

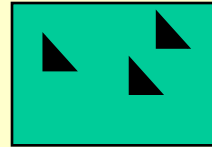
Visual Variables

Characteristics of visual symbols
How we distinguish between them

Visual variables - attributes

position

- changes in the x, y (z) location



size

- change in length, area or repetition



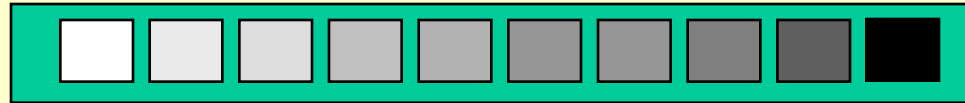
shape

- infinite number of shapes



value

- changes from light to dark



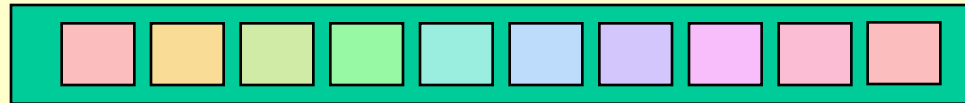
orientation

- changes in alignment



colour

- changes in hue at a given value



texture

- variation in pattern



motion

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**

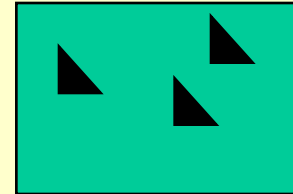
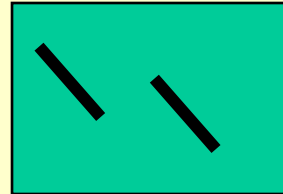
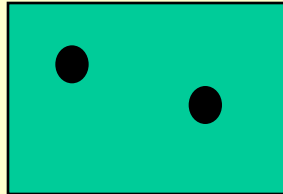
are changes in this variable perceived as ordered?

- **length**

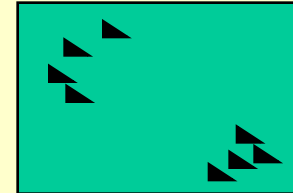
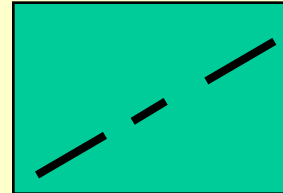
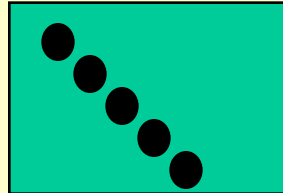
across how many changes in this variable are distinctions perceptible?

Position

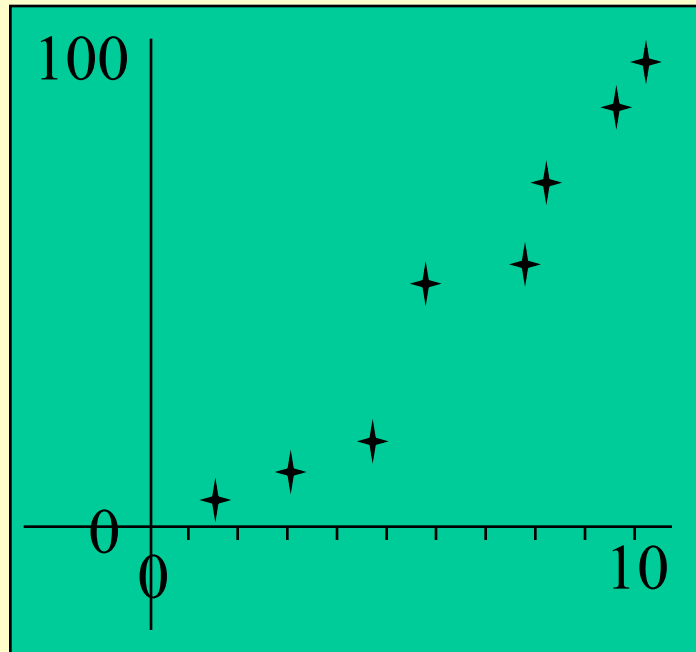
✓ selective



✓ associative



✓ quantitative

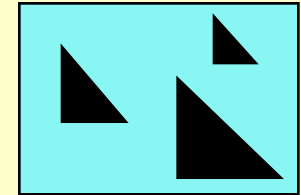
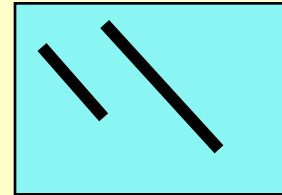
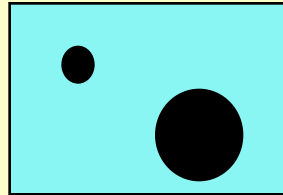


✓ order

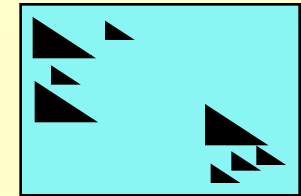
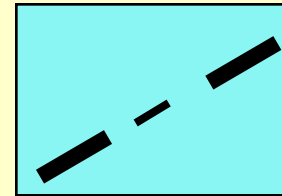
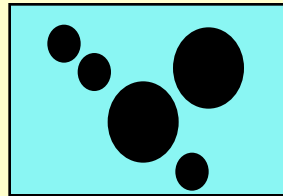
✓ length

