Perception and Cognition (Note by Sean Jung)

Pre-attentive processing attributes

Visual representations facilitate cognitive processing

Some representations are notably better than others ...

Understanding without training	Resistance to alternative 'conclusions'	Cross culture validity	Immediacy (hard wired)

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Visual Perception (I.e. Spatial)

Spatial representations are 'hard wired' in our brains. Spatial representations are notably better than others ...	Human assumptions of information are based on spatial relationships. Spatial relationships are universal.	Visual working memory is limited to spatial relationships.

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Visual Representation

Gestalt Principles

1. Gestalt Principles of Perception

1. Figure-Ground Principle: people instinctively perceive objects as either being in the Foreground or in the Background.

2. Principle of Proximity: We perceive objects close together as belonging to a group.

3. Principle of Similarity: We tend to group together objects that are similar.

4. Principle of Enclosure: We perceive objects as belonging together when they are enclosed in a boundary.

5. Principle of Closure: We are drawn to complete incomplete shapes.

6. Principle of Continuity: We tend to interpret lines in the most simple way, or in the direction they were flowing before.

7. Principle of Connectedness: We perceive objects that are connected (e.g. by a line) as a part of the same group.

Attention is Drawn to:

Controls	Similarity
Focused Attention:	
Pattern Contrast	Color	Position	Motion

Pre-attentive processing

Pre-attentive attributes

Category	Attribute
Form	Length Width Orientation Size Shape Added Marks Enclosure
Color	Hue Intensity
Position	2-D position Motion

Pre-attentive attributes are those that are processed by the human visual system in a parallel, high speed, manner. Pre-attentive processing is a form of "preconscious" perception. There are four pre-attentive attributes.

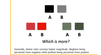
Form

Use Form to highlight differences

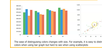
Spatial Form: Different Form, shape and size of the attributes are used to convey the differences in data points

Color

Choosing different hue (color) to convey the different data point. Intensity is opposite of saturation. Hue is the color, Intensity is how dark or light it is.



Intensity: Sender color conveys higher magnitude. Negative Intensity (red) conveys negative and positive (blue) conveys positive.



The value of changing hues (colors) changes with size. For example, it is easier to distinguish each colors when spread out than had to be very close using qualitatives.

Good example of using sense hue and different intensity to convey the magnitude of data points in the 3D.

Color is also effective for highlighting differences with meaning

Nominal: Nominal, categorical labels — Color, Texture, Hue

Binary: Two states — Positive/ Negative

It is a good attribute to use for colors that represent two states, such as positive and negative and other binary categories.

Ordinal: Categories with ordering — Color, Texture, Hue, Saturation, Hue, Value, Texture, Size, Orientation, Shape, Hue, Value, Texture, Size, Orientation, Shape, Hue, Value, Texture, Size, Orientation, Shape