

The Reconstruction of the Past

Lecture 20

Knowledge and Memory

- Semantic Memory
 - Generic Knowledge, Beliefs
 - Abstract
- Episodic Memory
 - Particular Experiences and Behaviors
 - Specific Events

What is the Relation Between
General Knowledge and
Memory for Specific Events?

Person Memory Paradigm

- Variant on Verbal-Learning Paradigm
 - List Items are Behaviors, Experiences
 - Rather than Words, Pictures
- Knowledge of a Person
 - Generic (Semantic) Knowledge
 - Traits, Attitudes
 - Episodic Knowledge
 - Specific Behaviors and Experiences

Phase 1: Study Trait Ensemble

Judy is:

- Intelligent
- Intellectually Sophisticated
- Artistically Sensitive
- Refined
- Imaginative
- Witty

Unitary Impression as *Schema*

Bartlett (1932)

- Organized Knowledge Structure
 - Knowledge, Beliefs
 - Expectations
- Generalized, Abstract
- Cognitive Basis for Perception and Memory
- Basis for “Effort after meaning”

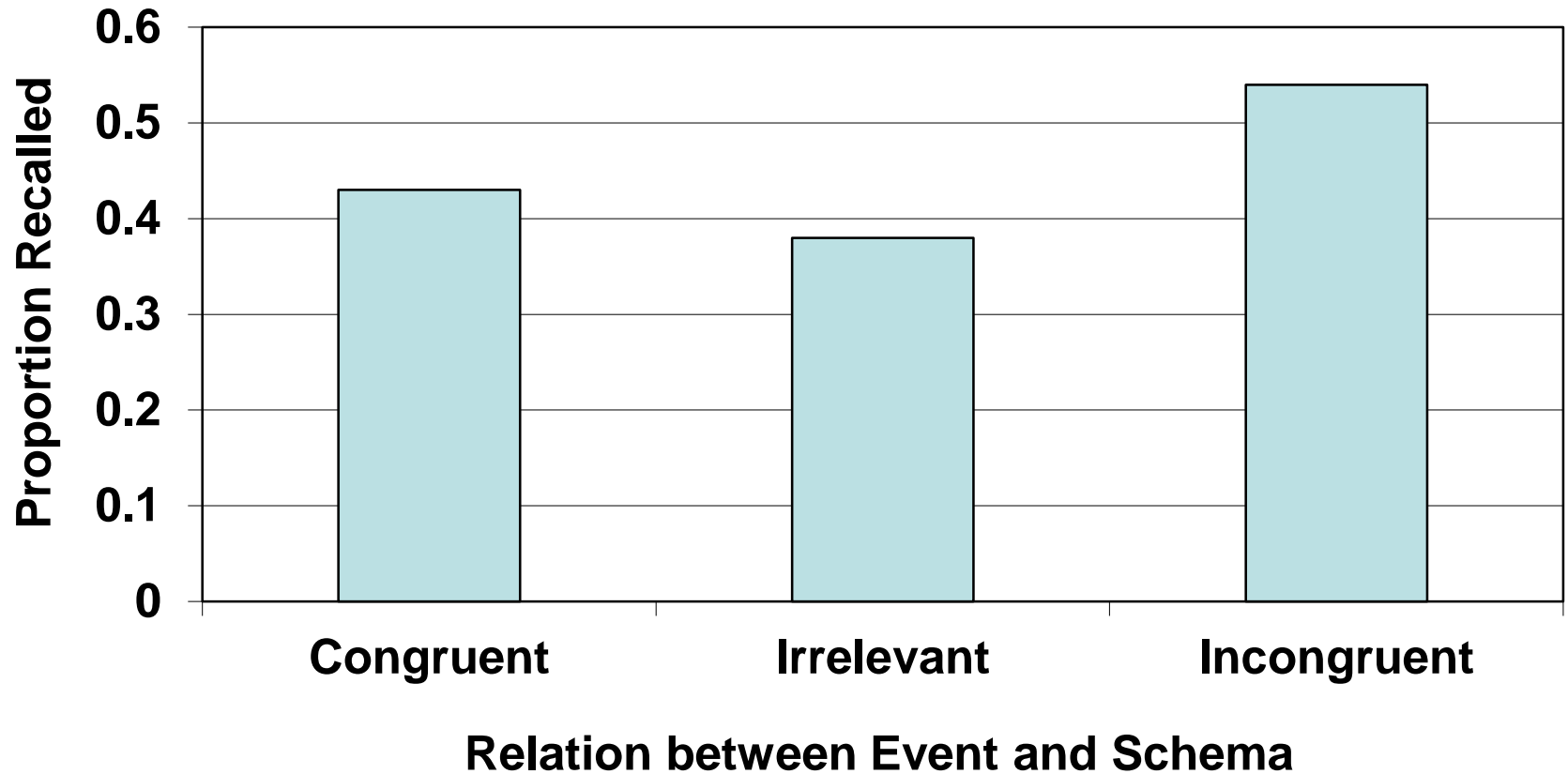
plural: *Schemata* or “Schemas”

