MEMORY

"I forgot to make a back-up copy of my brain, so everything I learned last semester was lost."

PRIYANKA SRIVASTAVA

1

OVERVIEW

- What is Memory?
- Is it an unitary function?
- Stages in information Processing
- How do we study memory?
- Some models of the memory
- Clinical cases of Memory

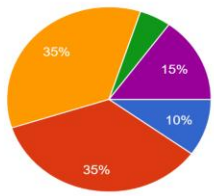
2

LET'S DO A SURVEY

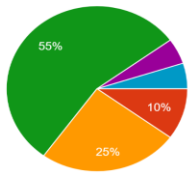
HTTPS://FORMS.GLE/OZYXKVYRNA3CCSKF7

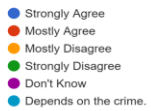
3

People suffering from amnesia typically cannot recall their own name or identity.
20 responses



In my opinion, the testimony of one confident eye-witness should be enough evidence to convict a defendant of a crime.
20 responses





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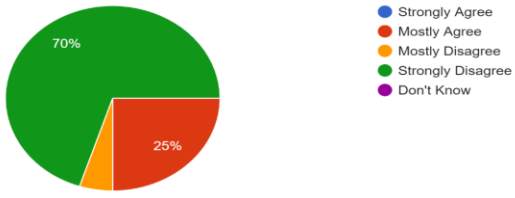
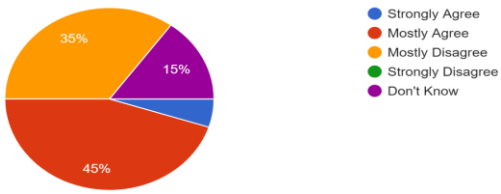
Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later.

20 responses



Hypnosis is useful in helping witnesses accurately recall details of crimes.

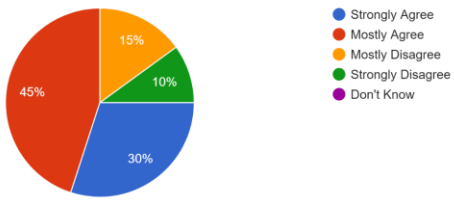
20 responses



5

People generally notice when something unexpected enters their field of view, even when they're paying attention to something else.

20 responses



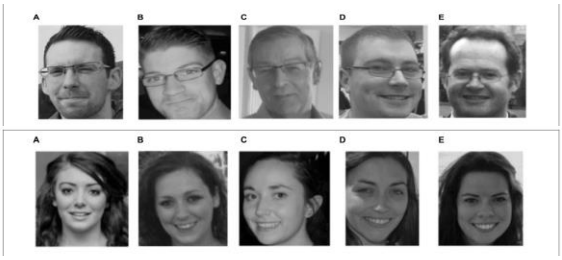
Inattention Blindness – Failure to perceive the object that are not the focus of attention

Perception & Cognition Group, Cog. Sci. Lab, KGSS, IIIT-H

6

Why this should matter?

FIGURE 1 | Screenshots of the low perceptual load video (A) and the high perceptual load video (B). The thief is visible in the foreground and the witness is visible outside the window.



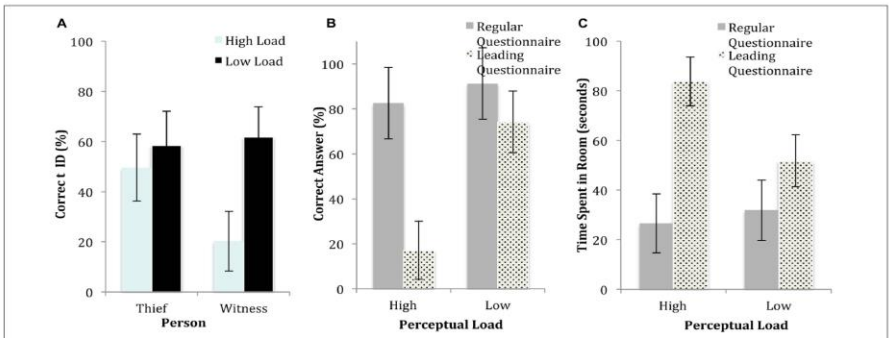
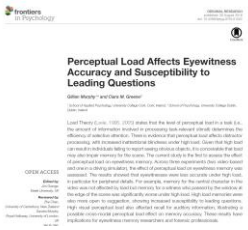