Size

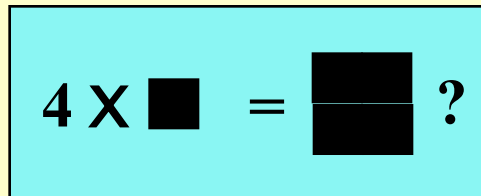
✓ selective



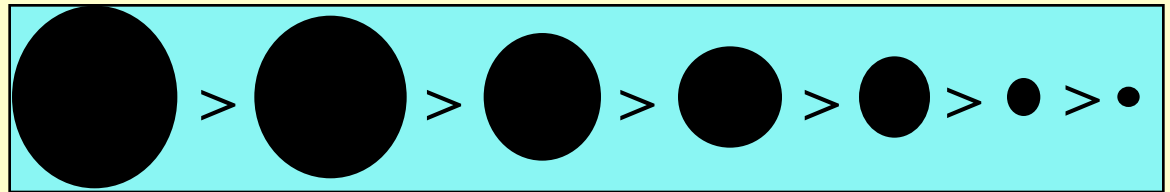
✓ associative



⌋ quantitative



✓ order

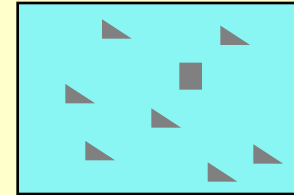
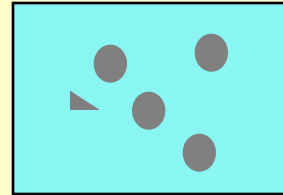
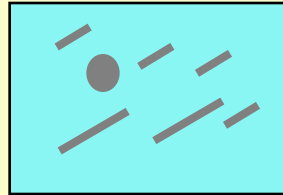


✓ length

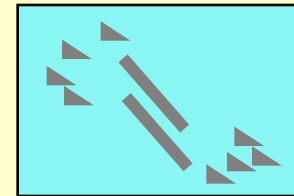
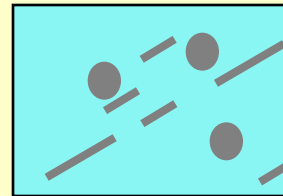
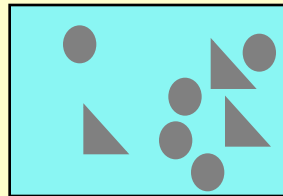
- theoretically infinite but practically limited
- association and selection ~ 5 and distinction ~ 20

