Top-Down Processing

Top versus Bottom

Word Superiority Effect

Sentence Superiority Effect

Phoneme Restoration Effect

Warren & Warren (1970)

The state governors met with their respective legislatures convening in the capital city.
Facial Features & Context

• Attention used to bind features together
• Code 1 object at a time based on location
• Bind together whatever features are attended at that location

FIT: Details
• Sensory “features” (color, size, orientation etc) coded in parallel by specialized modules
• Modules form two kinds of “maps”
  – Feature maps
    • Color maps, Orientation maps, etc.
  – Master map of locations

Feature Maps
• Contain 2 kinds of info
  – Presence of a feature anywhere in the field
    • There’s something red out there...
  – Implicit spatial info about the feature
• Activity in feature maps can tell us what’s out there
• Can’t tell us:
  – Where it is located
  – What other features the red thing has
Master Map of Locations
• Codes where features are located, but not which features are located where

More FIT Details
• Need some way of:
  – Locating features
  – Binding appropriate features together
• [Enter Focal Attention]

Role Attention in FIT
• Attention moves within the location map
• Selects whatever features are linked to that location
• Features of other objects are excluded
• Attended features are then entered into the current temporary object representation

Feature Integration Theory
• Distinction btw objects and features
• Pre-attentional, parallel processing of features
• Serial process of feature integration
• Focused attention is “glue”

Evidence for FIT
• Visual Search Tasks
• Illusory Conjunctions

Feature Search: Find red dot
Pop-Out Effect

- In a visual search task, the pop-out effect is the finding that a feature search task (searching for an item that differs from its distracters by a single feature) takes the same amount of time regardless of the number of distracters.
- Called the pop-out effect because the target seems to pop out of the array.

Conjunction Search

1 Distractor

12 Distractors

29 Distractors
Feature Search

- Is there a red T in the display?
- Target defined by a single feature
- According to FIT this should not demand attention
- Target should "pop out"

Conjunction Search

- Is there a red T in the display?
- Target defined by shape and color
- Target detection involves binding features, so demands attention
- Serial search w/focal attention

Visual Search Experiments

- Record time taken to determine whether target is present
- Vary the number of distracters
- FIT predicts that
  - Feature search should be independent of the number of distracters
  - Conjunction search should get slower w/ more distracters

Typical Findings

- Feature Targets pop out
  - Flat display size function
- Conjunction Targets demand serial search
  - Non-zero slope

Illusory Conjunctions

- Without focused attention features should be combined at random
  - Illusory Conjunctions
Treisman & Schmidt (1982)

- Two responses required on each trial
  - Report black digits
  - Report color of letters
- Subs sometimes recombine features (~30% of trials)
  - E.g. report seeing a green T or a red O