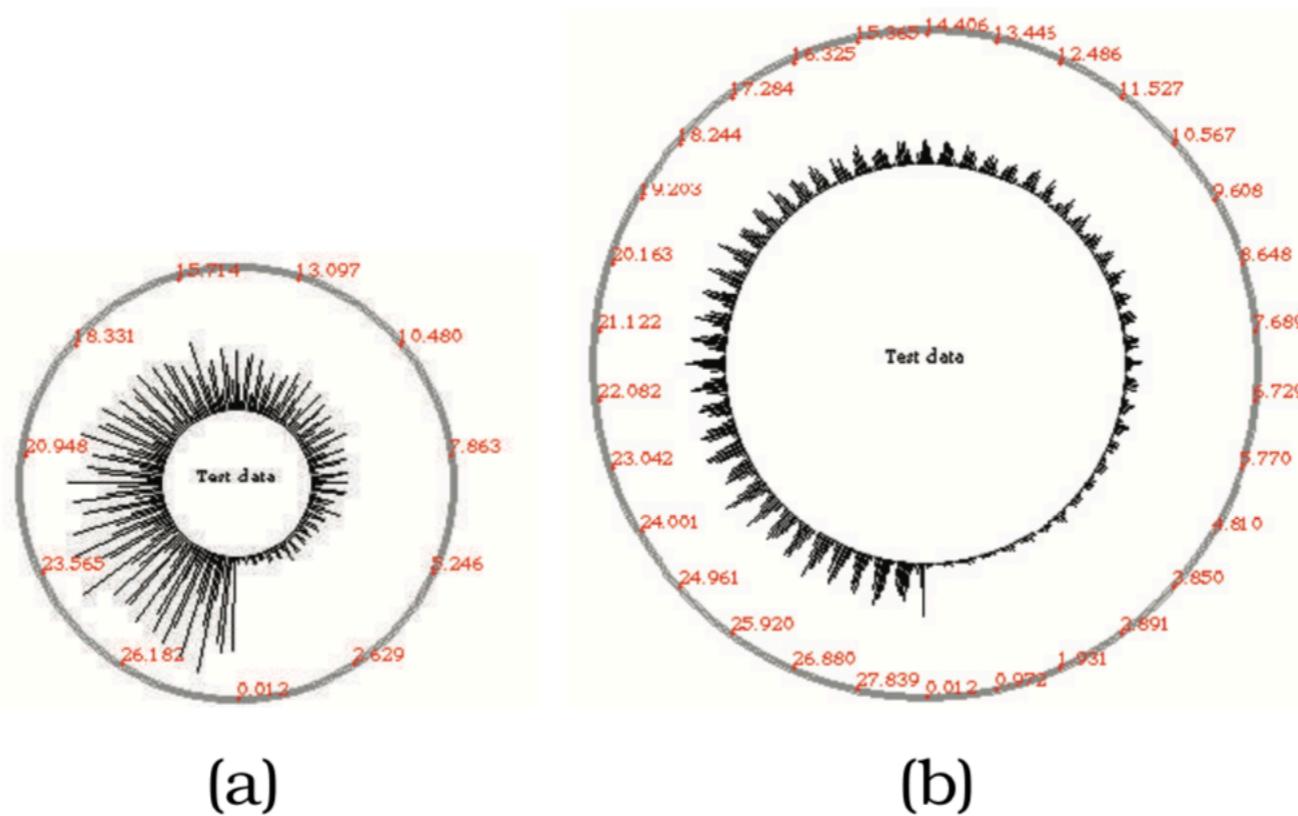


Figure 13.8. The SolarPlot circular histogram idiom provides indirect control of aggregation level by changing the circle size. (a) The small circle shows the increase in ticket sales over time. (b) Enlarging the circle shows seasonal patterns in addition to the gradual increase. From [Chuah 98, Figures 1 and 2].