Shape

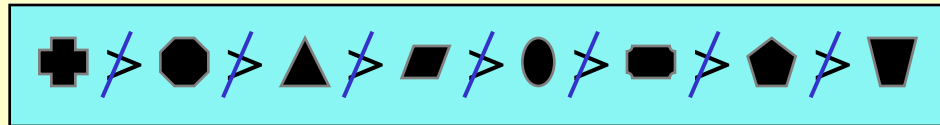
 selective



 associative

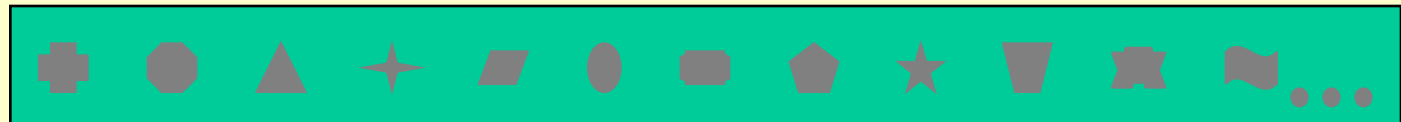


 quantitative

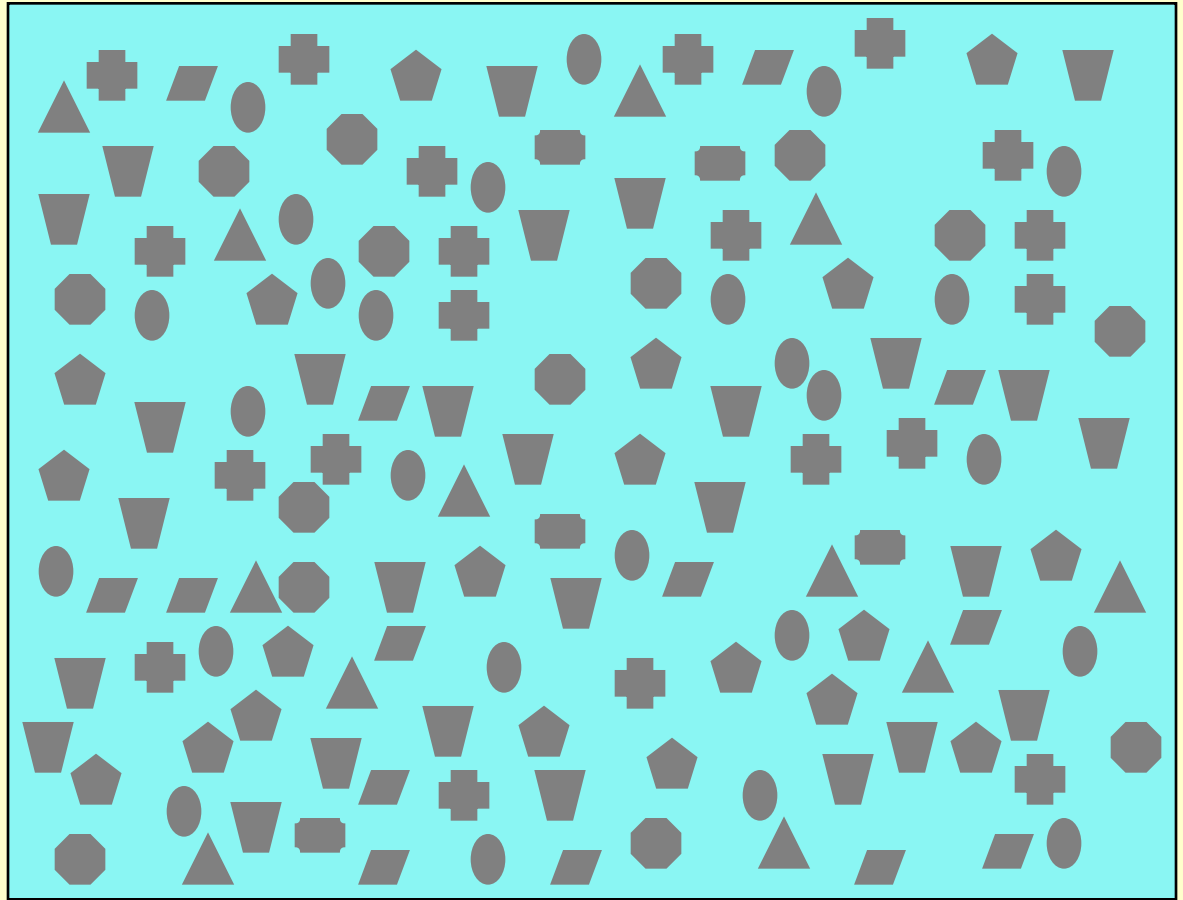


 order

 length - infinite variation

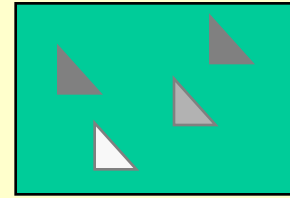
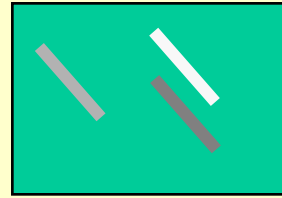
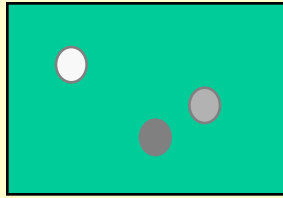


Shape

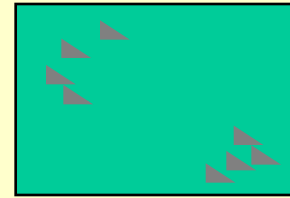
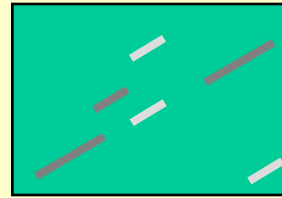
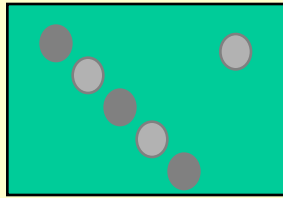


Value

✓ selective

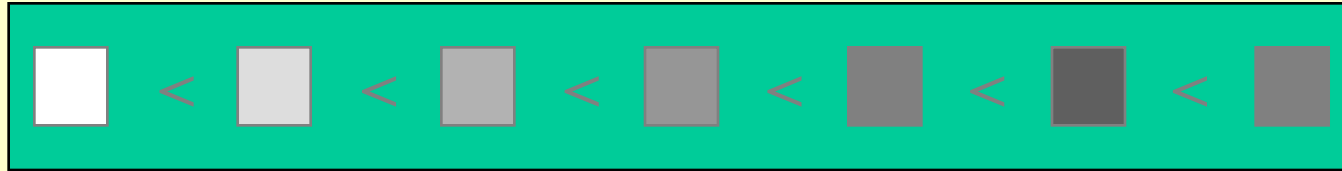


✓ associative



≠ quantitative

✓ order

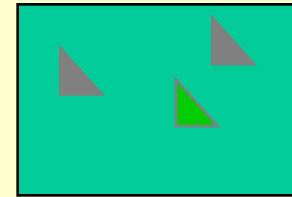
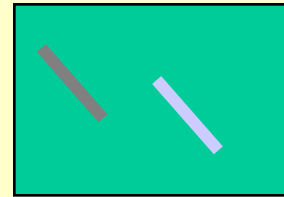
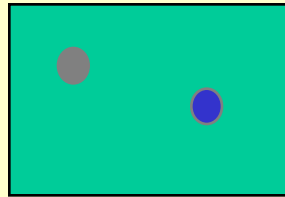


✓ length

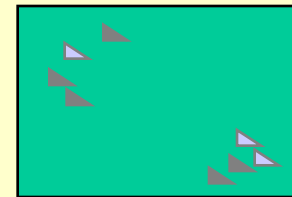
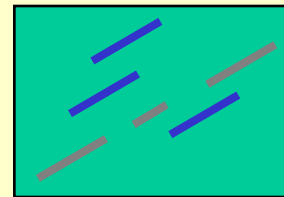
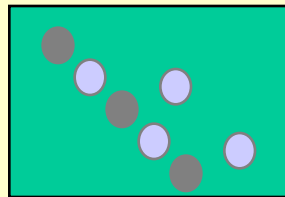
- theoretically infinite but practically limited
- association and selection $\sim < 7$ and distinction ~ 10

