Memory 3

Transience (Forgetting)

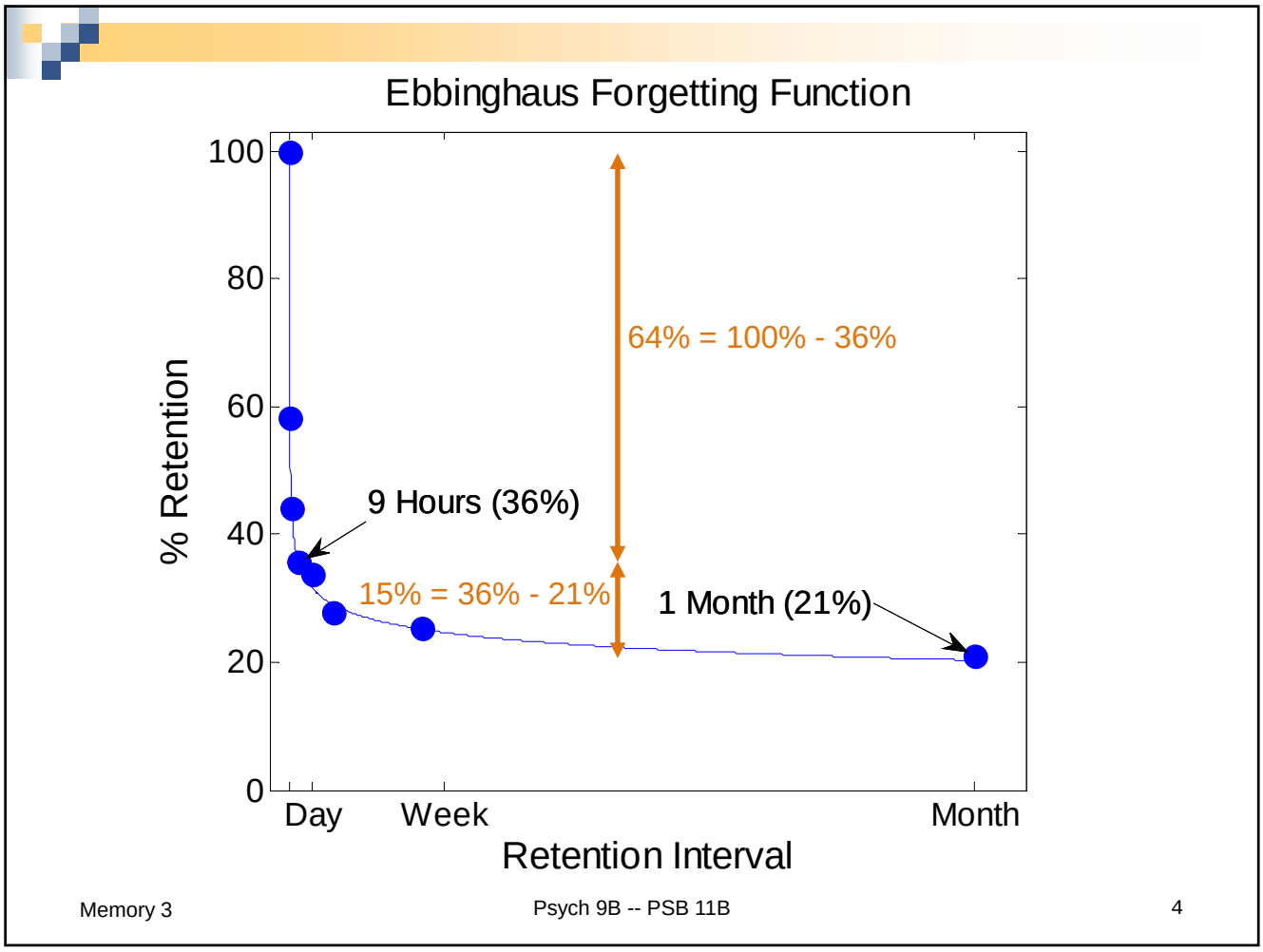
- Ebbinghaus
- For “Flashbulb Memories”
- Spacing Effect During Learning
- Aging

