

Visual Variables

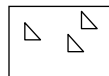
Characteristics of visual symbols
How we distinguish between them

Slides by Sheelagh Carpendale, University of Calgary

Visual variables - attributes

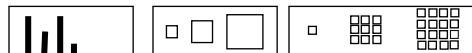
position

- changes in the x, y (z) location



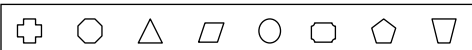
size

- change in length, area or repetition



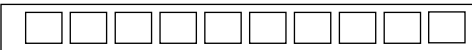
shape

- infinite number of shapes



value

- changes from light to dark



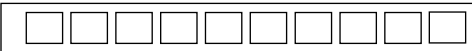
orientation

- changes in alignment



colour

- changes in hue at a given value



texture

- variation in pattern



motion

Saul Greenberg

Visual variables - characteristics

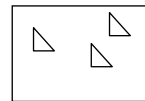
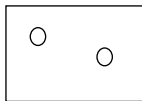
Different variable attributes may be:

- **selective**
is a change enough to allow us to select it from a group?
- **associative**
is a change enough to allow us to perceive them as a group?
- **quantitative**
is there a numerical reading obtainable from changes in this variable?
- **order**
are changes in this variable perceived as ordered?
- **length**
across how many changes in this variable are distinctions perceptible?

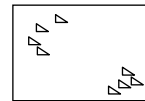
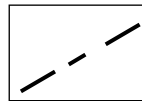
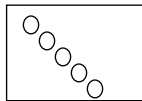
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Position

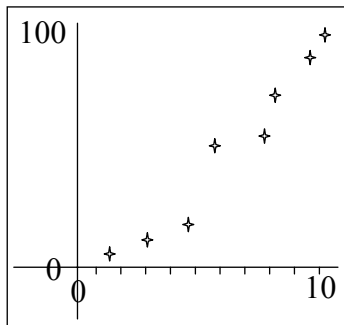
✓ selective



✓ associative



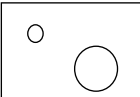

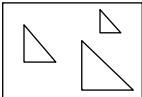
✓ quantitative

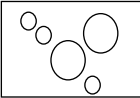
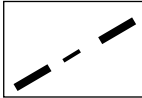
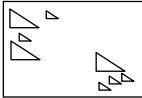


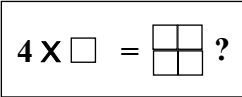
✓ order

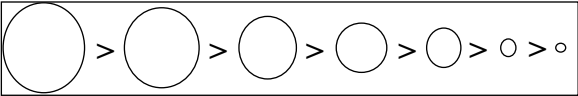
✓ length

Size

✓ selective   

✓ associative   

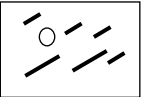
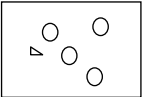
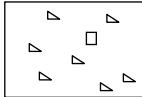
≅ quantitative 

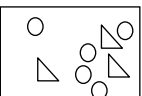
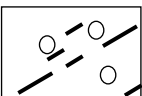
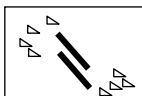
✓ order 

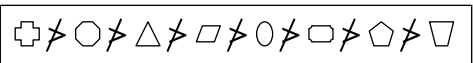
✓ length

- theoretically infinite but practically limited
- association and selection ~ 5 and distinction ~ 20


Shape

≅ selective   

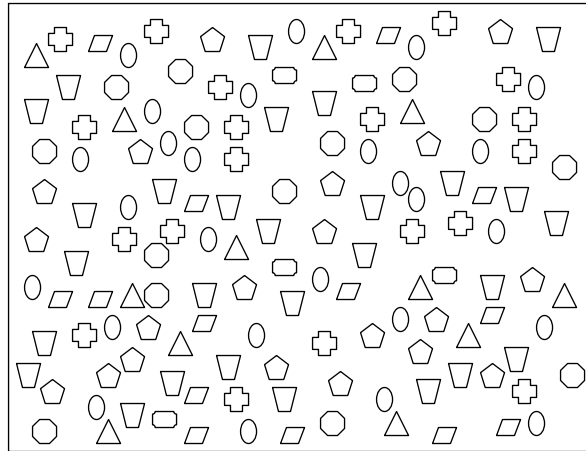
≅ associative   

≠ quantitative 

≠ order

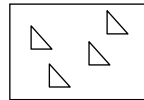
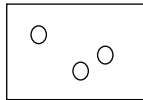
✓ length - infinite variation 

