



Principles

GC

Graphical Communication Principles

Kosslyn (Harvard Psychologist) identifies three “maxims” for “graphics that work”:

1. the mind is not a camera
2. the mind judges a book by its cover
3. the spirit is willing, but the mind is weak

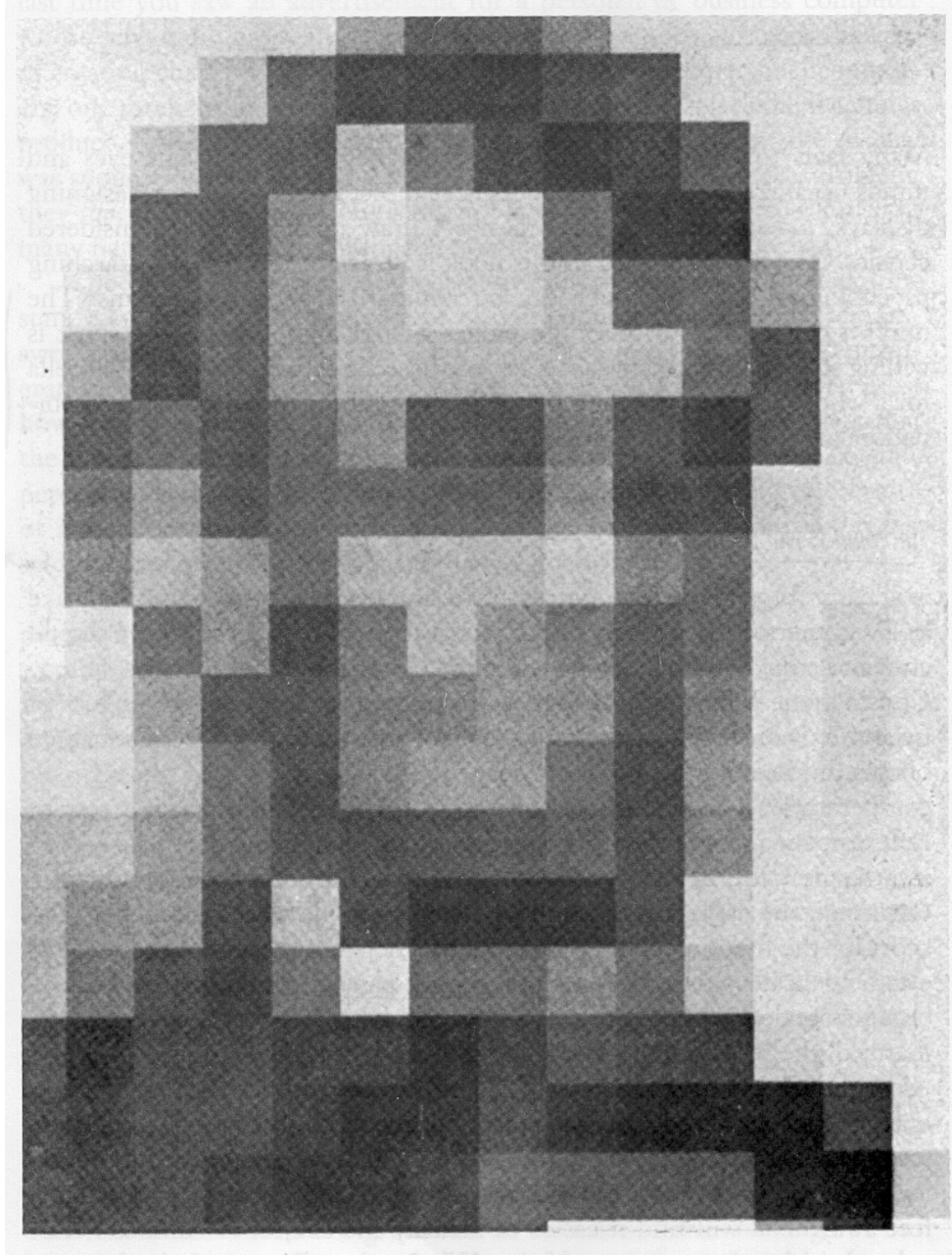
Tufte identifies criteria for “graphical excellence”

On the basis of experience thus far, let’s examine these.



