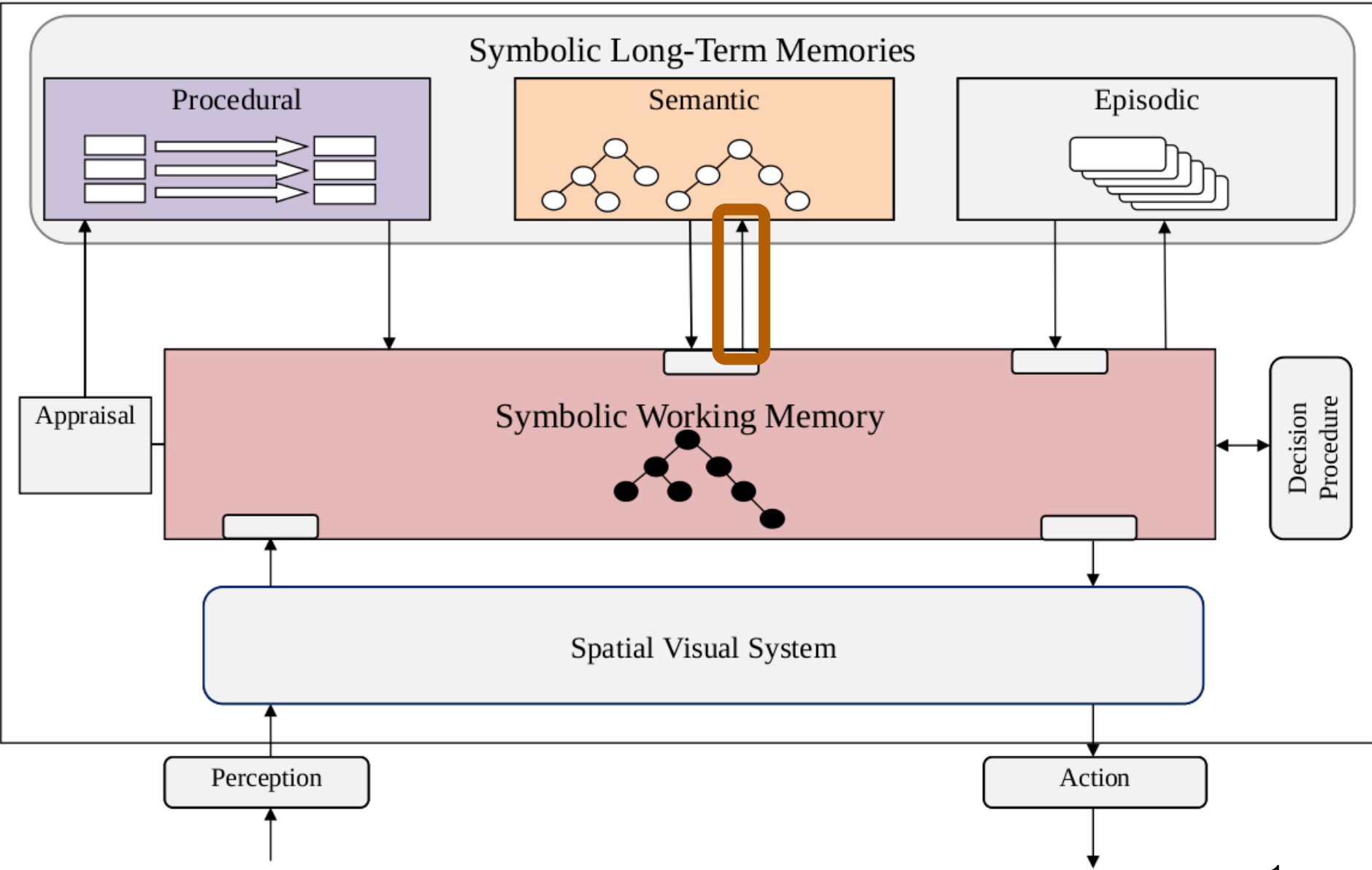


Current Activation Work

Steven Jones



What is Activation?

2

- A number
- Loosely a measure of utility or importance
- Associated with a single “memory”
 - Working Memory Element (WME)
 - Long-Term Identifier (LTI)
 - Episode?
- Based on Recency and/or Frequency of access
- Can decay with time
 - e.g. Base-Level

Why use Activation?

3

- **Semantic Memory (SMEM):**
 - Metadata to bias retrieval when multiple Long-Term Identifiers (LTIs) match
 - Pick the one with highest activation
- **Working Memory (WMEM):**
 - Metadata to determine whether or not to forget a Working Memory Element (WME)
 - Forget ones with activation below some threshold

Idea

4

- Useful in SMEM <-> Useful in WMEM?
 - If something is worth retrieving, it might also be worth not forgetting
 - **If something is worth not forgetting, it might also be worth retrieving**
- “Transfer” activation from working memory to semantic memory.