Color

✓ selective

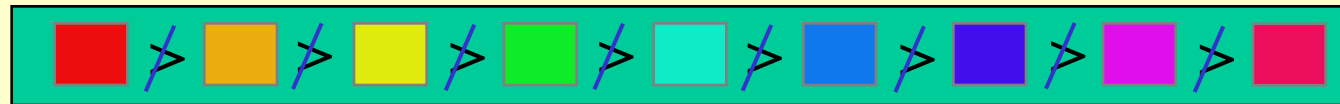


✓ associative



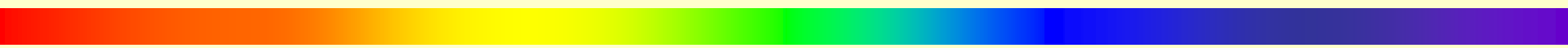
≠ quantitative

≠ order

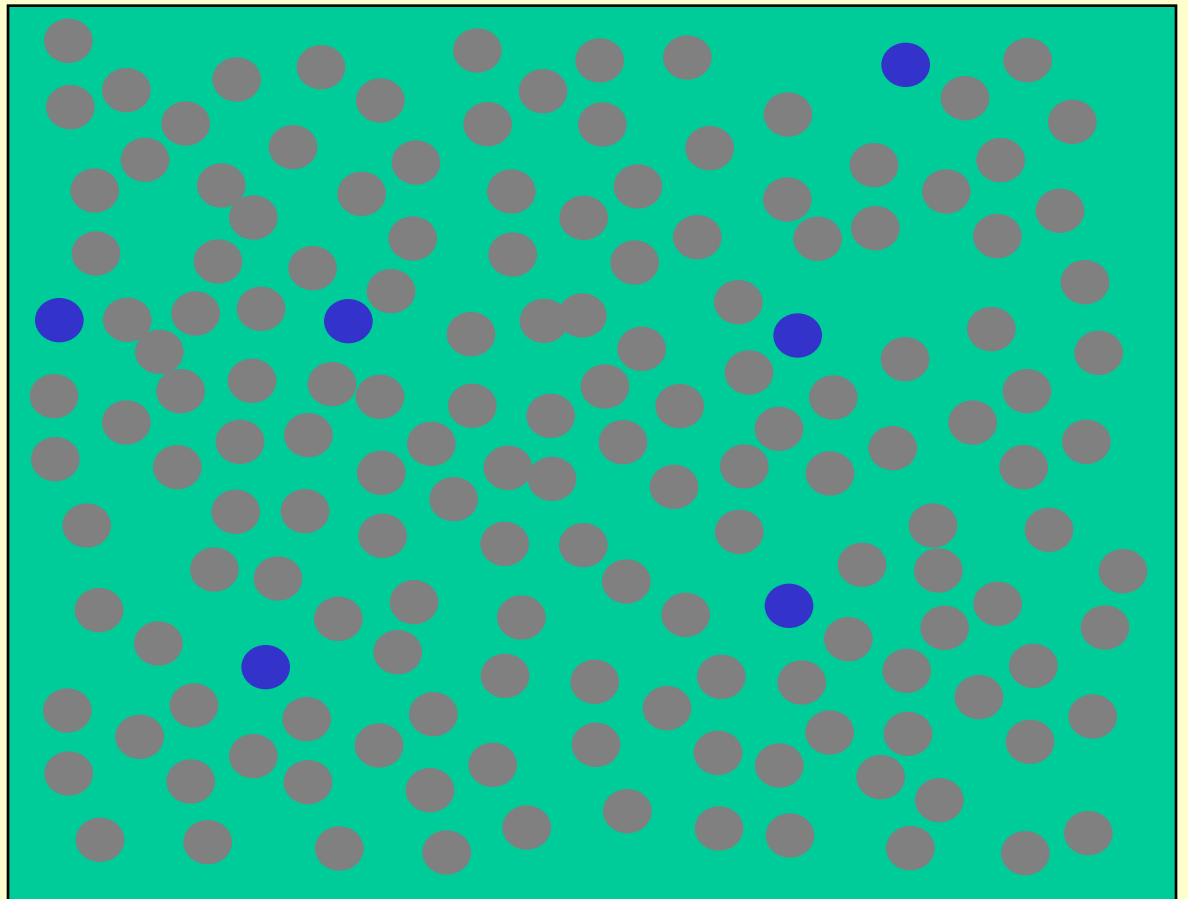


✓ length

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



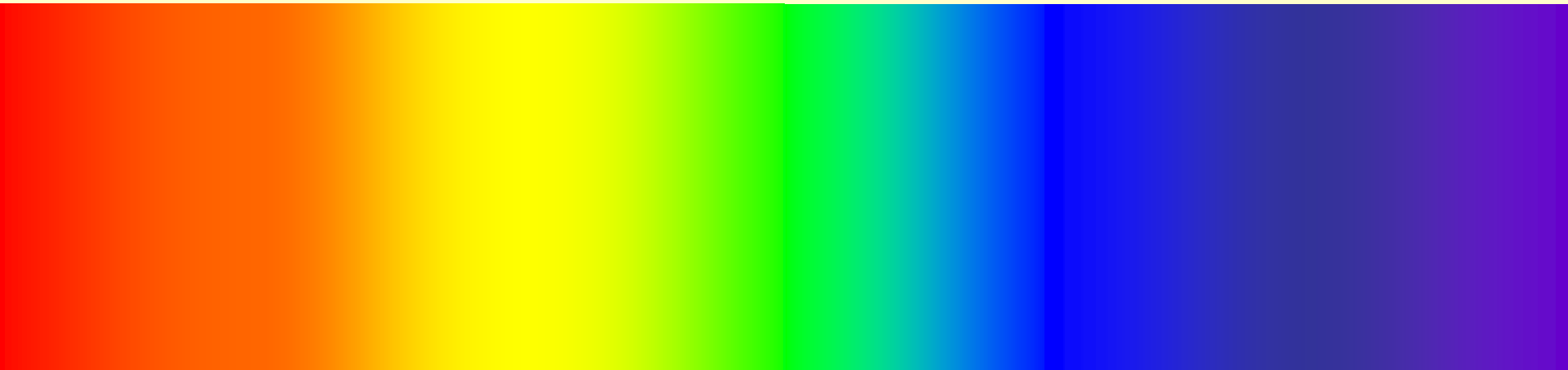
