**Chapter 8 Study Guide: Motion Perception [Jenn's study guide;**[**slides**](https://drive.google.com/open?id=1mPfF0GhKIQ-urQz7V8DJflq0CocayUkLLQWeZ9WkCAk)**]**

**Motion perception: Inferring speed and direction of elements in a scene.**

* Vocab to know:
  + First order motion- The motion of an object can be defined by changes in the illumination.
  + Second order motion- contrast, texture. Observing changes over time using feature tracking.
  + apparent motion- A series of still images played in succession can be perceived as motion. Ex. Movies are that are just a series of image frames. Think of other examples of this.
  + aperture problem- basically each neuron in the visual system is sensitive to specific visual input, its like each neuron is looking through a little slit or aperture. When seen through a slit perceived direction of motion may not match the actual direction of motion because you can’t see the ends of the stimulus. Ex. Barberpole illusion
  + correspondence problem- refers to the problem of determining which parts of one image correspond to which parts of another images, where differences are due to movement of the camera, elapse of time, and/or the movement of objects in the photos. (if objects in a scene are in motion relative to the camera this becomes very difficult). Think of examples.
  + biological motion- the pattern of movement for living beings is very specific. We are very sensitive to subtle cues regarding gender. Men and women move differently. We can determine this motion just be connecting a few small individual stimuli (such as dots). We can use it to identify familiar activities and gestures for social interaction.
  + interocular transfer- the transfer of effects from one eye to another
* Know about motion after effect-
  + a visual illusion experienced after viewing a moving visual stimulus for a certain amount of time, then you look somewhere else at a stationary stimulus such as a wall and it appears to move in the opposite direction as the original moving stimulus. It’s like those illusions where the wall appears to be moving after you stare at a moving screen for 30 seconds.
  + What is the waterfall illusion?
    - The waterfall illusion is an example of the motion after effect. If you look at a waterfall for a minute and then look at the static surrounding, you will perceive motion in the opposite direction, this suggests habituation to motion.
* What is Tau? What does it tell you?
  + Tau is optic flow information (distance, speed, etc) and it can be used to predict impact or “time to collision (TTC). Ex. A baseball being thrown at us, we can predict the time of impact.
* What parts of the brain are responsible for perceiving motion? In individuals who cannot perceive motion, what part of the brain is often damaged?
  + The bilateral cortical area (MT) and MTS are involved in motion (this is called V5 in Europe). People who are not able to perceive motion have a condition called cerebral akinetopsia. This is due to damage in the visual cortex (V1) or the visual area MT (V5).
* What is the comparator? What is its purpose and how does it work?
  + An area of the visual system that received one copy of the order issued by the motor system when the eyes move. It can then compensate for the image changed caused by eye movement.
* How do you use motion information to navigate? Optic array and optic flow?
  + Optic array- view of an object from a specific point of observation has many depth cues such as size, and occlusion.
  + Optic flow- apparent motion on the retina cause by the movement of the observer or scene relative to one another.
* What is the “focus of expansion”? What is its purpose? Why is this important?
  + Focus of expansion: During walking or driving or moving in general, the optic flow field for an observer expands from a singular point. This point is called the focus of expansion. This is important as it provides a cue regarding our heading direction.
* What does Warren’s lab (in the section labeled “using motion information) find in regards to humans estimating their direction of heading?
  + They used computer programs to generate displays of moving dots and lines to simulate optic flow information. They have made progress In understanding it. Humans can estimate their direction of heading to within 1-2 degrees solely on the basis of pattern of optic flow simulated by moving dots. Even when there were only a few dots.
* What is saccadic suppression?
  + The visual scene is blurred during eye movement. We are unaware of visual stimuli that occur while the eye is moving and our perception is based on snapshots when the eye is still.
* Types of eye movements (what they are and when you use them):
  + Saccades- a rapid movement of the eye between fixation points.
  + smooth pursuit- tracking a moving target.
  + Vergence- looking at a near vs. a distant object. The simultaneous movement of the pupils of the eye towards or away from one another during focusing.
  + Microsaccades- small jerk-like involuntary eye movements that are involuntary.
  + Superior colliculus- structure in midbrain that is important in initiating and guiding eye movements.