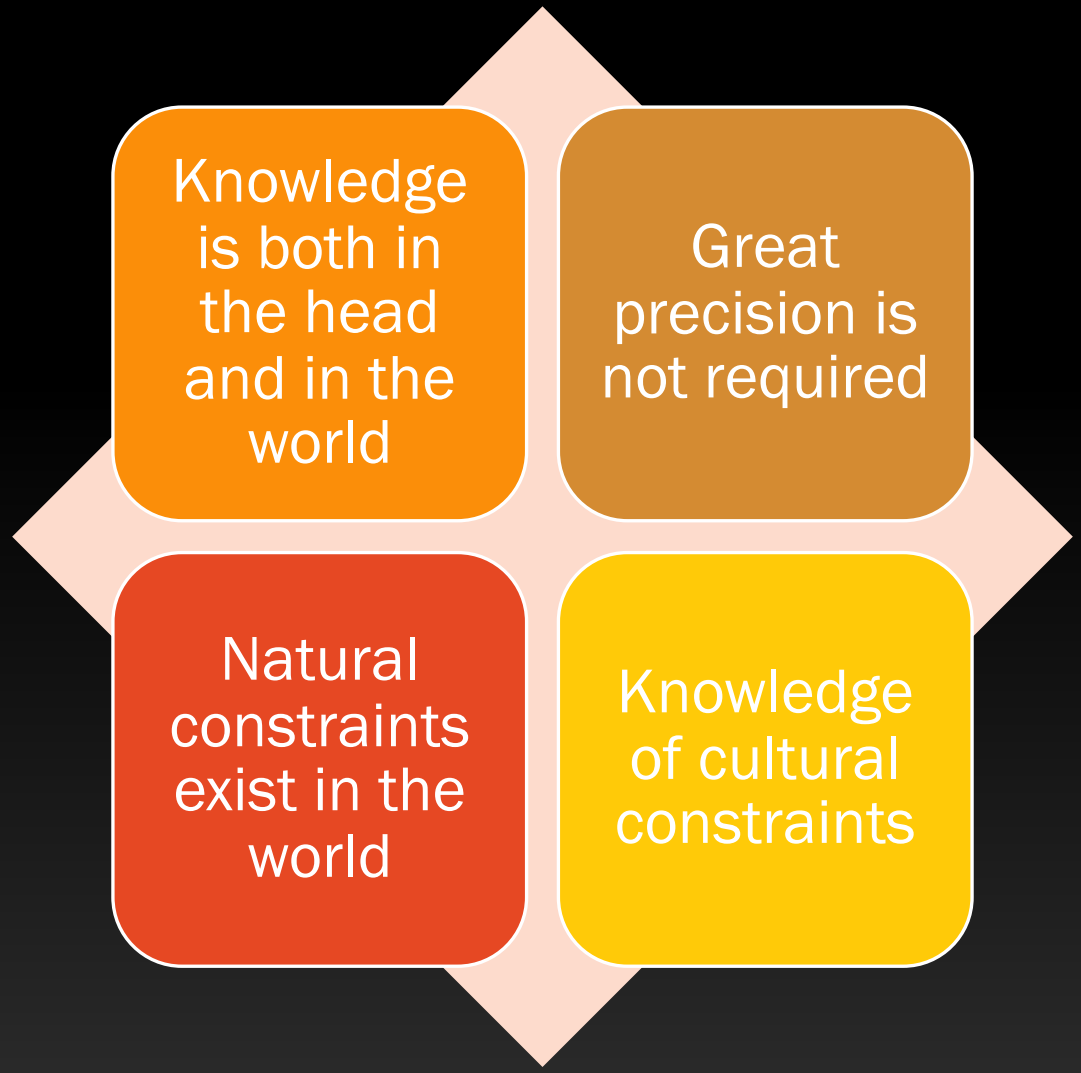
Knowledge: in head and world

PRESENTER: HAWI REGAA

Which is the US One-Cent Coin?