Hierarchical Parallel Coordinates

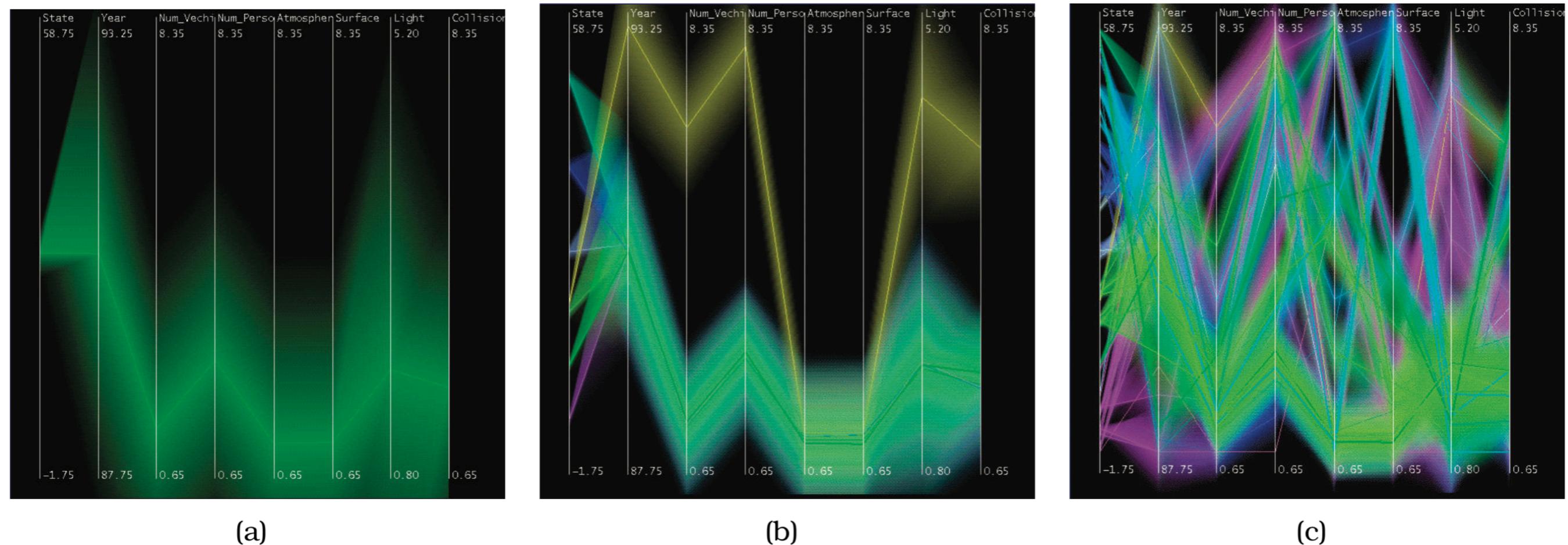
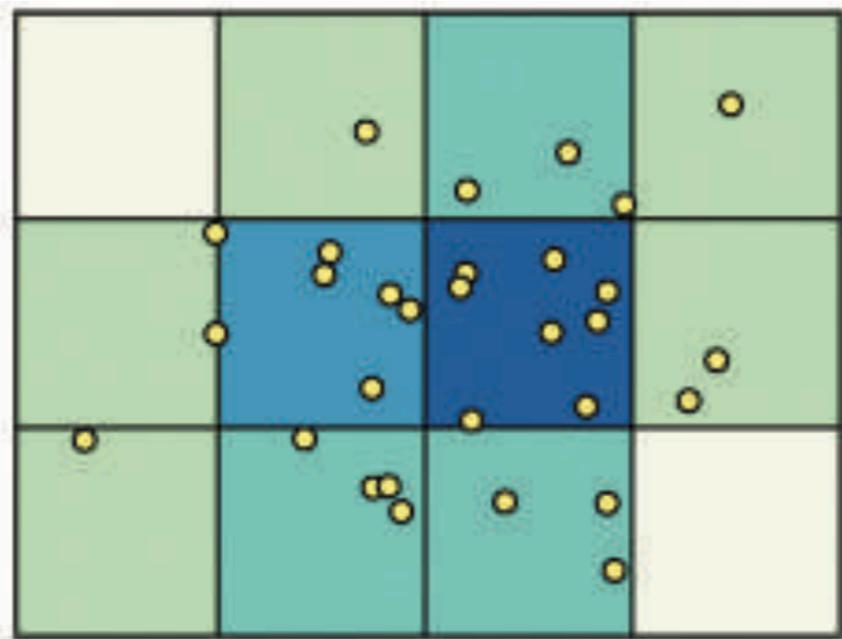


