Domain-sensitivity of sentence memory and (lack of) temporal contiguity effects

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Background: Contiguity in Memory

Temporal Contiguity Model: Items are associated with shared encoding contexts, which affect the maintenance and retrieval of items in memory. Retrieval of items leads to reactivation of their contexts [4].

• Temporal contiguity: in free recall of unstructured word lists: temporally proximal items within some group influence one another’s accessibility [3].
• Contiguity Effect: Correct recall of word \( w_i \rightarrow w_{i+1} \) or \( w_{i+1} \rightarrow w_i \).
• Forward Asymmetry (FA): \( w_{i+1} \) is more likely than \( w_i \).
• In word list experiments, contiguity effects also extend to chunks/groups, which delineate encoding contexts [6].

In search of temporal contiguity effects in sentential contexts

• Do linguistic groupings within a sentence correspond to encoding contexts in memory?

Hypotheses & Predictions

Linguistic Sensitivity (LS): Contextual reactivation is bounded by linguistic groupings.
• Linguistic cues to contextual grouping (e.g., syntactic or prosodic boundaries) delineate contexts in sentential memory.
• Predicts contiguity effects remain within linguistic chunks: no recall advantage for \( w_{i+1} \) following reactivation of \( w_i \) if \( w_i \) and \( w_{i+1} \) are separated by a linguistic boundary.

Temporal Contiguity (TC): Contextual reactivation renders temporally contiguous content more active, even across linguistic boundaries.
• Temporal contiguity affects memory representations, even within linguistic structures.
• Predicts contiguity effects cross linguistic chunks: recall advantage for \( w_{i+1} \) following reactivation of \( w_i \) even if \( w_i \) and \( w_{i+1} \) are separated by a linguistic boundary.

Results: Recall Accuracy

Generalization 1: Chunk reactivation does not lead to across-chunk contiguity effects.

Q: Does chunk reactivation lead to contiguity effects across linguistic boundaries? A: No – the benefit for reactivated chunks does not spill over to subsequent positions.

Recall Accuracy by Position – Question Correct Trials

Recall Accuracy by Position – Question Incorrect Trials

Condition → Comp. Q targets Chunk 2 → Comp. Q targets Chunk 3 → No Comp. Q

Generalization 2: Intrusions evidence chunk-to-chunk contiguity.

Q: Do intrusion rates reveal contiguity effects? A: Yes, but at the level of the chunk, maintaining congruence of syntactic roles.
• Overall intrusion rates by position in Chunk 2 and Chunk 3: 7-10%.
• Most intrusions (63-72%) came from the same item.
• Across-chunk intrusions:
  • Typically from contiguous chunks (Chunk 2 and 3 replaced)
  • Subjects most often replaced with subjects, objects with objects.
• Within-chunk intrusions: objects were likely to intrude in the subject position, not vice versa.

Discussion

• Reactivation questions successfully boosted accuracy for recall, but very selectively.
• Linguistic boundaries block associations between temporally contiguous words, but may facilitate associations between temporally contiguous chunks.
• Syntactic role information outweighs similarity from temporal contiguity in intrusion data.

Conclusions

• We find evidence for Linguistic Sensitivity
  • Reactivation advantage does not extend across chunk boundaries following reactivation question
  • Intrusions are more likely from the same structural position (e.g. subjects intrude subjects), and not from temporally contiguous list positions
• Evidence for Temporal Contiguity at the level of linguistic chunks, not individual words

References