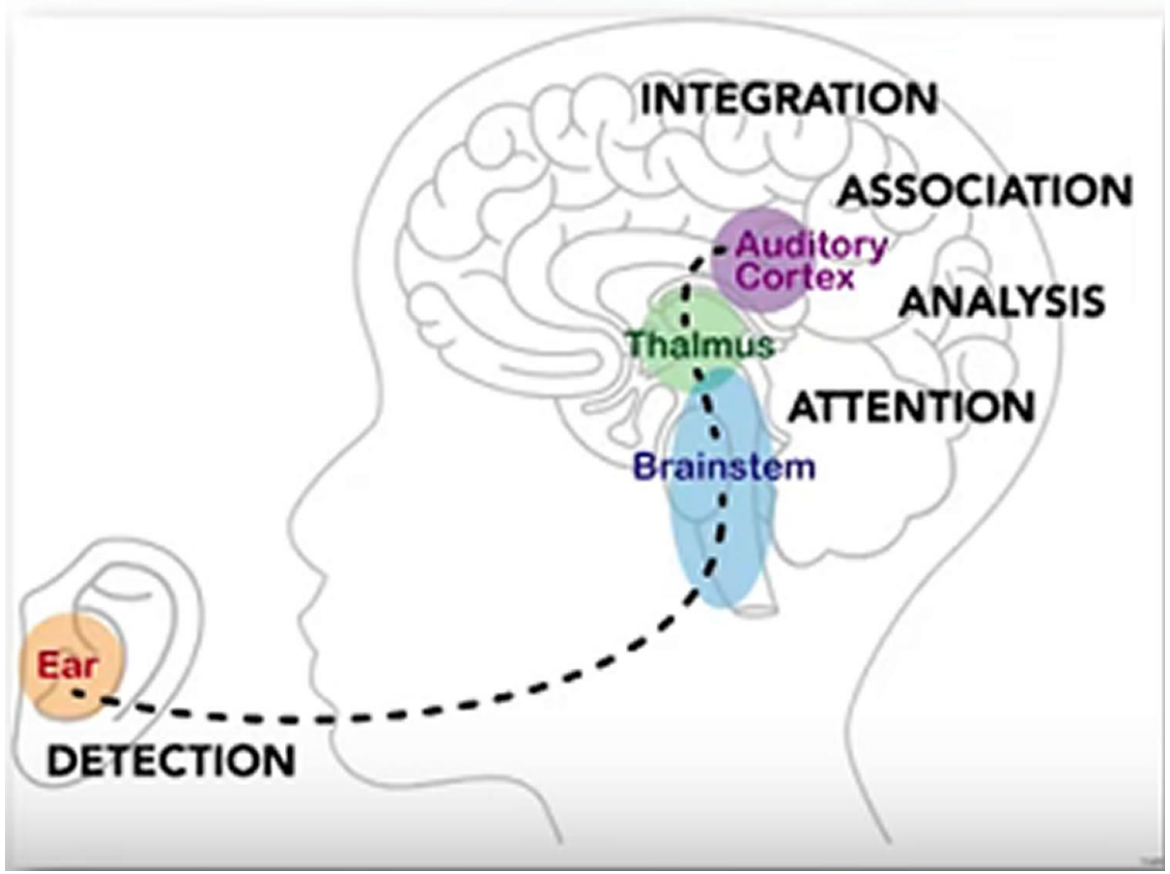
Usability Engineering

Session 4

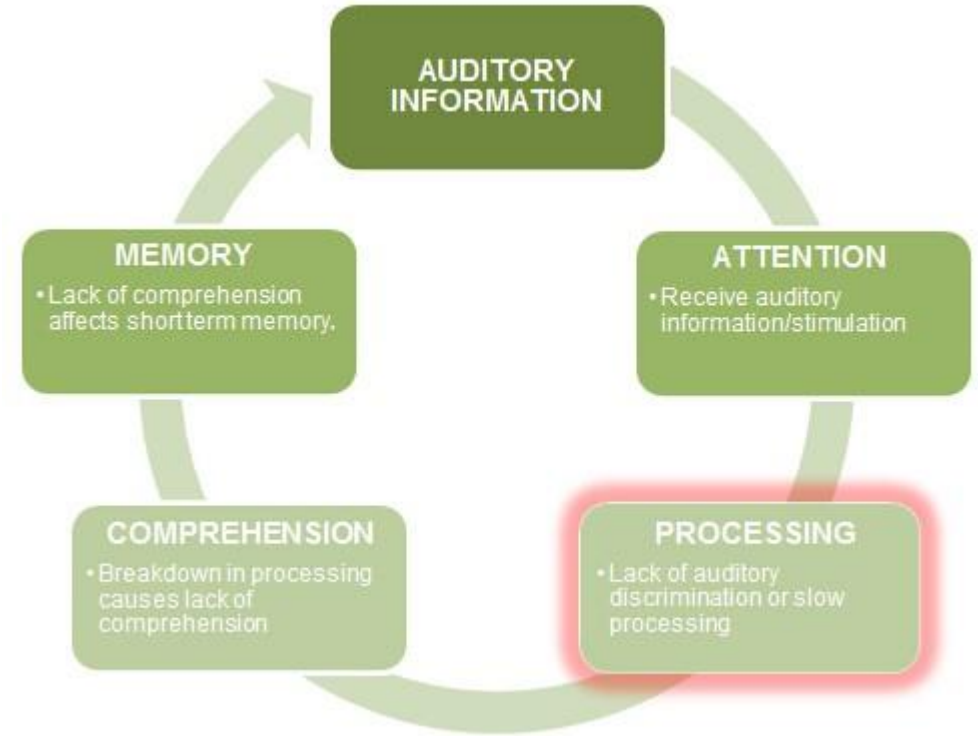
Agenda

- Session 5 Topics
- Questions from Session 4?
- Objectives of Session 5
  - Auditory, Tactual, and Olfactory Displays
  - Motor Skills
- Remote Control New Design and Support

Auditory, Tactual, and Olfactory Displays


INTEGRATION
ASSOCIATION
Auditory Cortex
ANALYSIS
Thalmus
ATTENTION
Brainstem
Ear
DETECTION

Auditory Processing



When to use auditory displays

- The origin of the signal is a sound
- The message is simple and short
- The message will not be referred to later
- Immediate action is required
- The information is continuously changing
- Visual system is overloaded/overburdened
- Illumination limits the use of vision
- A verbal response is required

Note:Table 6-2 describes the different types of audio alarms and when to use

Tactual(Tactile) Processing

- Can be used as a substitute for auditory signals:
  - Reception of coded messages, e.g., mechanical vibration
  - Perception of speech, e.g., using skin, tactile
  - Localization of sound, e.g., localization of sound through vibration to one ear at a time
- Can be used as a substitute for seeing
  - Identification of controls, e.g., the design of control knobs, buttons, etc.
  - Reading printed material, e.g., Braille
- Tracking task Displays that combine visual with tactile get better performance than using just the visual sense.

Olfactory Displays

- Use our sense of smell to determine a response