FIGURE 3 | Memory accuracy under low and high perceptual load in experiment 1A, with 95% confidence intervals shown. (A) Accuracy of identification of the thief and the witness under low and high load. **(B)** Accuracy in response to the regular and leading stapler question (*"did you see the stapler"* vs. *"did you see a stapler"*) under low and high load. **(C)** Estimates of the time the thief spent in the room, in response to regular and leading questions under low and high load.

7

FIGURE 4 | Screenshots of the shopping area in the high load (A) and low load (B) driving tasks. Pictured is the jeep that is about to be involved in the accident at the crosswalk under the billboards.



frontiers in Psychology

ORIGINAL RESEARCH

Perceptual Load Affects Eyewitness Accuracy and Susceptibility to Leading Questions

Gillian Murphy* and Ciara M. Greene*

OPEN ACCESS

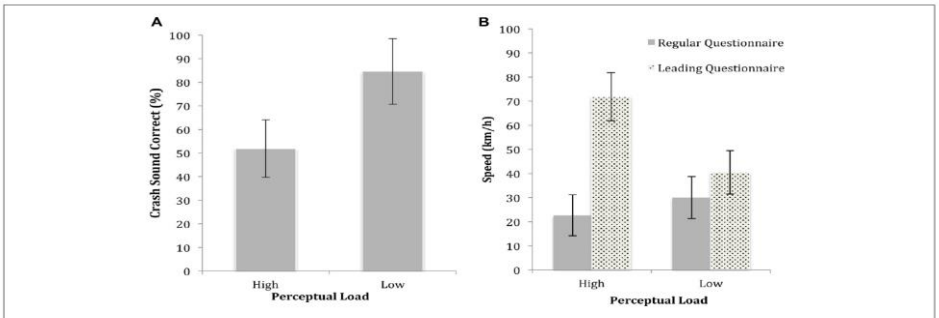


FIGURE 5 | Results from experiment 2 examining (A) cross-modal load effect of the low and high load drives, (B) the effect of a leading question about the speed of the red car, under low and high load.

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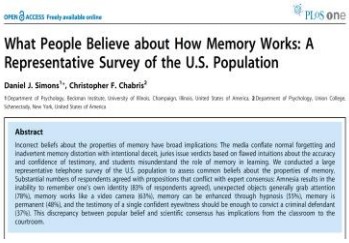
Table 2. Statements used and percentage of respondents giving each response, with the expert ($N = 16$) and the full Psychonomics sample ($N = 73$) percentages given for comparison.

