I. Memory and illusions

A. Visual illusions as an analogy to memory illusions

visible illusions: the sensory data is there before our eyes, yet we can be misled. Illusions persist even when we know that our perceptions are incorrect.

Hermann Grid
B. Memory Illusions

The memory data is no longer available. Based on our memories we make judgments that may be in error. We often fail to notice our memory illusions because we cannot directly compare our memories to the actual events.

“Overconfidence in memory could emerge from our daily experience: We recall events easily and often, at least if they are important to us, but only rarely do we find our memories contradicted by evidence, much less take the initiative to check if they are right.” (Chabris & Simons, 2014, NYT).

Memory Illusions

C. Reproductive vs. Reconstructive theories of memory.

The idea that memory is subject to illusions pits two views of memory against one another:

Reproductive Memory:

Memory is like a file cabinet, or video recording, that retains accurate copies of past experiences.

UVa Alumni magazine, March 2013
Memory Illusions

Reconstructive Memory

Memory is more like archaeology, in which we reconstruct the past from bits and pieces of information, using theories to guess what happened.

A memory Illusion?

Select a card.

Presto: It is gone!
II. Evidence for Reconstructive memory

A. The DRM procedure
(Deese, 1959; Roediger & McDermott, 1995)
Roediger & McDermott (1995):
Word list studies:

Participants studied 15 word lists:

- bed, rest, awake, tired, dream, wake, snooze, blanket, doze, slumber, snore, nap, peace, yawn, drowsy
I. Memory and Illusions (cont)

Roediger & McDermott (1995): results

Recall of studied words: 65%
Recall of strong associate: 40% (sleep)

Confidence in False Memories?
DeSoto & Roediger (2014)

Correlations between accuracy and confidence in false memories are either zero or negative.

False Memories and Psychopathology

Otgaar et al. (2017)

Individuals who suffer from depression and/or PTSD are particularly prone to generating false memories after they have been exposed to negative material or material related to their traumatic experiences.

Example of a negative DRM list:
Pain, cut, ouch, cry, injury, ...
Critical lure: hurt
I. Memory and Illusions (cont)

B. False Autobiographical Memories:
Typical scenario:
Students are asked to recall several events from their childhood. The events are taken from interviews with parents or relatives.
One of the events is a "pseudo-event" (something plausible that did not happen)
Students encouraged to recall the pseudo event several times.
False memories for the events and event details range from 20-70%, increases with repeated attempts to recall, imagery instructions, or picture support.

False Autobiographical Memories:
Examples:
Hyman & Billings (1998) 27% false recall of knocking over a punch bowl at a wedding.

Ceci, Huffman, Smith, & Loftus (1994) children falsely recalled getting a finger caught in a mouse trap and being taken to the hospital.
Shaw & Porter (2015) 70% false memory for committing a crime (theft or assault).

False Autobiographical Memories:
Role of photographs in false memories.
Students were asked to recall events from grades 5 or 6, 3 or 4, and 1 or 2.
Parents provided events for the 5th and 6th, and 3rd and 4th
The grade 1or 2 event was a made up event (putting “slime” in the teachers desk).
Two recall sessions, one after a week of reminders to try to recall the event.
Two primary conditions:
- **Photo:** students shown a photo of the appropriate class
- **No-photo:**

Lindsay et al (2004) Role of photographs

Results: percent reporting memory for pseudo-event

<table>
<thead>
<tr>
<th></th>
<th>Session 1</th>
<th>Session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo</td>
<td>31%</td>
<td>65%</td>
</tr>
<tr>
<td>No Photo</td>
<td>14%</td>
<td>23%</td>
</tr>
</tbody>
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III. Fuzzy Trace Theory

**Dual Retrieval Model**

Brainerd et al. (1996; 2009; 2014)

People develop two separate memory representations, verbatim and gist.