Phase 2: Study Behaviors

- Schema-Congruent
 - $p(\text{behavior} \mid \text{schema}) > p(\text{behavior} \mid \text{no schema})$
 - Judy won the chess tournament.
 - Judy attended the symphony concert.
- Schema-Incongruent
 - $p(\text{behavior} \mid \text{schema}) < p(\text{behavior} \mid \text{no schema})$
 - Judy made the same mistake three times.
 - Judy was confused by the daytime television show.
- Schema-Irrelevant
 - $p(\text{behavior} \mid \text{schema}) = p(\text{behavior} \mid \text{no schema})$
 - Judy ordered a sandwich for lunch.
 - Judy took the elevator to the third floor.

Schema-Congruence and Memory

Hastie & Kumar (1979)



The Schematic Processing Principle

Memory for a specific event is a function of the relationship between that event and pre-existing schemata (knowledge, expectations, beliefs).

Two Processes in Schema-Dependency

- Schema-*Congruent* Behaviors
 - Easily Encoded
 - Schema Provides Retrieval Cues
 - Cue-Dependency
- Schema-*Incongruent* Behaviors
 - Must Be Explained
 - Explanation Requires Processing
 - Elaboration
- Schema-*Irrelevant* Behaviors
 - Receive Neither Benefit

The Schematic Processing Principle Expanded

- Memory is a function of the relationship between an event and pre-existing schemata.
- *Schema-relevant* events are remembered better than schema-irrelevant events.
- Among schema-relevant events, *schema-incongruent* events are remembered better than schema-congruent events.

Principles of Memory

- Encoding
 - Elaboration
 - Organization
- Storage
 - Time-Dependency
 - Interference
- Retrieval
 - Cue-Dependency
 - Availability vs. Accessibility
 - Encoding Specificity
 - Schematic Processing

The Library Metaphor of Memory

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The Library Metaphor

- Encoding
 - Purchase a Book
 - Catalog a Book
- Storage
 - Book on Shelf
- Retrieval
 - Look up Book in Catalog
 - Get Book from Shelf
 - Dewey Decimal System
 - Library of Congress
 - Read Contents

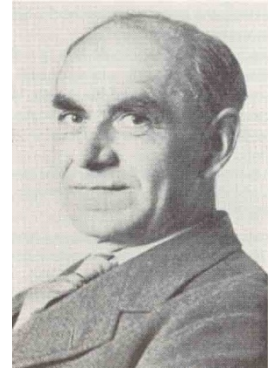
Memory as Reproduction

(ever since Ebbinghaus)

- Remembering as Reproducing Event
 - Encoding makes Knowledge Available
 - Retrieval Gains Access to Knowledge
- Mechanisms of Forgetting
 - Unavailability
 - Poor Encoding
 - Inaccessibility
 - Poor Retrieval

Memory as Narrative

Bartlett (1932)



- Objections to Verbal-Learning Paradigm
 - Rote Associations
- Remembering More Like Telling Stories
- Study Memory for Stories, Not for Lists
 - Method of Repeated Reproduction
 - Subjects Repeat the Same story
 - Method of Serial Reproduction
 - Subjects Repeat *Each Others'* Stories



The War of the Ghosts

Native American Folktale Collected by Franz Boas
Bartlett (1932)

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Native American Folktale Collected by Franz Boas
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One night two young men from Egulac went down to the river to hunt seals, and while they were there it became foggy and calm.

Then they heard war-cries, and they thought: "Maybe this is a war-party".