Transfer?

5

- WMEs get their activation boosted when tested in rules.
- A boost to a WME's activation should be a boost to the activation of a LTI in that WME
- Call the same function used to boost activation for a LTI in SMEM

How can transfer be tested?

6

- Word Sense Disambiguation
 - Given an ambiguous cue (word without a labelled sense) and large body of words, select the right sense.
 - Example: “minute”
 - a measure of time
 - small
 - a measure of angular distance
- How well can activation be used to disambiguate senses based only on memory access?

Task

7

“... a/1 [minute]/2 detail/1 ...”

- Input:
 - “minute”
- Ideal Output:
 - “minute, 2”

What else is needed?

8

- A corpus that contains words with their senses labelled
 - SemCor
 - contains many words in natural ordering with their WordNet senses tagged
- An agent that retrieves senses from memory

Retrieval Agent

9

- Input:
 - “minute, 2”
- Agent will retrieve from SMEM with a cue of “^string |minute|”
- If the retrieved LTI has the wrong sense, the agent will prohibit it and search again.
- Repeats until correct sense retrieved.
- Fires extra rules to emulate additional parsing when correct sense is retrieved.

What measure to use?

10

- “First” - How often is the right sense retrieved on the first try?
 - It might be that after a single retrieval, the information is no longer relevant and the agent should move on
- “Total” - How many retrievals are necessary to find the right sense?
 - It might be that the agent needs to continue to retrieve until the right sense is finally found.