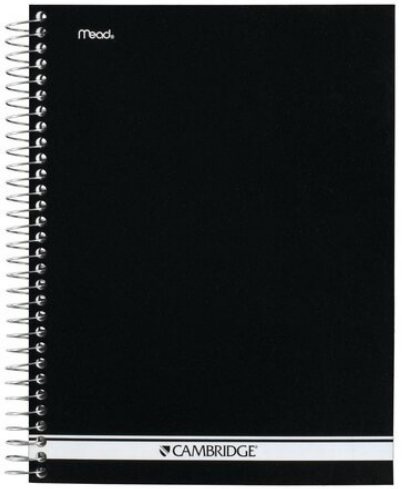
Precise Behavior from Imprecise knowledge



It is in the world!

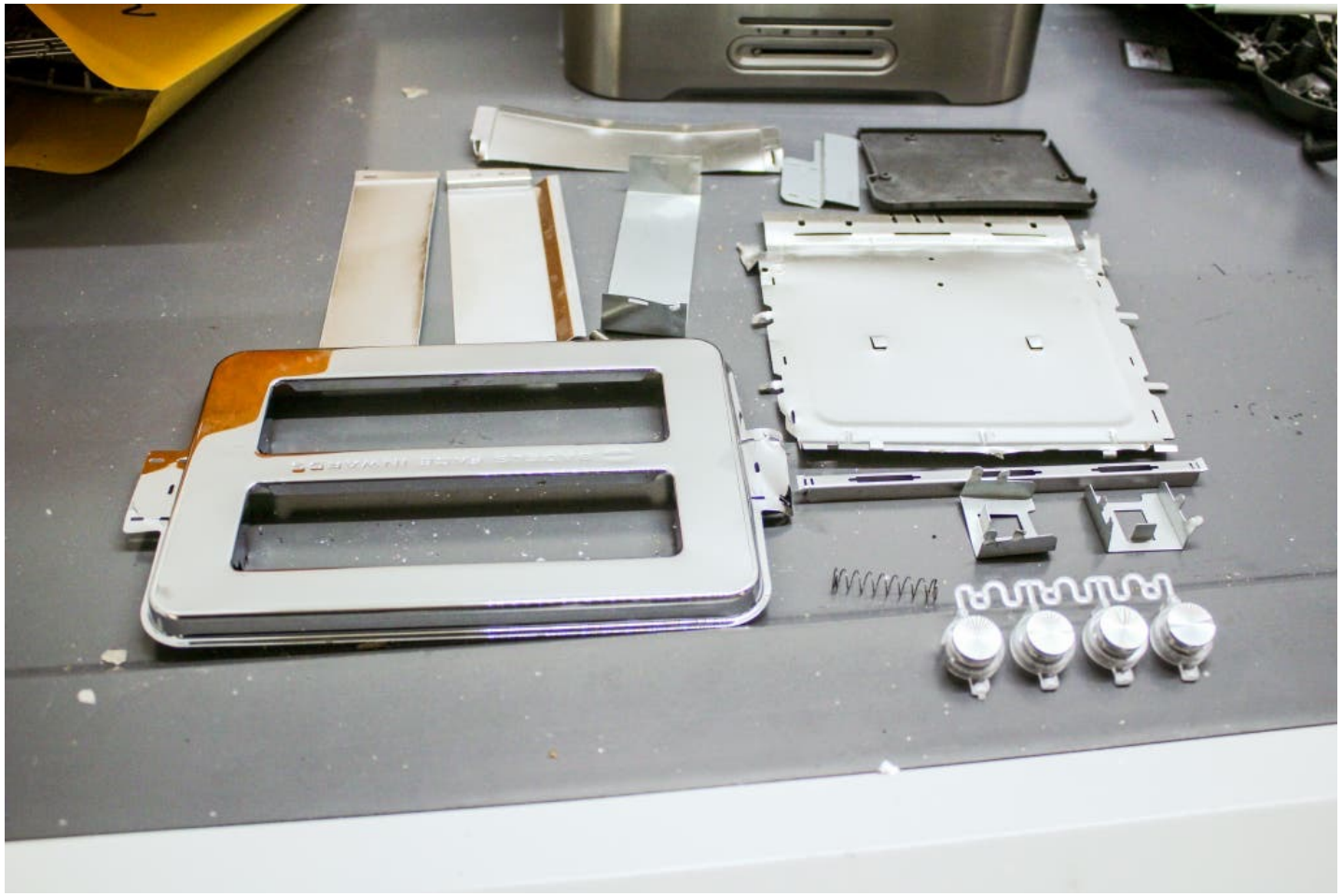
- Knowledge of:
  - Declarative knowledge
- Knowledge how:
  - Procedural knowledge

