Encoding and Forgetting
Encoding = processing

What factors affect how information enters memory?
Levels of Processing
(Craik & Lockhart, 1972)

- shallow processing → fragile memory
  - phonemic, orthographic

- deep processing → durable memory
  - semantic
Levels of Processing
(Craik & Lockhart, 1972)

challenge to Atkinson-Shiffrin model
Levels of Processing
(Craik & Lockhart, 1972)

Pros:

- introduced idea that encoding is complex - not simply a matter of rehearsal or stimulus – response association
- focus on how processing affects memory - “deeper” → better recall
- lots of supporting data
Levels of Processing
(Craik & Lockhart, 1972)

- Hyde & Jenkins (1973)
  - deeper processing > intentionality

- Glenberg et al. (1977)
  - elaborative encoding > rehearsal

- Craik & Tulving (1975)
  - semantic > structural processing
Bransford & Johnson (1972)

If the balloons popped, the sound wouldn't be able to carry since everything would be too far away from the correct floor. A closed window would also prevent the sound from carrying, since most buildings tend to be well insulated. Since the whole operation depends on a steady flow of electricity, a break in the middle of the wire would also cause problems. Of course, the fellow could shout, but the human voice is not loud enough to carry that far. An additional problem is that a string could break on the instrument. Then there could be no accompaniment to the message. It is clear that the best situation would involve less distance. Then there would be fewer potential problems. With face to face contact, the least number of things could go wrong.
Bransford & Johnson (1972)
The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities that is the next step, otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important but complications can easily arise. A mistake can be expensive as well. At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one never can tell. After the procedure is completed one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will then have to be repeated. However, that is part of life.
Levels of Processing
(Craik & Lockhart, 1972)

Cons:
• more descriptive than explanatory
  - “deep” “shallow” are vague
• not a good account of implicit memory
• doesn't apply to amnesics
Dual Coding Theory
(Paivio, 1986)

visual and verbal channels
- visual $\rightarrow$ analogue, verbal $\rightarrow$ symbolic
- limited resources
- memory organization

e.g., visual context improves memory
Bransford & Johnson
Encoding Specificity
(Tulving, 1983)

memory improves as a function of the similarity between encoding and retrieval contexts

anecdotal:
- hard to recognize someone in different context
- retracing steps can help find lost object
State-dependent Learning

- mood (Eich, Macaulay & Ryan, 1994)
- language (Marian, & Fausey, 2006)
- motivation (Woike et al. 2009)
- physiological state (Goodwin, et al., 1969)
Mnemonics

any learning technique that aids memory

- first letter
  - Mary's Violet Eyes Make John Stay Up Nights Period

- method of loci
  - associate each TBR item with a visual location
    - Simonides Greek lyric poet – born 556 B.C. - credited with inventing mnemonics

- link system
  - create association among TBR items, e.g. a story
Famous mnemonists

- **Datas** – London 1901 – stage name – model for Hitchcock's 39 Steps – history, statistics
- **Sh** – 1920's - Solomon Veniaminovich Shereshevsky – studied by Luria – synesthesia - remembered lists from decades earlier
- **A. C. Aitken** (1895-1967) – mathematician able to recall pi to 707 places
- **Kim Peek** – model for “Rain Man” - more than 7,600 books - knows the zip codes of every location in America - the highways leading to any city or town in America
Subliminal Processing

subliminal: below threshold for awareness

urban legend: movie theaters flash product names that make people buy the products

based on Vicary (1957) – market researcher – Fort Lee, NJ – claimed popcorn sales rose 57.7% and Coke 18.1% during 6 week period - 3/1000 of a second once every five seconds “eat popcorn” “drink Coca-Cola”
Subliminal Processing

However:

• Vicary never published detailed description

• In interview for Advertising Age in 1962, Vicary stated that the original study was a fabrication
Subliminal Processing

Can subliminal information affect memory?
Subliminal Processing

- hostility (Bargh & Pietromonaco, 1982)
- research ideas (Baldwin, et al., 1991)
- competition (Neuberg, 1988)
- aggression (Chen & Bargh, 1997)
Subliminal Processing

Priming

- positive
  - facilitates processing (reduces RT)
  - spreading activation
  - can be subliminal

- negative
  - inhibits processing (increases RT)
  - must be consciously ignored
Subliminal Processing

Priming
• perceptual
  - modality (visual, auditory, etc)
  - format (font, letters)
  - word-stem completion task

• conceptual
  - based on meaning
  - e.g., association, or category
  - lexical-decision task
Forgetting

- errors of omission
  - lack of information

- errors of commission
  - false addition of information
Examples of Forgetting

everyday objects, e.g. penny
The front of the penny pictures a right-facing profile of Abraham Lincoln, the 16th President of the United States of America.

The front reads, "IN GOD WE TRUST," "LIBERTY," and the year the coin was minted. The small initial under the date is the mint mark, denoting the location of the US mint that produced the coin (D means Denver, Colorado, S means San Francisco, California, and P means Philadelphia, Pennsylvania).

The back of the penny pictures the Lincoln Memorial, a monument to Abraham Lincoln located in Washington, D.C. If you look closely at a real penny, you can see a tiny picture of Lincoln sitting inside the Lincoln Memorial.

The back reads, "UNITED STATES OF AMERICA," "ONE CENT," and "E PLURIBUS UNUM" (which means, "Out of many, one"). This design was adopted in 1959, replacing one that pictured two stalks of wheat.
Examples of Forgetting

cryptomnesia - unintentional plagiarism
  e.g. songs, papers, etc

cause: impaired source monitoring
Examples of Forgetting

eyewitness reports

cause: incorrect schema activation
Examples of Forgetting

Tip of the Tongue breakdown in lexical retrieval

cause: incomplete activation
Ways to explain forgetting

- decay
- interference
- encoding failure
Decay

- Thorndike (1914) *Psychology of Learning*
- memory trace “fades” or decays
- Brown-Peterson task (STM=18 secs)
Interference
- proactive
- retroactive
Encoding failure
- anterograde amnesia (STM → LTM)
- lack of attention
- schema bias