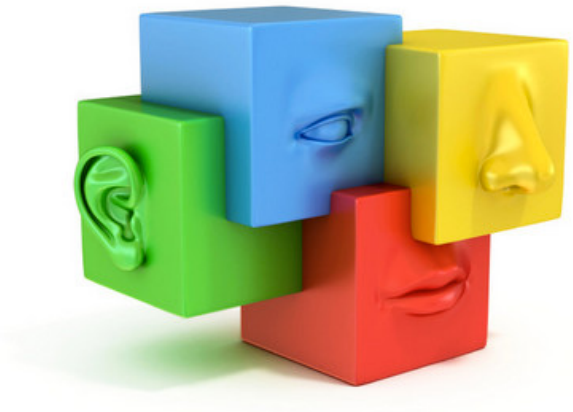
AP Psychology

3.4 – The Other Senses

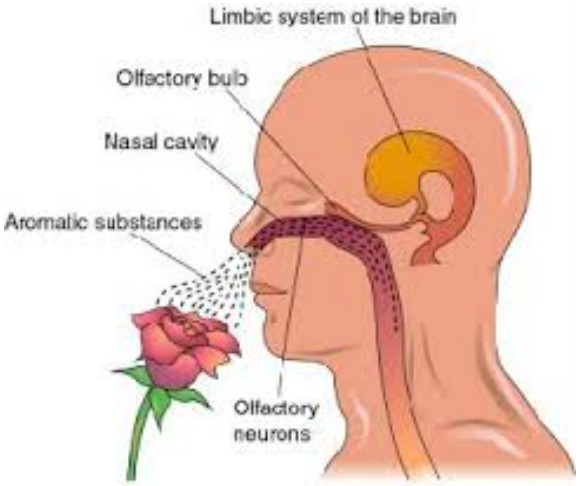
Sensation & Perception

- **The Chemical Senses**
  - Smell and taste are sometimes referred to as the chemical senses
    - Respond to chemical molecules rather than to forms of energy such as light and sound waves
  - These receptors are located near each other and often interact
    - As a result, we often have difficulty separating the two sensations