Transience of Memory

- Transience = forgetting that occurs with the passage of time
- Scientific understanding of transience can be traced to a book by Hermann Ebbinghaus in 1885
  - Consonant/Vowel/Consonant nonsense syllables
  - **Not**: D-O-T or B-O-L
  - **Possible:** D-A-X B-O-K Y-A-T

After learning a list of 30 nonsense syllables you are tested after either 9 hours or 1 month. Do you think you would forget more of the list in the first 9 hours or during the interval **between** 9 hours and 1 month?

A. More forgotten in 9 hours than between 9 hours and 1 month.
B. About the same amount forgotten in 9 hours than between 9 hours and 1 month.
C. Less forgotten in 9 hours than between 9 hours and 1 month.


Ebbinghaus Forgetting Function
100
80
60
40
20
0
% Retention
64% = 100% - 36%
9 Hours (36%)
15% = 36% - 21%
1 Month (21%)
Day
Week
Month
Retention Interval

Ebbinghaus's Other Contributions

- Memorization time increases sharply with the number of syllables
- Distributing learning over time is more effective than learning in a single session
- A small amount of initial practice leads to savings for later learning
- Continuing to practice material after it is "learned" enhances retention
- Primacy and recency effects
- Meaningful versus nonsense material

- For the last slide I used decisions you might make while studying to illustrate some of Ebbinghaus's findings. Is that reasonable? How do we know that what he found *generalizes* to your study situation? After all he studied only himself over a century ago, using nonsense stimuli, in an artificial setting.

  Given what you know, would you consider altering your study habits based on Ebbinghaus's results?

A. Yes, definitely
B. Possibly
C. Probably not
D. Definitely not

Internal and External Validity

- External validity question

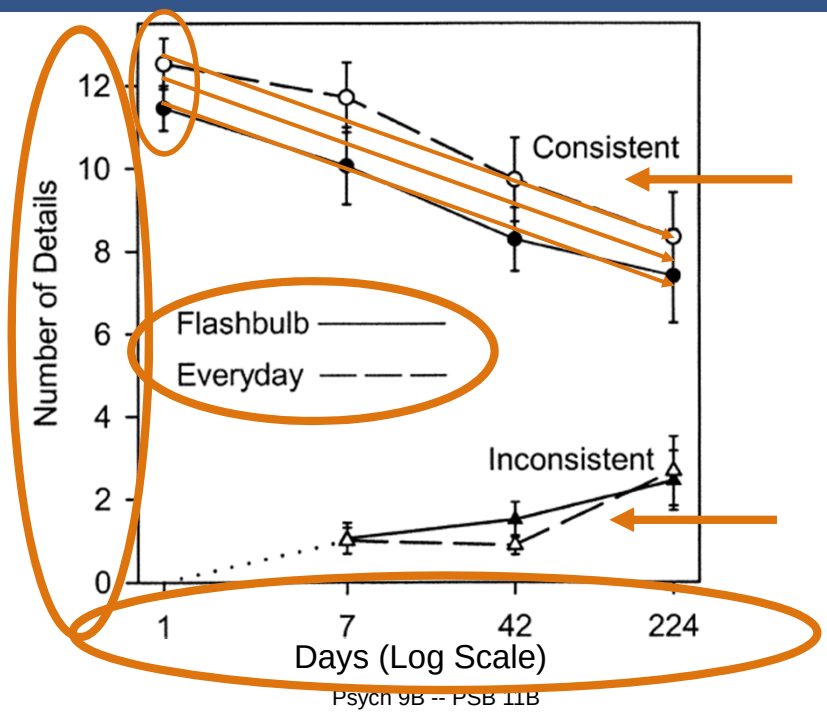
  How reasonable is it to generalize results from an experiment to other persons, places, times?
  - Replication
  - Proximal similarity
- Internal validity question

  How reasonable is it to infer that the manipulation in an experiment caused an observed change?