Shape

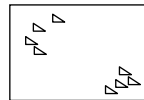
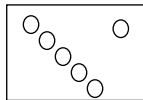


Value

✓ selective

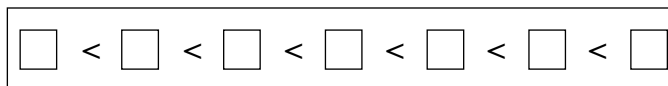


✓ associative



≠ quantitative

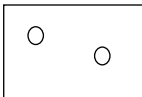

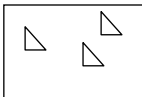
✓ order

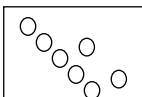
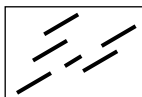
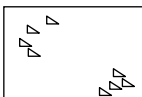


✓ length

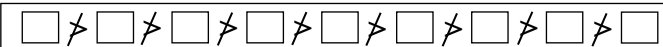
- theoretically infinite but practically limited
- association and selection ~ < 7 and distinction ~ 10

Color

✓ selective   

✓ associative   

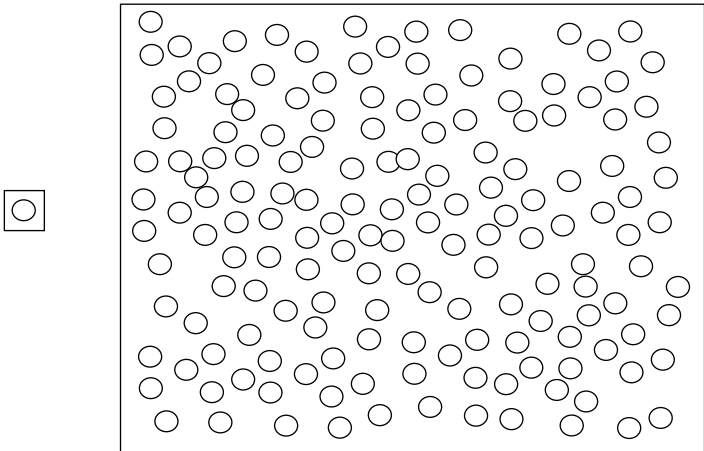
≠ quantitative

≠ order 

✓ length

- theoretically infinite but practically limited
- association and selection ~ < 7 and distinction ~ 20