When is precision required?



Constraint simplify memory

- Rhyming poems
- Toaster in pieces



Memory is knowledge in the head

Many codes exist to make life easier

- Postal code, telephone, etc

Security codes are different

- How do we cope?
  - “password,” “123456,” and “abc123.”
- Real issues:
  - Identity theft, criminals
- Require complexity
  - “Strong” password
  - Change frequently

Multiple identifiers

Something you have

Physical identifiers: cards, keys, biometric

Something you know

Memorized : knowledge in the head

Structure of memory

Short-term memory (working memory)

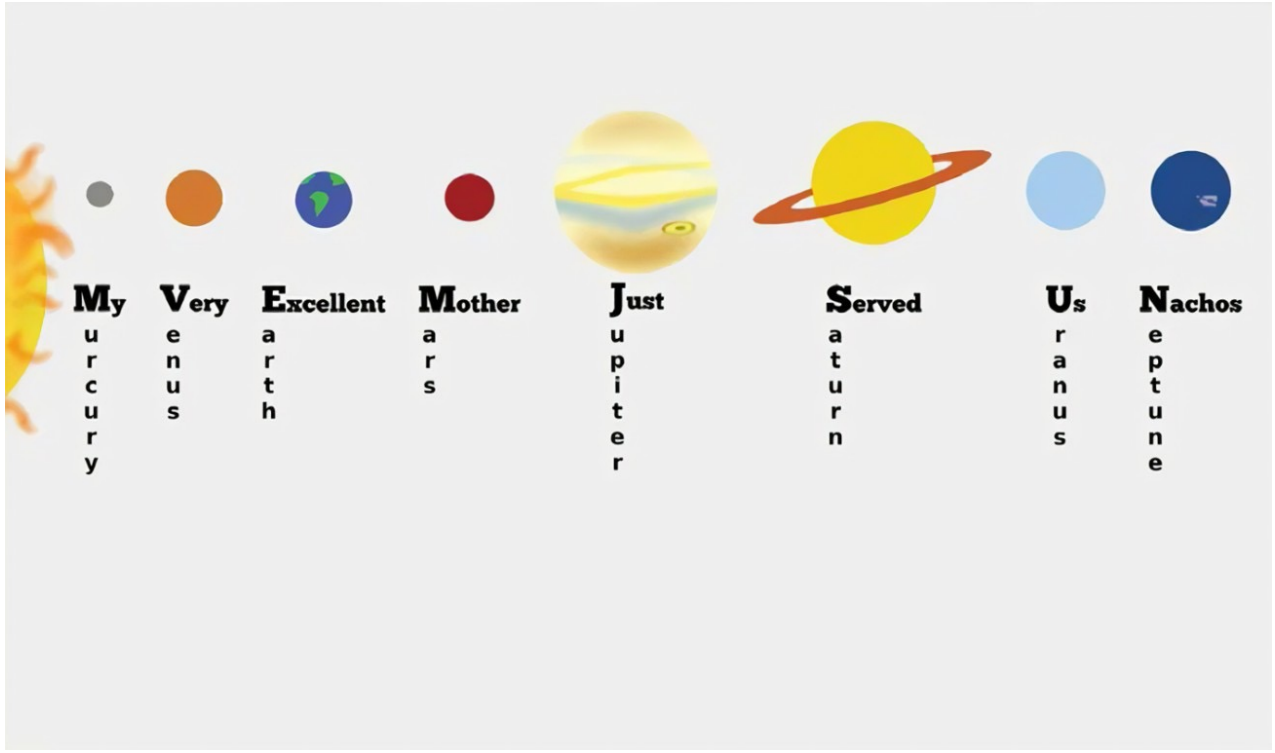
Present

The burden is limited: e.g. multiple 65 by 46

Useful for everyday tasks

Names, Phrase,

Memorized until distracted



How can we help it?

