




# Mapping

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# Mapping Quantitative Values

- Position
- Length
- Angle/Slope
- Area
- Volume
- Color/Density

less effective and less accurate  
in terms of geometric representation

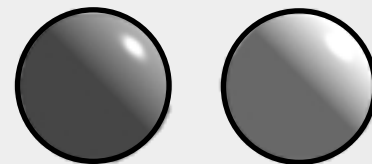
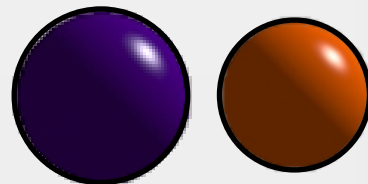
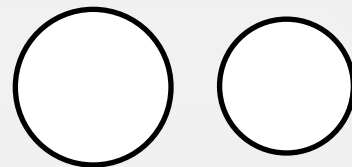


CLEVELAND, W. S., AND MCGILL, R. Graphical perception: Theory, experimentation and application to the development of graphical methods. Journal of the American Statistical Association, 79(387) 1984

# Mapping Quantitative Values

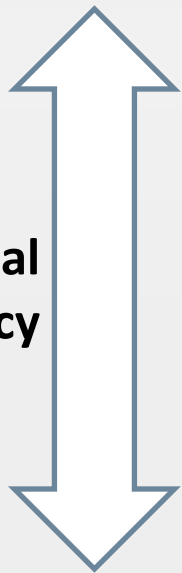


- Position
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# Mapping Quantitative Values

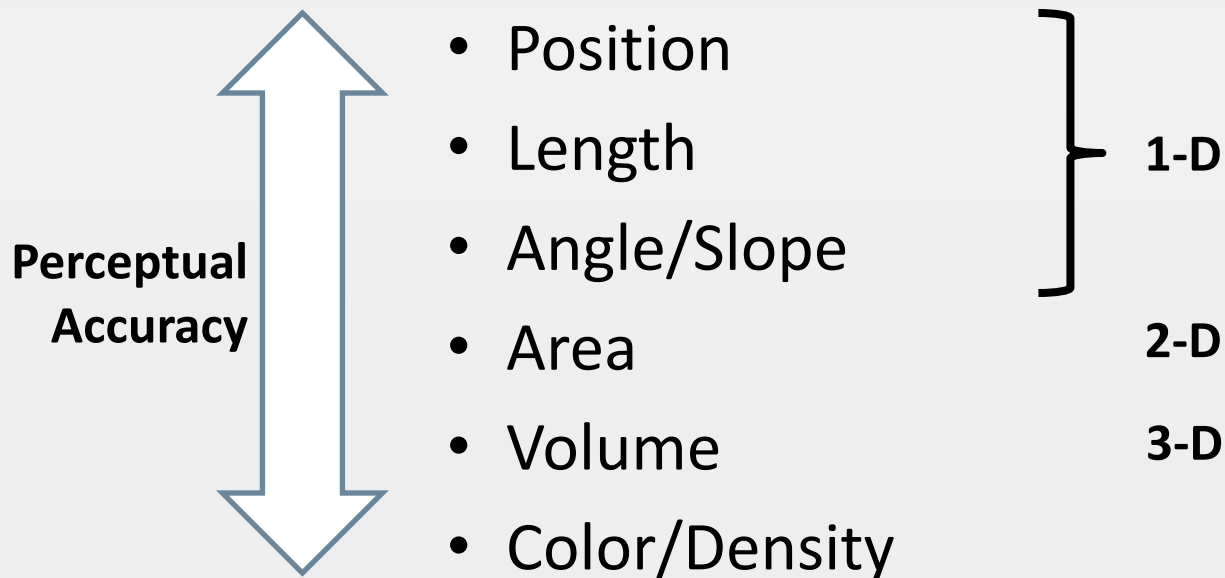
**Perceptual  
Accuracy**



- Position
- Length
- Angle/Slope
- Area
- Volume
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# Mapping Quantitative Values



CLEVELAND, W. S., AND MCGILL, R. Graphical perception: Theory, experimentation and application to the development of graphical methods. Journal of the American Statistical Association, 79(387) 1984

## Quantitative

Position

Length

Angle

Slope

Area

Volume

Density

Saturation

Hue

## Quantitative

Position

Length

Angle

Slope

Area

Volume

Density

Saturation

Hue

## Ordinal

## Quantitative

Position

Length

Angle

Slope

Area

Volume

Density

Saturation

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## Quantitative

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## Quantitative

Position

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Volume

Density

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Hue

## Ordinal

Position

Density

Saturation

Hue

Length

Angle

Slope

Area

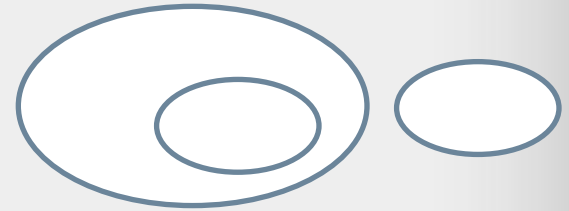
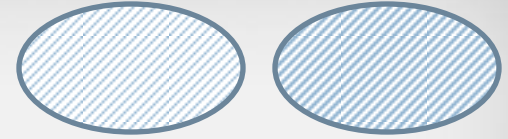
Volume

## Quantitative

Position  
Length  
Angle  
Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
**Texture**  
**Connection**  
**Containment**  
Length  
Angle  
Slope  
Area  
Volume



## Quantitative

Position  
Length  
Angle  
Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
Texture  
Connection  
Containment  
Length  
Angle  
Slope  
Area  
Volume

## Nominal not comparable

## Quantitative

Position  
Length  
Angle  
Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
Texture  
Connection  
Containment  
Length  
Angle  
Slope  
Area  
Volume

## Nominal



## Quantitative

Position  
Length  
Angle  
Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
Texture  
Connection  
Containment  
Length  
Angle  
Slope  
Area  
Volume

## Nominal

Position

## Quantitative

Position  
Length  
Angle  
Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
Texture  
Connection  
Containment  
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Area  
Volume

## Nominal

Position

## Quantitative

Position  
Length  
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Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
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Volume

## Nominal

Position  
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Texture  
Connection  
Containment  
Density  
Saturation

## Quantitative

Position  
Length  
Angle  
Slope  
Area  
Volume  
Density  
Saturation  
Hue

## Ordinal

Position  
Density  
Saturation  
Hue  
Texture  
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Volume

## Nominal

Position  
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Texture  
Connection  
Containment  
Density  
Saturation

## Quantitative

Position  
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Density  
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## Ordinal

Position  
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## Nominal

Position  
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Containment  
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## Quantitative

Position  
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## Ordinal

Position  
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Volume

## Nominal

Position  
Hue  
Texture  
Connection  
Containment  
Density  
Saturation  
Shape  
Length  
Angle  
Slope  
Area  
Volume