Memory 4

Emotion Signals Importance
Blocking
Intrusion Errors

Emotion Signals "Importance" for Memory – DVD

- James L. McGaugh – Retired, but still active distinguished professor in Neurobiology & Behavior

DVD Clip: Summary

- Adrenaline is a hormone and neurotransmitter released from the adrenal glands when danger threatens or in an emergency
  - it triggers the "fight-or-flight" response.
- Injections of adrenaline after a learning episode increase retention.
- Presumably this happens because evolution has created a link in which adrenaline also marks an event as important for memory.

- The studies of adrenaline and beta-blocker argue convincingly that adrenaline mediates (i.e., helps to make happen) the link between stress responses and improved memory.
  In rats
  The question of whether this result applies to humans is a question of _____.

A. Internal Validity
B. External Validity
C. Independent Variable
D. Dependent Variable

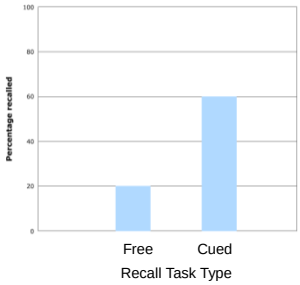
Two Roles of the Amygdala in Memory

- During fear conditioning, an area of the amygdala associates sensory stimuli with the aversive events they predict
  - Later, when similar stimuli are detected, another area of the amygdala elicits fear responses
- Other areas of the amygdala respond to adrenaline, by signaling to the rest of the brain the presence of something "important" that should be remembered

- The "Recalling Information" zap involves comparing results from a *free-recall* and a *cued-recall* task. Comparing the results from these procedures tells us about _____ .

A. Memory span
B. Blocking
C. Absent mindedness
D. Transience

Data Summary
Recalling Information Zap



Blocking

Information is available in long-term memory but is inaccessible

Effects of Materials and Age on the Incidence of Blocking

- Burke et al. 1991 diary study

TABLE 4
MEAN NUMBER AND PERCENTAGE OF TOTs BY WORD TYPE AND AGE

Group	Proper name of person/ place/movie M	%	Object name M	%	Abstract word M	%
Young	2.28	58	0.26	7	1.38	35
Midage	3.70	69	0.60	11	1.10	20
Old	4.54	69	1.16	18	0.86	13
Examples	"Chuck Berry" "Casablanca"		"steer" "algae"		"idiomatic" "consensus"	

- Think back to a recent time when you had trouble coming up with a word you were sure you knew. What type of word it was it?

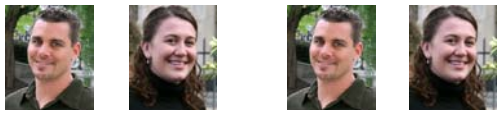
A. An abstract word (e.g., "idiomatic" or "consensus")
B. An object name (e.g., "steer" or "algae")
C. A Proper name (e.g., "George Sperling" or "Britney Spears")
D. Some other type of word
E. Can't recall a blocking incident

Bringing Blocking into the Lab

- In 1990, Gillian Cohen came up with a creative way to do this research

"Why is it difficult to put names to faces?" British J. of Psychology, 81, 287-297.

Group A | Group B



Baker Potter baker potter

Why We Block on "Baker"s More Often than "baker"s?

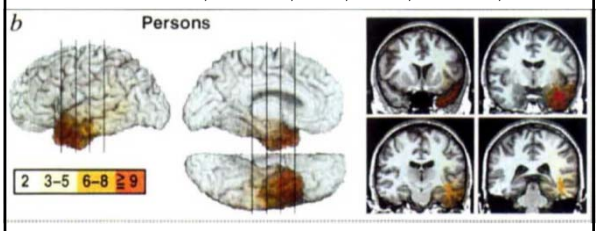
- John Stuart Mill: "Proper names are not *connotative*, they *denote* individuals who are called by them: but they do not indicate or imply any attributes belonging to those individuals."
- Proper names are blocked because they are less well integrated in memory
- Descriptive proper names lead to less blocking than other proper names (Bredart & Valentine, 1998)