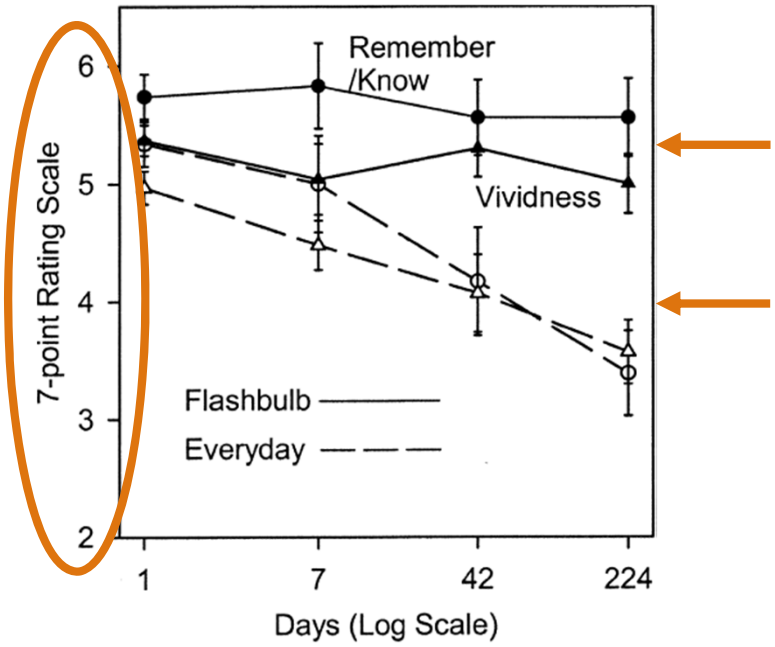
Talarico & Rubin, 2003 Description

- Interviewed 54 Duke students on September 12, 2001 and recorded
  - How they had learned of the attacks the previous morning
  - Details of some other memorable incident in their personal lives occurring in the last 3 days
- 3 randomly chosen subsets of these 18 participants were asked for the same information after one of 3 delays
  - 7 days
  - 42 days
  - 244 days

Talarico & Rubin, 2003 Results



Talarico & Rubin, 2003 Results



Summary: Transience

- Ebbinghaus first described the time course of transience.
- Our confidence in the generality of his results is increased by the many times they have been replicated using different materials, procedures, and participants.
- Transience occurs at the same rate for different materials
- Data about transience do not always match our intuitions

- You have need to learn a list of 30 facts that you will be using for at least the next year. How would you allocate your time to study them?

A. Study in the list in ***a single session*** until you know all the items.

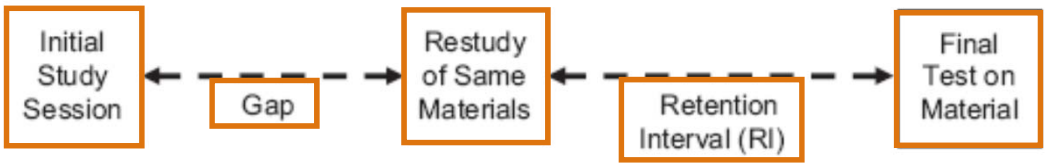
B. Study the list one day until you know the facts fairly well. Wait a ***day*** and then study the list again until you know all the items.

C. Study the list one day until you know the facts fairly well. Wait a ***week*** and then study the list again until you know all the items.