Statement	Group	Strongly Agree	Mostly Agree	Mostly Disagree	Strongly Disagree	Don't Know
Amnesia: *People suffering from amnesia typically cannot recall their own name or identity.*	**Public**	47.8	34.9	10.1	3.7	3.7
	Experts	0.0	0.0	12.5	87.5	0.0
	Psychonomics	0.0	1.4	31.5	57.5	9.6
Confident testimony: *In my opinion, the testimony of one confident eyewitness should be enough evidence to convict a defendant of a crime.*	**Public**	11.2	25.9	35.1	24.7	3.1
	Experts	0.0	0.0	6.2	93.8	0.0
	Psychonomics	0.0	0.0	11.0	87.7	1.4
Video memory: *Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later.*	**Public**	23.9	39.1	23.4	11.3	2.4
	Experts	0.0	0.0	6.2	93.8	0.0
	Psychonomics	0.0	0.0	2.7	97.3	0.0
Hypnosis: *Hypnosis is useful in helping witnesses accurately recall details of crimes.*	**Public**	15.0	39.6	26.9	10.4	8.1
	Experts	0.0	0.0	18.8	68.8	12.5
	Psychonomics	0.0	0.0	15.1	69.9	15.1
Unexpected events: *People generally notice when something unexpected enters their field of view, even when they're paying attention to something else.*	**Public**	27.2	50.3	18.3	2.1	2.1
	Experts	0.0	18.8	31.2	50.0	0.0
	Psychonomics	2.7	15.1	35.6	43.8	2.7
Permanent memory: *Once you have experienced an event and formed a memory of it, that memory does not change.*	**Public**	16.5	31.1	34.7	14.1	3.6
	Experts	0.0	0.0	0.0	93.8	6.2
	Psychonomics	0.0	0.0	6.8	91.8	1.4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What People Believe about How Memory Works: A Representative Survey of the U.S. Population

Daniel J. Simons[1*], Christopher F. Chabris[2]

1 Department of Psychology, Beckman Institute, University of Illinois, Champaign, Illinois, United States of America, 2 Department of Psychology, Union College, Schenectady, New York, United States of America

Abstract

Incorrect beliefs about the properties of memory have broad implications. The media conflate normal forgetting and inadvertent memory distortion with intentional deceit, juries issue verdicts based on flawed intuitions about the accuracy and confidence of testimony, and students misunderstand the role of memory in learning. We conducted a large representative telephone survey of the U.S. population to assess common beliefs about the properties of memory. Substantial numbers of respondents agreed with propositions that conflict with expert consensus: Amnesia results in the inability to remember one's own identity (83% of respondents agreed), unexpected objects generally grab attention (78%), memory works like a video camera (63%), memory can be enhanced through hypnosis (55%), memory is permanent (48%), and the testimony of a single confident eyewitness should be enough to convict a criminal defendant (37%). This discrepancy between popular belief and scientific consensus has implications from the classroom to the courtroom.

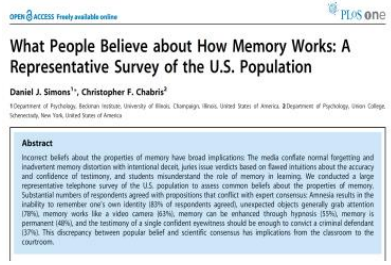
9

Across all six items, an average of 60.4% of respondents agreed with statements that the expert sample almost uniformly rejected. In other words, fewer than 40% of the responses agreed with the scientific consensus. More than half of respondents disagreed with

Amnesia: 82.7% of respondents agreed that "people suffering from amnesia typically cannot recall their own name or identity." All 16 experts disagreed.

Confident Testimony: 37.1% agreed that "in my opinion, the testimony of one confident eyewitness should be enough evidence to convict a defendant of a crime." All 16 experts disagreed.

Video Memory: 63.0% agreed that "human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later." All 16 experts disagreed.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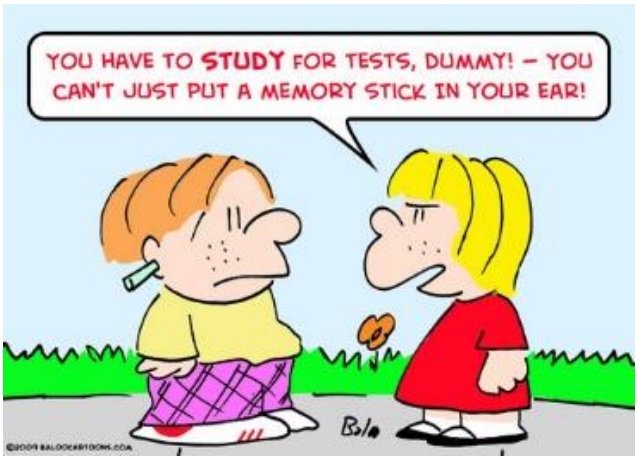
10

Hypnosis: 55.4% agreed that "hypnosis is useful in helping witnesses accurately recall details of crimes." 14 experts disagreed and 2 responded "Don't Know/ Unclear."