Color

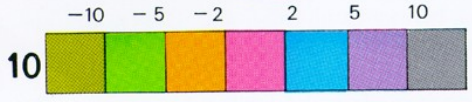
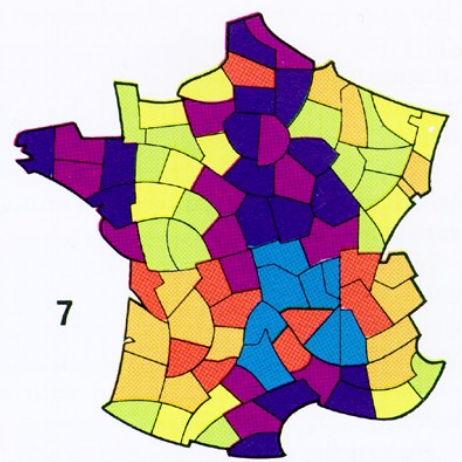
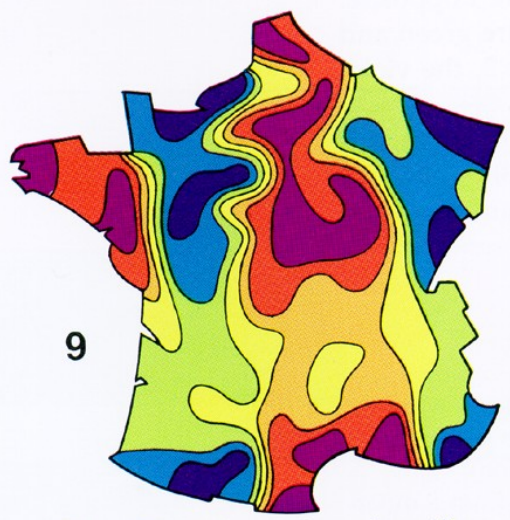
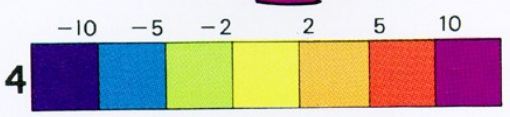
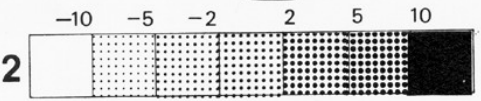
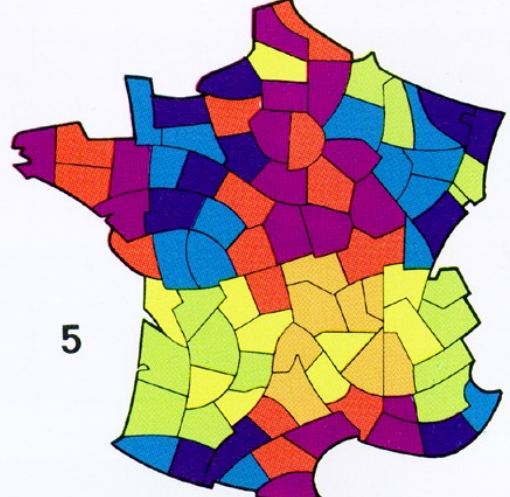
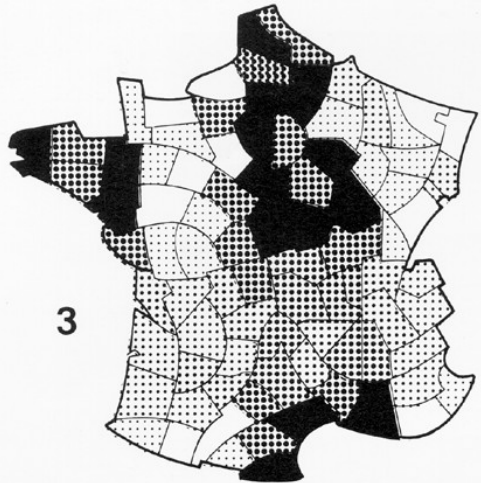


