Howard Wainer (pages 85-124)

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Overview

- Pie Charts
- Double Y-Axis Graphs
- Tabular Presentation
- Rose Graphs
- Trilinear Plots
- Implicit Graphs

Why Make Charts and Graphs?

.. What is the point of any kind of chart or graph?

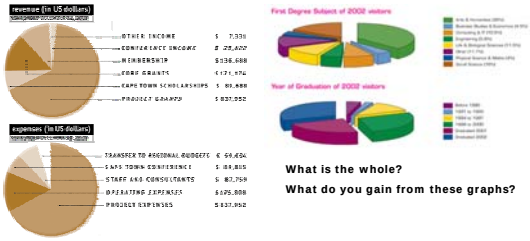
:: Impart knowledge
:: Enhance clarity
:: Provide a visual analysis of information
:: Assist the viewer in drawing conclusions

Make meaning (and wisdom) out of data.

*(remember Wurman's **data** > **information** > **knowledge** > **wisdom**)*

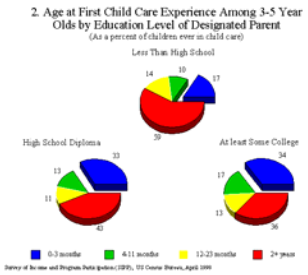
Pie Charts

:: for displaying small quantities of information
:: 5 or fewer data points
:: intended to show a percentage of a whole



What is the whole?
What do you gain from these graphs?

Pie Charts

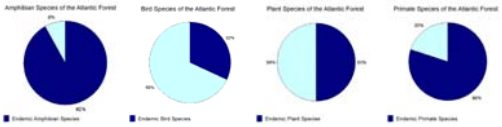


What would be a better way of presenting this data?

Pie Charts

So when *do* you use pie charts?

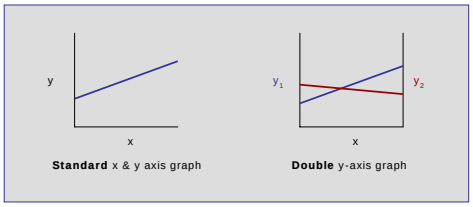
:: With a very small dataset
:: To show, in percent, how one thing relates to the whole



Unfortunately, that's not very interesting information.
We have no way of **predicting**, understanding **causality**, or viewing **multivariate data**.

Double Y-Axis Graphs

"*The sin of a 'double Y-axis graph' is mortal*" (91).

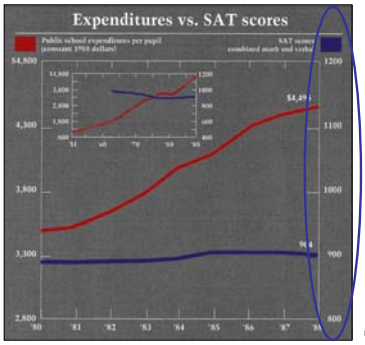


Standard x & y axis graph

Double y-axis graph

Because the designer has control over both y_1 and y_2, you can dramatically distort the visual contents to show invalid causality.

Double Y-Axis Graphs

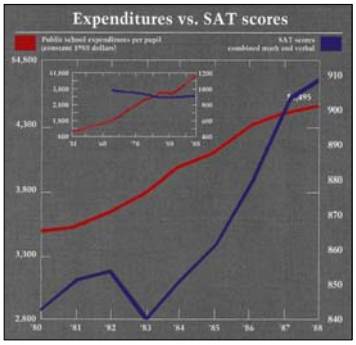


SAT scores use the right axis; funding per pupil uses the left axis.

It appears as if the increased funding over the years has no affect on SAT scores – they don't seem to change at all.

But what if the right y axis was different?

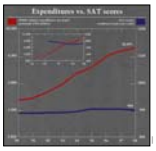
Double Y-Axis Graphs



If we change the right axis to have a tighter scale (840 – 910) instead of a broad scale (800 – 1200), we start to see more of a connection between the two variables.

Both graphs are "accurate".

Which graph is better?



Tabular Data

Table 1: students injured by freak shop accidents (rate per 1,000 students)

Major	Total	Milling Machine	Table Saw	Drill Press	Band Saw	Other
Ceramics	10.1	0	0	.1	0	10
Fashion	11.4	0	0	1.3	1.1	9
Fibers	9.2	0	0	1.1	1	7.1
Furniture	24.1	13.5	3.4	0	2.2	5
Graphic Design	13.7	0	0	0	0	13.7
Historic Preservation	17.3	7.1	3.1	1	3.1	3
Industrial Design	33	20.5	3.2	1.3	3	5
Interior Design	9.6	0	2.6	1	2	4
Jewelry	22.1	7	5	0	0	10.1
Liberal Arts	4.8	0	0	0	0	4.8
Metals	25.3	20.3	1	1	1	2

Tabular Data

Wainer presents several methods for increasing the legibility and usefulness of "tabular data" (tables):

1. Order the rows and columns in a way that makes sense
2. Round – a lot!
3. ALL is different and important
4. Take the graph further

Tabular Data : Order the rows and columns

Table 1: students injured by freak shop accidents (rate per 1,000 students)

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Is alphabetical order the best order for the rows?