Unexpected Events: 77.5% agreed that "people generally notice when something unexpected enters their field of view, even when they're paying attention to something else." 13 experts disagreed and 3 agreed.

11



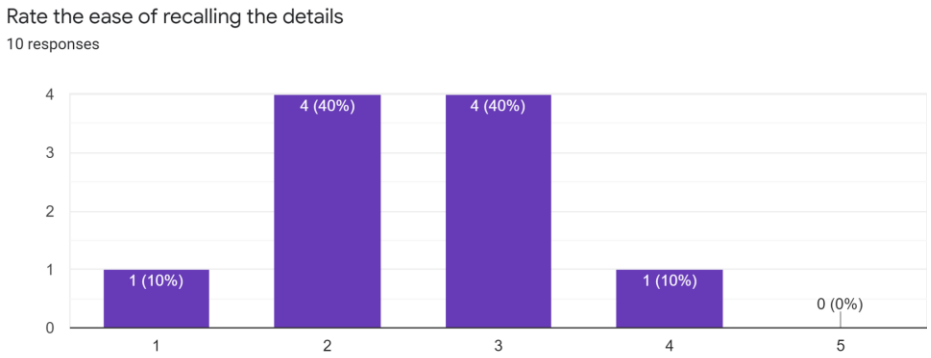
Discussion about recording and construction … leads us realize the individual differences in constructing memory in reference to the same information available at a particular time and space … ; STM loss; Jill Price; Encoding …

12

Recall the details of activities you had last week !

5 mins.

https://forms.gle/3QZC2TxgJaYvyuu88



13

13

AN INTERESTING CASE OF MEMORY – JILL PRICE

https://www.youtube.com/watch?v=SoxsMMV538U&ab_channel=JimCristea

1. Recall of dates of each Easter from 1980 – 2003
2. Dates of public events that occurred years earlier – Rodney King beating (a black American, a construction worker, a victim of police brutality, Los Angeles), O.J. Simpson (a former NLF player, acquitted of the brutal double murder), Bombing at Atlanta Olymics
3. What were your doing on “this date”, chosen randomly. To which she responded in detail as day, month, time, a friend, name of restaurants, clothes that she wore, etc.

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Psychology Press

A Case of Unusual Autobiographical Remembering

ELIZABETH S. PARKER[1], LARRY CAHILL[2] and JAMES L. McGAUGH[2]

[1]*Department of Neurology, University of California, Los Angeles, Irvine, and Psychiatry & Neurology, University of Southern California, California, USA*
[2]*Center for the Neurobiology of Learning and Memory and Department of Neurobiology and Behavior, University of California, Irvine, California, USA*

This report describes AJ, a woman whose remembering dominates her life. Her memory is “nonstop, uncontrollable, and automatic.” AJ spends an excessive amount of time recalling her personal past with considerable accuracy and reliability. If given a date, she can tell you what she was doing and what day of the week it fell on. She differs from other cases of superior memory who use practiced mnemonics to remember vast amounts of personally irrelevant information. We propose the name *hyperthymestic syndrome*, from the Greek word

14

14

ACTIVITY 1 – TOP 10 LIST

- Top 10 list of what you use memory for:
  - Remembering class timing etc….
  - 2 mins.
  - Categorize (group activity – 1 min.)

15

WHAT ARE THE PURPOSES OF MEMORY?