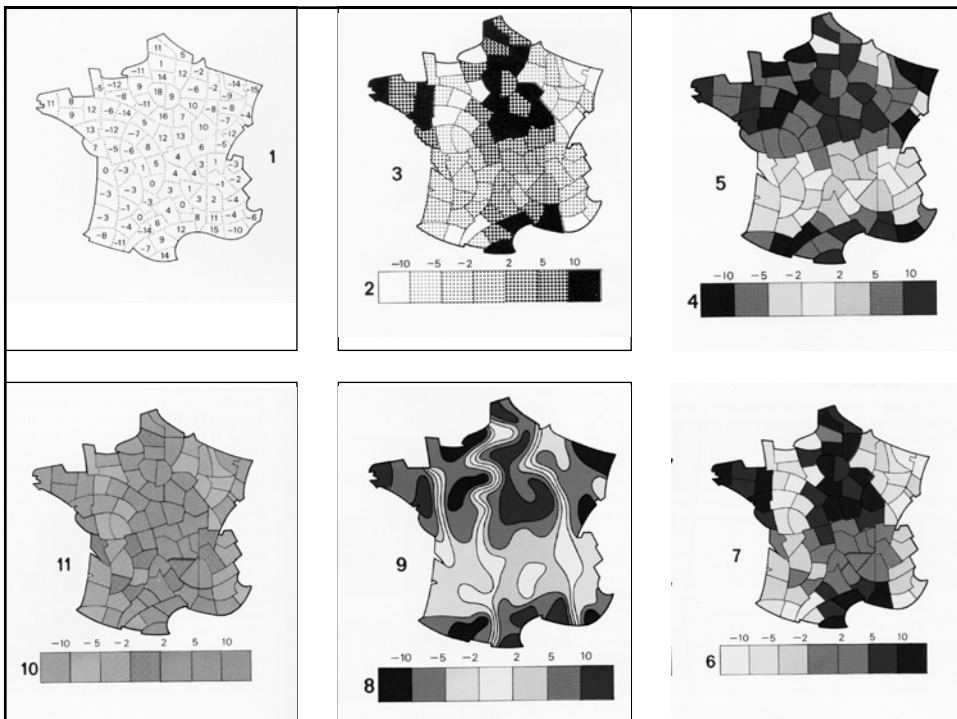
Color

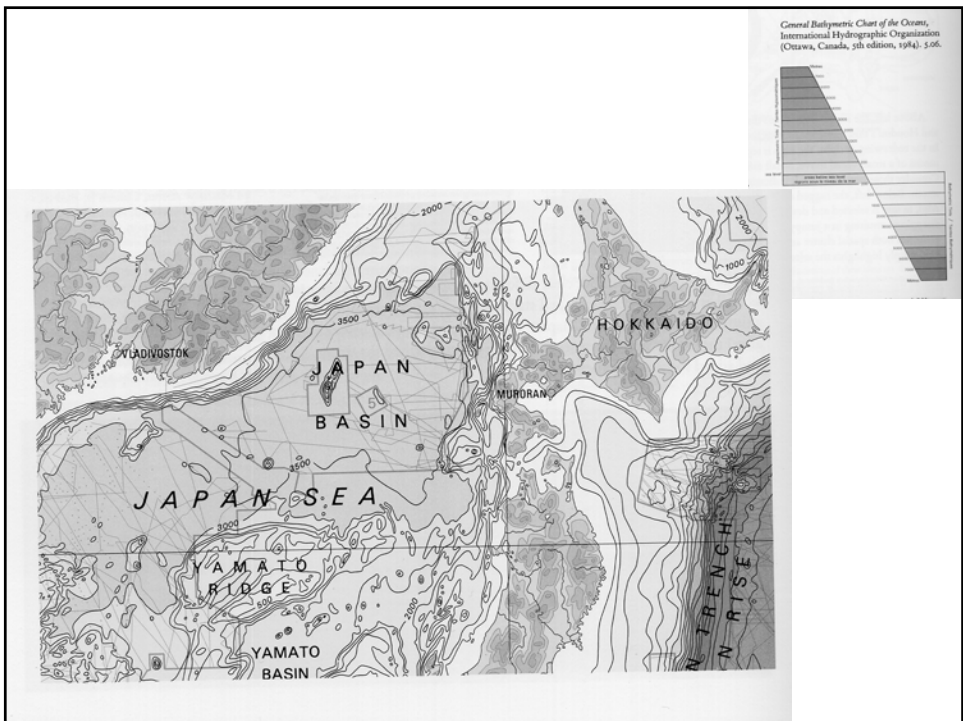
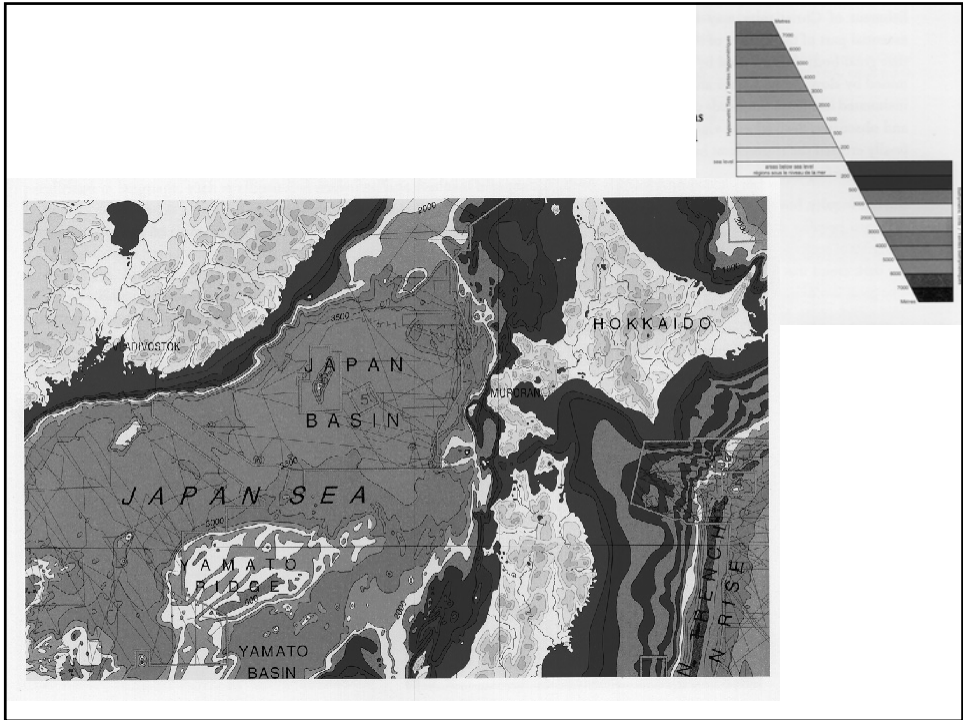