Mind vs. Camera

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Mind vs. Camera

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- we perceive at different levels of discrimination *simultaneously*
“Abe” is visible —though out of focus!
- we react automatically to patterns
 - birds flying in formation are seen as group, not individuals
 - training improves observation, e.g., in coaches
- *differences* in patterns are especially noticed



Grouping Objects

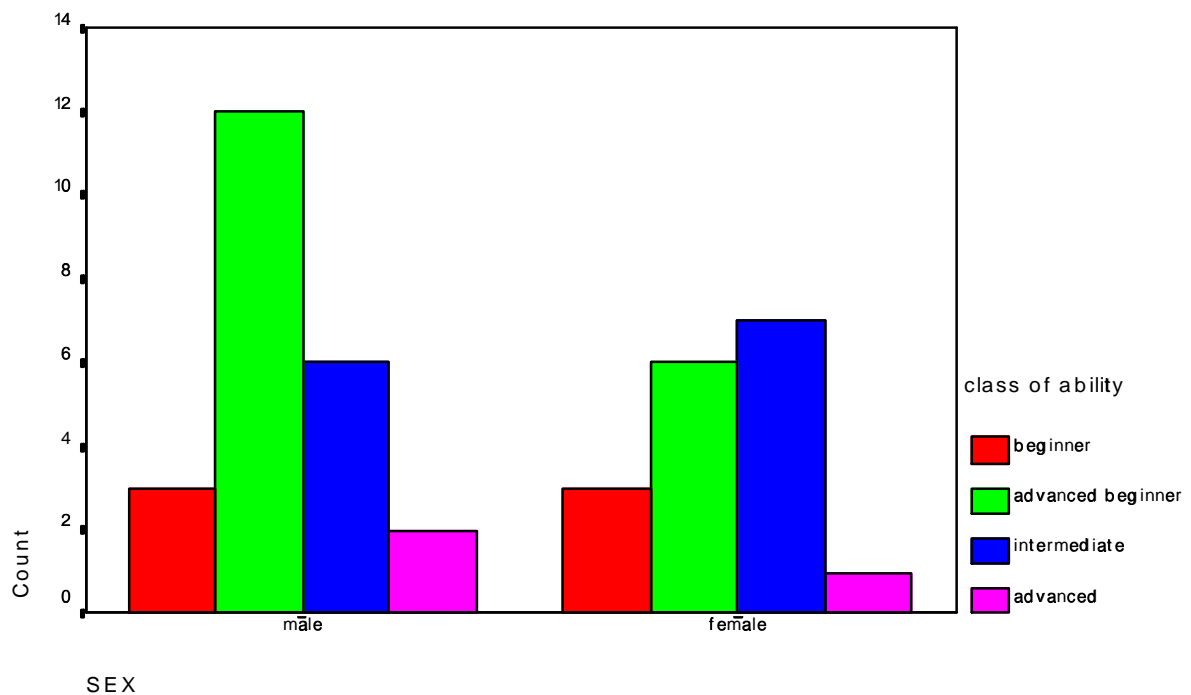
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We interpret objects as related based on