Retroactive – memory of past

Prospective – memory of future, planning

16

CLIVE WEARING – CASE STUDY

- Clive Wearing, British musicologist, fell ill with a viral encephalitis
- It attacked his brain and damaged hippocampus and related medial temporal lobe (perirhinal, entorhinal, and para-hippocampal), frontal lobe
- Hippocampus – formation of new memory, transform short term memory to long term memory
  - Loss of ability to form new memory – Anterograde amnesia
  - STM – 7 to 30 secs.
  - Loss the ability to recall the events happen before injury – Retrograde amnesia
- Frontal lobe – loss the control on emotion
- His music abilities remained intact – procedural memory – basal ganglia, motor cortex, and cerebellum
- Memory is not important just for past, it is equally important for your future …

17

CLIVE WEARING

18

- We sometimes forget something, which we desperately want to remember
- We sometimes remember things that never really happened
- Sometimes it serves us well and other times it miserably fails us
- When we can trust and when we should be skeptical about them?

19

WHAT IS MEMORY?

- Everything in life is memory, save for the thin edge of the present

(Gazzaniga, 2000)

- The thin edge of the present is what is happening right at this moment, but a moment from now the present will become the past, and some of the past will become stored in memory. ….."Everything in life is memory"
- Memory is the process involved in retaining, retrieving, and using information about stimuli, images, events, ideas and skills after the original information is no longer present

(Goldstein, 2008)

20

Memory is ability to encode, store and retrieve information

Encoding: Process of transforming the temporary information into a lasting memory of what our senses take in

Semantic Encoding : encoding new information in association with already stored information

22061823

Can you remember this?

Think of a meaning of the information, like a gambler would see these numbers like – betting about $220 at 6-to-1 odds on horse number 8 to place 2nd in the 3rd race –

21

Semantic Encoding : encoding new information in association with already stored information

Craik and Tulving, 1975 – presented a series of words and asked their participants to make one of the three judgements –

- Semantic judgement
- Rhyme judgement
- Visual judgment

- Semantic judgement (association, meaning) – HAT – is hat a type of clothing?
- Rhyme judgement (sound) – Does hat rhyme with cat?
- Visual judgment (visual appearance) – written in uppercase or lowercase?

Recall showed better memory with semantic encoding than other processes

22

Encoding: Process of transforming the temporary information into a lasting memory

Visual Imagery Encoding: storing information in form of images

Visual Imagery – encoding – method of loci

Organizational Encoding: organizing information according to the relationships between items

Organizational - encoding

Activity : Recall the items

Divide into three groups, by asking only the active group look at the screen, rest close their eyes

Organization: categories

Peach, Cow, Chair, Apple, Table, Cheery, Lion, Couch, Horse, Desk

Visual Imagery: place them with their images in head

Peach, Cow, Chair, Apple, Table, Cheery, Lion, Couch, Horse, Desk

Semantic: Organize them with elaborative associations

Peach, Cow, Chair, Apple, Table, Cheery, Lion, Couch, Horse, Desk

STORAGE - IS MEMORY AN UNITARY FUNCTION?