Mnemonics!

Multiple Sensory Modalities to mitigate STM

Don’t interfere:

Visual info with auditory

Action with auditory or written material

Present different information with different modalities.

E.g. Auditory instruction for driving

Design Implications

- Don’t count on STM.
- How do we remember critical info?
  - Write it down
  - nurses do it all the time
- Provide meaningful structures:
  - Make memory unnecessary

Long -Term Memory

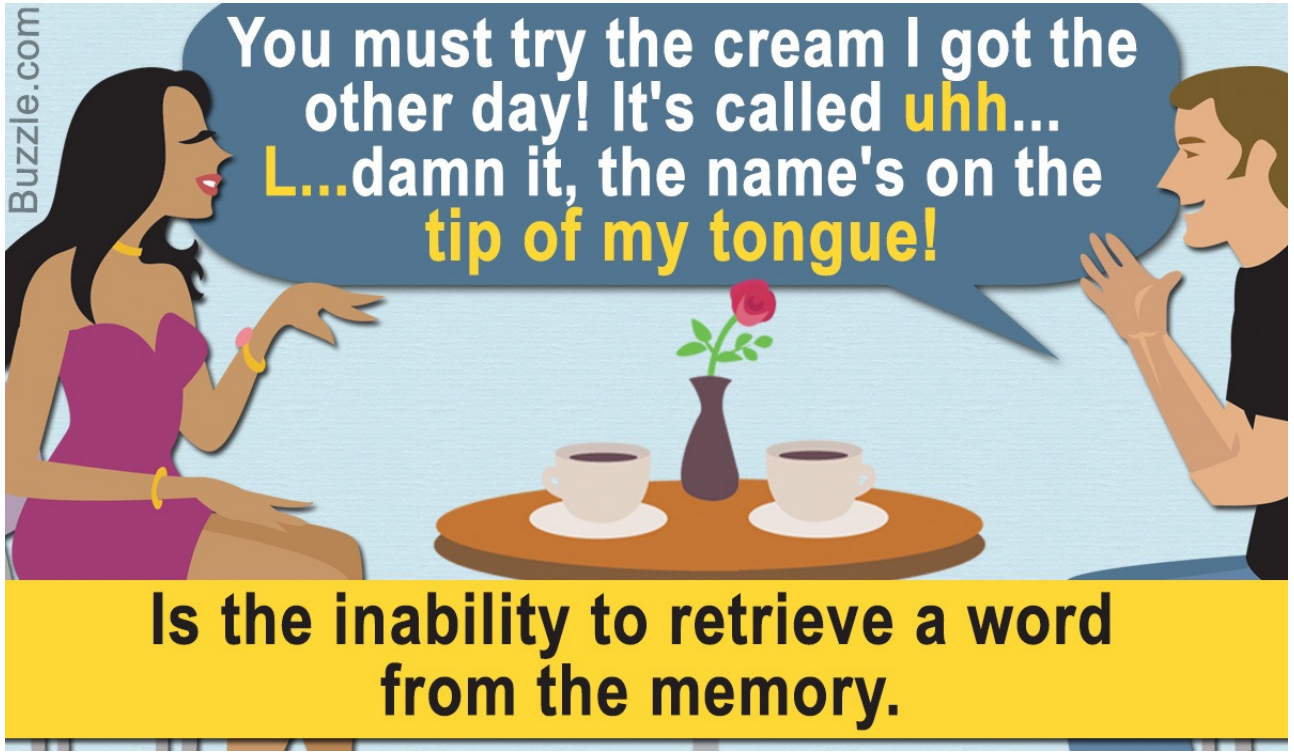
Takes time to get into it, takes time to get it out

Experiences are altered

Retrieval = reconstructive processing

Flawed

E.g. eye witness testimony



LTM Difficulties

- Not organized
  - Tip of the tongue

Memory for arbitrary and meaningful things

- The alphabet names:
  - Has no meaning or obvious structure
- Rote learning
  - memorization by repetition
- Arbitrary associations
  - names to faces
  - Motorbike handlebar e.g.