- proximity

XXX XXX vs. XX XX XX

side-by-side histograms intended to show comparison of corresponding parts

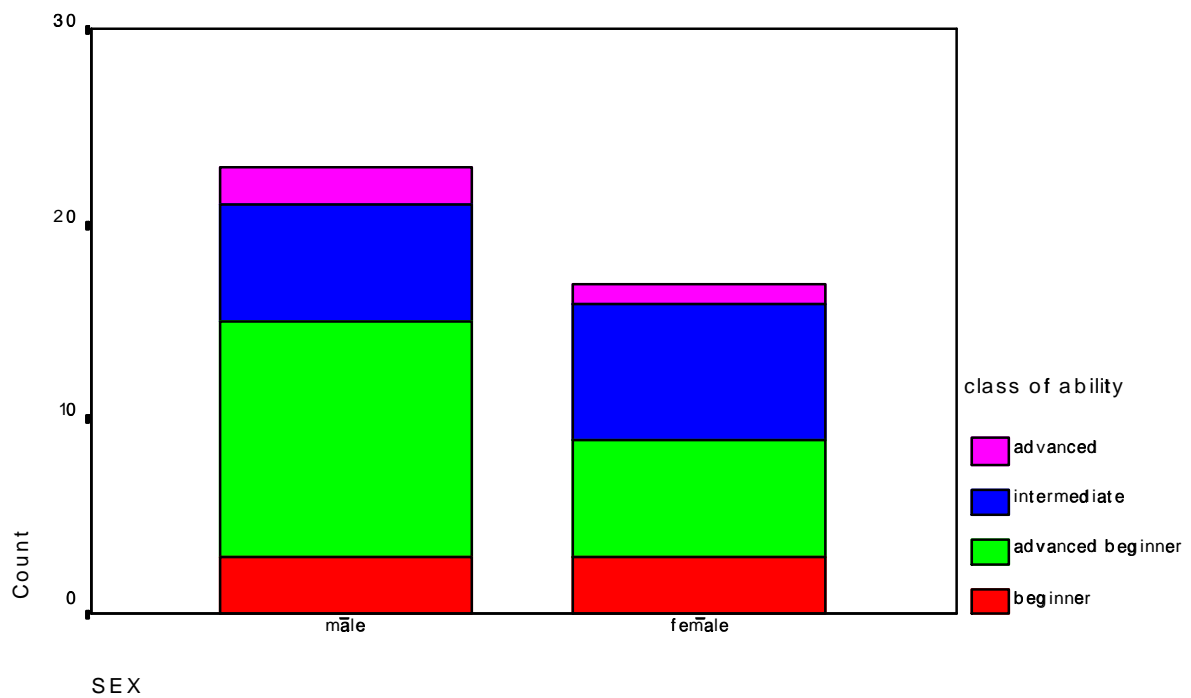




Grouping by Proximity

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Segmented bar charts are *more effective* because the elements to be compared are *closer*.



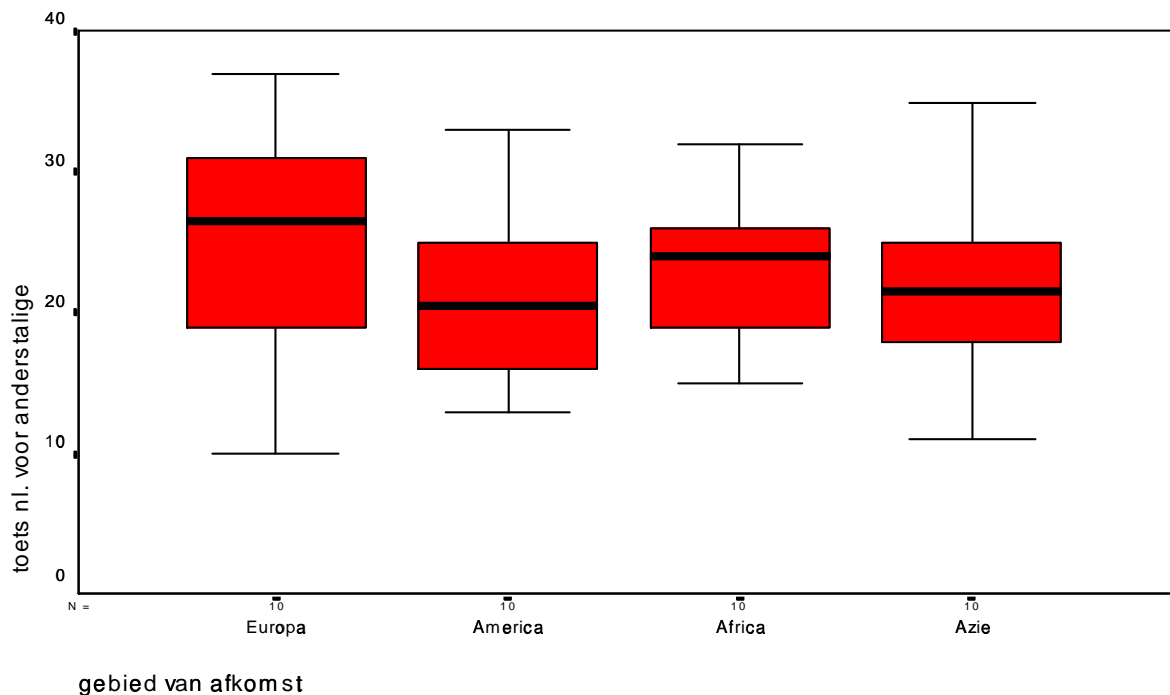
The relative size of the ability classes can be compared because they are adjacent



Grouping by Proximity

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Side-by-side box 'n whisker diagrams are likewise *effective* because the elements to be compared are *close*.



