Dot Charts... and how to construct one with WordPerfect

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Introduction

The virtue of using a dot-chart to display values of a variable is shown in Cleveland 'The Elements of Graphing Data' (pub. Wadsworth, 1985). Here you can see what a dot-chart looks like and then how to construct one with WordPerfect (so that no graphics package is needed!). The document goes on to show the inherent superiority of the dot-chart over the pie-chart (that extremely 'information-poor' graphic construction!).

Dot-charts

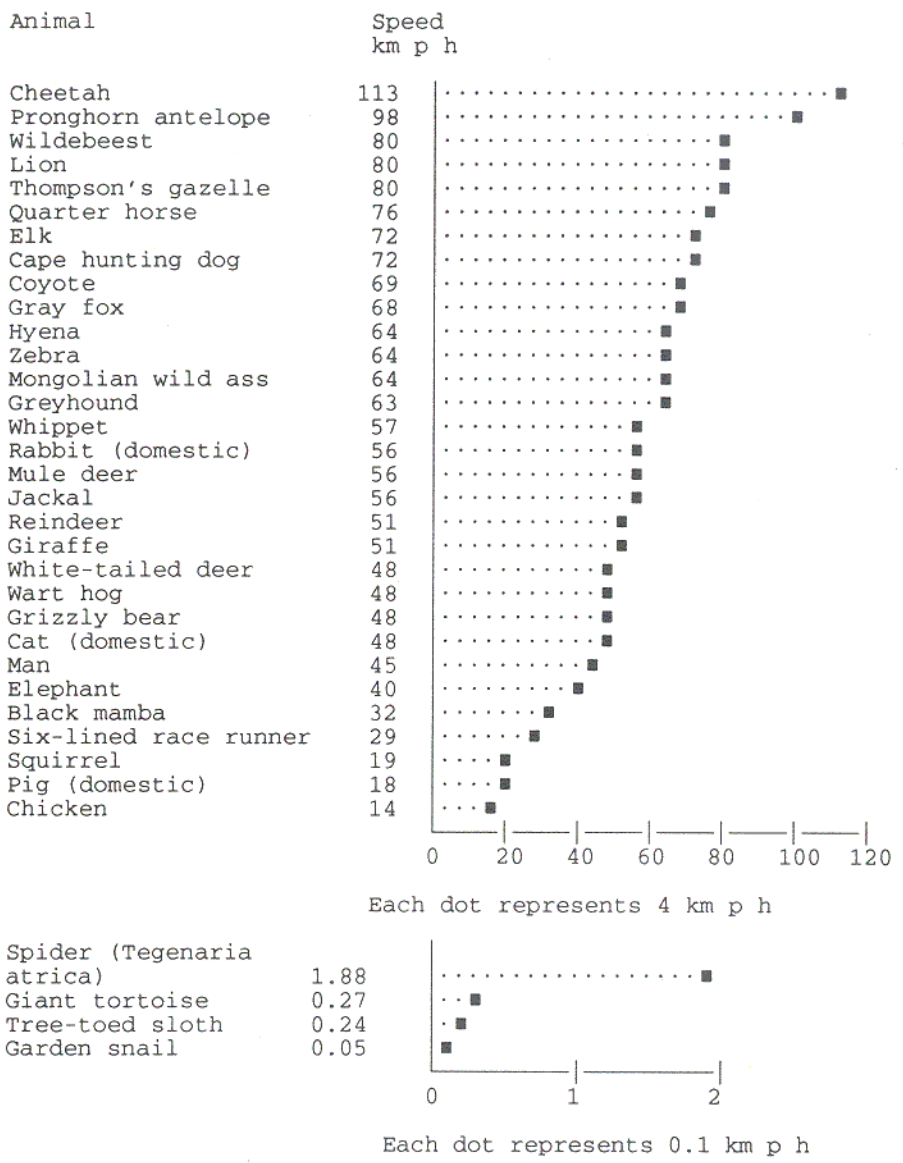
Dot-charts have much to recommend them. They are useful in showing values of categorical, or ordinal variables. The chart below is one of the examples from Cleveland's book. The data comes from Willoughby D.P. (1974) 'Running And Jumping' Natural History Magazine Vol 83 pp 69-72.

Note that the area is split so that the slowest four of the animals in the sample are grouped together. The chart shows a considerable amount of data in a compact and readily digestible way. The eye easily follows across from left to right as in reading (as in the European tradition of text, anyway).

The chart is in accordance with the ideas presented in the book by Edward Tufte 'The Visual Display of Quantitative Information' (pub. Graphics Press, 1983).

Using WordPerfect avoids having to learn to use another package and can be a particularly effective way for those individuals and groups having only limited access to software to present a clear case. (It should not just be the 'well-endowed', who have access to expensive software and facilities, who feel confident to present information.)

Figure 1.From Willoughby D.P. (1974) 'Running And Jumping' Natural History Magazine Vol 83 pp 69-72.



An example of the superiority of the dot-chart

Let's say we are thinking about two universities and we are interested in the composition in terms of the age ranges of the students in each of them. The data are artificial but will serve to illustrate. Let's say one of the universities is called Tufte and the other is called Cleveland, (after two people who have brought to attention the need for sensible graphics). Let's say we are given data for three age bands, Young, Middle and Old.