They escaped to the shore, and hid behind a log.

Now canoes came up, and they heard the noise of paddles, and saw one canoe coming up to them.

There were five men in the canoe, and they said: "What do you think? We wish to take you along. We are going up the river to make war on the people".

One of the young men said: "I have no arrows".

"Arrows are in the canoe", they said.

"I will not go along. I might be killed. My relatives do not know where I have gone. But you", he said, turning to the other, "may go with them".

So one of the young men went, but the other returned home.

The War of the Ghosts, continued

And the warriors went on up the river to a town on the other side of Kalama. The people came down to the water, and they began to fight, and many were killed.

But presently the young man heard one of the warriors say: “Quick, let us go home: that Indian has been hit”.

Now he thought: “Oh, they are ghosts”. He did not feel sick, but they said he had been shot.

So the canoes went back to Egulac, and the young man went ashore to his house, and made a fire.

And he told everybody and said: “Behold I accompanied the ghosts, and we went to fight. Many of our fellows were killed, and many of those who attacked us were killed. They said I was hit, and I did not feel sick”.

He told it all, and then he became quiet. When the sun rose he fell down. Something black came out of his mouth. His face became contorted. The people jumped up and cried.

He was dead.

Memory Errors in *The War of the Ghosts*

Bartlett (1932)

- Errors of Omission
 - Progressive Forgetting
 - Gist vs. Minor Details
 - Unexpected Details
- Errors of Commission
 - Rationalization
 - Transformation of Detail
 - Transformation of Order

Memory as Reconstruction

Bartlett (1932)

- Retrieve Dominant Details
 - Trace Information
 - Vague, Fragmentary, Ambiguous
 - General “Attitude” Toward Story
- Schema-Based Inferences
 - Attitudes
 - Expectations
 - World Knowledge
- Coherent Story
 - But May Not Be Accurate

The Reconstruction Principle

Memory reflects a blend of information contained in memory traces and knowledge, expectations, and beliefs derived from other sources.

Eyewitness Memory Paradigm

Loftus, Miller, & Burns (1978)

- Variant on Verbal-Learning Paradigm
 - List is Continuous Scene
 - Rather than Words, Pictures
 - View Slide Show, Film
 - Subsequent Memory Test

Imagine That You're a Bystander Watching the Following Scenes

Courtesy of Prof. Elizabeth F. Loftus
UC Irvine





Now, For Some Questions

Visual Recognition Test

What Did You See?

A



B



What Did You See?

A



B



What Did You See?

A



B



Correct



What Did You See?

A



Correct



B



Post-Event Misinformation Effect

Loftus, Miller, & Burns (1978)

- Staged Traffic Accident

- Critical Question

- Nonleading

- Did you see another car pass the red Datsun while it was stopped at the **yield** sign?

- Leading

- Did you see another car pass the red Datsun while it was stopped at the **stop** sign?