The relative distribution of the ability classes can be compared because they are adjacent.

Difference between segmented bar chart and side-by-side box 'n whiskers plots: more numeric detail in the latter.

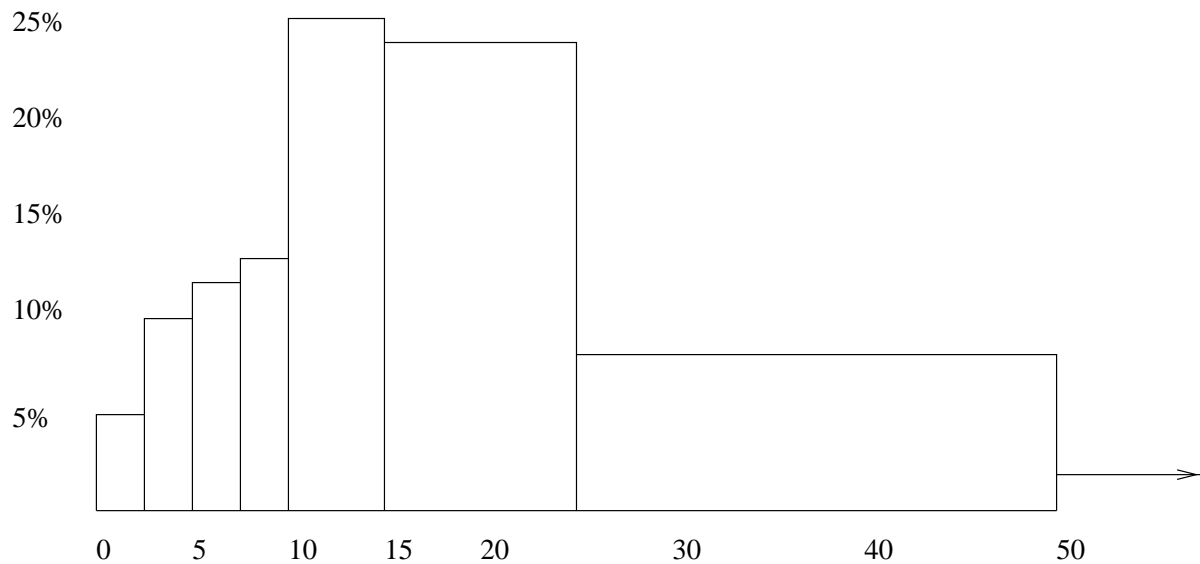


Mind vs. Camera

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- automatic pattern recognition

we see the rectangles in histograms and react (roughly) to their *area*, not height — *automatically*



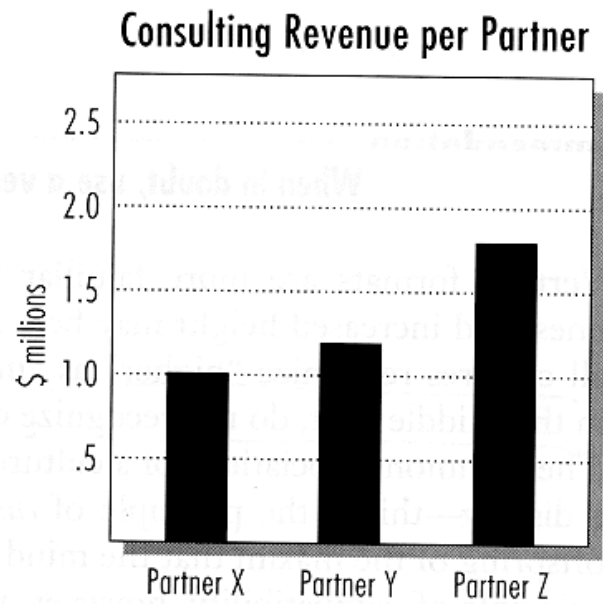
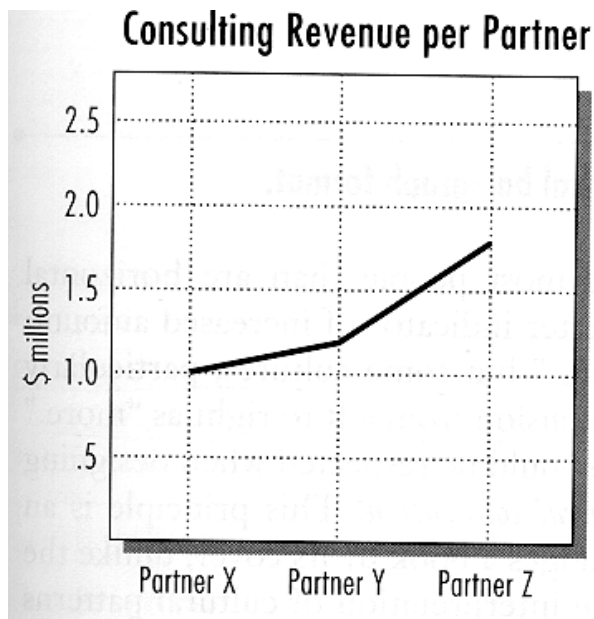
1973 income (K\$)	%
0-2.5	5
2.5-5	10
5-7.5	12
7.5-10	13
10-15	26
15-25	24
25-50	8
50-∞	2