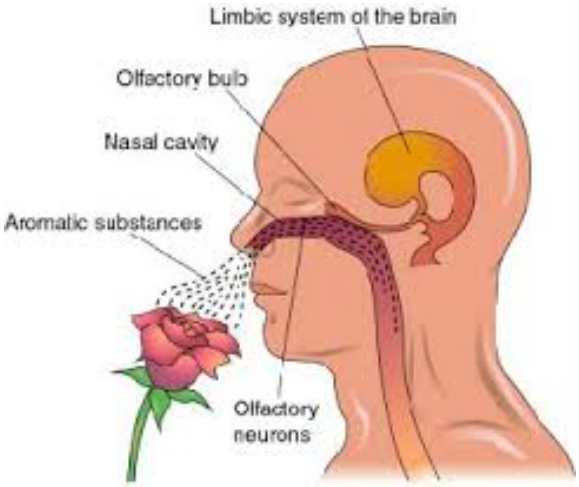
Sensation & Perception

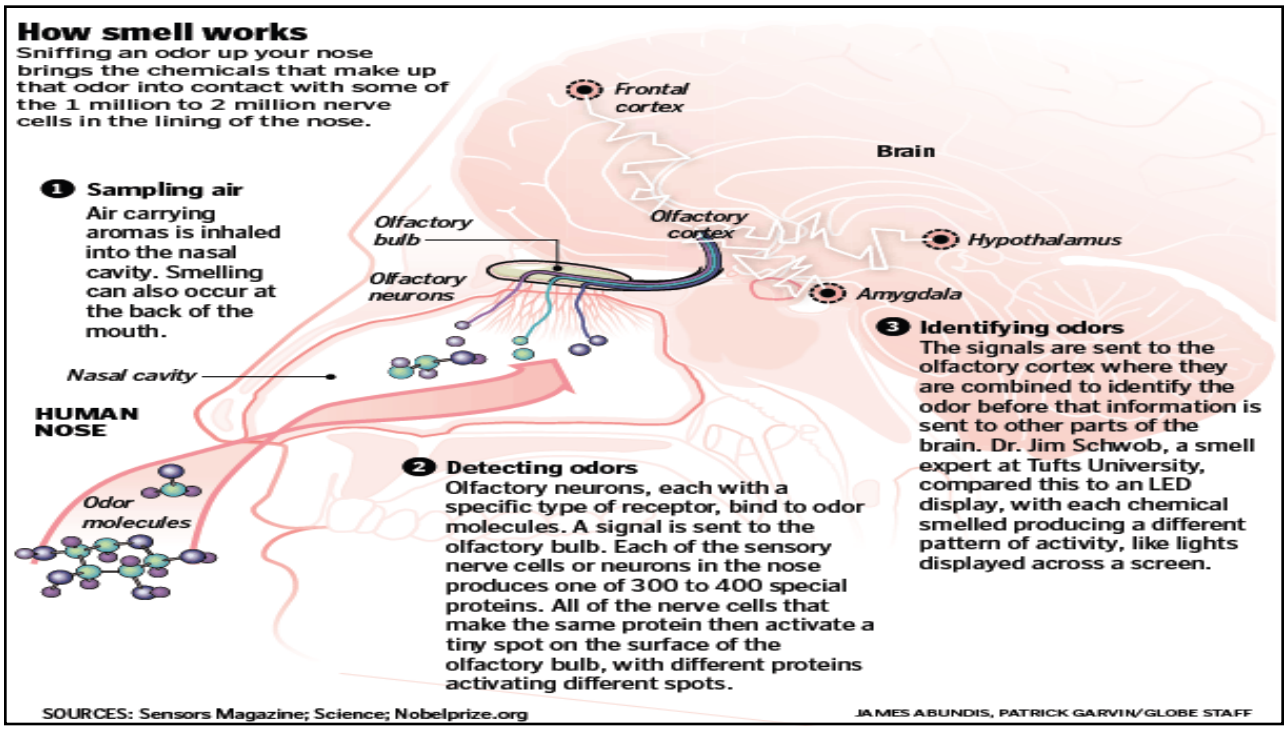
- **Smell/Olfaction**
  - The mucous membrane at the top of each nostril contains receptor cells that absorb airborne chemical molecules
    - Olfactory receptors can detect over 10,000 distinct smells
    - Can help us detect odors ranging from fragrant flowers to dangerous leaking gas
  - Receptor cells communicate neural messages to the olfactory bulb



Sensation & Perception

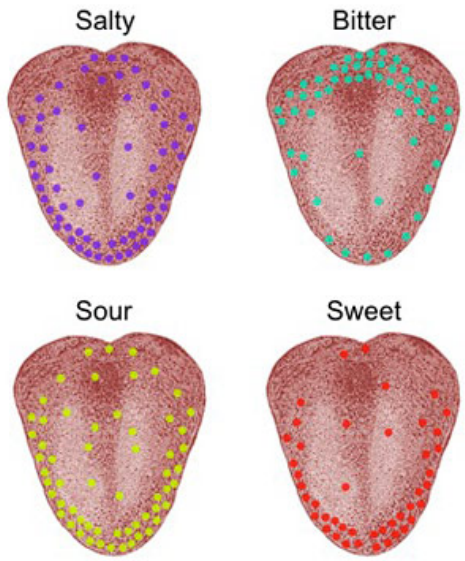
- **Smell/Olfaction**
  - Important Note: Unlike all other bodily sensations, impulses from the olfactory bulb do not go to the thalamus
  - Instead, the nerve fibers from the olfactory bulb connect to the brain at the amygdala and then to the hippocampus
    - This direct connection to these limbic system structures may explain why smell is capable of triggering such vivid memories and emotions





Sensation & Perception

- **Taste/Gustation**
  - Our tongue is covered with bumps called papillae.
  - Papillae are covered with taste buds.
    - Taste buds are also found in the palate at the back of the throat
  - Four major taste sensations:
    - Sweet, Sour, Salty, and Bitter.
  - In recent years, researchers have added "Umami"
    - "Delicious" or "Savory"
    - Umami is associated with the taste of protein found in meats and meat broths



Sensation & Perception

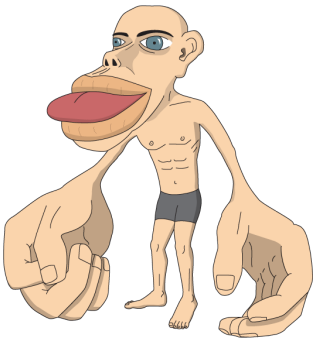
- **Taste/Gustation**
  - Taste is labeled as the least critical of our senses
  - However, it can play an important survival role by helping us avoid eating or drinking harmful substances.
  - On a positive note, taste, along with smell, plays an important role in our enjoyment of everything from savory fruits to delicious desserts!