- Recognition Tests

- Car at *Yield Sign* or *Stop Sign*

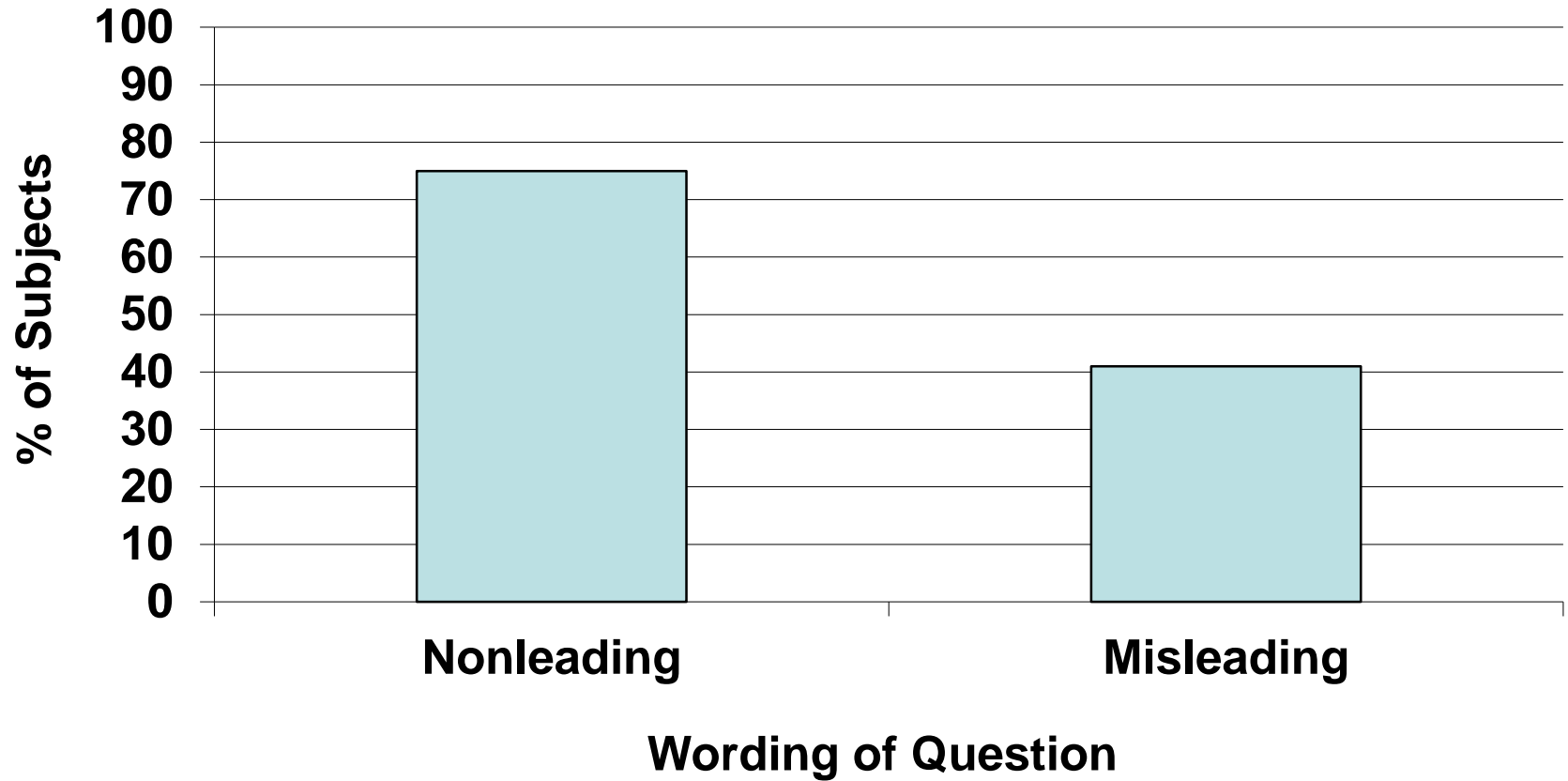


Structure of the Study

	<u>Question</u>	
<u>Stimulus</u>	<i>Yield Sign</i>	<i>Stop Sign</i>
<i>Yield Sign</i>	Nonleading	Misleading
<i>Stop Sign</i>	Misleading	Nonleading

Correct Recognition of Sign

Loftus, Miller, & Burns (1978)



Post-Event Misinformation Effect

- Leading Questions Can Influence Eyewitness Report
 - Memory Not “Pure”
- Misinformation Gleaned from Leading Questions Can Be Incorporated into Memory for Event

