Episodic Memory
What is episodic memory?

- term “episodic memory” coined in 1972 by Endel Tulving
- ability to recall specific past events about what happened where and when
Context-dependent

- Who?
- What?
- Where?
- When?
Colegrove (1899)

Do you recall where you were when Lincoln was shot?

- 33 years after Lincoln's death
- 179 subjects interviewed
- 71% recalled time of day, location, informant
Flashbulb Memories:
Vivid, detailed memory for surprising, consequential, emotional events

Six characteristic features:
place, ongoing activity, informant, own affect, other affect, and aftermath
How accurate are Flashbulb Memories?

Challenger space shuttle explosion (1986)

Bohannon (1988): less than 35% had detailed memories after 8 months

Neisser (1982): confidence high, accuracy low after 3 years

However...
McCloskey et al. (1988): 89% of the subjects could accurately recall location, activity, source of the news, and their reaction 9 months later for those who rated the event important to them.

Wiley (2003): victims who experienced Marmara earthquake (1999) had more complete, more durable and more consistent memories than those of a comparison group.

emotion, consequences, importance → Flashbulb Memory
Source Monitoring (Johnson et al., 1993)

Processes involved in making attribution about origin of memories, knowledge, & belief

Needed to:

- identify memory as related to self
- differentiate between fact & fantasy
- determine reliable vs unreliable source
- separate actions from intentions
Source Monitoring (Johnson et al., 1993)

- Information used to identify source
  - Internal vs external
  - Various external sources

- Sensory details
  - Imagined < detail than perceived

- Similarity between internal & external

- Ease of encoding
  - More processing $\rightarrow$ internal
Eyewitness Memory (Loftus & Palmer, 1973)

Eyewitness testimony very important in criminal cases

But, how accurate is eyewitness memory?
Eyewitness Memory (Loftus & Palmer, 1973)

Experiment:
• subjects watched traffic accidents
• questionnaire following video
• key question: How fast were cars going when they ______ into each other?
Eyewitness Memory (Loftus & Palmer, 1973)

Results:

- “smashed” → higher speed than bumped, collided, contacted, hit
- “smashed” → more false memory for broken glass 1 week later
Event Perception

interaction of perception and memory

What affects how activity perceived?

How does perception affect memory?
Heider & Simmel (1944)

An Experimental Study of Apparent Behaviour

**Goal:** quantify social interaction
Heider & Simmel (1944)
Heider & Simmel (1944)

Most undergraduates created elaborate stories about the geometric shapes

- social perception like object perception
- biases → errors in attributing causality
- rule of psychological balance
  - minimize ambivalence
  - maximize simple affective view
Newtson (1973)

How does the perception of action affect social judgments?
Newtson (1973)

**basic methodology**

- simple videos of familiar activities
  - sorting papers
  - assembling something
- respond to “meaningful” changes
  - press response button
  - “event boundaries”
Newtson (1973)

# of events → information extracted

- high agreement at large events boundaries
- smaller events nested in larger events
- result of bottom-up & top-down processing (perceptual cycle)
Newtson (1973)

factors affecting event perception

bottom-up
- body position
- motion features
- relation among objects/people

top-down
- meaningfulness of material
- goals, intentions
- prior knowledge
(a) During an ongoing event, event models maintain a steady internal state that is robust to changes in the input. Event models guide perceptual processing and prediction.

(b) Predictions become less accurate. This transient increase in error is detected by comparing predictions with current perceptual representations (see pink highlight).

(c) Event models are destabilized and their input units are gated open (see pink highlight).

Event models settle into a new stable state as predictions again become accurate.

Kurby & Zacks (2007)
Events and Memory

**Working memory:**
- updating at event boundaries frees resources to orient to new information

**Long-term memory**
- recognition memory better for boundaries than non-boundaries
- increased parsing → better recall
Event Perception in Clinical Populations

schizophrenia
- less likely to identify goal-related events
- more likely to recall with temporal order

dementia
- differ in both coarse and fine parsing
- remember less
Change Blindness

- failure to note changes
- effect greater at short ISI
- even faces can be changed without awareness
Change Blindness

Cause?

- failure to store information
- failure to compare
- probably related to STM
What is the relation between events and autobiographical memory?
Conway & Pleydell-Pearce (2000)
Self-memory System (SMS)

- knowledge base
- working self
Conway & Pleydell-Pearce (2000)

knowledge base

- lifetime periods
  - general themed knowledge
- general events
  - repeated or related events
- event-specific knowledge
  - detailed individual events
Conway & Pleydell-Pearce (2000)

**Working self**

- working memory à la Baddeley
  - set of control processes
  - coordinates separate systems
  - detailed individual events
  - interconnected goal hierarchies
Mobile Robotics

Center for Intelligent Systems

- navigation through space
- monitor the path ahead
- information about expected landmarks
- expectations used to direct attention
- update information – new expectations
episodic memory for a cognitive robot (Dodd, 2005), (Dodd and Gutierrez, 2005), and (Ratanawasd, et al., 2006) - Center for Intelligent Systems