Everyday Environment

- "Seeing the world around you is like drinking from a firehose. The flood of information that enters the eyes could easily overwhelm the capacity of the visual system." (Kanwisher & Downing, 1998)
- many stimuli in our environment that we are not aware of

Overt Orienting (Response)

- adjusting the sense organ to optimally pick up information about the event
- observable response by external observer

Covert Orienting

- enhanced processing of the event by fixing our attention on it
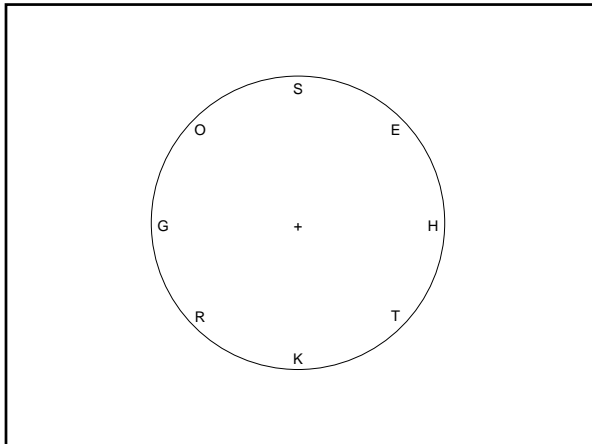- not directly observable
- Helmholtz

```
        S
   O         E


G       +        H


   R         T
        K
```

Automatic Orienting

- unpredictable occurences automatically capture our attention
  – sudden visual onset/offset
  – sudden loud noise
  – sudden movement

Distribution of Attention

- attentional gaze (mind's eye)
  – spotlight
    • locus
    • extent
    • detail set

Filtering

- often focus our attention on a stimulus while excluding all others
- cocktail party phenomenon
- dichotic listening task

Filtering

- anything that makes the stimulus stand out from the rest will improve filtering
  - auditory domain
    - different frequencies
    - different spatial locations
    - different speeds
    - different language
    - different message meaning

Corteen & Wood (1972)

- Present list of words with some city names
  - city names were followed by a small shock
- dichotic listening task
  - unattended – words + city names
  - attended – unrelated words
- > GSR to city names (old & new)

Searching

- successively redeploying attention in an attempt to find a target
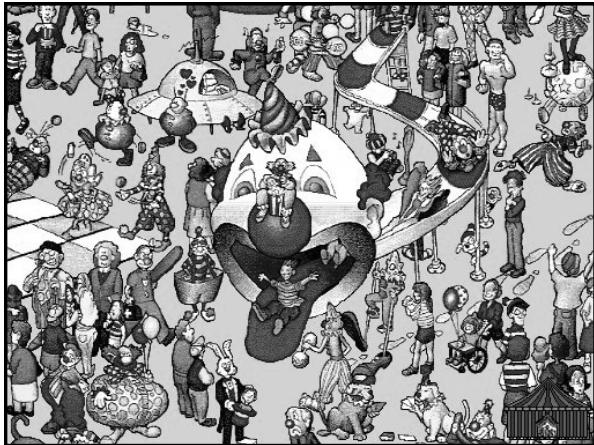
Inhibition Of Return

cued   opposite

cued RT > opposite RT

Searching

- feature search – targets and distractors differ on the basis of a single feature
  - pop out – parallel search
- conjunction search – targets and distractors differ on the basis of a particular combination of features
  - serial search

Searching

- sudden onset of a stimulus captures attention
  - pop out
- if entire display or multiple stimuli have same property then serial search
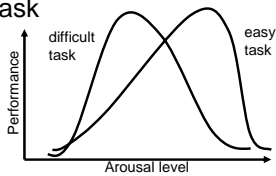
Yerkes-Dodson Law

- performance on a task is related to arousal level
- inverted U-shaped function
- optimal arousal depends on difficulty of task

Preparing

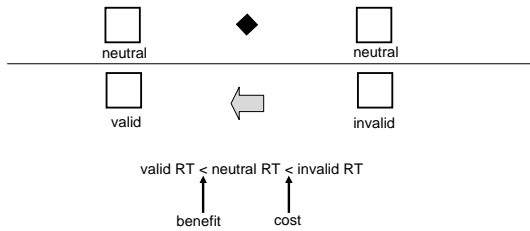- using knowledge or context to generate an expectancy about the stimulus

□	◆	□
neutral		neutral
□	⇦	□
valid		invalid

valid RT < neutral RT < invalid RT

benefit   cost

Bottleneck Theories of Attention

- Broadbent(1958) – early selection
  - only notice low-level sensory details of unattended channel
- Moray (1959) – name
- Treisman (1960) – message switching
- Deutsch & Deutsch (1963) – late selection
  - all information is processed fairly deeply

Resource Theories of Attention

- attention has a pool of resources
- resources are allocated in priority sequence
- more difficult primary stimulus processing, less processing of other stimuli

Processing & Attentional Resources

- Automatic versus Controlled
- Examples
  - learning to drive
  - typing
  - sports

Summary

- We process our environment by deploying (orienting) our attention to a particular part of the environment.
- We then selectively process the information from that part of the environment by filtering out the rest of the environment.
- If the information that we require to perform our task is not present in that location we then redeploy our attention to search for the part of the environment that does have the information.
- Knowledge and contextual information is taken into account to generate expectations that are used to prepare our deployments of attention.