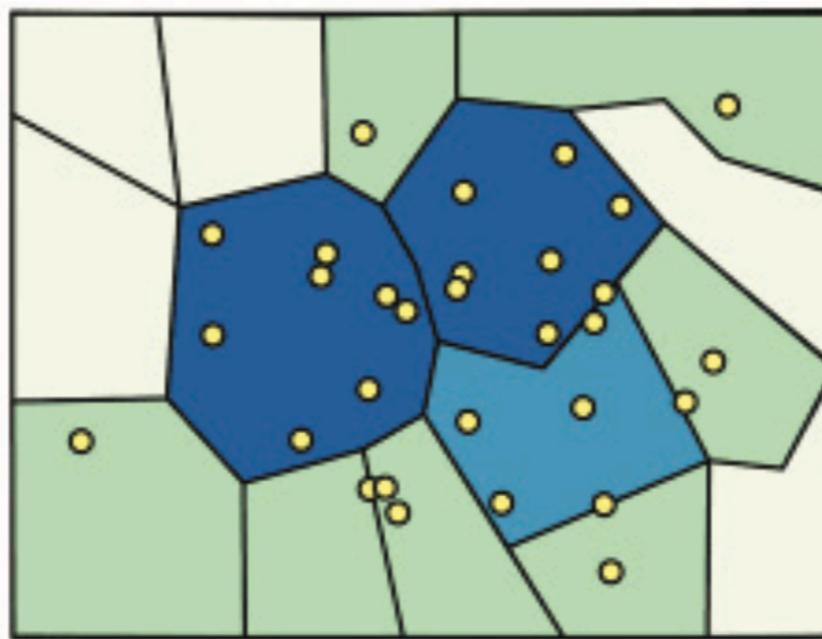
Figure 13.9. Hierarchical parallel coordinates provide multiple levels of detail. (a) The single top cluster has large extent. (b) When several clusters are shown, each has a smaller extent. (c) When many clusters are shown, the proximity-based coloring helps them remain distinguishable from each other. From [Fua et al. 99, Figure 4].

Spatial aggregation

- 課題: Modifiable areal unit problem (MAUP)



(a)



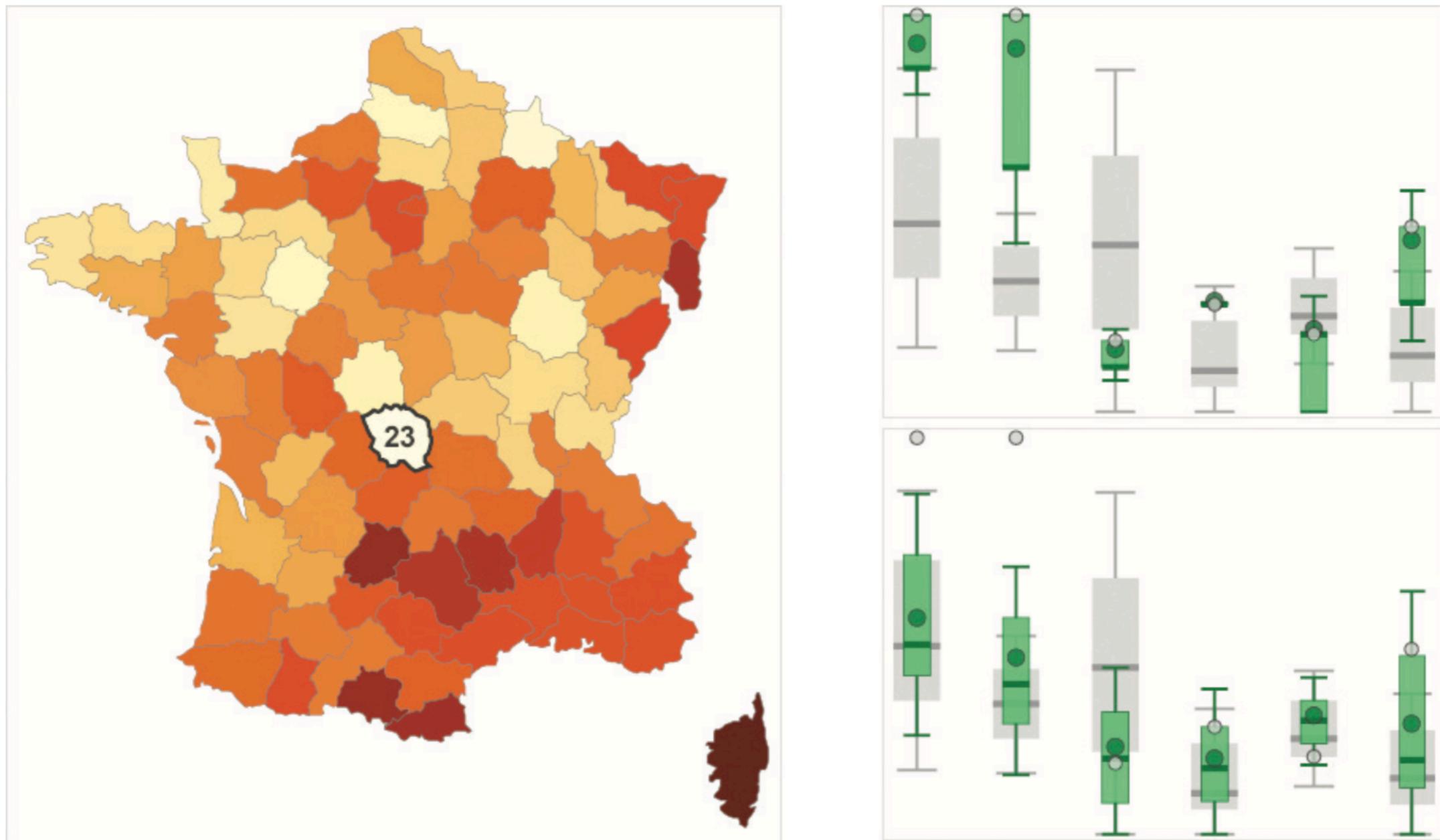
(b)