Tabular Data : Order the rows and columns

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Total seems a lot more interesting.

Tabular Data : Round – a lot!

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Can we get our heads around what 25.3 students, at a rate of 1:1000 students, means?

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Historic Preservation	17	7	3	1	3	3
Graphic Design	14	0	0	0	0	14
Fashion	11	0	0	1	1	9
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Interior Design	10	0	3	1	2	4
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Liberal Arts	5	0	0	0	0	5

Rounding helps us understand the data and calls attention to outliers

Tabular Data : ALL is different and important

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Understanding percentage of the whole helps us hypothesize causality.

Tabular Data : ALL is different and important

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	180	67	18	6	13	74

Tabular Data : Take the graph further

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It is ok to 'break the rules', to emphasize particular items of relevance.

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Tabular Data

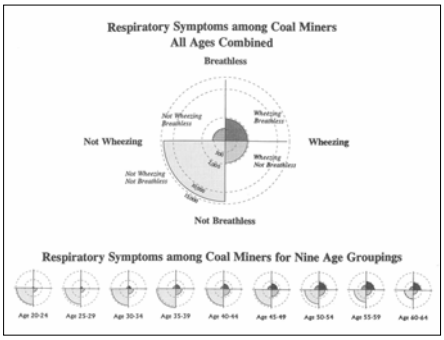
By ordering, rounding, understand the whole and adding detail, we can see:

:: A clearer understanding of which majors have the most accidents

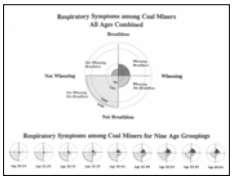
:: A very visual understanding of where additional training may be needed

:: A direction for further study: clarification of what "other" means, as it accounts for 100% of the accidents in several majors

Rose Graphs



Rose Graphs



:: Allows us to see a visual comparison of four variables (*breathless, wheezing, not breathless, not wheezing*)

:: Thumbnail versions placed next to each other paint a very chilling story of progression

:: Very effective for "at a glance" presentation of multivariate data

Trilinear Plots

Wainer blames the news media for being too timid

Trilinear plots are hard to understand, but only because we have not been trained

Very effective method of presenting three-dimensional probability data

What is an example of a probability question that has three-dimensions (or three choices)?

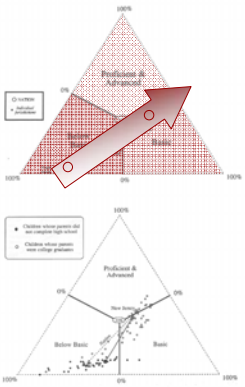
Trilinear Plots

:: Each variable has a third of the area of the triangle

:: The progression of data from one section to another indicates the percentage of each variable

:: On this particular plot, moving east and north on the graph is best; any region that is northeast of another dominates the latter in terms of education skills

:: Use trilinear plots when plotting three dimensional data!



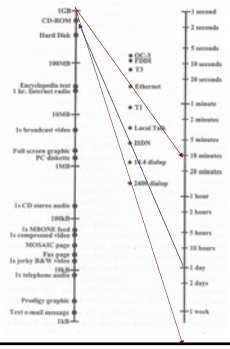
Implicit Graphs

"An internet trip time planner" – an implicit, custom graph.

1. Pick a piece of data
2. Pick a transport mechanism
3. Find out how long it takes

or,

1. Pick a timeframe
2. Pick a piece of data
3. Find out what transport mechanism is best



Conclusions

Use the appropriate graph for the specific type of data

Explore non traditional, more complicated visualizations for more complicated problems (don't treat your audience as if they are dumb)

Make meaning out of data

Let's Try It.

Create each of the following graphs, representing the **course curriculum and sequencing** necessary to get a degree in Industrial Design:

:: Pie Chart
:: Double Y-Axis Graphs
:: Rose Graphs

Which works best?
Which works worst?

What's the conclusion of this exercise?

Summary

- Pie Charts
- Double Y-Axis Graphs
- Tabular Presentation
- Rose Graphs
- Trilinear Plots
- Implicit Graphs