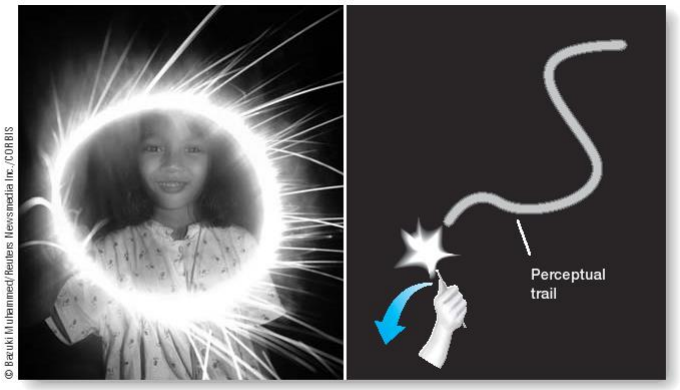
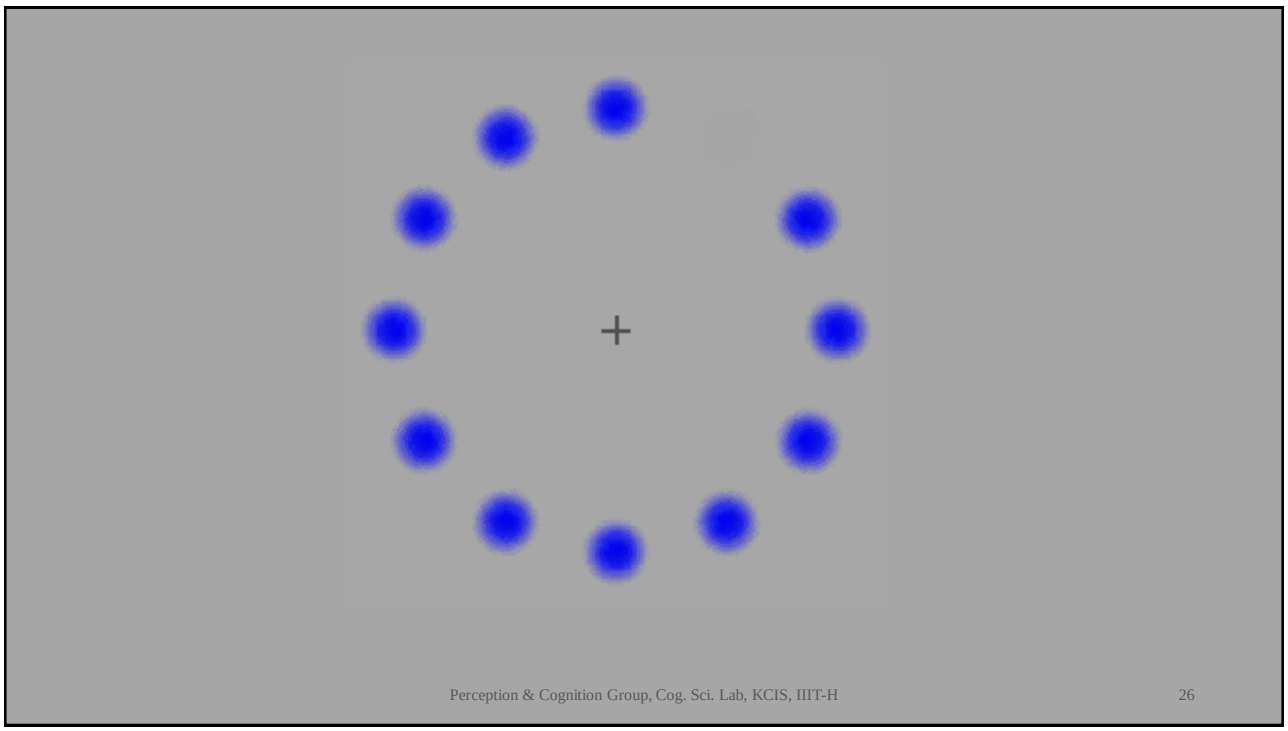


Figure 5.5 (a) A sparkler can cause a trail of light when it is moved rapidly. (b) This trail occurs because the perception of the light is briefly held in the mind.

Storage: process of maintaining information in memory over time, i.e. retaining the information

25



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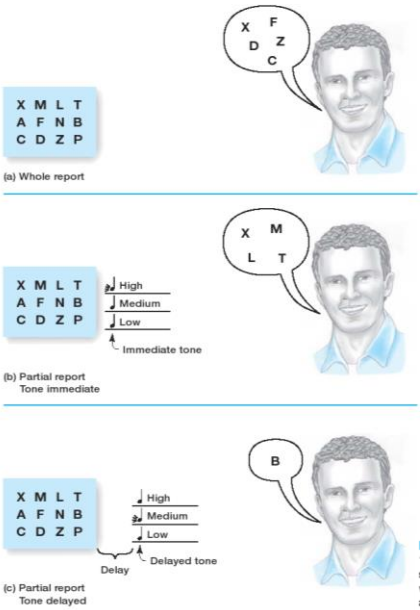
U G J X

