*KRCP Lecture 4*

*Attention*

**Kinds of Attention**

* **Voluntary** (controlled) or **Reflexive** (automatic)
* **Overt** (direction of attention visible from outside) or **cover** (not)
* **Feature-based** (to feature), **spatial** (location) or **object-based** (object)

**Functions of Attention**

* **Vigilance** (signal detection)
* **Search**: Actively looking for a signal
* **Selective Attention**: Actively focus on some information and ignoring other
* **Divided Attention**: Shift attention between multiple tasks

**Signal detection theory**

|  |  |  |
| --- | --- | --- |
| Signal | Detect a Signal | Do not detect a Signal |
| Present | *Hit* | *Miss* |
| Absent | *False alarm* | *Correct rejection* |

* **Sensitivity**: many hits, few false alarms
* **Specificity**: few misses, many correct rejections

**Search**

* **Targets** and **Distracters**
* **Array size effect**: the larger the array the more difficult
* **Feature (pop-out) search** (targets and distractors are maximally different 🡪 parallel process) and **conjunction search** (targets and distractors share similarities)
* **Feature integration theory** (Treisman): object perception differs from object recognition and features are “registered early, automatically and in parallel, while object are identified separately”
* **Similarity theory**: People are attracted by similar people
* **Guided search theory**: we first process multiple basic features simultaneously across a large field, we then look for one specific element or combination of basic features at a time in a smaller area

**Selective Attention**

* **Cocktail party problem**: many people are talking, listening to one
* **Dichotic listening task**: present 2 different messages to each ear, “shadow” one message 🡪 other messages receives little processing
* **Posner Cuing Task/Endogenous Cuing**: arrow showing where to focus, then object, 3 different trials: valid, invalid or neutral trials; Reaction times for expected locations are a lot faster than for unexpected or neutral locations
* **Early Filtering** (Broadbent): Sensory Register, Filter, Perceptual process, STM (Short Term Memory)
* **Late Filtering** (Deutsch and Deutsch): Sensory Register, Perceptual process, Filter, STM
* **Attenuation Theory** (Treisman): Sensory Register, Perceptual process interacting with Filter Modulates, STM

**Anatomy of Attention**

* **Cortex**: 2 areas: **Posterior parietal lobe** of the cortex (orienting visual attention and shifting it from one location to another) and **right frontal cortex** (maintaining alertness)
* **Dorsal frontoparietal network**: goal directed control of spatial attention; Superior dorsal parietal and frontal lobe
* **Ventral frontoparietal network**: stimulus driven control; Inferior ventral parietal and frontal cortex (lateralized to the right)

**Automatic and Controlled Processes**

* **Automatic Processes**: require no attention or conscious control, can perform multiple at once
* **Controlled Processes**: require attention or conscious control, can only perform one at a time
* **Automatization**: controlled processes becoming automatic
* **Practice effects**: rate of learning slows
* **Stroop effect**: demonstration of interference in the reaction time of a task