The “Needle” List

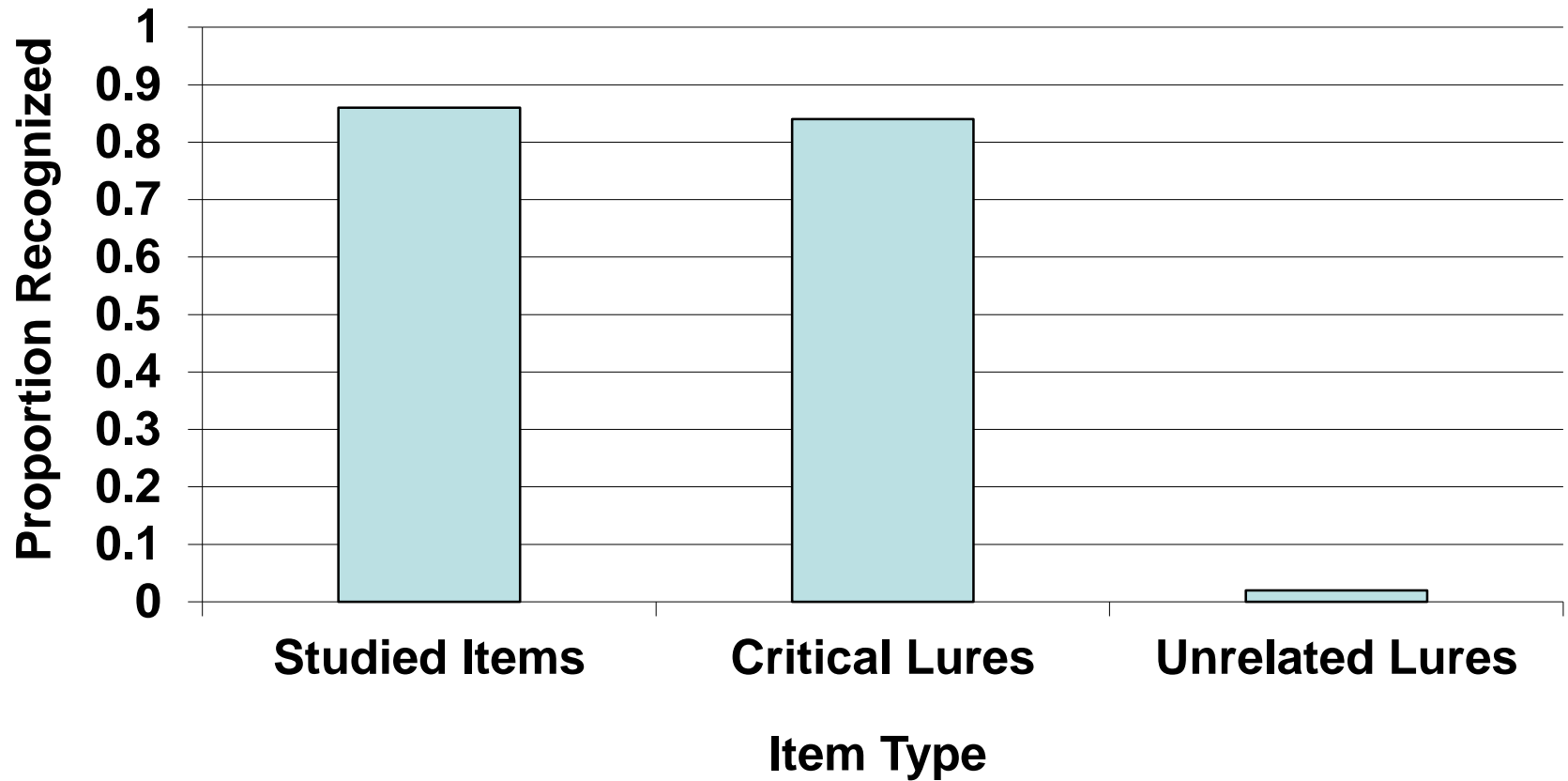
Roediger & McDermott (1995), after Deese (1959)

