

MEMORY

Psy 20

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Ebbinghaus "forgetting" function:

What % of learning time is "saved" at various intervals?
(Fig 6.1, 7.1-7.2)

Basic model:

sensory store

--> **longterm memory (LTM)**

LTM semantic, episodic, procedural (skills/habits)
explicit (conscious), implicit
(aka declarative/nondeclarative)

Evidence for **STM**?

Drop off in retention w/ interference (Fig 6.3)

"7 +/- 2" memory capacity

rehearsal--> memory suggests STM as waystation
(doctor's office-- if your name's not recorded you are not recalled)

but "depth of processing" matters, not "amount" of rehearsal
so it's not "short-term" in the sense of limited time before loss

also: hippocampal damage → LTM deficit (amnesia) but STM intact
patient KF 1-digit STM span, but normal LTM
→ can bypass STM somehow

Working Memory

Central Exec [homunculus warning!] "runs" phonological/articulatory loop, visuospatial sketchpad.

Articulatory loop limited in time (1.5 secs)

e.g. Chad, Burma, Greece, Cuba, Malta (4.17/5)

Czech., Somaliland, Nicaragua, Afghanistan, Yugoslavia (2.80)

Loop involves "inner" speech?

Conrad: Misremembered letters "mispronounced"

HBKLMW B misremembered as V, D

Finished files are the result of years of scientific study combined with the experience of years

WM skills correlated with vocabulary learning in kids

Visual sketchpad

Useful part of WM? e.g. mental arithmetic visual?

Frontal cortex and primate WM

Area 46 "stores" location info during delay
neurons continually fire during delay period
keep memory "alive"

Activation and LTM

recency matters: primes etc "activate" memories

e.g., p "fruit" 1.53 secs
 b "fruit" 1.21 secs 0 delay
 1.28 secs 1 delay
 1.33 secs 2 delays

like lights turned on in neighboring houses

Neuro evidence: LA Times +Rugg, Science: 1998 first direct evidence that "amount" of activity predicts whether you remember or forget

spreading activation:

activation spreads along network

How do we know?
associative priming

dog-c _____
bone-m _____
1.41 secs

gambler-c _____
bone-m _____
1.53 secs

Practice and strength

power law of practice (fig 6.10)

$$\log(\text{time to recognize}) = a - b \log(\text{practice})$$

neuro evidence:

stimulated pathways increase sensitivity (Fig 6.12)

Levels of Processing

"depth" of processing improves memory

- sentences connecting nouns
E generated sentences 29% recall
S generated sentences 58% recall

(deeper processing or familiarity? a bad experiment...)

- "meaningful" elaborations

upside-down sentences remembered better

synonyms better than rhymes

S-generated better than S-read

"rate pleasantness" of words better than letter-checking

cops trick: "see if he has an honest face" to improve ID memory

- text comprehension:

advance-organization helps
make up Qs? helps
answer Qs helps

- incidental vs intentional : Does planning to remember help?

doesn't matter!?	rate pleasantness	check letters
incidental	68%	39
intentional	69	43

Interference

How does forgetting occur? Decay or interference?

test:	A-D control	C-D control	
learn	A-B	A-B	
learn	A-D	C-D	(interferes)
test	A-B	A-B	

Both groups "forget" A-B due to interference.
A-D group retention worse.

Fan effect

Limited total activation--> less recall of any 1 activated node

demo: doctor in bank (1-1)
fireman in park (1-2)
lawyer in church (2-1)
lawyer in park (2-2)

claim: presentation activates node
activation spreads along 1/n related paths (1/n each)
recognition depends inversely on activation

no of sentences w/ location	no sentences w/ person	
	1	2
1	1.11 secs	1.17
2	1.17	1.22

interference vs. decay

Decay occurs on clock time?

Claim: Less interference during sleep [few new memories]
so retention should be better overnight

revision: Material learned at night more memorable!

interference, facilitation & fact relatedness

What if "interfering" facts are related? Helps retention?

Yes.

	<u>recall interval</u>		
	immediate	1 wk	
target fact	92%	62	Mozart Paris-Munich
irrelevant facts	80	45	Mozart back trouble
relevant facts	94	73	Mozart heartbroken in M

relevant facts improve memory for target fact, overcomes interference

how does relatedness help?...

Retrieval and inference

Recall of relevant facts may be inference, not recall per se

(Carol Harris/Helen Keller study)

Plausibility judged faster w/ time (abandon exact retrieval)

& reverse fan effect (more facts--> quicker p judgment)

Listerine case: When is an ad making false claims?