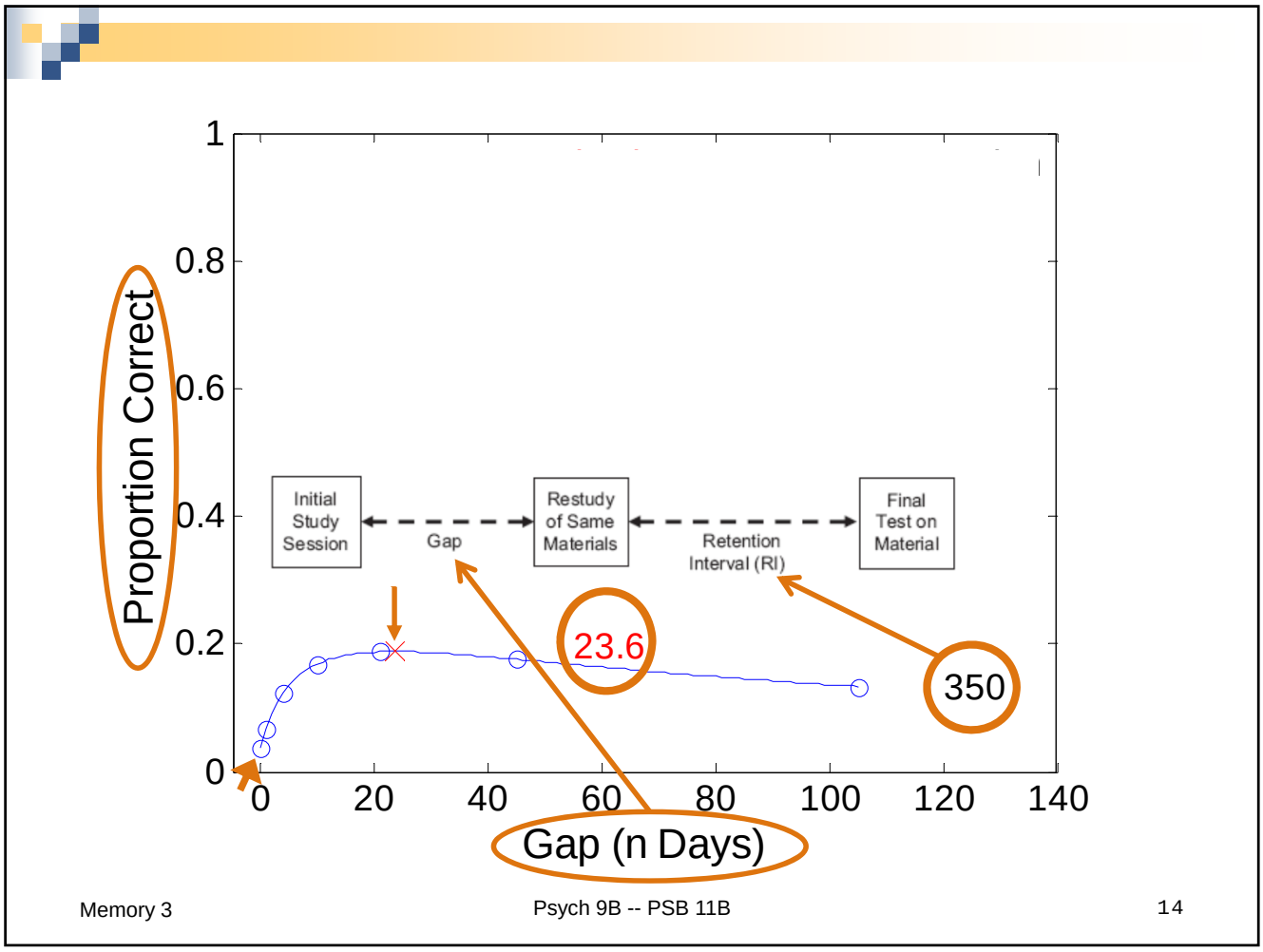
D. Study the list one day until you know the facts fairly well. Wait a ***month*** and then study the list again until you know all the items.