Thread
Pin
Eye
Sewing
Sharp
Point
Prick
Thimble

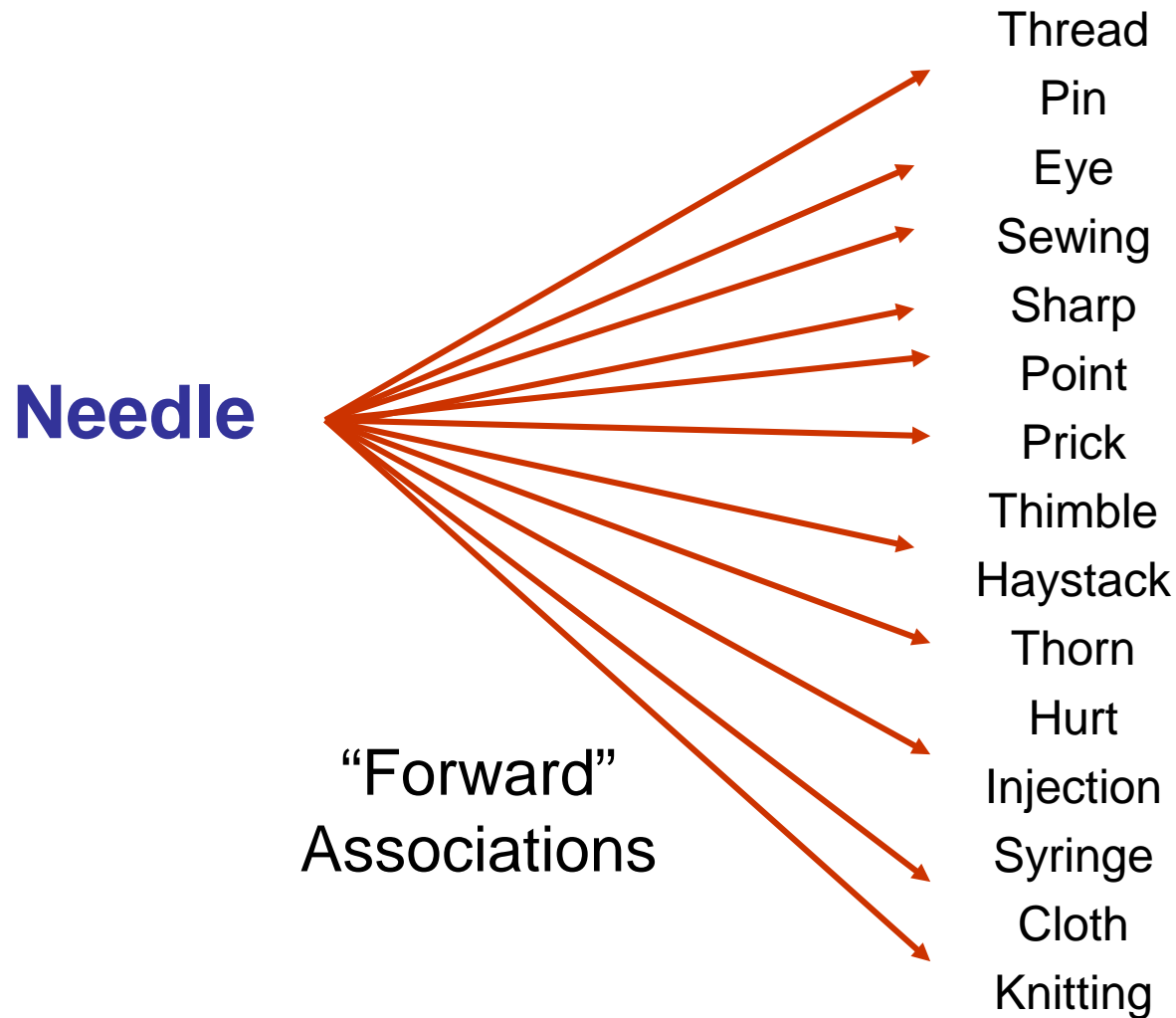
Haystack
Thorn
Hurt
Injection
Syringe
Cloth
Knitting

