

Memory discrimination

PSY 200
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 Lecture 18

How to take a test.

Discrimination

- Many cognitive tasks require you to discriminate between events/stimuli
 - Is this a real smile?
 - Is this fruit ripe?
 - Is there a stapler on the desk?
- The same kind of discrimination is required for memory



Discrimination

- Discrimination is difficult because memories can come from lots of different sources
- Consider so-called “False memory” studies
 - as in CogLab
 - subject views a list of words
 - the list of words have something in common
 - » they are all related to a *target* word

False memory

- An example list is
 - *smooth, bumpy, tough, road, sandpaper, jagged, ready, coarse, uneven, riders, rugged, sand, boards, ground, gravel*
 - the special target is *rough*, which is not shown to the subject
- After viewing the list, the subject must go through a set of words and identify which ones were in the just seen list
 - some words were in the list
 - some words were not seen
 - » including the special target

False memory

- The main finding is that the special target is often identified as part of the just seen list
 - even though it was not
- Sometimes people will even report that they recall “seeing” the special target
 - but this is impossible because it was never shown
- CogLab data (68 participants)

Type of selected items	Percentage of recalls
In original list	80.8
Normal distractor (not in list)	7.2
Special distractor (not in list)	69.9

False memory

- These types of findings suggest that our memories are
 - not necessarily accurate, we can remember things that never occurred
 - able to be manipulated, to a certain extent, I can make you have certain memories
- Why does the false memory effect happen?

False memory

- With every to-be-remembered item you store some information, but not only information about the item
 - Other information is automatically generated as well
 - smooth, bumpy, tough, road, sandpaper, jagged, ready, coarse, uneven, riders, rugged, sand, boards, ground, gravel*

Memory: Item 1

smooth

rough

baby

Memory: Item 2

bumpy

smooth

rough

baby

road

Memory: Item 3

bumpy

smooth

rough

tough

baby

nails

road

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False memory

- At the end of the trial, you have a lot of items in memory that are related to the list
 - Some of them are items that were actually on the list and some of them are items that were "generated" but not actually on the list
 - Reporting all items from memory is not going to lead to good performance
 - Both types of memory items are real, but only one type matches the physical stimuli
- Good performance on this task requires *discrimination* between memories generated by physical stimuli and memories generated by internal processes
 - Source monitoring

jagged bumpy stones

smooth peaks

tough rough

baby sandpaper

gravel road nails

uneven

Memory

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Discrimination

- Good memory recall usually requires not only recall of an item from memory
- You also must identify the correct item relative to the appropriate context or time frame
 - The current trial
 - The context of the experiment
 - Relative to an earlier event
 - At a particular moment in time

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Interference

- Retroactive interference (RI)
 - new information prevents recall of previous information
 - e.g., Overwriting a computer file.
- Proactive interference (PI)
 - prior learning prohibits new learning
 - e.g., Learning new cultural customs.

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Proactive interference

- May be due to a variety of effects
 - One is that memory involves discriminating new from old
- Visual memory
 - See a set of photos
 - Then see a test photo and decide if new or old

Memory: Trial 1

Memory: Trial 2

Memory: Trial 3

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Proactive interference

- Suppose you see this building as the test on the third trial
 - You have a match in memory, but is from trial 1, not trial 3
 - You may report it having been shown in trial 3
- In general, previous trials make memory discrimination more challenging

Memory: Trial 1

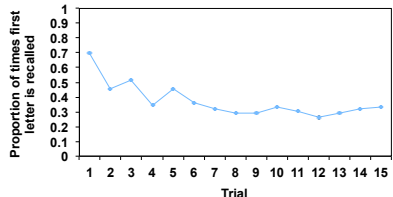
Memory: Trial 2

Memory: Trial 3

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Proactive interference

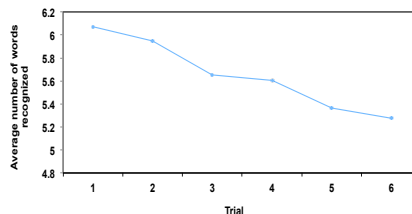
- One finds proactive interference for lots of memory tasks
- CogLab serial position experiment
 - I looked at recall of the *first* letter in each list, averaged across all students