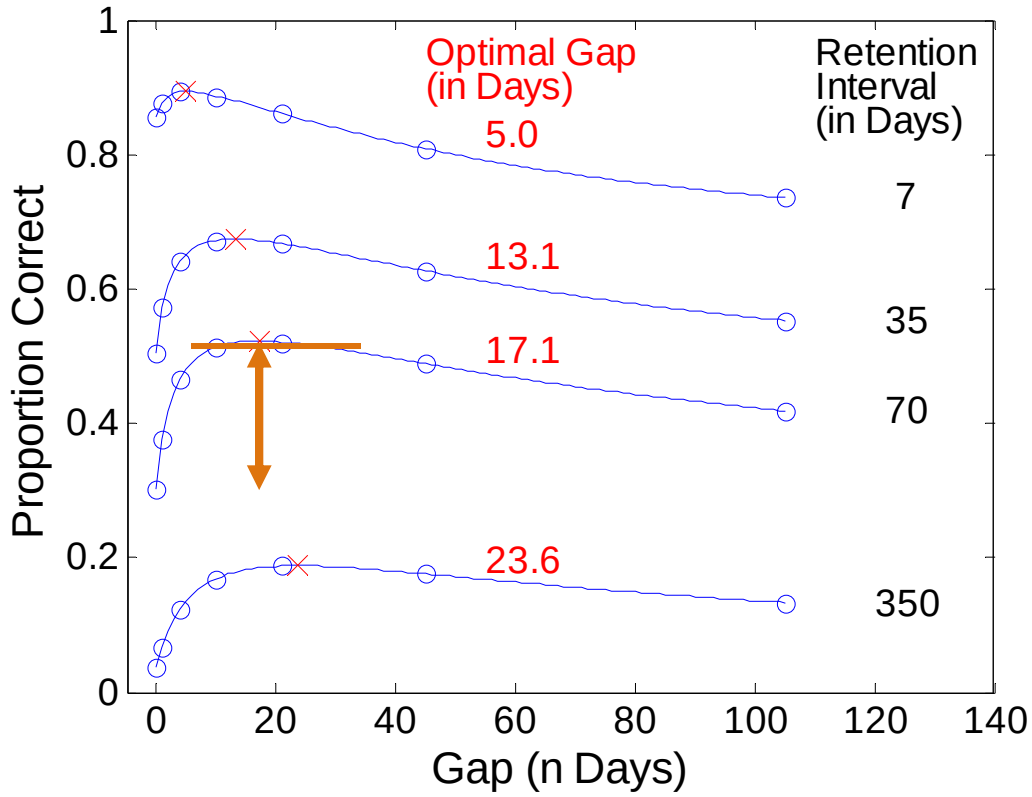
N. J. Cepeda, et al. (2008) Spacing Effects in Learning

Psychological Science, 11, 1095 - 1102



- Gaps (days): 0, 1, 2, 4, 7, 21, 105
- Retention Intervals: 7, 35, 70, 350
- Initial study session: 32 facts learned
  - Example: What European nation consumes the most spicy Mexican food?
- Restudy: entire list of questions was run through twice
- Final Test: Tested once on each question

