

# Sleep on it! Sleep Consolidation Produces Strong Delayed Memory Retrieval much like Immediate Retrieval

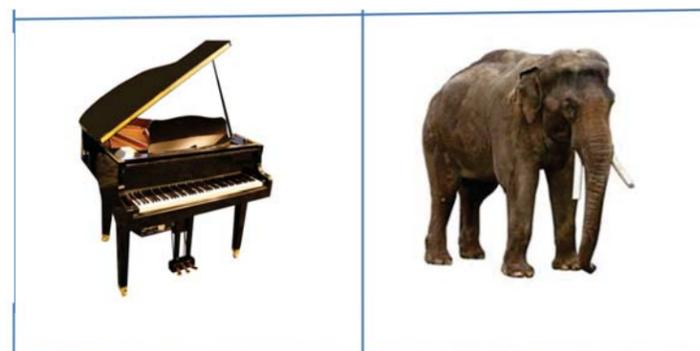
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## Background

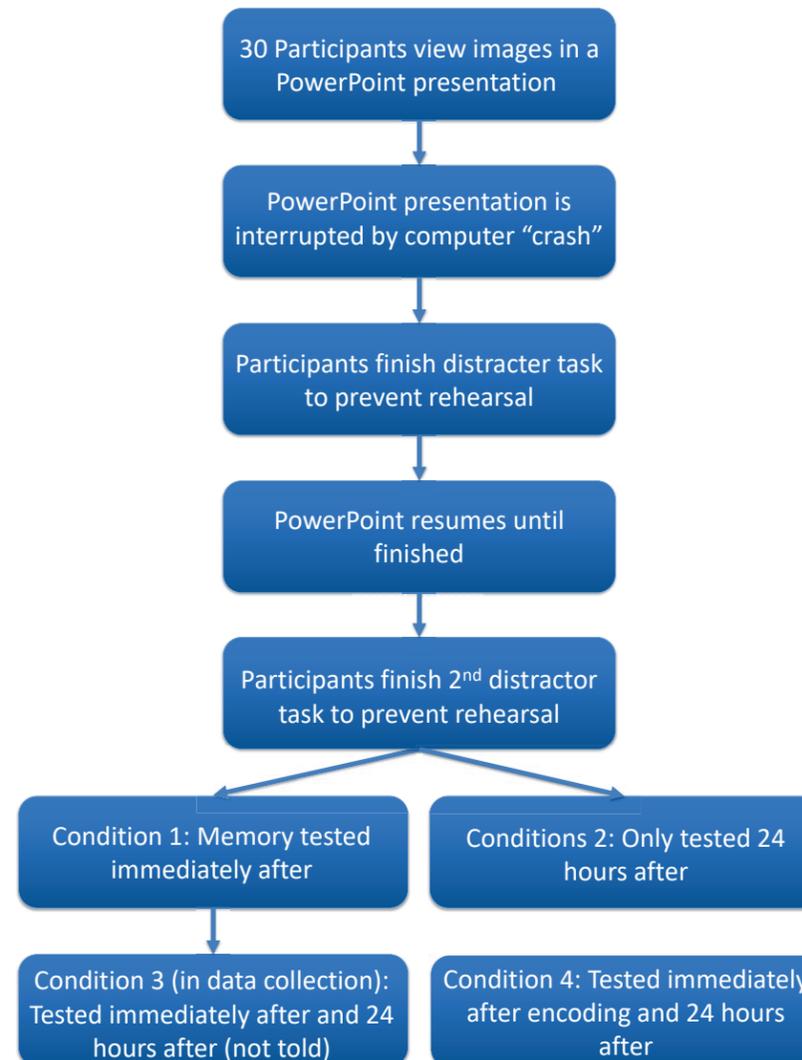
- **Research Question:** Can sleep consolidation reduce the effects of an interruption during encoding, leading to improved accuracy on a delayed recognition task?
- **Consolidation:** During sleep, memories acquired earlier are processed at a deeper level and strengthened by creating associations with previously-stored information (Rasch & Born, 2008). This process helps better integrate new information into existing long-term memory storage systems. Research indicates that the consolidation process can also prevent the effects of interference during memory retrieval (Robertson, 2012).
- **Present Study:** The present study was designed to examine the effects of sleep consolidation after an interruption of encoding had occurred and the effect of interruption on primacy (in a list, people better remember words presented earlier) and recency (in a list, people better remember words presented later) effects (Rundus, 1971).