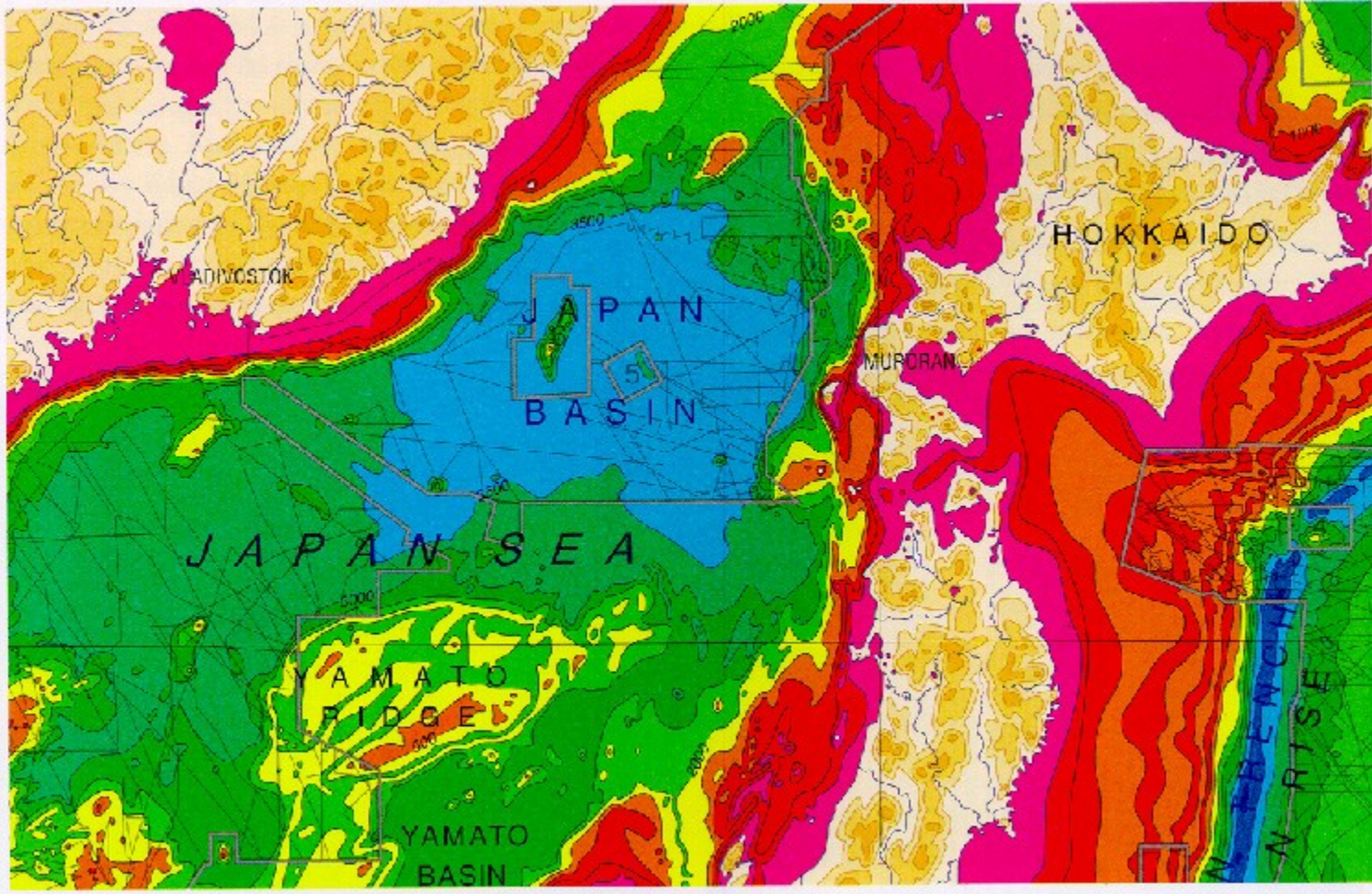
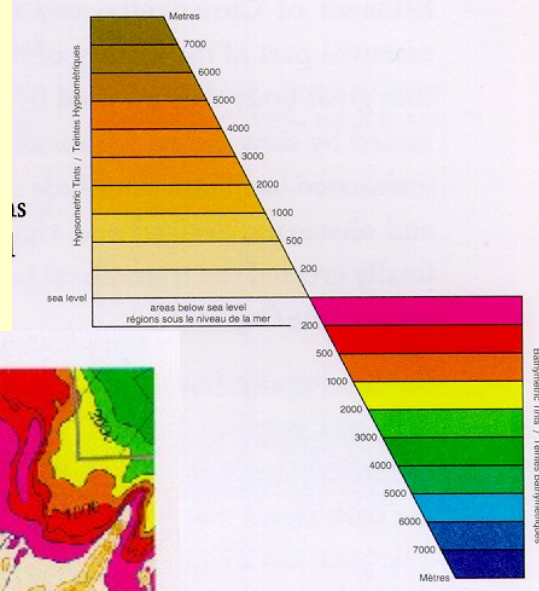
Encoding color