Approximate Models

Example 1:

- It is 55°F -> Celsius
- °C = (°F−32) × 5 / 9 = 12.8
- °C = (°F−30) / 2 = 12.5

Example 2:

- There are five memory slots in short-term memory. Each time a new item is added, it occupies a slot, knocking out whatever was there beforehand.

Prospective memory

- Reminders!
  - Knowledge is in head
  - Need reminders for your reminders
- if not important and far:
  - Place burden on the world
- 2 aspects for ideal reminders
  - Signal: knowing to remember
  - Message: info itself

Multiple heads, Multiple devices

“That new place where they grill meat”

“Oh, the Korean barbecue on Fifth Street?”

“No, not Korean, South American, um,“

“Oh, yeah, Brazilian, it’s what’s its name?”

“Yes, that’s the one!”

“Pampas something.”

“Yes, Pampas Chewy. Um, Churry, um,”

“Churrascaria. Pampas Churrascaria.”

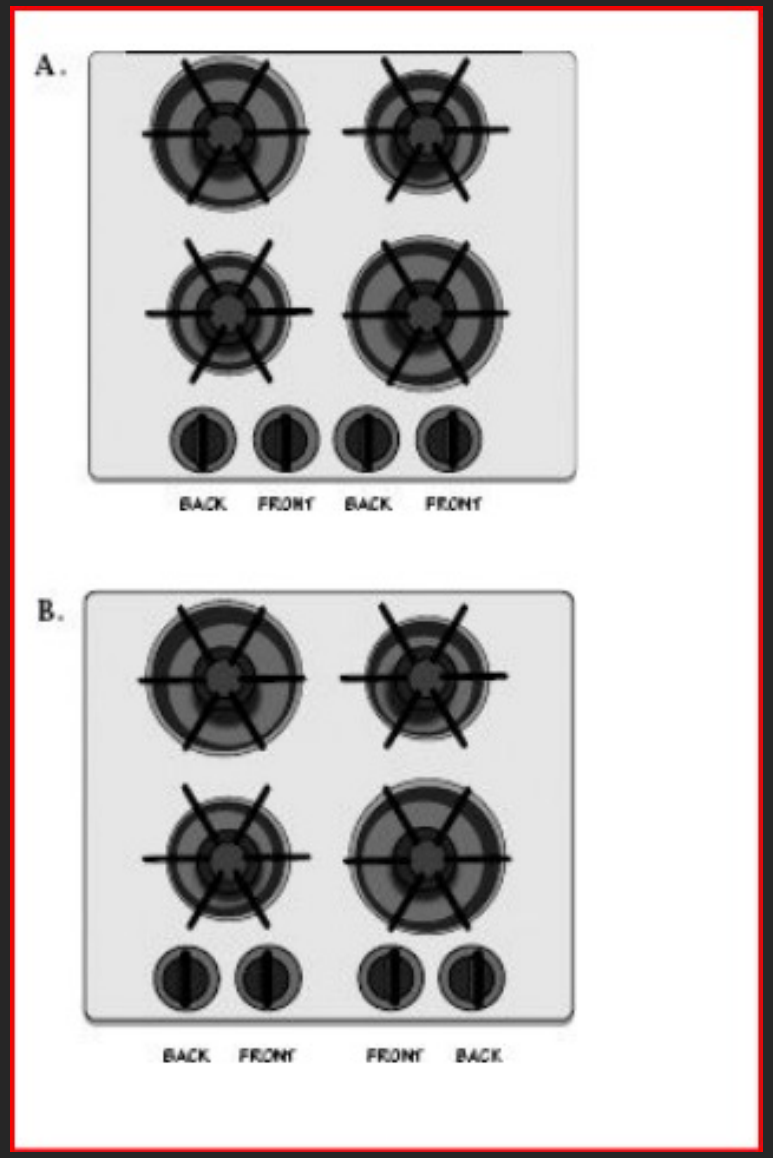
Transactive Memory

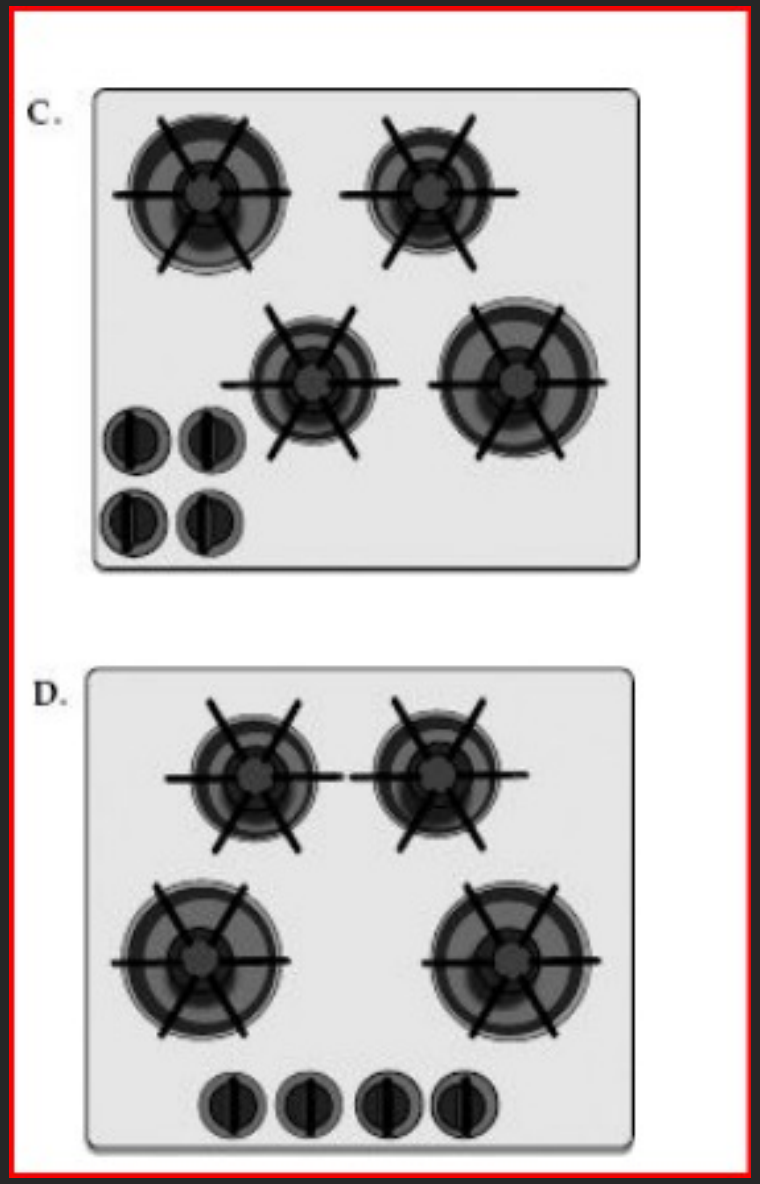
- Each adds their bit of knowledge
- Turn to technological aids (Cybermind)

Natural mapping

Best mapping: Controls are mounted directly on the item to be controlled.

- Second-best mapping: Controls are as close as possible to the object to be controlled.
- Third-best mapping: Controls are arranged in the same spatial configuration as the objects to be controlled.





Good examples

Consider:

- gesture controlled faucets
- soap dispensers,
- hand dryers.

Design can differ with culture

- Difference in perception of time
  - Aymara Indians of South America :
    - What we see is in front
    - What we can’t see is in the future(behind us)

Thank you