The Associative Memory Illusion

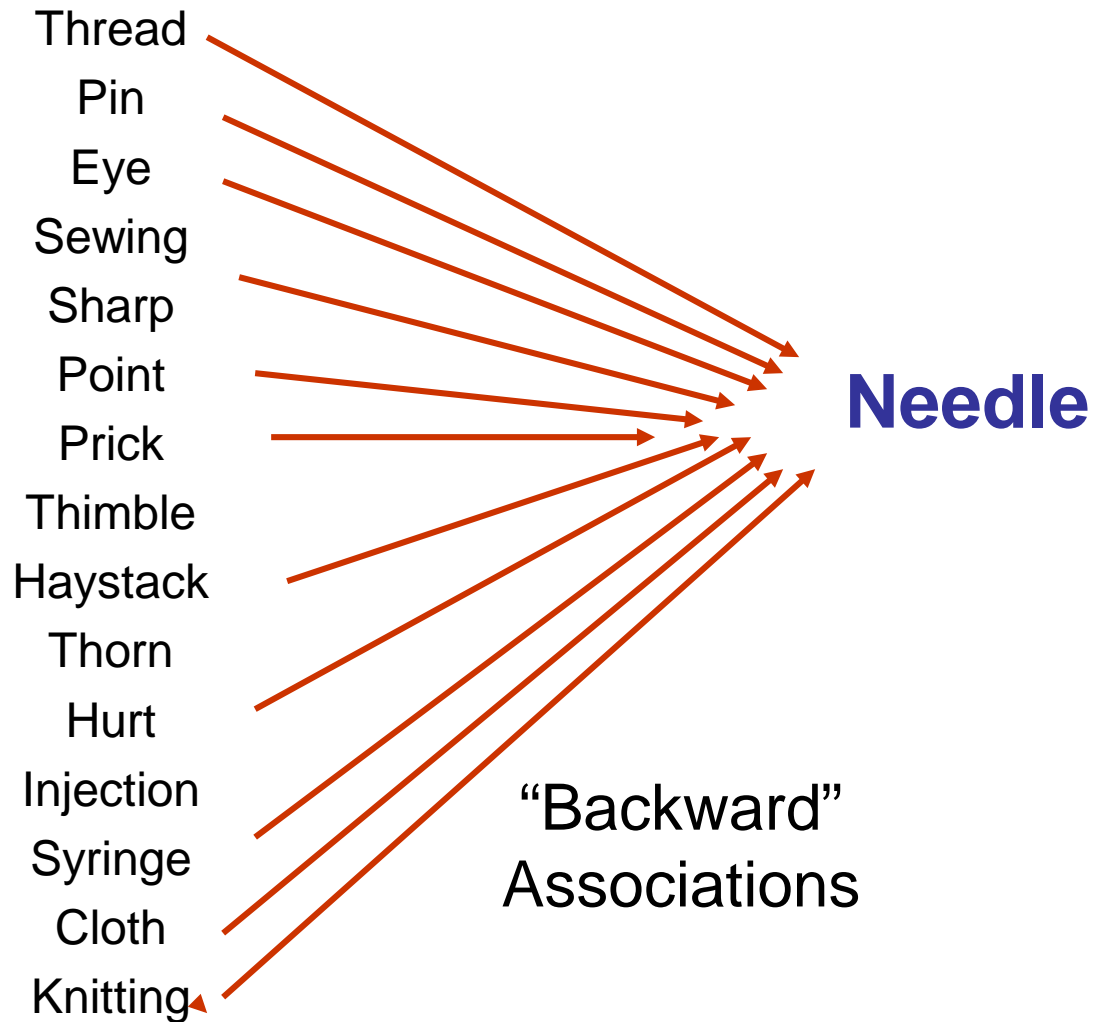
Roediger & McDermott (1995)



Semantic Associates of *Needle*



Inducing the Associative Memory Illusion



Illusions in Perception and Memory

- Perceptual Illusions

- Perceive the *Present* Inaccurately

- Systematic Distortion, Bias

- Product of Constructive Activity

- “Going Beyond the Information Given” in Stimulus

- Memory Illusions

- Remember the *Past* Inaccurately

- Systematic Distortion, Bias

- Product of *Reconstructive* Activity

- “Going Beyond the Information Given” in Trace

Implications of the Reconstruction Principle

Memory reflects a blend of information contained in memory traces and knowledge, expectations, and beliefs derived from other sources.

Memories are Not *Records Of* the Past.

Memories are *Beliefs About* the Past.

Seven (Plus or Minus Two) Principles of Memory

- Encoding
 - Elaboration
 - Organization
- Storage
 - Time-Dependency
 - Interference
- Retrieval
 - Cue-Dependency
 - Availability vs. Accessibility
 - Encoding Specificity
 - Schematic Processing
 - Reconstruction

At least so far as *conscious* recollection is concerned....

Explicit and Implicit Memory

Schacter (1987)



- **Explicit Memory**
 - Conscious Recollection of Past Event
 - Recall, Recognition
- **Implicit Memory**
 - Change in Experience, Thought, Action
 - Attributable to Past Event
- **Dissociation**
 - Explicit Memory Impaired
 - Implicit Memory Spared

“Guessing Game”

- Word-Stem Completion

I’m thinking of a word that begins with these three letters. Can you fill in the blanks?