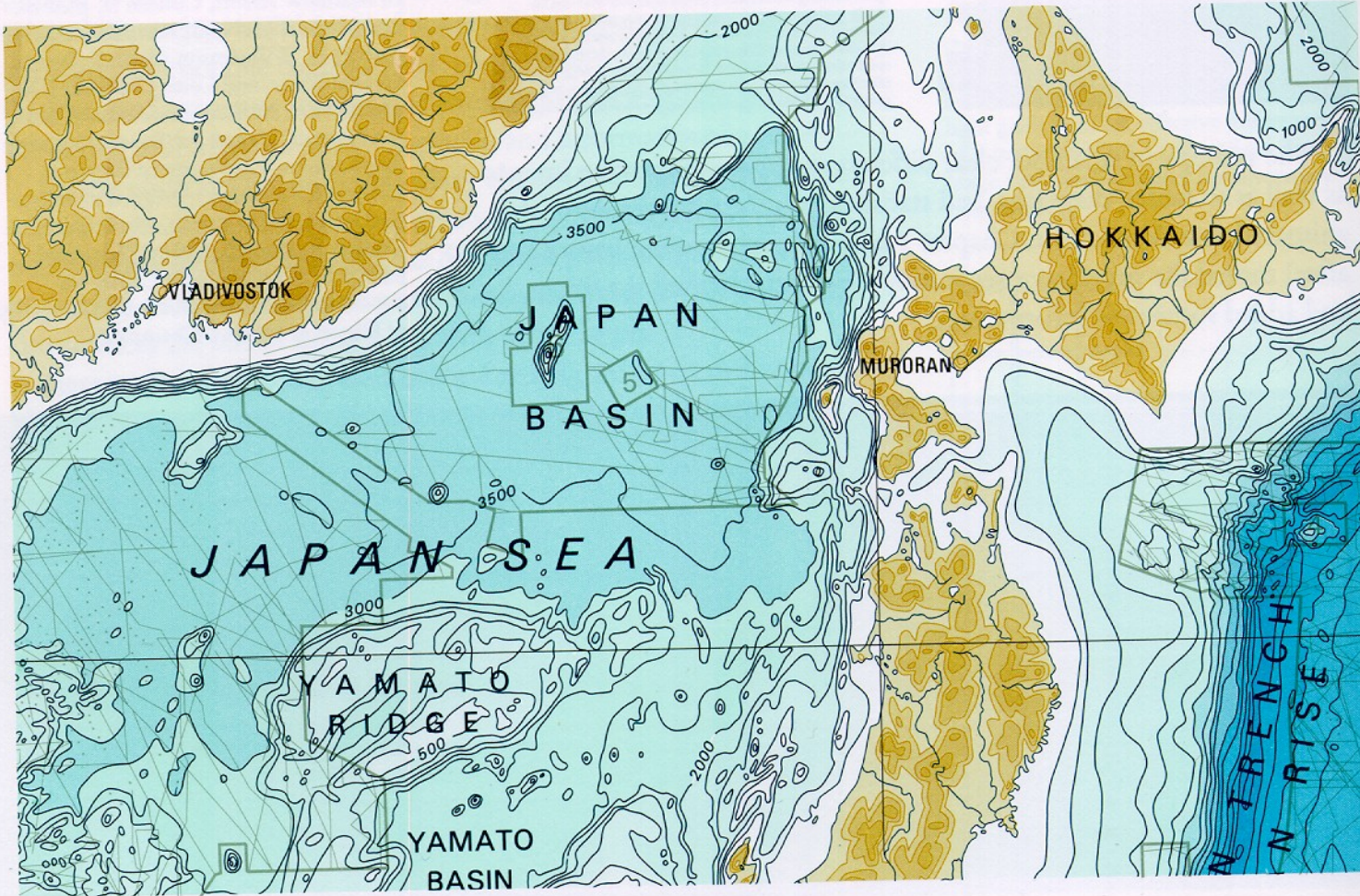
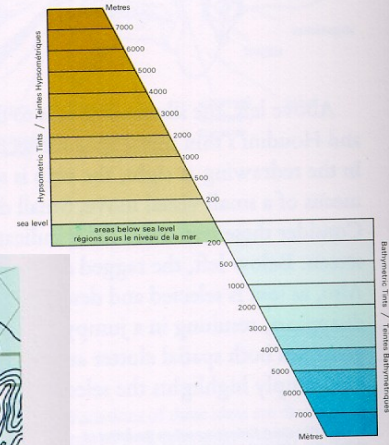
Common advice says use a rainbow scale

- Marcus, Murch, Healey
- problems with rainbows







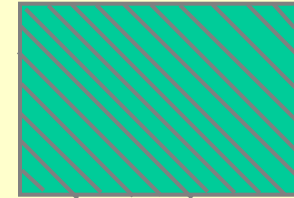
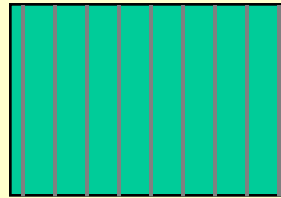
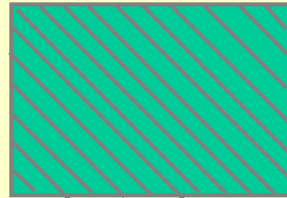


Orientation

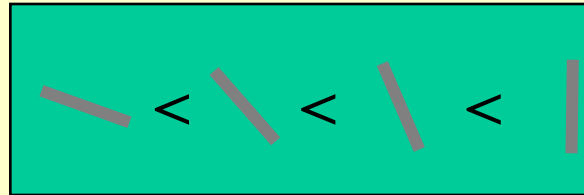
✓ selective



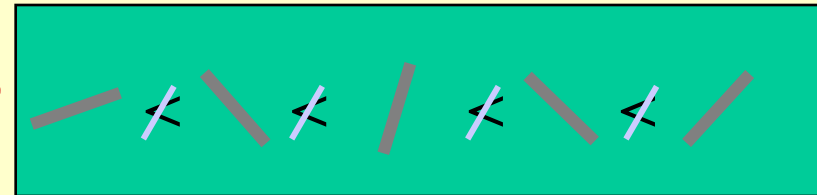
✓ associative



≠ quantitative



?