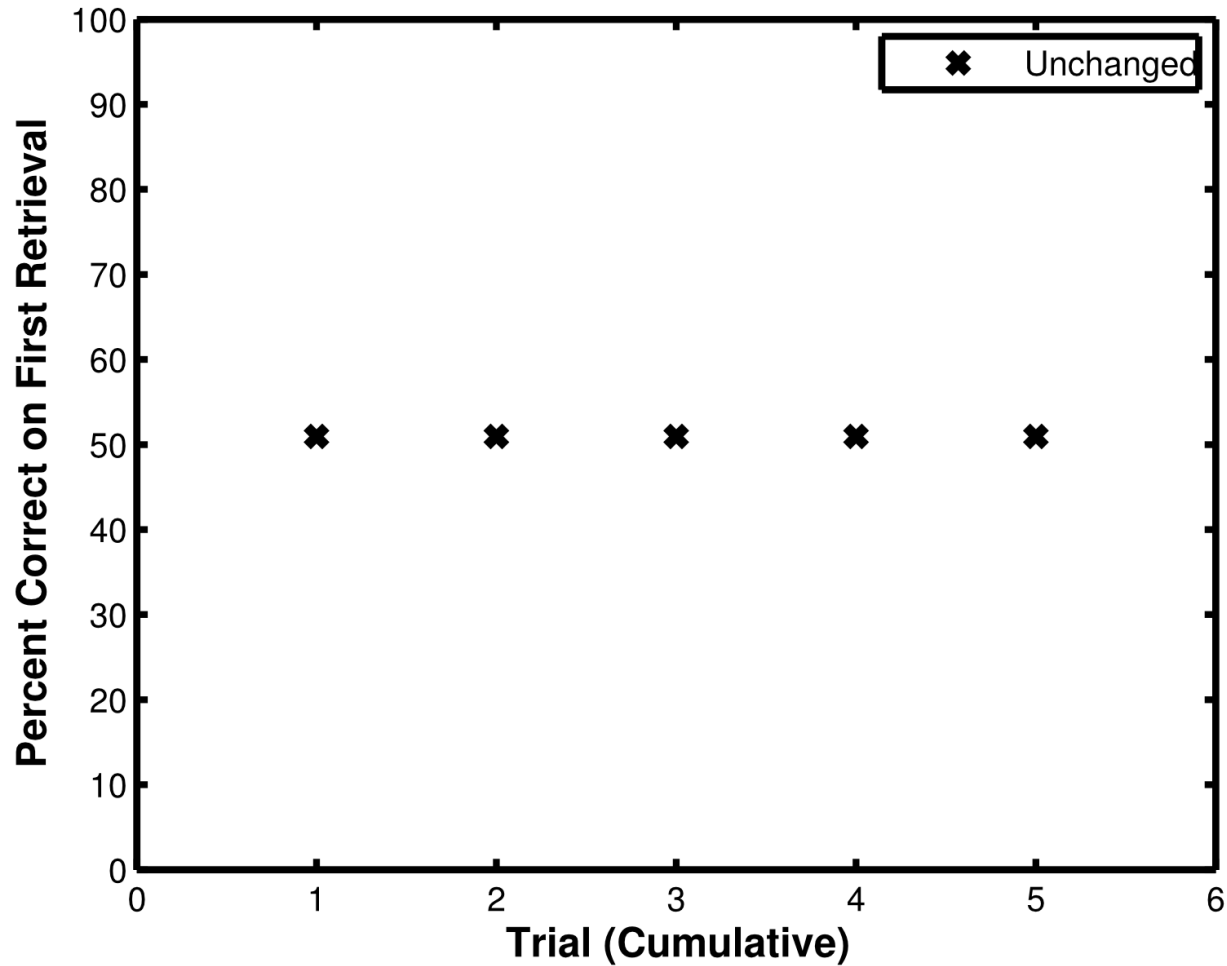
Results

11

- Two activation schemes
 - Frequency
 - Base-level
 - ~~Recency~~
- Two configurations
 - With transfer
 - Triggers transfer inside an if-statement that checks for a LTI
 - Unchanged
 - Identical agent code
 - Replaces the check for LTI with a hard-coded “false”

