

VISUAL VARIABLES

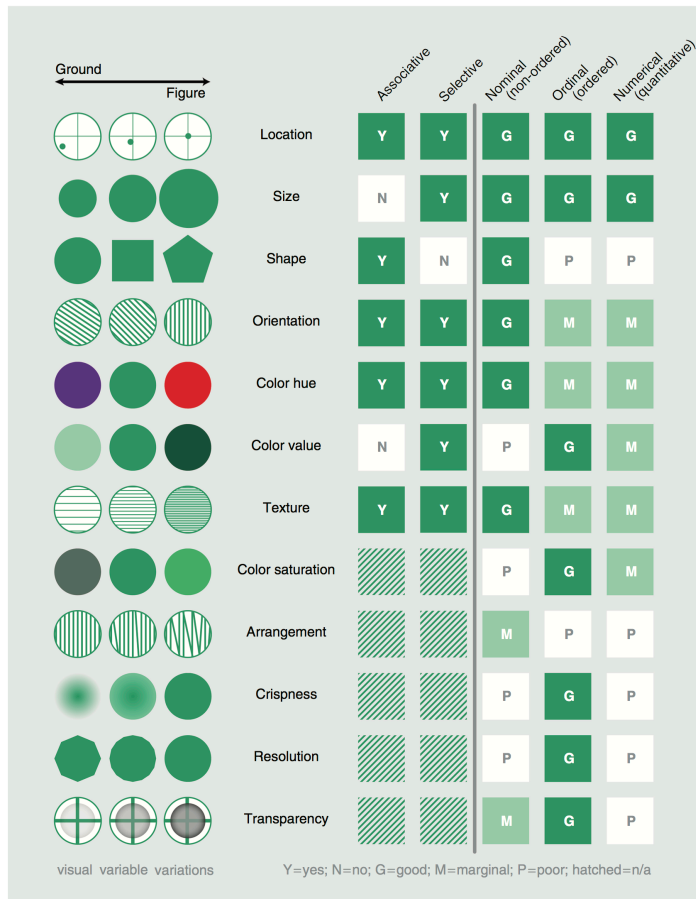


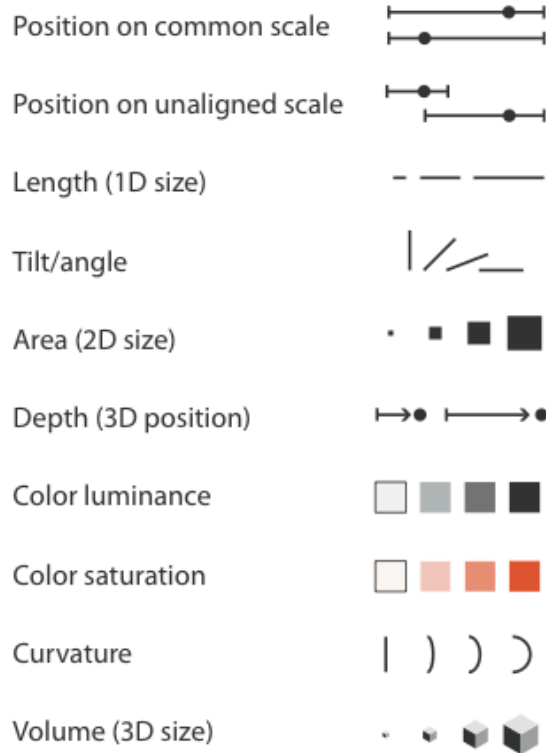
Figure 1 The visual variables and their syntactics. Figure derived from Bertin (1967/1983), MacEachren (1995), and MacEachren *et al.* (2012).

Properties and
qualities of
Visual Variables

SYNTACTICS
Roth (2017)

Channels: Expressiveness Types and Effectiveness Ranks

➔ Magnitude Channels: Ordered Attributes



Most
Effectiveness
Least

Quantitative (interval, ratio)

estimation tasks
are performed
more successfully
with the higher
encoding methods

Ordered

we cannot estimate **quantities** well
from encodings that use these visual
variables, though we can **order** them

Munzner (2014)

Channels: Expressiveness Types and Effectiveness Ranks

Selective / Associative / Dissociative

Identity
Qualitative
(nominal)

identity tasks
are performed
more successfully
with the higher
encoding methods

so we associate symbols that are grouped together
more than we associate symbols
that have the same shape ...
and color hue works well to
'make things look the same'
when we are trying to associate symbols
with the same quality

➔ Identity Channels: Categorical Attributes

Spatial region



Color hue



Motion



Shape



Most

Effectiveness

Least

Munzner (2014)

levels of measurement data

categories

measurements

*labels
that describe
characteristics of
things*

*numbers
that describe
characteristics of
things*

nominal

ordinal

interval

ratio

organisation names
telephone numbers

ranked size
low, medium, high

You can't create ratios from the numbers

temperature (C or F)
calendar year

counts
monetary value



COLORBEWER
SCHEMES

qualitative

sequential

sequential

sequential

BICYCLE
EXAMPLE

brand
trek, canyon, cube

frame size
XS, S, M, L, XL, XXL

year made
2015, 2016, 2017, 2018

price
£1,699 ; £799 ; £1,475

MUNZNER
TERMINOLOGY

identity

order

magnitude

magnitude