(vs. inviting false inferences)

Association & retrieval

Org'l structure helps retrieval (Tab 7.5 Fig 7.7)

--> self-organizing + practice works great

Method of loci:

Mnemonic technique

"Walk" familiar path, locate objects along it
(uses org'n-- path-- and visual imagery)

Encoding context matters!:

coat-tie E vs. flannel shirt E (59% vs 42%)

dry/wet (Fig 7.8)

positive/negative moods

(cf. mood congruence-- easier to remember

happy events in happy mood, etc. Fig 7.9)

<u>study state</u>	<u>cigs</u>	<u>test state</u>	
		<u>cigs</u>	<u>pot</u>
cigs		25%	20%
pot		12%	23%

Implicit memory

Can people "remember" things they cannot explicitly recall?

Yes. (How do we know?)

Amnesics:

Do fine on word completion tasks

e.g. learn CAT

"complete the word however you want"

C _ _

Inclusion/exclusion task:

learn MERCY

inclusion: complete M E R _ _ with any word
(preferrably learned)

exclusion: complete M E R _ _ with a new (not-learned) word

Jacoby study (Fig 7.11):

Test implicit memory w/ "perceptual identification"
(40 msec exposure)

Implicit association test (IAT) for "prejudice" in word-association!

Downs syndrome patients (severe retardation) have same implicit memory as "normals", but terrible explicit memory!

Procedural memory for skills/habits (e.g. riding a bike) often implicit

Everyday memory

Memories for personal events:

lifetime periods (yrs)	mental photo album
e.g. lived in Chicago	chapters
worked at Sears	
general events (wks)	pages
event-specific details (hrs)	sentence

free recall--> general events

specific events recallable if sensory "tape" (sounds, visions)

lifetime retention:

- recency effect
- reminiscence bump 10-30 yrs old (many "1sts")
 + important public events
- childhood amnesia (0-5)

disputed...seems to be due to slow wiring of inferotemporal cortex
("repository") so infant memories are not stored in right LTM place

event dating

like atmospheric cue:

important events seem recent

unimportant events seem distant

temporal landmarks

(day of week recall)

Flashbulb memories

Is there a separate mechanism for "flashbulb memories"?

surprising, important (consequential) events

e.g. sudden deaths, science breakthroughs...

Not clear:

Some examples (Thatcher resignation)

simply distinctive/elaborate processing?

Are people with excellent memories special?

No: usually meaningful encoding

retrieval structure (e.g. loci)

speedup (1-2 times faster)

Exceptions:

e.g., S. 1920s Russia reporter

synesthesia (visual, sensory encoding)

"2 is a high-spirited woman"

False Memory Syndrome

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Claim: Some painful traumatic memories are "repressed".

Can be "unearthed" by therapy

Should sometimes be the basis for legal action (criminal, "reasonable doubt", or "civil", "preponderance")

Alternative (Loftus et al): Memory is not like a lockbox that can often be buried and forgotten

Memory is more like clay that is molded and reshaped
False memories can be "implanted" which "feel" like real ones to the remember-er

How common is repression?

It occurs. Rare? E.g. study of car accident victims. 25% did not remember years later.

But...*all* children w/ parents murdered at ages 5-10 recalled years later
Childhood amnesia (<5 yrs of age, remember little)

Are memories of childhood abuse & trauma real?

Therapists believe they are (80% believe).

"I have no reason not to believe them"; "If a woman said it happened, it happened"

Why? Symptoms-- "low self-esteem, sexual dysfunction, self-destructive behavior, body memories"

Courage to Heal book: "So far, no one we've talked to thought she might have been abused, and then later discovered that she hadn't been."

Bradshaw: "Do you have trouble knowing what you want? Are you afraid to try new experiences? If someone gives you a suggestion, do you feel you ought to follow it? "

"If you answered one of these questions Yes, you can count on some damage having been done to you...between the 9th and 18th months of your life."

Loftus: Therapists can "implant" memories unwittingly ("Tell me what the bastard did")

Could false memories seem real?

Memory is easily reconstructed (like restoring a painting or sculpture)

E.,g. spurious "flashbulb memories" (Tony Conigliaro night/day game; Challenger explosion). Football game w/ cardiac arrest; memories wove in new insinuations (e.g. saw blood on the player's uniform)

Brilliant experiment-- implanting a false memory of being lost in the mall to "Chris"

Actual case-- Paul Ingram, accused of abuse (Satan-worshipping cult).

Later "confessed". Social psychologist made up another incident which P.I. "ingested"

What to do?

Craft law to "get the psychology right".

More experiments on how implanted memory works (fMRI "lie detector").