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Proactive interference

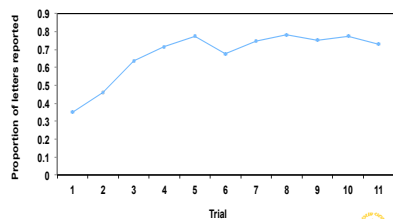
- One finds proactive interference for lots of memory tasks
- False memory experiment
 - I looked at recall identification of the normal words in the list



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Proactive interference

- Inference does not happen for *all* experiments
 - Just those related to memory
- Partial report experiment (first 12 trials had the cue *before* the letter matrix – to give you practice)



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Release from PI

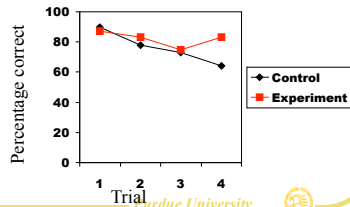
- Proactive interference weakens for different stimulus types
- Run two Brown-Peterson type experiments

Control		Experimental
XJF	Trial 1	XJF
WRM	Trial 2	WRM
DBL	Trial 3	DBL
NRX	Trial 4	942

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Release from PI

- Trials 1-3 show build up of PI
- Experimental group shows *release* of PI on Trial 4



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Release from PI

- Works for many kinds of memory tasks
- Many kinds of stimuli

5, 7, 9, 1
vs
5, 7, 9, HAND

NICE, SUNNY, ENJOY, PUPPY
vs
NICE, SUNNY, ENJOY, KILL

News stories →

D, D, D, D
vs
D, D, D, F

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Memory system

- Every memory system must have at least two components/processes
 - Storage
 - retrieval
- We have described proactive interference as being due to difficulty discriminating new items from previous items
- But there is an alternative explanation
 - Proactive interference might prevent items from being stored and thereby make them unrecalable

Working memory

- For example, working memory has a storage interference hypothesis for the phonological loop
- Working memory suggests that interference can occur
 - by blocking ACP rehearsal (articulatory suppression, Brown-Peterson task, word length effect)
 - within the PS when items sound similar
 - both of these block the *storage* of items (items fall out of the loop)

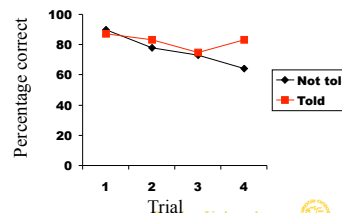
Testing models

- Test location of PI by changing instructions *after* the list is presented
- Experiment
 - stimuli are names of indoor and outdoor games
 - subjects usually do not notice that word on the fourth trial is an *indoor* game and others are *outdoor* games
- Take two groups of subjects
 - one has traditional PI type experiment
 - one is told of difference on fourth trial, at the time of test

Trial 1	FOOTBALL
Trial 2	SOCCER
Trial 3	BASEBALL
Trial 4	★ WALLYBALL

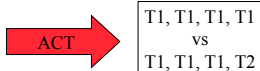
Interference at recall

- If PI prevented the last item from being *stored* your telling a subject that the fourth item was an indoor sport, should make no difference (other than guessing)
 - but it makes a big difference, they show release from PI



How to take a test

- Avoid PI
- Answering successive questions on the same topic hurts recall
 - after answering unrelated questions
 - go back to questions you cannot answer
 - less proactive interference
 - should recall more



Conclusions

- Discrimination
- Retroactive interference
- Proactive interference
- Release from PI
- Strong effects
- Knowing about can help in everyday tasks

Next time

- Constructive memory
- Flashbulb memories
- Memory misattribution
- Misleading questions

- *How good is eye-witness testimony?*