Mind vs. Camera

GC

- automatic pattern recognition



we “see” the line extending up toward left, and extrapolate it as a “positive” tendency



Book Covers

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BLUE

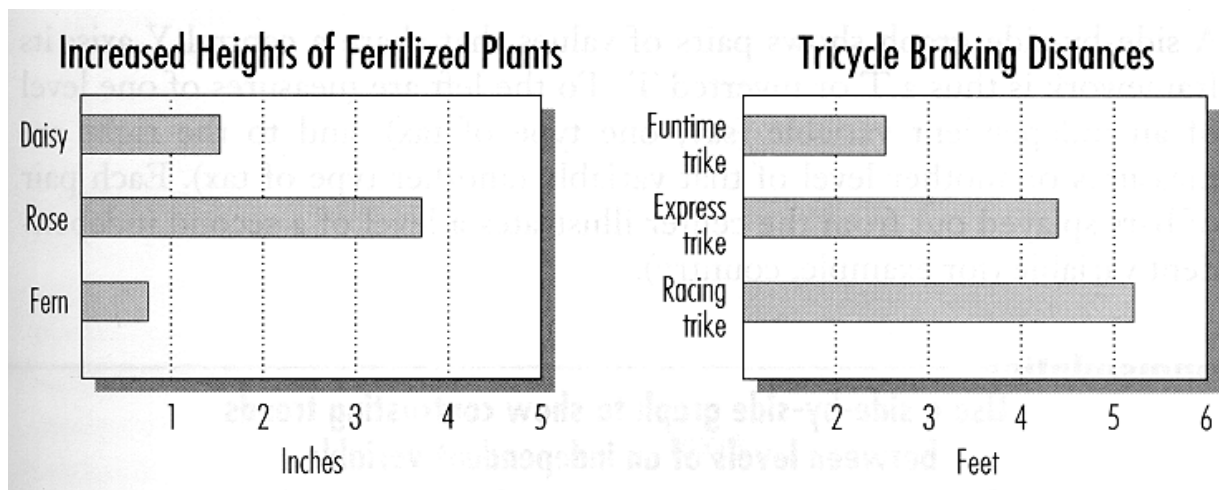


Book Covers

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- the mind judges a book by its cover
 - more people misread the word 'blue' when it's colored red
 - people take more time to read it correctly (Stroop, 1935)