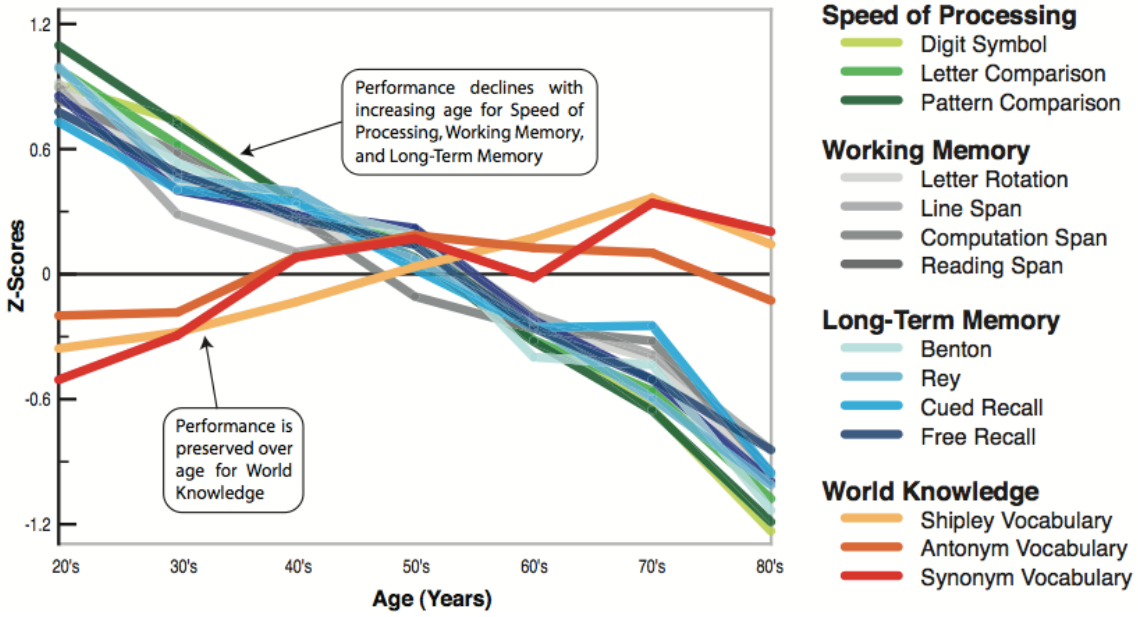

Proportion Correct
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
Gap (n Days)
Initial Study Session
Gap
Restudy of Same Materials
Retention Interval (RI)
Final Test on Material
23.6
350


Optimal Gap
(in Days)
5.0
13.1
17.1
23.6
Retention
Interval
(in Days)
7
35
70
350
Proportion Correct
Gap (n Days)
0
0.2
0.4
0.6
0.8
1
0
20
40
60
80
100
120
140

- Compared with that of your parents, would you say that your memory for past events is

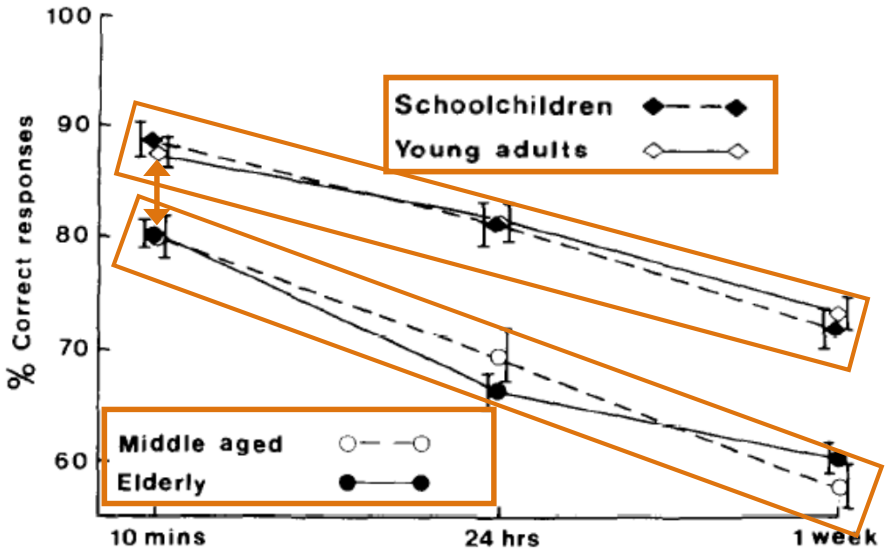
A. Much better
B. A little better
C. About the same
D. A little worse
E. Much worse

Age-Related Cognitive Decline Begins Early



From Park & Reuter-Lorenz (2009)

Transience and Aging



Data from Huppert & Kopelman, 1989

- Summary Question
  Which of the statements A-D below is *false*?

A. Transience is the loss, over time, of information that had been stored in memory.

B. Ebbinghaus studied transience under carefully controlled conditions but it has been replicated with more natural stimuli and conditions.

C. Degree of transience depends on the content of a memory trace.

D. Transience is influenced by aging.

E. All of statements A – D are correct.

Looking Ahead

- Next Wednesday Memory Chapter Test
- For Friday
  - Gleitman: Ch. 8, pp. 327-337
  - Zap #9: False Memory Task
- Coffee at Phoenix Grill?