(c)

Figure 13.10. Modifiable Areal Unit Problem (MAUP) example, showing how different boundaries for aggregation regions lead to very different visual patterns on choropleth maps. (a) Central region is high density. (b) Central region is medium density. (c) Central region is low density. From http://www.e-education.psu.edu/geog486/l4_p7.html, Figure 4.cg.6.

Example: GWVis



Attribute aggregation

→ Aggregate

→ Attributes



Dimensionality Reduction

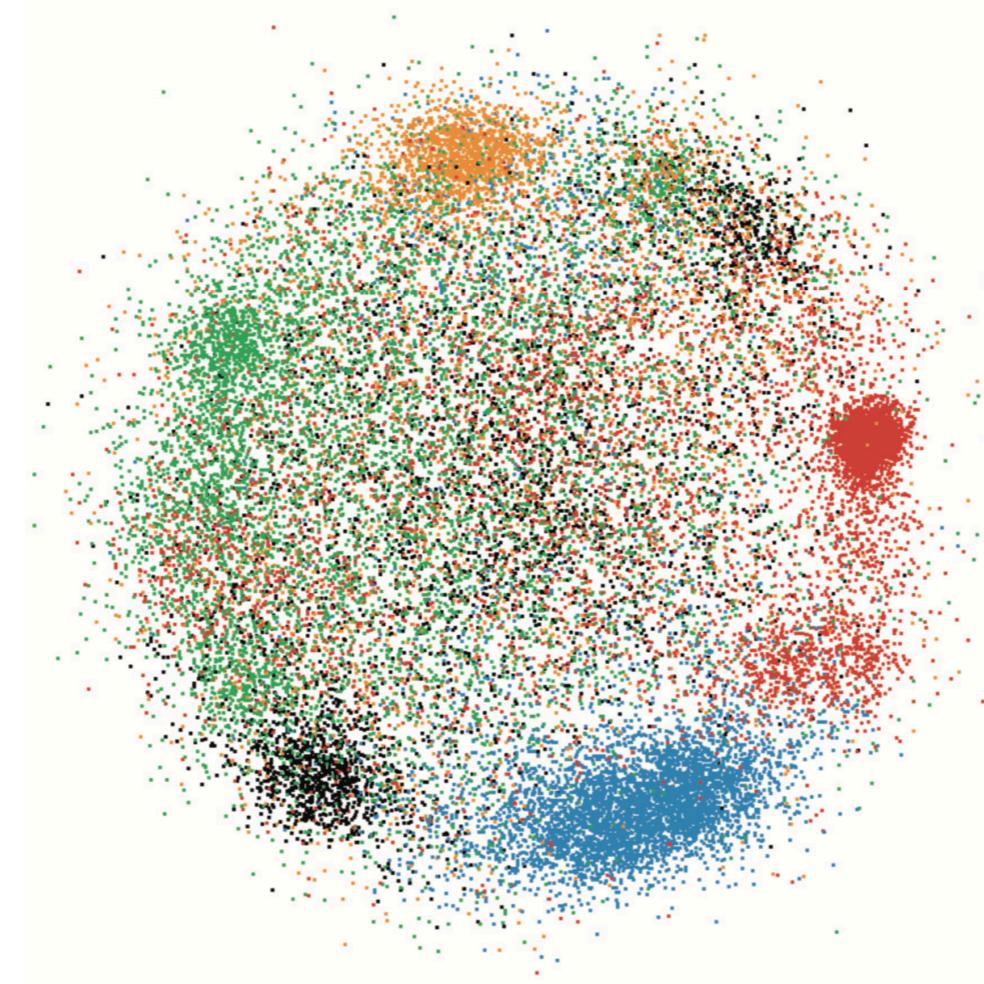


Figure 13.12. Dimensionality reduction of a large document collection using Glimmer for multidimensional scaling. The results are laid out in a single 2D scatterplot, allowing the user to verify that the conjectured clustering shown with color coding is partially supported by the spatial layout. From [Ingram et al. 09, Figure 8].

Example: DimStiller

