**Psych 117L: Article Summary**

Full reference (in APA format) of the article you are summarizing (if it is not one of the papers that was posted on Canvas, attach that article)

Rose, Nathan, "A Processing Approach to the Working Memory/Long-Term Memory Distinction: Evidence from a Levels-of-Processing Span Task" (2010). All Theses and Dissertations (ETDs). 300. https://openscholarship.wustl.edu/etd/300

Your summary should be about 2 pages and should summarize the following. It should be your own work, and each member of your group should summarize a different paper.

**Introduction:**

1.What topic was studied and why is it important, according to the researchers?

This paper extensively covered the research on the different memory processes and investigated during which recall scenarios is primary memory used versus secondary memory. Previous research had shown that the levels of processing effect was present in long-term memory recall tasks but not present in working memory tasks where the recall task occurred without a delay. Previous research also showed that retrieving items in working memory tasks was beneficial for long-term memory retention and that this retention was even better when the retrieval emphasized secondary memory (Rose et al., 2010). This previous research on the distinctions between working and long term memory retention in relation to levels of processing encoding and retrieval left one topic unexplored that the researchers thought important to investigate: If according to the previous research secondary memory retrieval was involved during the levels of processing span task, why was no levels of processing effect shown on immediate recall? The researchers found this topic important for defining the distinctions between working memory and long-term memory and how different levels of processing as well as different encoding and retrieval methods impact recall in both immediate and delayed recall tasks.

2. Explain the theory on which this paper was based (do not just name it, explain it!)

Craik and Tulving’s theory of levels of processing hypothesizes that information is better remembered in LTM tasks the deeper that the processing occurs. Shallow processing is typically visual processing (is this word written in capital letters?) and phonological processing (does this word rhyme with x?). Deeper processing is defined by categorical (Is this word a type of fish?) and semantic processing (would this word fit in the following sentence?).

This study replicated Craik and Tulving’s levels of processing experiment but used a working memory task with delayed recall.

Craik and Lockart’s transfer-appropriate-processing framework theorizes that encoding and retrieval have the highest accuracy when they match. If the cognitive processes match at both encoding and retrieval, recall performance is better.

Tulving’s encoding specificity theory states that memory recall performance is better when the test context and study context match.

3. What were the main research questions studied or hypotheses tested?

How do different levels of processing (visual, semantic, and phonological) influence the memory of words in immediate versus delayed recall tasks?

Will the levels of processing effect be shown in a working memory task as opposed to a long-term memory task?

Which types of processing are the most effective for working memory, secondary memory, and long-term memory recall tasks?

Retrieval from secondary memory is involved in performance of the levels of processing span task.

Long term retrieval would be better for words from longer lists (8 words) than words from shorter lists (4 words) because shorter lists are remembered using the primary memory which does not transfer to long term memory. The longer list is encoded using secondary memory and, for this reason, words from this list are better remembered in delayed recall tasks.

**Method:**

4. How were the variables of interest manipulated (independent variable) and/or measured (dependent variable)? (If there was more than one experiment in the paper, answer this for each experiment).

3 Level of Processing: Visual, Phonological, Semantic) x 2 (List Length: 3- or 8-Items) x 2 (Time of Test: Immediate Recall, Delayed Recognition) within-subjects design. Participants were informed that they would be tested on memory recall of the words presented.

Participants were given a levels of processing span task which is a series of questions pertaining to words that were to be remembered. Each word had a single question with it that either pertained to its appearance (Is this word written in capital letters?), its phonology (does this word rhyme with X?), or its semantic meaning (Is the following word a member of the category x?). Participants had to respond with their keyboard answering Y for yes and N for no. There were three trials with either 3 item and 8 item lists for each condition (uppercase, rhyme, category). Then, participants were asked to recite the target words in the order they were presented. After the immediate recall tasks, participants were given 10 minutes of a distractor mathematics activity and then given a surprise recognition test. There were both target words and lure words presented individually on the computer and participants had to indicate whether the word was Old or New.

**Results**:

5. What were the findings of the study? Were the researchers’ original hypotheses supported by their observations? (If there was more than one experiment in the paper, answer this for each experiment).

There was a main effect of list length where a greater number of words from the shorter list were recalled than the longer list. The list length did not interact with the level of processing.

In the delayed recognition test, semantically coded words were better recognized than words processed in the phonological or visual condition. Immediate recall did not differ for visually or semantically processed items and it also did not differ in the shallow vs deep processed items. A reverse effect was seen in list length: in the immediate recall task, a ceiling effect was shown from the 3 word lists at almost 100% recall; this dropped in the delayed recognition task to 67%. Whereas the words in the 8-item lists, in the immediate recall task only 50% were recalled accurately; this later jumped to 73% of the words being recognized as old on the delayed recognition task. This is consistent with the hypothesis that retrieval from secondary memory is involved in the working memory span task and that the retrieval of items from the 3-item list did not implement the secondary memory system as much as retrieval of the 8-item lists.

**Discussion:**

6. What conclusions can be drawn from the study and what new information does the study provide?

Semantic or conceptual processing during encoding tends to induce better long-term memory retention and recall as opposed to structural or perceptual processing including phonological or visual encoding. There is a substantial benefit of deeper levels of processing for long term memory recall tasks, but this effect is not present in immediate recall tasks.

Levels of processing during initial encoding did not affect performance in the working memory task. However, there is evidence that suggests that retrieval from long-term memory is involved in the performance of working memory tasks. The lack of a shown levels of processing effect in working memory tasks could be due to differences in encoding, maintenance, and/or retrieval processes.

**Evaluation:**

7. Is this a valuable study? Do you agree with the authors’ interpretation or can you suggest an alternative interpretation?

Yes this is a valuable study because it examined a variety of research on both short and long term memory recall and used the existing theories to examine a specific difference in how levels of processing effect memory retrieval in both short and long term memory tasks.

**Future Direction**s:

8. What is one idea for a follow up study you could do on this topic?

The researchers posed an additional question pertaining to the reason levels of processing has no effect on immediate retrieval. This could be due to the way that information is rehearsed for a short term memory recall task (like trying to remember a phone number). A follow up study could explore how a variety of memory rehearsal techniques impact recall in an immediate memory task and how well those same methods work for a delayed recall or recognition task.

**Feasibility:**

9. Could you do a study like this with the resources you have in this lab class? Why or why not?

I don’t think this could be done in our lab class because I believe it would take a larger participant pool to show any significant effect for these different rehearsal techniques. I think it would be interesting to brainstorm a variety of rehearsal techniques and think about how in our own lives we think those techniques work or don’t work for us.

**Reflection:**

10. How did this study inform the study you are doing for your final project?

I think this study gave great information about some of the theories behind the differences between short and long-term memory encoding and retrieval and allows us to explore those theories in greater detail. I think it allows us to form better hypotheses regarding our experiment on the effects of word length and self-reference on recall in both short-term and long-term memory recall tasks.