P J M B

F C A L

27

SENSORY MEMORY



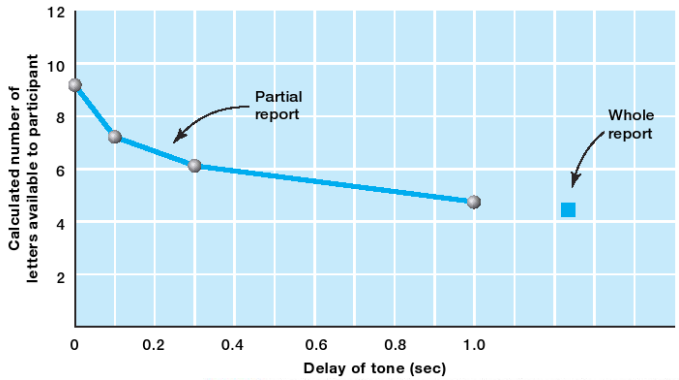


Figure 5.7 Results of Sperling's (1960) partial-report experiments. The decrease in performance is due to the rapid decay of iconic memory (called *sensory memory* in the modal model). (Reprinted from "The Serial Position Effect in Free Recall," by B. B. Murdoch, *Journal of Experimental Psychology, 64*, pp. 482–488. Copyright © 1962 with permission from the American Psychological Association.)

Figure 5.6 Procedure for three of Sperling's (1960) experiments. (a) Whole report procedure: Person saw all 12 letters at once for 50 msec. and reported as many as he or she could remember. (b) Partial report: Person saw all 12 letters, as before, but immediately after they were turned off, a tone indicated with row the person was to report; (c) Partial report, delayed: Same as (b), but with a short delay between extinguishing the letters and presentation of the tone.

28

28

STM *VS.* LTM– SERIAL POSITION EFFECT

Stimulus

Drum
Curtain
Bell
Coffee
School
Parent
Moon
Garden
Hat
Farmer
Nose
Turkey
Color
House
River

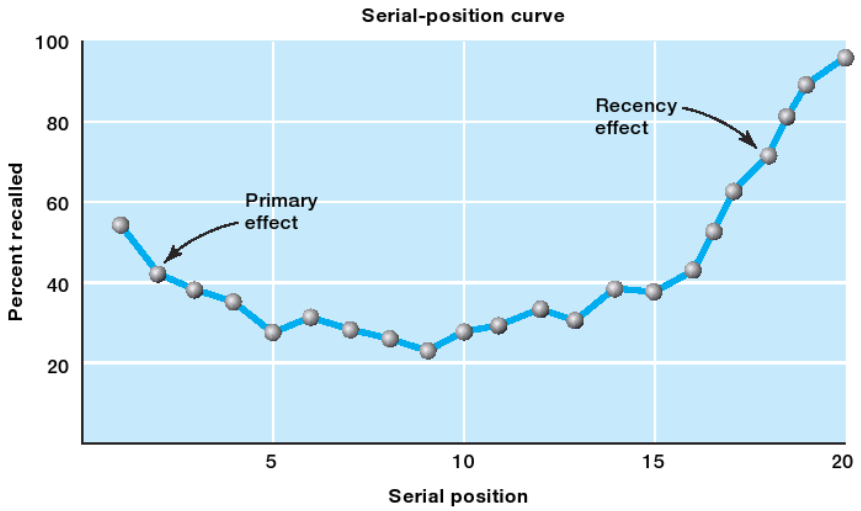
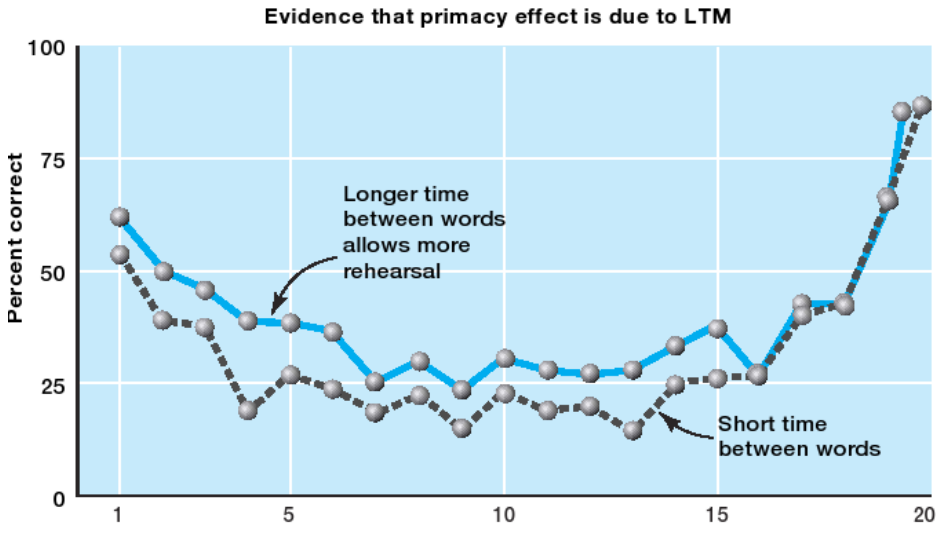