Memory is based on two kinds of retrieval:
1) **direct access to verbatim memory** – fast, errorless, reinstates vivid and realistic details
2) **reconstruction of “gist” representation** – partial identification of semantic information plus a generative process

Memory performance is based on the contributions of both of these retrieval processes.
Two main components of false memories

1. Regenerative Component
   A. gist creation
   B. material related to the original experience is activated in memory (associative component)

2. Source Monitoring Errors
   A. People mistake memories of information from one source for information from another
   B. For example:
      1. Dreams vs. actual experiences
      2. Images vs. actual visual memories
      3. Repeated stories for factual accounts

IV. Schema Theory

A. Schema: organized knowledge structures stored in memory that are used to guide comprehension and memory.

B. History:
   Motor schemas (Sir Henry Head, 1890’s)
      the tennis swing
   Story schemas (Bartlett, 1932): “War of the Ghosts”
      poor overall memory recall included many “reconstructive errors”

II. Schema Theory

D. Current ideas:
   story schemas (grammars):
      setting, conflict, resolution, closing.
   scripts: generalized episodes, causal chains
      e.g. restaurant
   person schemas (stereotypes?): general knowledge about a person or a group of people.
   frames: other general knowledge structures
      e.g. a general framework for board games
III. Principles of Schematic Processing

A. Integration
B. Selection
C. Interpretation
D. Abstraction

III. Principles of Schematic Processing

A. Integration: The stored representation is unified. A holistic representation is formed.

Example: Bransford & Franks (1971) materials:
One proposition sentences:

- The girl broke the window.
- The girl lives next door.
- The window was large.
- The window was on the porch.

Bransford & Franks (1971) (cont)

Two proposition sentences:
- The girl who lives next door broke

Three proposition sentence:
- The girl broke the large window on the porch.

Four proposition sentence:
- The girl who lives next door broke the large window on the porch.
Bransford & Franks (1971) (cont)

Subjects read a mixture of 1, 2, and 3 proposition sentences.

Then tested on a set including some old and some new 1, 2, and 3 proposition sentences, and the 4 proposition sentence that they had not read.

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Bransford & Franks (1971) results

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III. Principles of Schematic Processing (cont)

B. Selection: schemas lead to the selection of information that is central to the active schema.

Example: Anderson & Pichert (1978)
Participants read a story about two boys playing in a house.

The participants were asked to take one of two perspectives
1) potential home buyer
2) burglar.
Anderson & Pichert (1978) (cont)

Recall I
1) potential home buyers remembered the leaky roof, and the deck that needed repair.
2) burglars remembered the VCR and color TV.

Recall II
Then participants were asked to change perspectives. Now they were able to recall previously unrealled information relevant to the new perspective.

III. Principles of Schematic Processing (cont)

C. Interpretation: a process by which information is altered or elaborated upon to fit the activated schemas.

Example 1: Loftus & Palmer (1974)
Subjects were shown a film of a traffic accident and then were asked a series of questions:

Group 1:
"About how fast were the cars going when they *hit* each other?"

Groups 2:
"About how fast were the cars going when they *smashed into* each other?"

<table>
<thead>
<tr>
<th></th>
<th>Group # 1</th>
<th>Group # 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Est.</td>
<td>34 mph</td>
<td>41 mph</td>
</tr>
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Example: Loftus & Palmer (1974) (cont)
1 week later the subjects were again asked about the film
"Did you see any broken glass?"

<table>
<thead>
<tr>
<th></th>
<th>Group # 1</th>
<th>Group # 2</th>
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<tbody>
<tr>
<td>Percent reporting broken glass</td>
<td>14%</td>
<td>32%</td>
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Conclusion: memory for the event was changed to be consistent with the activated schema.
III. Principles of Schematic Processing (cont)

D. Abstraction: coding of the meaning, but not the exact format of selected information. Loss of surface details.

Example: Sachs (1967)

Subjects read a paragraph containing the following sentence:

"He sent a letter about it to the Galileo, the great Italian scientist."

This sentence was either near the beginning, middle, or end of the paragraph.

Sachs (1967) results

Reconstructive Errors in Memory

V. Conclusions:
A. We are not passive "recorders" of our experiences. Rather, comprehension of an event is an active, constructive process.
B. Recollections of an event may include "gist" as well as "verbatim" elements.
C. Comprehension and memory are guided by mental structures or schemas.
D. Schematic processing leads to predictable effects on memory: integration, selection, interpretation, abstraction.