Localization of Recall for Names

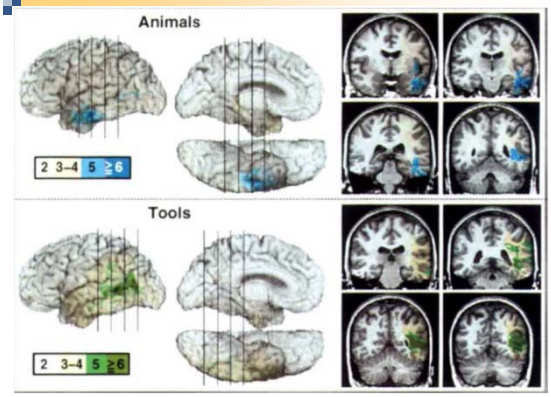
- LS a patient unable to produce proper names
  - Most cognitive abilities were unaffected
  - *Anomia,* limited to proper names
    - Shown 50 common objects, he could name 50
    - Shown 50 famous people, he could name 2
  - Other proper names – e.g. cities and countries – were affected as well as names of people

Proper-Name Anomia Localized in the Temporal Pole

Data from Damasio, Grabowski, Tranel, Hichwa, & Damasio, 1996



Although other areas play a role, the left temporal pole is usually critical to making the link between a person's characteristics and name



Summary: Blocking

- When information that is in memory is inaccessible
- Blocking is more likely for memories that are less well integrated with other information
  - E.g. names
- Mechanisms for retrieval for some kinds of information appear to be localized in the brain

Zonker's Intrusion Error

Binding Errors Another Source of Intrusion Errors

- Binding Error

  Mistakenly combining pieces from the memories of different, actual events

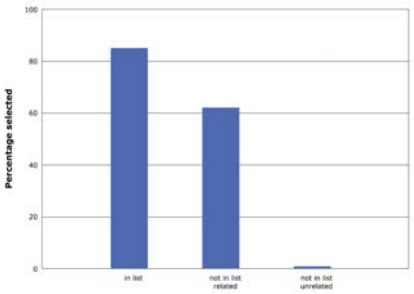
More Source Confusion: John Doe #2

- 2 suspects were sought after the Oklahoma City bombing in 1995
  - Timothy McVeigh
  - John Doe #2
- The description of John Doe #2 came from a bystander who recalled McVeigh and a second man renting a truck
- Later it became clear that this second man had been present at a transaction the bystander observed a day later

Binding Errors in the Laboratory

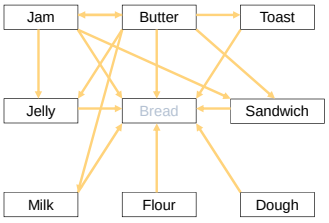
- One way to induce binding errors
  - Studying lists with words like *spaniel* and *varnish*
  - Increases the probability of claiming to remember test words such as *spanish*

ZAP: False Memory Task



Semantic Associations A 3rd Source of Intrusion

- Medial Temporal Lobe (MTL) stores memories using overlapping representations
- Because of the overlap, activation of an MTL representation results in some activation of the representations for related concepts
- Familiarity relies on MTL



Summary: Misinformation Errors

- Source confusion errors: Correct recall of event details but incorrect recall their source
- Binding errors: When details of separate events are combined
  - The hippocampus binds details associated with events into separate episodic memories
- Semantic Association errors: Spreading activation leads to recall of events that have not occurred
  - Medial Temporal Lobe encodes semantic memories
  - The organization of semantic memory combines information from different events rather than keeping them separate

Looking Ahead

- Memory Chapter Test on Wednesday
- For Monday
  - Norton Reader: Chapter by Schacter, pp. 165-176
  - View or read a 60 Minutes story c Eye Witness Testimony link is on the Schedule page
  - View NY Times video The Trial That Unleashed Hysteria Over Child Abuse
  - Zap #10: Implicit Learning
- Coffee at Phoenix Grill?