Figure 5.8 Serial-position curve (Murdoch, 1962). Notice that memory is better for words presented at the beginning of the list (primacy effect) and at the end (recency effect).

29

STM VS. LTM



b)

Figure 5.9 Result of Glanzer and Cunitz's (1966) experiment. Memory for earlier words is better when words are presented more slowly (solid line). (Reprinted from *Journal of Verbal Learning and Verbal Behavior, 5,* M. Glanzer et al., "Two Storage Mechanisms in Free Recall," pp. 351–360 (Figures 1 & 2), copyright © 1966, with permission from Elsevier.)

30

30

STM VS. LTM

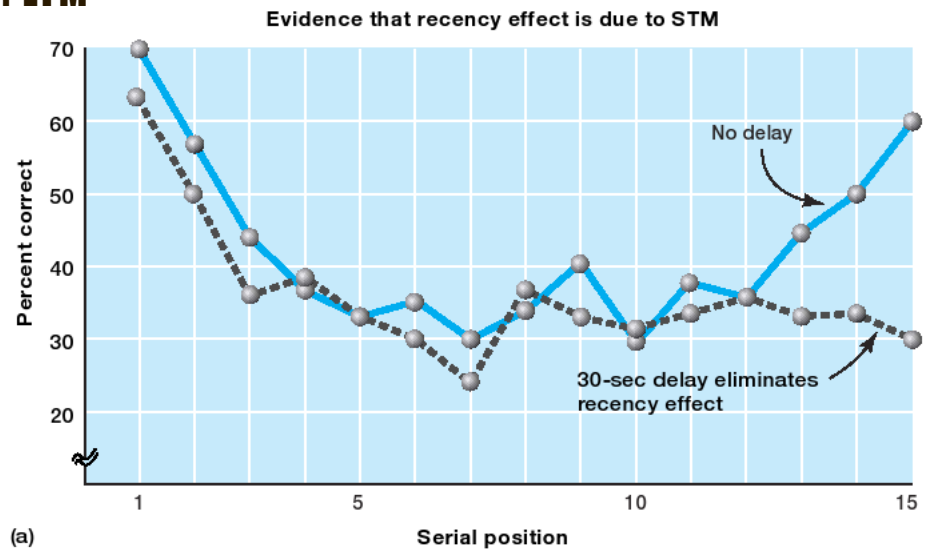


Figure 5.9 Result of Glanzer and Cunitz's (1966) experiment. (a) The serial-position curve has a normal recency effect when the memory test is immediate (solid line), but no recency effect occurs if the memory test is delayed for 30 seconds (dashed line).