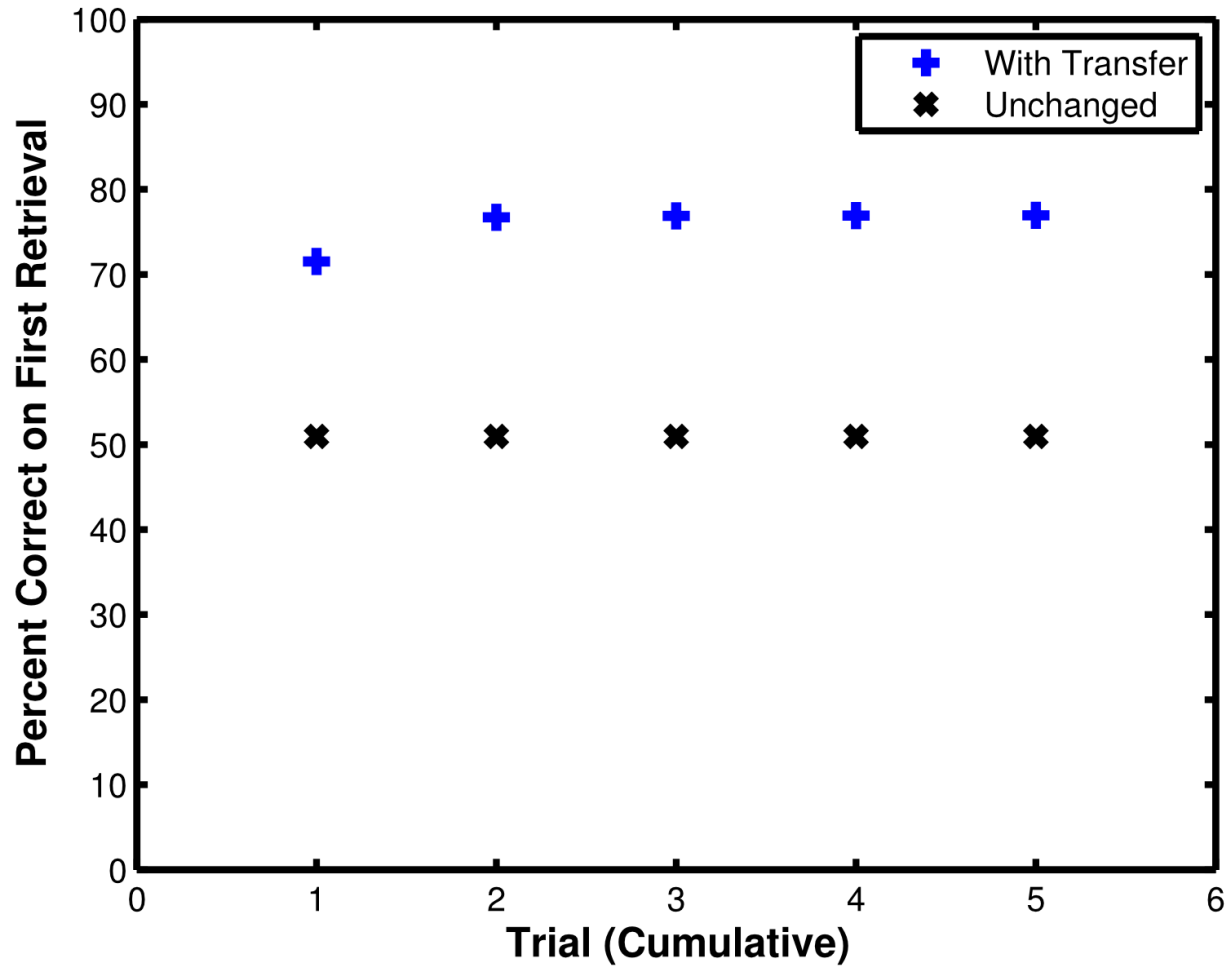
Frequency Activation

12



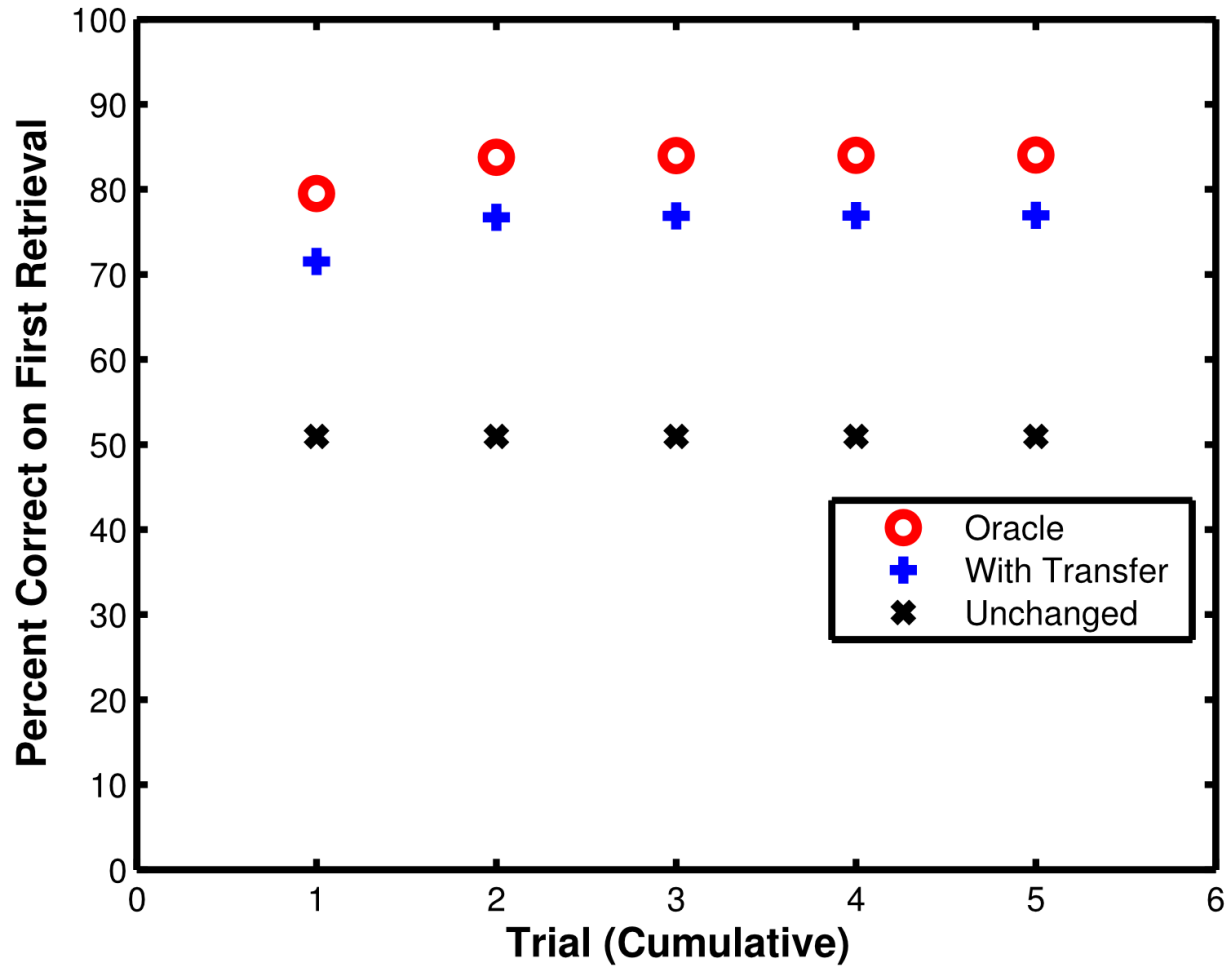
Frequency Activation

13



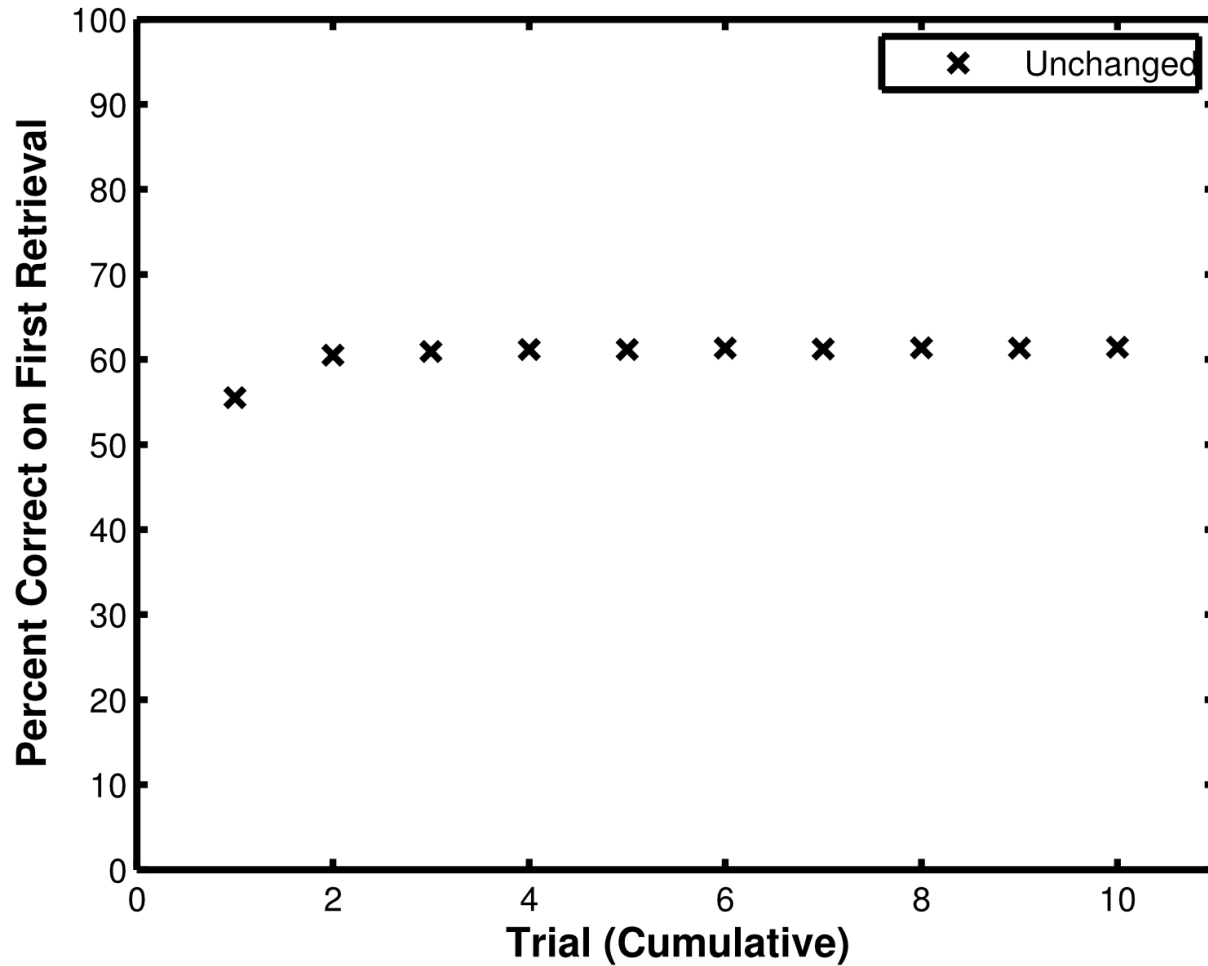
Frequency Activation

14