≠ order

✓ length

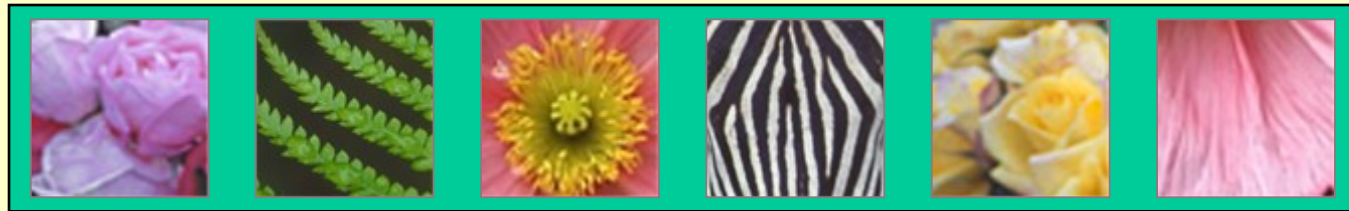
- ~5 in 2D; ? in 3D

Texture

✓ selective



✓ associative



≠ quantitative

≠ order



✓ length

- theoretically infinite

Motion

✓ selective

- motion is one of our most powerful attention grabbers

✓ associative

- moving in unison groups objects effectively

≠ quantitative

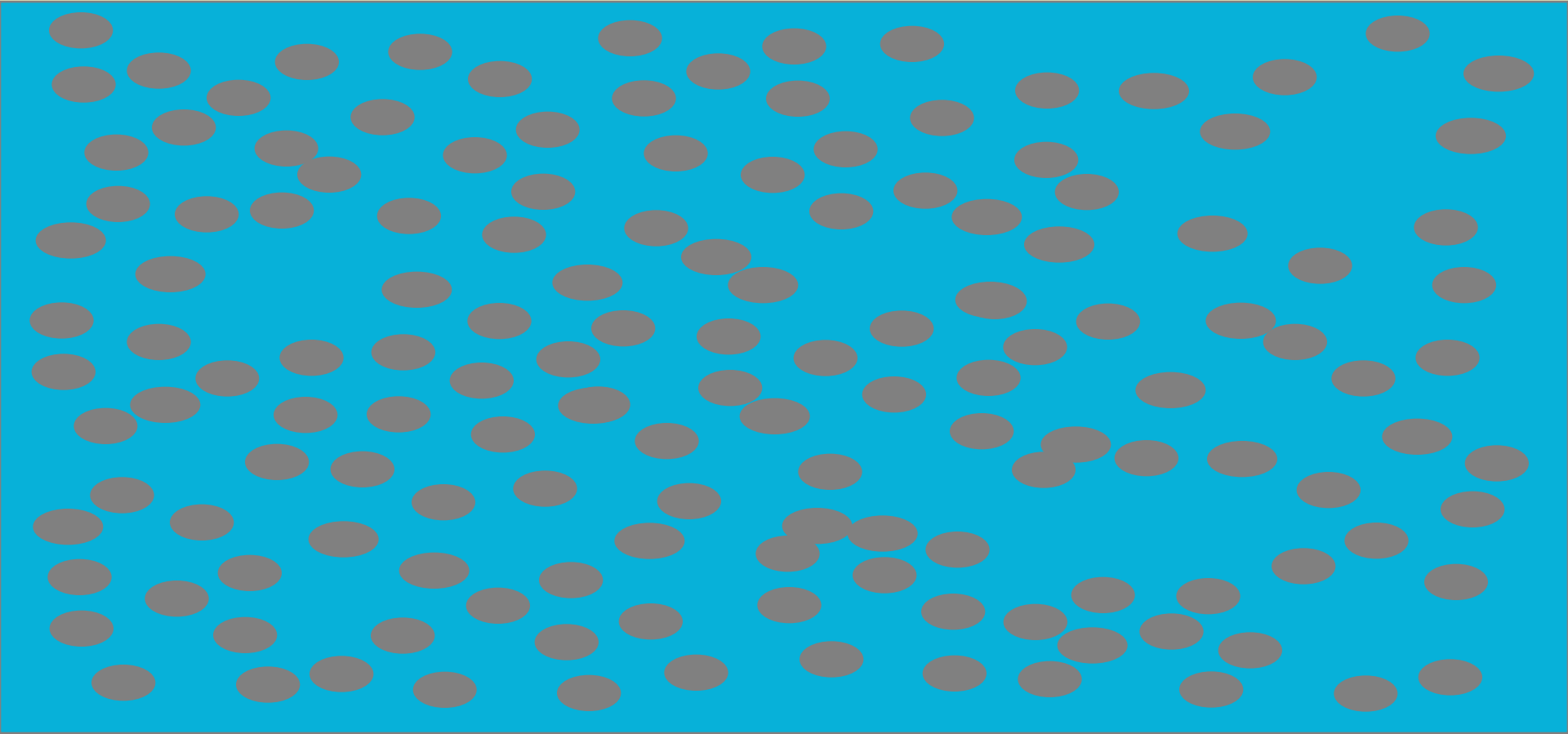
- subjective perception

≠ order

? length

- distinguishable types of motion?

Motion



What you know now

Attributes of visual variables

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

Characteristics of visual variables

- selective
- associative
- quantitative
- order
- length