Improving memory 2

PSY 200

Greg Francis

Lecture 22

Get a good night's sleep.

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Memory

We seem to be unable to control our memories

- learn things we don't want to remember
- unable to learn things we want to remember

Is there any reliable cue that something will be remembered?

- no
- but there are several tricks you can use to improve memory in certain situations

2

Memory trick - grouping

- We often hear of people memorizing pages of the phone book
  - how do they do it?
  - some cheat (frauds)
  - others take advantage of organization and memory tricks
- SF learned to increase his digit span to 79 digits (any random sequence)
  - 230 hours of practice (over 20 months)
  - Ericsson, Chase & Faloon (1980)

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SF: Digit span

- Broke down and organized each digit list
- Long-distance runner
  - sequence like 3492 converted to "3 minutes 49.2 seconds- near world record time"
- Eventually created a hierarchy of tricks (ages, dates)
- Technique did *not* transfer to other memory tasks (e.g., letters)

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Method of loci

- Used by ancient Greeks to remember complicated speeches
- To remember a list of words or key ideas
  - visualize walking around an area with distinctive landmarks
  - link the items to be remembered with landmarks by using bizarre mental imagery
  - to recall items in order, mentally walk through area
  - (any ordered sequence will work -- e.g., a children's rhyme)
- Memory piggybacks on the easy recallability of the bizarre imagery

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Method of loci

- e.g., grocery list

ITEMS	LOCI	Add vivid, bizarre imagery
hot dogs	driveway	
cat food	garage interior	
tomatoes	front door	

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Peg word system

- Associate items in list with a previously memorized list

One is a bun.	Six is a stick.
Two is a shoe.	Seven is a heaven.
Three is a bee.	Eight is a gate.
Four is a door.	Nine is a line.
Five is a hive.	Ten is a hen.

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Peg word system

- "Hook" to be remembered items to the list
  - visual imagery helps again!

ITEMS	Peg word	
milk	bun	recall by reciting poem
bread	shoe	
bananas	tree	

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Link word method

- Foreign language vocabulary
  - find an English key word that sounds like some part of the foreign word
  - form a mental image of the key word interacting with the English translation of the foreign word
- E.G.
  - pato -> Spanish for "duck", sounds like "pot-o"
    - » imagine duck with *pot* on its head
  - zronok-> Russian for "bell", sounds like "zrahn-oak"
    - » imagine an *oak* tree with bells as acorns

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Link word method

- In a study of learning 120 Russian words (Atkinson & Raugh, 1975)
- Two groups
  - control: heard Russian words, saw English translation
  - experimental: heard Russian words, saw English translation, saw key words, and applied method
- Experimental group learned more words faster and for longer
  - 6 weeks later
    - » experimental (43% correct)
    - » control (28% correct)

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Link word method

- CogLab Link word lab (154 participants)
- Study 50 French words (25 in each condition)
  - Half with a provided link word to form an image
  - Half without a provided link word (no image)

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Mnemonists

- Some people seem to have extraordinary memories
  - professional - apply one of the techniques we've discussed
  - spontaneous- seem to not consciously apply a technique
- Photographic memory?
  - Few documented cases
  - Generally, not happy outcomes

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S.: Luria

- Luria: Russian psychologist
  - met S in 1920s
- S
  - able to recall without error a list of 70 words
    - » took 2-3 minutes
    - » able to report it again several months later
  - other unusual characteristics

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S.: Luria

- Extreme synesthesia
  - sensory information from one modality evokes sensation in another
  - tone, 30 cps, 100 decibles --> "saw" a strip 12-14 cm wide the color of old, tarnished silver
    - » 50 cps--> brown strip, taste of sweet and sour borscht
  - voices gave rise to visual responses
  - used the full sensation of events to help memory

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S.: Luria

- Visual imagery
  - used method of loci
  - such strong imagery it interfered with his ability to understand simple prose
    - » words kept evoking inappropriate images...

