Improving memory

PSY 200
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Lecture 21

How to improve your memory without spending $20.

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

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)

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

<table>
<thead>
<tr>
<th></th>
<th>Session 1 Learning context</th>
<th>Session 2 Context</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Classroom 1</td>
<td>Classroom 2</td>
</tr>
<tr>
<td>Classroom 1</td>
<td>0.41</td>
<td>0.69</td>
</tr>
<tr>
<td>Classroom 2</td>
<td>0.53</td>
<td>0.39</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>In capital letters?</td>
<td>BOOK</td>
<td>book</td>
</tr>
<tr>
<td>Rhyme with thing?</td>
<td>spring</td>
<td>sprint</td>
</tr>
<tr>
<td>Synonym for heavy?</td>
<td>bulky</td>
<td>brown</td>
</tr>
</tbody>
</table>
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

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
  - 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?
    - 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

Implications

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

CogLab

- Recall is better as depth of processing increases
  - “Test” is what matters here, other data is just for completeness
  - 68 participants

Intention

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

Judgments of Learning

- 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
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

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?

Learning styles

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

Karpicke & Roediger (2008)

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

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!
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.

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.

Conclusions
- Lots of ways to improve memory
  - Encoding specificity
  - Level of processing
  - Judgments of Learning
  - Practice testing
  - Learning styles

Next time
- Mental imagery
- Sleep
- Brain training
- CogLab on Link Word due!
- Get a good night’s sleep!