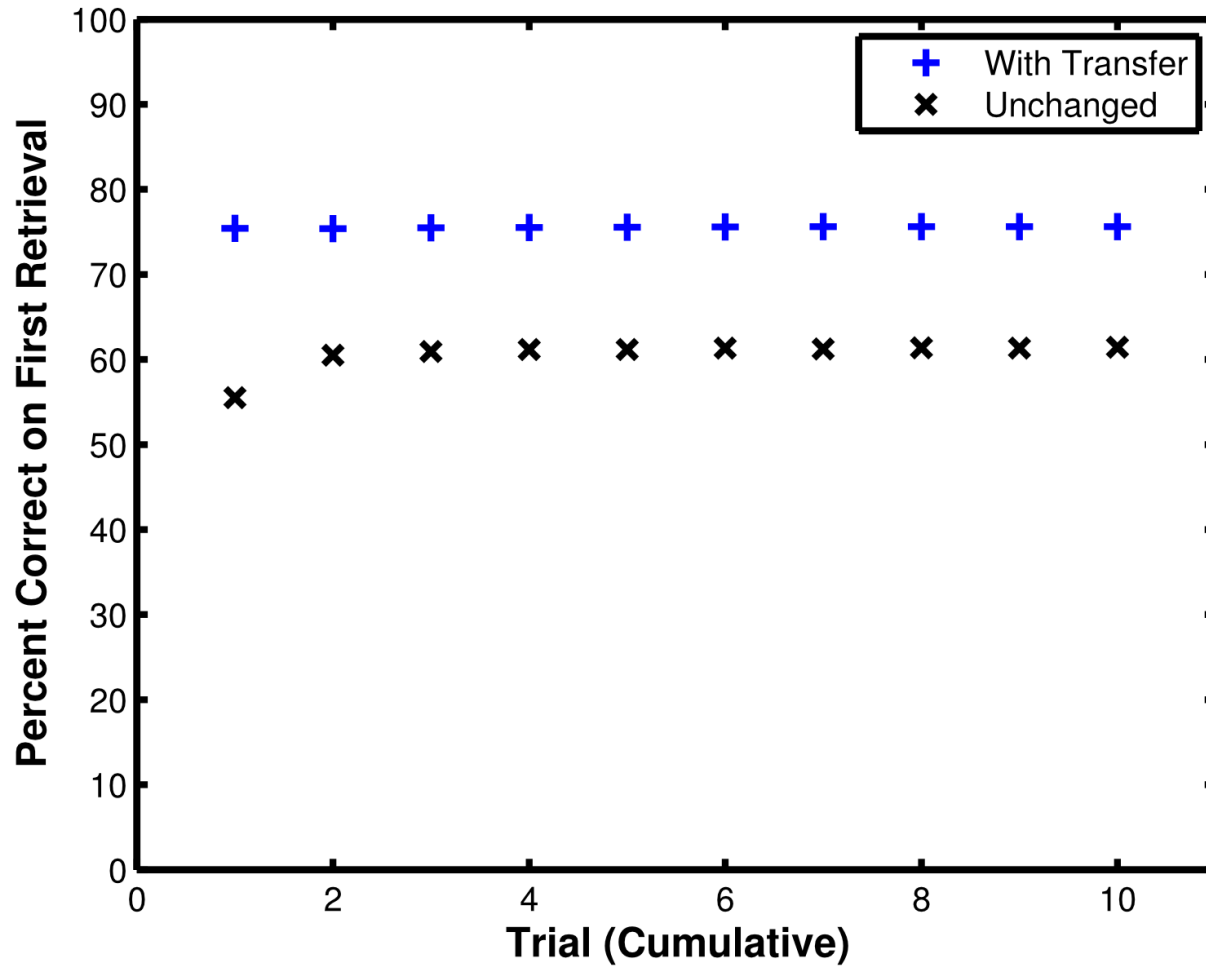
Base-Level Activation

15



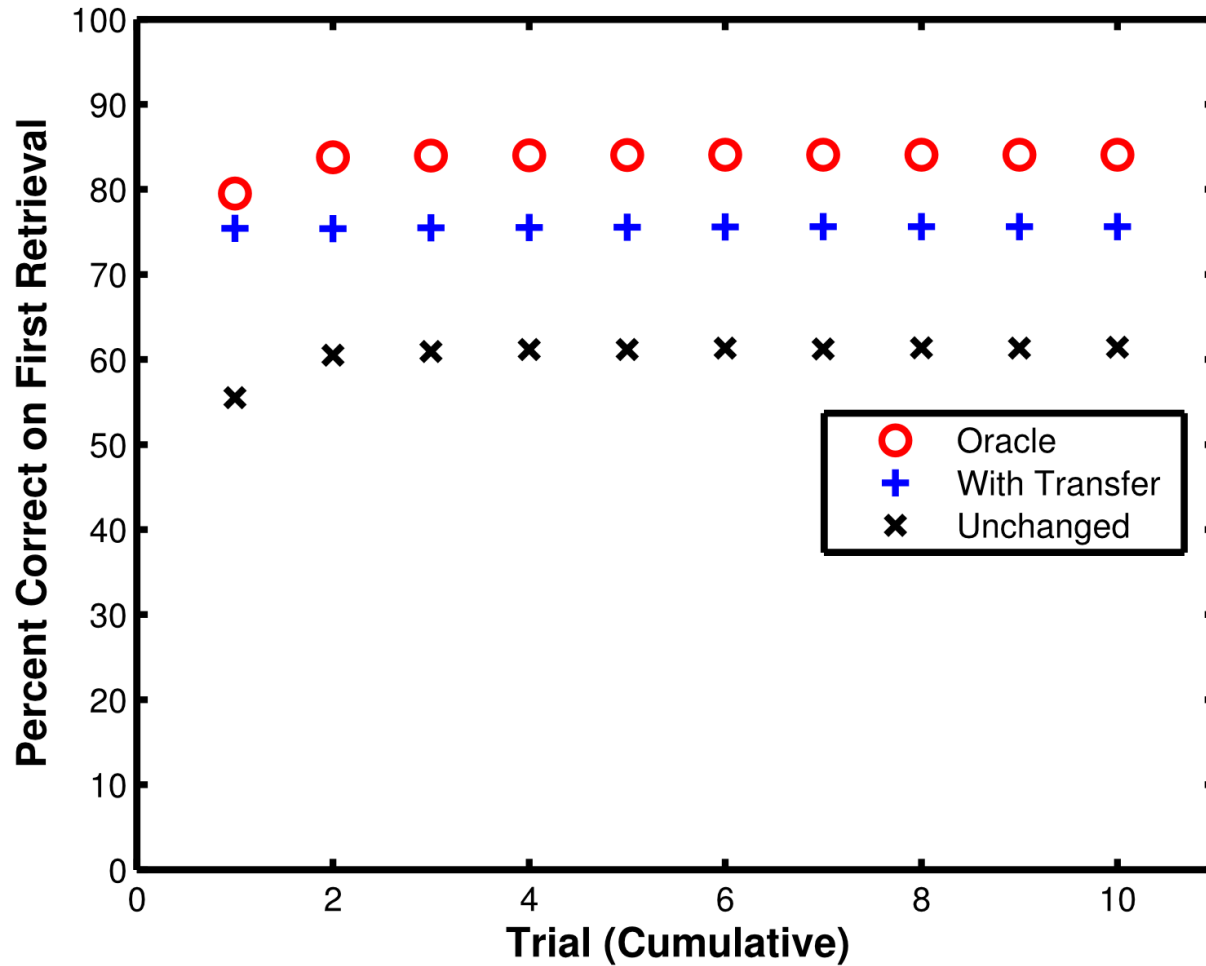
Base-Level Activation

16

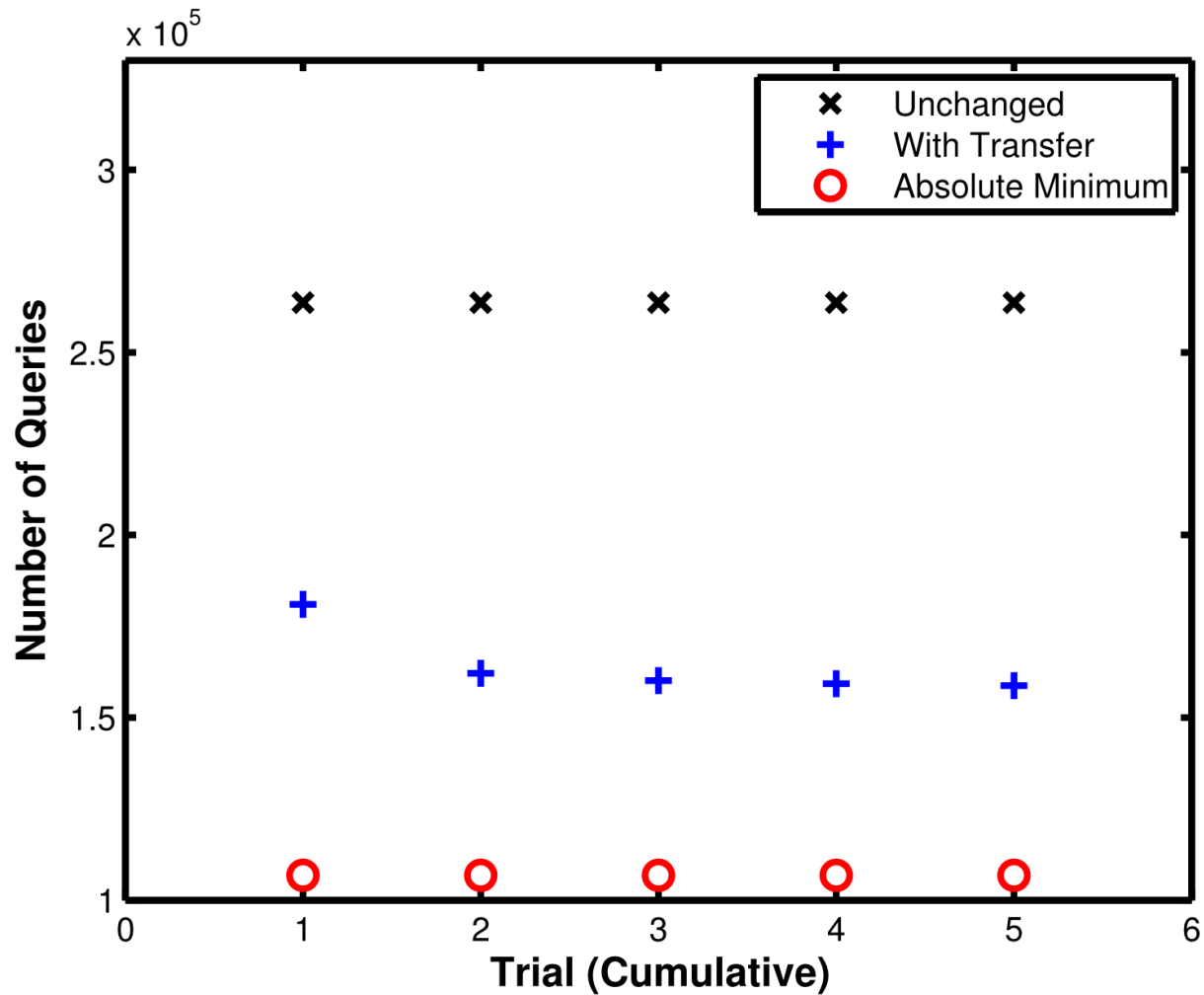


Base-Level Activation

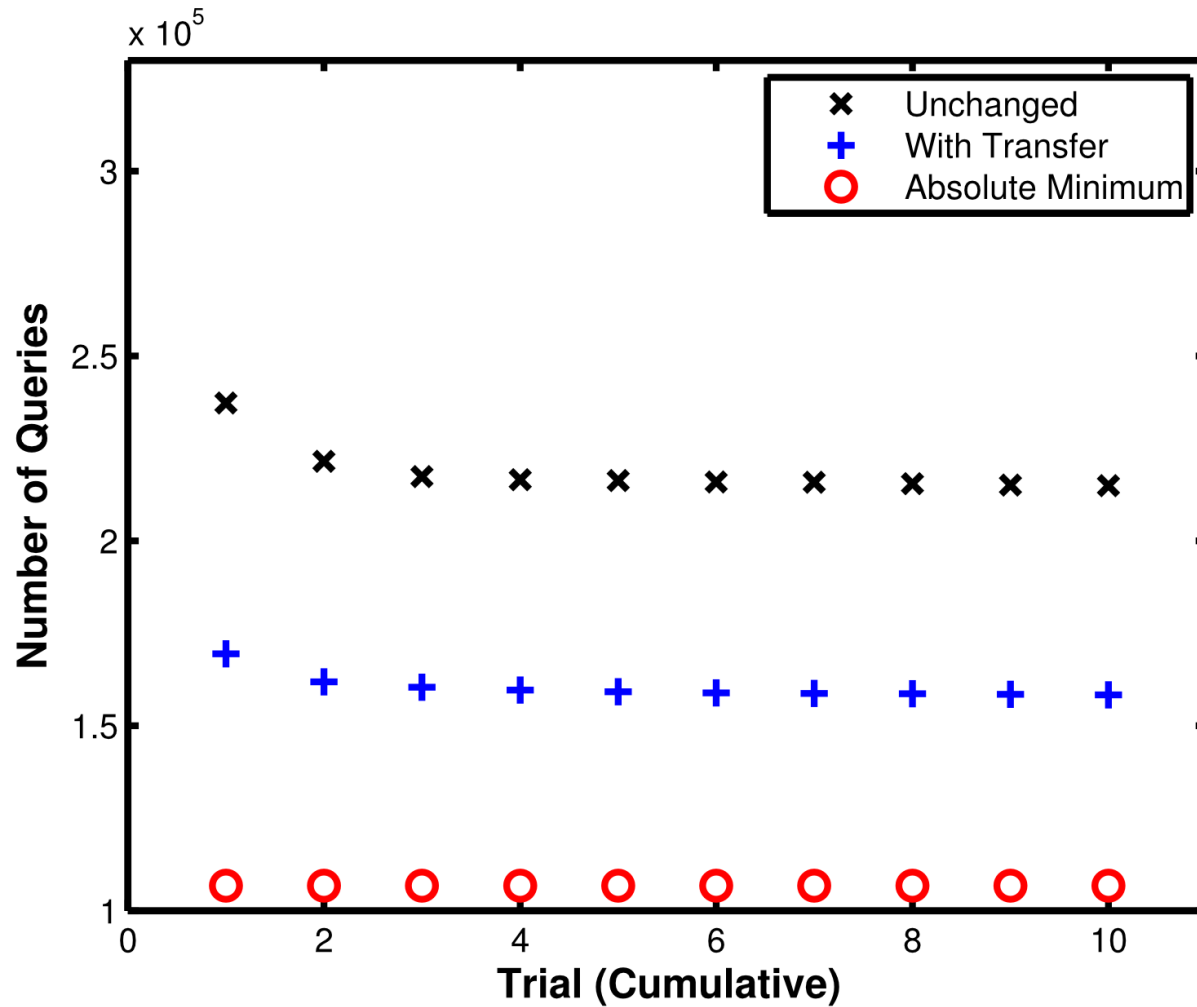
17



Frequency “Total”



Base-Level “Total”



Nuggets

- Fewer queries to find correct sense
- No need to perform entire queries just to bias activation
- Goals outlined in “Unification of Activation” might be worth pursuing

Coal

- Unrealistic “parsing” agent
- Simple domain
- Only tested one type of transfer

Future Work

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- Semantic Memory to Working Memory
 - Will make highly activated LTIs remain longer before forgetting
 - Almost implemented
- Episodic Memory
 - Biasing Episode Retrieval
 - with what?
 - WMEs that make up cue
 - WMEs in the episode
 - Emotional appraisal intensity