Encoding color

Common advice says use a rainbow scale

- Marcus, Murch, Healey
- problems with rainbows



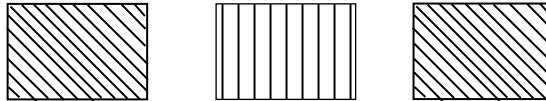


Orientation

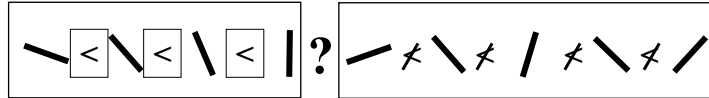
✓ selective



✓ associative



≠ quantitative



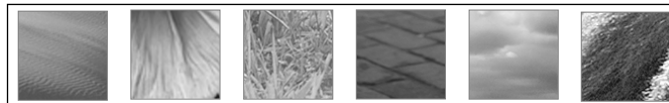
≠ order

✓ length

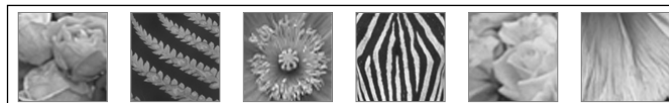
- ~5 in 2D; ? in 3D

Texture

✓ selective

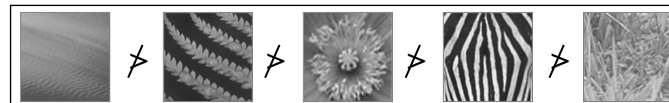


✓ associative



≠ quantitative

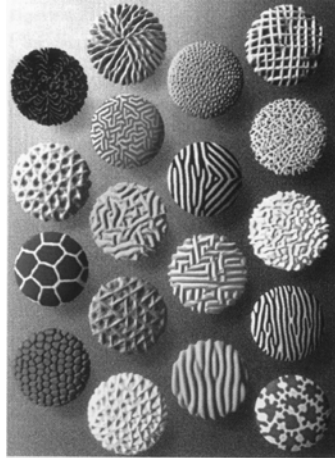
≠ order



✓ length

- theoretically infinite

Textures

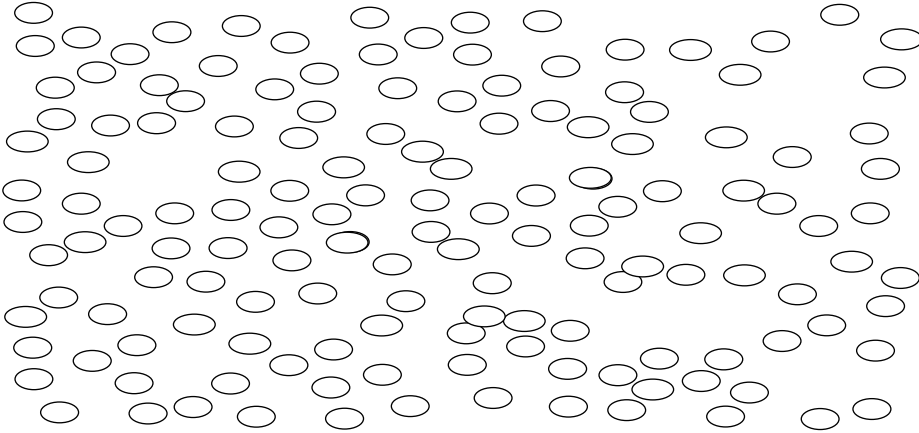


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Motion

- ✓ selective
 - motion is one of our most powerful attention grabbers
- ✓ associative
 - moving in unison groups objects effectively
- ≠ quantitative
 - subjective perception
- ≠ order
- ? length
 - distinguishable types of motion?

Motion



What you know now

Attributes of visual variables

- position
- shape
- orientation
- texture
- size
- value
- color
- motion

Characteristics of visual variables

- selective
- associative
- quantitative
- order
- length

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