therefore, use natural symbols, directions, etc. where possible

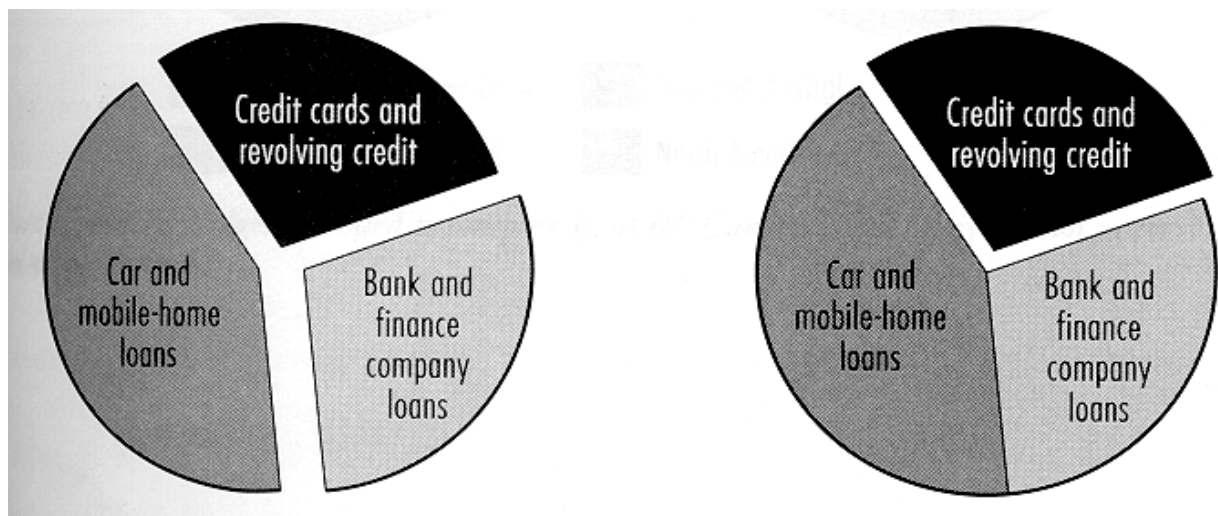




Graphical Weakness

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we see whole given most of a (common) form, and we see it less clearly when the form is broken up



fully exploded pie chart makes "pie" less easy to see

pie with single piece missing emphasizes whole *and* single piece

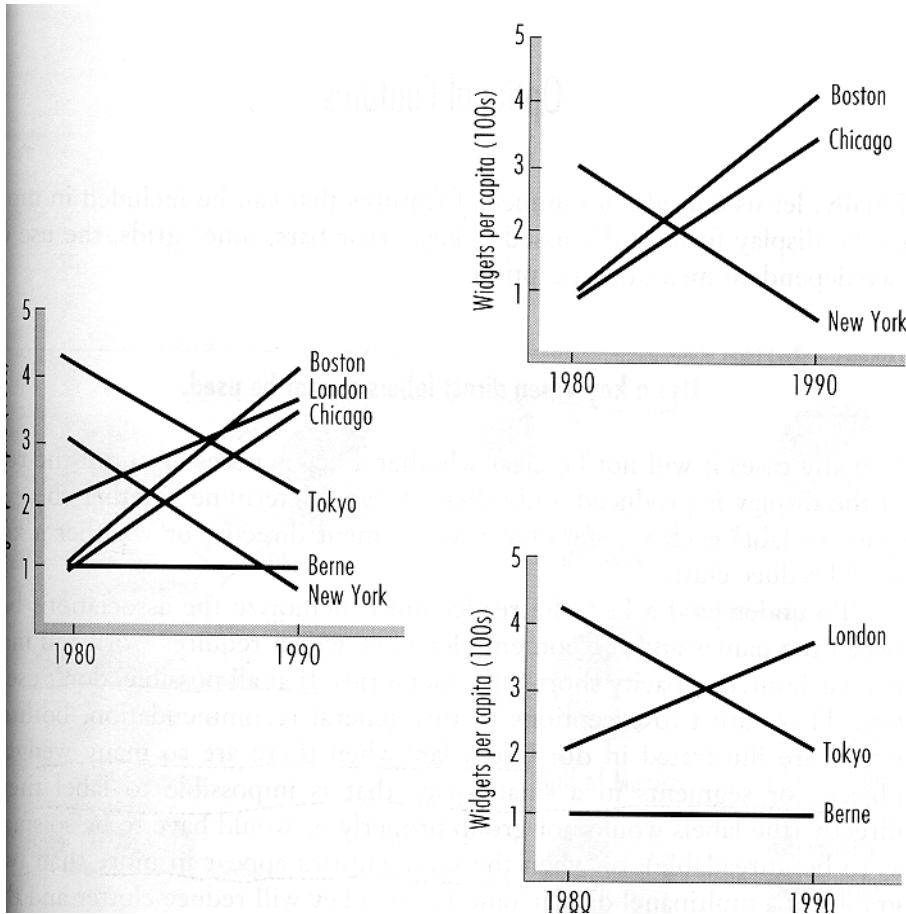
the mind won't work to put the pieces together



Graphical Weakness

GC

too much detail is confusing



- chart with too many lines is “effective” in expressing a lot in little space
- hard to read — too dense

rule of thumb: four “chunks” of information is max