Ash_____

Bel_____

Cle_____

Exp_____

- Word-Fragment Completion

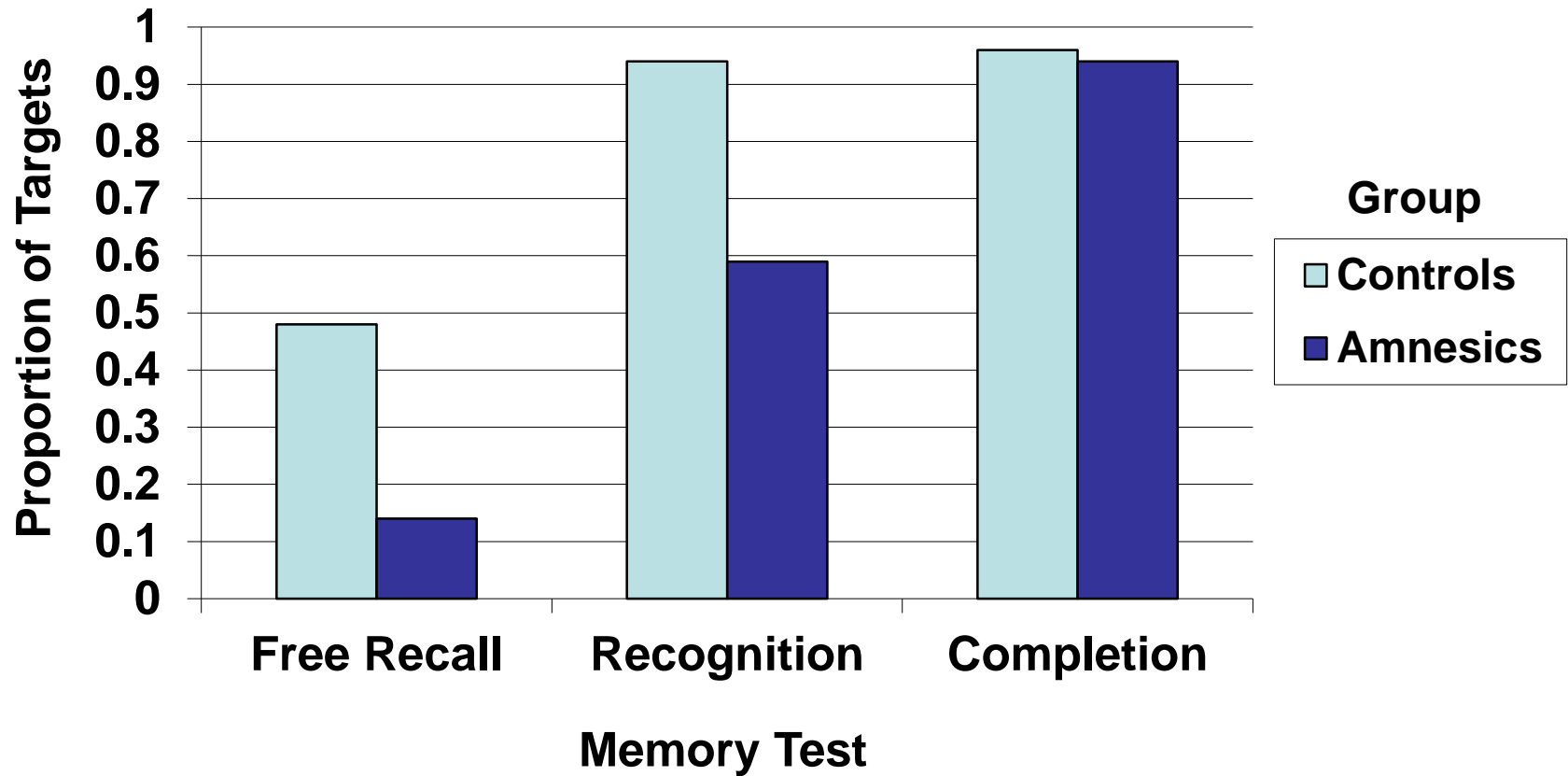
I’m thinking of a word that has these letters in it. Can you fill in the blanks?

D___k

F_I___w

Memory in the Amnesic Syndrome

After Warrington & Weiskrantz (1970)



Priming as Implicit Memory

- Performance of One Task
 - Studying a List of Words
- Facilitates Performance of Another Task
 - Word-Stem, Word-Fragment Completion

Unified View of Perception, Memory

- Constructive Activity in Conscious Cognition
 - Perceptual Construction
 - Builds Up Representation of Present Experience
 - Memory **Re**construction
 - Builds Up a Representation of Past Experience
- Unconscious Cognition
 - Implicit Perception
 - “Subliminal” Perception
 - Implicit Memory
 - Priming Effects in Amnesia
 - and “Subliminal” Perception