	Age Group			Total	
	Young	Middle	Old	Percent	N
Tufte	36%	33%	31%	100%	16000
Cleveland	31%	33%	36%	100%	25000

First the data is presented in pie chart form.

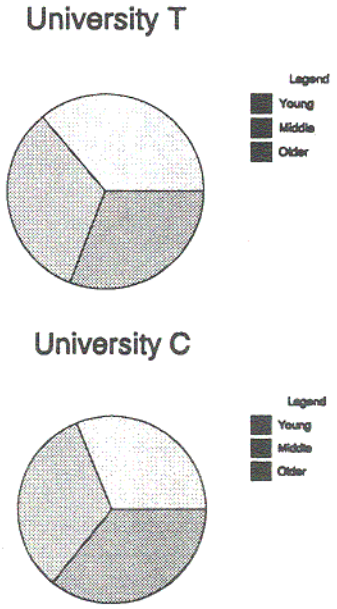


Figure 2.

Criticism

1 One cannot see adequately variation of data within a pie.

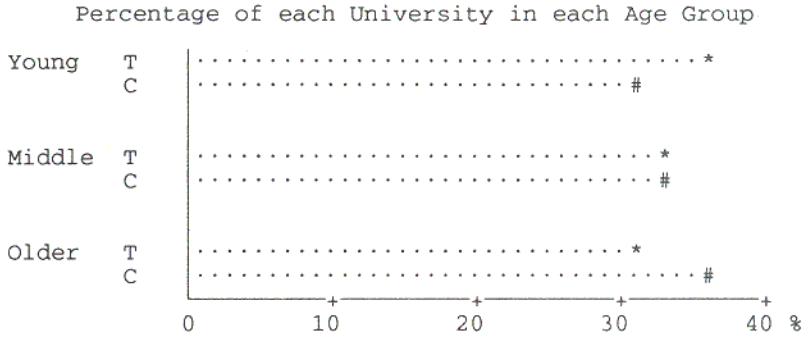
2 One cannot see adequately variation of data between pies.

3 The inherent circular construction of a pie chart does not reflect the 'linear' ordering of the age group scale.

4 They take a lot of space and 'ink' to say not very much, not very well.

Now the data are presented in dot chart form.

Figure 3



Advantages

1 Respects the ordinal nature of age group.

2 Comparisons can be easily made between age groups and universities. We find that in Tufte University there is a falling profile with age group, whilst at Cleveland it rises. (If this were not already obvious from the data table!). Note, regarding the data as samples, that for the large numbers involved the difference, between 31% and 36%, is statistically significant at $p < 5\%$.

3 The data-ink ratio and data density are higher.

Basic Principles of how to construct a Dot chart with WordPerfect

The dot chart can be easily constructed using Wordperfect.

1 First ensure that you have selected a fixed pitch font. These can be recognised by the letters cpi (characters per inch in their names e.g. Brougham 12cpi, Courier 10cpi).

2 The axes can be drawn using the line-draw feature. To do this press Ctrl-F3, L, 1 for a single line. Then use the cursor keys to draw the line. Press F7 when finished.

3 The dots can be entered conveniently using the repeat feature. First move the cursor to the appropriate point then press Esc. This results in the prompt:

Repeat Value = 8

Type in the number of dots required, but do not press Enter, press the full-stop key and the specified number of dots appear at the cursor position.

4 Remember to change the base font back if required by using CTRL-F8, F.

Example of creating a dot-chart in WordPerfect

The chart showing the data in Figure 3 can be created as follows:

1 Press CTRL-F8, F then select a 10 pitch font, then press <Enter> to go down to the next line.
2 Type in the labels in the normal way, i.e type Young, press <space> three times, type T, press <space> twice, press <Enter>. Continue until all the labels are done.
3 Move the cursor to the end of the first label line 2 spaces to the right of T, then press Ctrl-F3, L, 1, press ↑ once and then ↓ as required for the vertical-axis and —▸ and ◂— for the horizontal-axis. Press F7 when finished. The lines can be tidied up if necessary by editing in the normal way using <Del> or <BackSpace>.
4 Move the cursor back to the end of the first line, one space to the right of the vertical-axis, press <Esc>, type 35 the number of dots required

(36-1). Now press, (full stop) then type in the symbol which terminates the line of dots, * in this case. So now we have the 36 characters required to represent the 36%. Press the ↓ and continue in the same way for the other percentages.
5 Finally move to the origin. It is important to press <Ins> to select typeover mode. Press <Esc>, 10, —▸, then +. Press <Esc>, 9, —▸, + to provide ticks every 10 spaces on the x-axis. The labels can be added below in the normal way.
6 Viewing the chart using Shift-F7 then V is useful to do before printing.

(The dots on the chart shown in Figure 1 were in fact produced using the symbol (·), produced by using Alt-249, rather than the full stop symbol (.). There are a number of symbols in the extended character set which might be useful (the square blob ■ to signal the final dot was produced by using Alt-254). These are obtained by holding down the Alt key while pressing the required number-keys on the number-pad.

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