


Improving memory

PSY 200
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Lecture 21

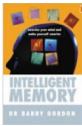
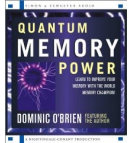
How to improve your memory without spending \$20.


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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







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Encoding specificity

- We know that memory is best when study and test contexts are similar
 - For example, testing in the study classroom
- But variability in study promotes more general recall
 - Smith et al. (1978)
 - Subjects studied words twice: either in same context or different contexts (3 hour interval between contexts)





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Encoding specificity

- Test subjects in a neutral context (after another 3 hour interval)
- Look at proportion correct recall
 - Highest with variable study contexts
- Advice: if you want to remember something in lots of contexts, study in lots of contexts



Session 2 Context	Session 1 Learning context	
	Classroom 1	Classroom 2
Classroom 1	0.41	0.69
Classroom 2	0.53	0.39

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Study style


- Time spent studying is also "context" for memory retrieval
- Generally, more study leads to better memory
- Style of study matters too
 - distributed practice is better than massed practice
 - avoid cramming!
 - true for many skills

3 hours

1 hour

1 hour

1 hour


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Level of processing

- Memory can be influenced by *depth of processing* at the time of study
 - Craik & Tulving (1975)
- Subjects observe words with associated tasks

question	YES	NO
In capital letters?	BOOK	book
Rhyme with thing?	spring	sprint
Synonym for heavy?	bulky	brown

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Level of processing

- Recall is better as *depth* of processing increases
 - More distinctive memories are created, which helps subsequent recall
 - By varying depth of processing, you can construct memories that are more likely to be recalled

Study task	Number of words recalled
Capital	10
Rhyme	13
Synonym	22

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CogLab

- Recall is better as *depth* of processing increases
 - "Test" is what matters here, other data is just for completeness
 - 175 participants

Phase	Letter Processing	Rhyme Processing	Semantic Processing
Encoding	0.95	0.95	0.85
Test	0.45	0.65	0.80
Lures	0.75	0.75	0.75

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Levels of Processing

- Level of processing is more important than *intent* to learn (Hyde & Jenkins, 1973)
- 11 groups of subjects
 - 1 control group: told they will be tested to recall the words
 - not given any study task
 - 10 experimental groups split to perform a study task
 - Pleasant-unpleasant rating
 - Estimate frequency of word usage
 - E-G checking: does word contain an E or a G?
 - Identify part of speech: noun, verb,...
 - Sentence framing: which sentence does word best fit in?
 - For all experimental groups, either
 - (a) Intentional learning: told they will be tested to recall the words
 - (b) Incidental learning: not told they will be tested

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Intention

- Recall (out of 24 words) varies a lot with task
- Not much variation with intention to learn

Task type	Incidental	Intentional
Sentence frame	6	5
E-G checking	6	8
Part of speech	8	8
Frequency of Usage	10	10
Pleasant	11	12
Control	10	10

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Implications

- Advice: study *interactively*
 - read notes
 - rewrite notes
 - rephrase notes
 - teach someone else
- Importantly, people are not usually good at estimating whether something will be remembered

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Judgments of Learning

- Nelson & Dunlosky (1991)
- Subjects study a pair of words (e.g., OCEAN – TREE)
- Estimate how likely they are to be able to remember one word if shown the other (JOL).
 - Given OCEAN, how likely to remember the associated item later?
 - This is the subject's estimate of their ability to use LTM
- Make judgment either
 - Immediately after studying the pair
 - Delayed to later in the experimental trials
- Note: students studying for an exam often use the *immediate* approach for a JOL to decide if they need to continue studying

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Judgments of Learning

- Immediate JOLs do not match memory performance (at the end of the experiment)
 - Especially for high JOLs
- Delaying the JOL leads to fairly accurate JOLs
- Advice: study, wait, estimate learning

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Practicing recall

- A common approach to studying is to use flash cards (or something similar)
- Two steps to studying
 - 1) Read material on both sides (study)
 - 2) Practice test the material (given one side, try to recall the information on the other side)
- What should you do when you successfully recall the information during the practice test?
 - Continue to study?
 - Continue to test?
 - Set aside and focus on other cards?

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Practicing recall

- Karpicke & Roediger (2008)
- Subjects study 40 Swahili - English word pairs
 - mashua -- boat
 - kaka -- brother
 - Test for English given Swahili:
 - mashua --???
- Four groups of subjects, that differ after an item is correctly recalled
 - ST (study-test): subject studies and continually tested over every pair
 - SnT (study on non-recalled - test on all): when a subject recalls a pair, it is no longer studied, but it continues to be tested
 - STn (study all, test only on non-recalled): when a subject recalls a pair, it continues to be studied, but it is not tested
 - SnTn (study on non-recalled, test on non-recalled): when a subject recalls a pair, it is not studied or tested again
- A week later, everyone is tested

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Practicing recall

- Standard advice is that once you learn something, study something else
- This is not good advice
- Performance is best when every pair is tested, even if you have already demonstrated it is memorized
- The amount of time spent studying the words does not matter so much
- Suggests that you learn how to recall the information
- Advice: Test yourself!

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Learning styles

- A common approach in education is to identify a student's learning style and then teach for that style
- Lots of tests to identify a student's learning style
- There do seem to be real differences in what style people indicate they prefer

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Learning styles

- Unfortunately, there is absolutely no evidence that reported learning style preference has anything to do with learning
- Pashler et al. (2009) observed that to demonstrate evidence that learning style influenced learning, you have to show a particular kind of interaction of effect

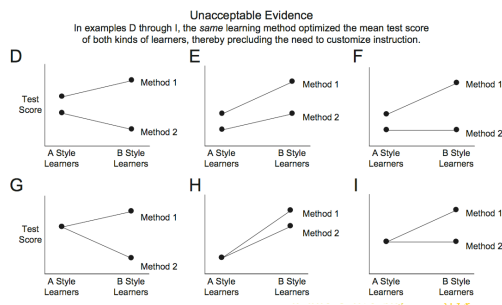
Acceptable Evidence
In examples A, B, and C, the learning method that optimized the mean test score of one kind of learner is different from the learning method that optimized the mean test score of the other kind of learner.

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Learning styles

- Pashler et al. (2009) then reviewed hundreds of studies purporting to show evidence for learning styles, but only ever found effects like these
- But these only indicate an advantage for a type of learning or a method



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Learning styles

- Why is the idea popular?
- It fits with the American ideal of everyone being capable of learning if given the chance (no child left behind)
- It allows parents (and students) to blame the educational system for failure rather than lack of motivation or ability
- It lends itself well to statistical quirks of finding “just the right method” for a given student
- It’s a generalization of the experience that a given student benefits from a new explanation of material

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Conclusions

- Lots of ways to improve memory
 - ♦ Encoding specificity
 - ♦ level of processing
 - ♦ Judgments of Learning
 - ♦ Practice testing
 - ♦ Learning styles

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Next time

- Mental imagery
- Sleep
- Brain training
- CogLab on Link Word due!
- *Get a good night's sleep!*

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