Sensation & Perception

- **Skin Senses**
  - Skin is our largest and heaviest sense organ.
  - Skin protects our internal organs, holds body fluids, produces sensations of touch, warmth, and cold and provides essential information about pain
- **Body Senses**
  - Body senses provide essential information about your position and orientation in space

Sensation & Perception

- **Skin Senses**
  - **Touch**
    - Touch or pressure receptors are not evenly distributed among the different areas of our bodies.
      - For example, they are more densely concentrated in the hands, face, and lips than on the legs or back.



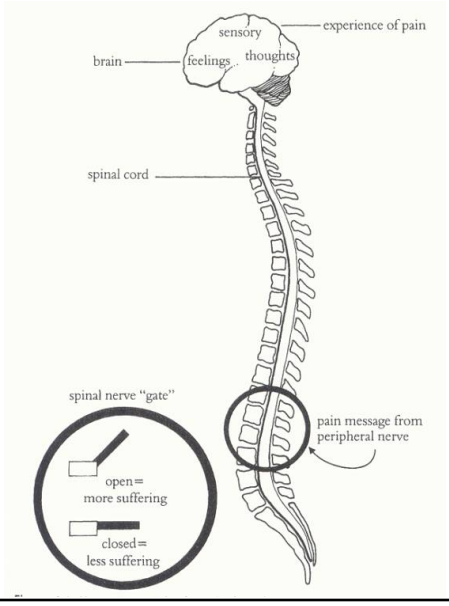
    - Plays a particularly important role in human relationships by helping communicate feelings of support, conformity, and love.

Sensation & Perception

- **Skin Senses**
  - **Pain**
    - The unpleasant sensation of physical discomfort or suffering
  - Pain plays a key survival role by warning about potential or actual injuries

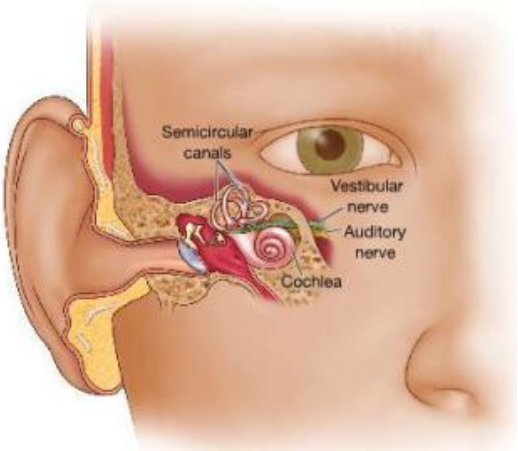
Sensation & Perception

- **Skin Senses**
  - **Gate-Control Theory of Pain**
    - The brain regulates pain by sending signals down the spinal cord that either open or close sensory pathways or "gates"
      - If the brain signals the gates to open, pain is experienced or intensified.
      - If the brain signals the gates to close, pain is reduced.
    - Psychological factors such as anxiety and fear can intensify pain while positive emotions such as laughter can help minimize pain.



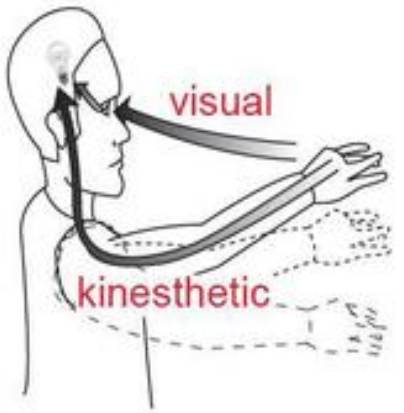
Sensation & Perception

- **Body Senses**
  - **Vestibular Sense**
    - Provides a sense of balance and equilibrium
    - The inner ear contains receptors that are especially important for maintaining balance
      - Semicircular canals are filled with fluid and lined with hair like receptor cells that shift in response to motion
      - Provide the brain with important information about the body's posture and head position



Sensation & Perception

- **Body Senses**
  - **Kinesthetic Sense**
    - Refers to sensing the movement and position of individual body parts relative to each other
    - Sensors in the joints and muscles send signals that coordinate with signals from the skin, eyes, and ears
    - Without kinesthesis, we would need to watch our limbs constantly to coordinate movement



Movement Perception