- No widespread implementation
- The most significant is when an odor is added to an odorless dangerous substance: e.g. natural gas.

Motor Skills

Biomechanics of Human Motion

- Biomechanics deals with the various aspects of physical movements of the body.
  - Kinesiology is the study of human motion as it relates to the construction of the sketal muscular system
- Types of Body Movements
  - Flexion: decrease in the angle of the joint
  - Extension: increase in the angle of the joint
  - Abduction: movement away from the body
  - Adduction: movement toward the body
  - Rotation : movement of turning a body segment
  - Circumduction: rotating a body segment

Using Motion to Respond : Simple Reaction Time

- Simple Reaction Time (RT): the time it takes to initiate a response when only one particular stimulus can occur and the same response is always required
  - Typical reaction time is between 150ms and 200ms.
- What effects Simple RT?
  - Stimulus modality
  - Stimulus detectability
  - Spatial frequency
  - Preparedness/Expectancy of a signal
  - Age
  - Stimulus location

Choice Reaction Time

- Choice Reaction time is the time it takes to respond to a stimulus when more than one stimulus is presented and each stimulus requires a different response.
- What effects Choice (RT)
  - Compatiability between stimuli and response
  - Practice
  - Warning
  - Type of movement
  - More than one stimulus is presented,e.g., the second response is presented prior to the first.

Remote control redesign

Next Steps