## Hypotheses

- We hypothesized that pictures that appeared near the beginning and the end of encoding, and those that appeared after the resumption of the interrupted slideshow would be better remembered than those pictures that appeared just before the interruption, due to primacy and recency memory effects.
- We hypothesized that pictures tested for memory on the second day would be remembered better, due to sleep consolidation, than when tested for memory only on the first day.



## Methods

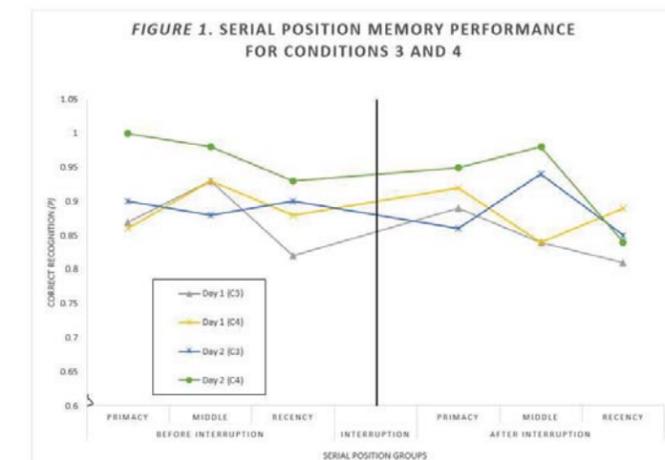


## Results and Conclusions

Table 1. Means and Standard Deviations for Picture Type by Test Day

Test Day	Targets	Lures
	M(SD)	M(SD)
Day 1 (only)	.84(.18)	.87(.12)
Day 2 (only)	.84(.15)	.72(.15)
Day 1 + 2 (NT)		
1 <sup>st</sup> Test	.86(.11)	.81(.16)
2 <sup>nd</sup> Test	.90(.18)	.86(.15)
Day 1 + 2 (T)		
1 <sup>st</sup> Test	.88(.12)	.93(.13)
2 <sup>nd</sup> Test	.96(.11)	.98(.15)

Note. Not told about Day 2 Memory Test (NT). Told about Day 2 Memory Test (T).



- Table 1: When looking only at those groups that were tested on Day 2, with (C3, C4) or without testing on Day 1 (C2), there was a significant and strong interaction between picture type (target vs. lure) and condition ( $p = .004$ ). That is, performance for Conditions 3 and 4 was much stronger than that for Condition 2, with that for Condition 4 much stronger than Condition 3.
- Table 1: The interaction for comparing Day 1 only and Day 2 only was significant ( $p < .001$ ), such that performance of picture type didn't vary between Day 1 and Day 2, but performance for lures on Day 2 declined while targets stayed high. There was also a main effect of test day ( $p = .002$ ).
- Figure 1: Serial position effect on performance was better for those participants who were told they were going to be tested on Day 2 ( $p = .012$ ). This does not indicate practice by participants because it didn't occur with participants in Condition 2 when they were also told they would be tested. There were primacy and recency effects, with primacy being better than recency.

## References

- Rasch, B., & Born, J. (2008). Reactivation and consolidation of memory during sleep. *Current Directions in Psychological Science*, 17, 188-192.
- Rasch, B., & Born, J. (2013). About sleep's role in memory. *Physiological Review*, 93, 681-766.
- Robertson, E. M. (2012). New insights in human memory interference and consolidation. *Current Biology*, 22, 66-71.
- Rundus, D. (1971). Analysis of rehearsal processes in free recall. *Journal of Experimental Psychology*, 89, 63-77.