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Brain Training

- Several companies market activities to make you smarter
  - "Exercise" your brain with games that are adapted from neuroscience
  - Does that even make sense?
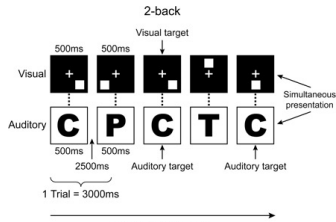- Often aimed toward elderly (Alzheimers) and young children

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Brain Training

- Much of the hype comes from a study that trained people for a few hours on a *dual n-back* task (Jaeggi *et al.*, 2008)
  - Does the current stimulus match the one from *n* trials back?
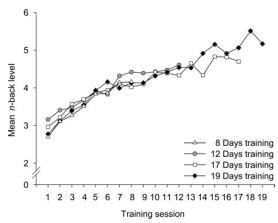 - *n* is adjusted for each person so the task is always demanding

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Brain Training

- Much of the hype comes from a study that trained people for a few hours on an *dual n-back* task (Jaeggi *et al.*, 2008)
  - *n* is also a measure of how well subjects do the task
- Subjects do get better at the *n*-back task with training

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Brain Training

- Transfer effects for a measure of fluid intelligence (refers to the ability to reason and to solve new problems independently of previously acquired knowledge)
  - Training group does better than a control group
  - Amount of training time is related to gain in intelligence

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Brain Training (WARNING!)

- Redick *et al.* (2013) cautions:
- The conclusions are based on 4 small studies that varied in many ways
  - It is probably a mistake to average scores across these studies
- Some selective reporting of measures of fluid intelligence
  - Measures that did not show an effect were not reported
- No comparison to an "active control"
  - Where subjects complete a training task that should *not* improve fluid intelligence

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Brain Training (WARNING!)

- In October 2014, a group of memory researchers released a statement with the following summary:
  - *We object to the claim that brain games offer consumers a scientifically grounded avenue to reduce or reverse cognitive decline when there is no compelling scientific evidence to date that they do. The promise of a magic bullet detracts from the best evidence to date, which is that cognitive health in old age reflects the long-term effects of healthy, engaged lifestyles. In the judgment of the signatories below, exaggerated and misleading claims exploit the anxieties of older adults about impending cognitive decline. We encourage continued careful research and validation in this field.*
- You should be similarly skeptical about claims for improving attention, perception, and other mental capabilities
  - Playing video games does not seem to improve your attention or perception
- You *can* improve performance on specific tasks, but that does not typically transfer to other tasks
- You *can* make yourself smarter by learning new information

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Sleep

- Many types of memory improve with sleep
- Some type of "consolidation" of memories
- The effect is not just *time*
  - Although time also has an effect
- We'll look at one representative study
  - Ellenbogen et al. (2007)

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Sleep

- Subjects learn to identify order relationships between "random" shapes
- Only shown one pair at a time
- Subjects have to learn/memorize the appropriate answer to each pair

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Sleep

- There is a ordered arrangement to the stimuli
- If you know this arrangement, deciding for any pair is easy
  - But subjects are never explicitly told about this arrangement

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Sleep

- Subjects are split in to three groups, according to when they are tested
  - 20 minutes later
  - 12 hours later
  - 24 hours later
- No differences when tested on the originally studied items

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Sleep

- Subjects are split in to three groups, according to when they are tested
  - 20 minutes later
  - 12 hours later
  - 24 hours later
- Big differences when tested on new pairs that fit the ordered structure
  - E.g., A>C, C>E, B>D

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Sleep

- Half of the 12 hour group had sleep and half did not
- It makes a difference for pairs of items that are far apart in the ordered structure
- 1-degree: A>C, B>D,…
- 2-degree: A>D, B>E,…
- Advice:
  - study **early**!
  - Get some **sleep**!

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Conclusions

- Lots of ways to improve memory
  - Method of loci
  - Imagery
  - Mnemonics
  - Brain training
  - Sleep

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Next time

- Mental representation
- Prototypes
- Exemplars
- Propositions
- CogLab on Prototypes due!
- *What is a shoe?*

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