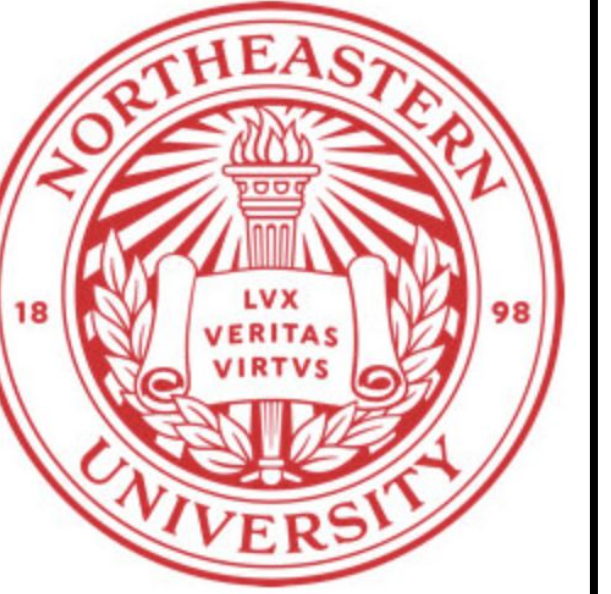




# The Effect of Emotional Arousal and Cognitive Load on Context Memory Recall

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## Introduction

Memory research in cognitive psychology explores how factors like emotional arousal and cognitive load affect our ability to recall information.

**Cue Utilization Theory:** Arousal effects memory by narrowing the focus of of attention. (Easterbrook, 1959)

**Tunnel Memory:** Emotional arousal can enhance memory for central details while impairing the recall of peripheral details. (Cahill & McGaugh, 1995)

**Item-Source Tradeoff:** Participants often remembered the content of questions better than who asked them (Jurica & Shimamura, 1999)

**Film Clips & Context Memory:** Investigated how emotional film clips affected memory. They found that negatively valenced clips impaired context memory, while arousing clips enhanced it. (Anderson & Shimamura, 2005)

To avoid biases from emotional stimuli, they focused on context memory, where recall tasks were unrelated to the stimuli. This influenced our approach, which also focused on context memory and used film clips as emotional arousal stimuli.

**Emotional Arousal & Cognitive Load:** A recent literature review outlined four ways emotional arousal and cognitive load are related. (Plass & Kalyuga, 2019)

Is emotional arousal a form of cognitive load? Or is it an early stage that leads to cognitive load? We want to examine this relationship in more depth.

**Cognitive Load Theory:** Working memory has limited resources, where high cognitive load can either impair or enhance performance. (Sweller, 1988)

**Dual Task Scenarios:** Performing two tasks simultaneously impairs performance as cognitive load exceeds working memory capacity (Pashler, 1994).

**Dual Competition Model:** Parallel and simultaneous tasks such as emotional arousal and cognitive load compete for resources, possibly hindering recall. (Pessoa, 2009)

These theoretical frameworks guide our study on how these factors interact to influence context memory. We predict that emotional arousal will enhance memory recall while cognitive load will hinder it. Together, these two tasks will compete for limited cognitive resources, observing hindered memory recall.

## Research Questions

1. How does Emotional Arousal affect Context Memory Recall?
2. How does Cognitive Load effect Context Memory Recall?
3. Is there an interaction Between Emotional Arousal and Cognitive Load on Context Memory Recall?

## Method

**Participants:** 23 personal contacts (18-76 years old), mean age = 36 years

- Randomized into two conditions
  - High emotional arousal - 13 participants
  - Low emotional arousal - 10 participants
- Every participant completed Low and High Cognitive Load Task

### Variables

#### IV's

- Emotional Arousal
  - **High Emotional Arousal**
  - **Low Emotional Arousal**
- Cognitive Load
  - Low Cognitive Load
  - High Cognitive Load

#### DV

- Context Memory - the ability to remember emotional, social, spatial, or temporal circumstances related to an event



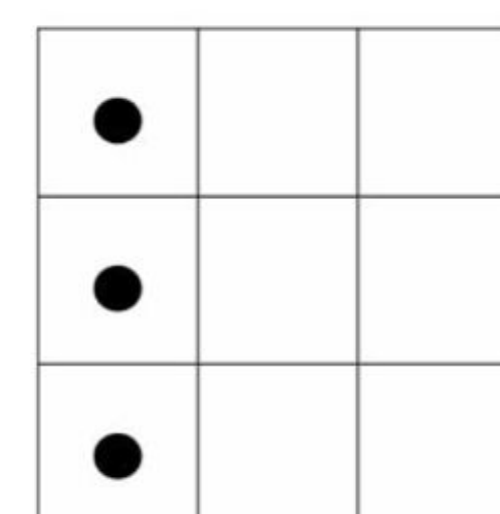
### Materials

- Film Clips - High Arousal vs. Low Arousal
  - Clips from Cars Movie
- Word List
  - Two 15-words lists containing neutral nouns
- Cognitive Load Task
  - Spatial Memory Task - 1 High and 1 Low task
- Word Recall Task - untimed, word box

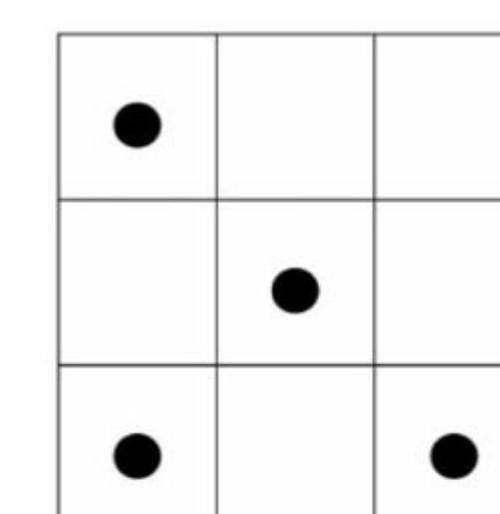
### Procedure

1. Participants watch film clip (High or Low Emotional Arousal) based off randomized condition
2. 15-word list is presented one word at a time, 4 seconds ea.
3. Participants complete Low or High Cognitive Load task (randomized order)
  - i. Spatial memory task - 3 dot (low load) vs. 4 dot (high load)
4. Participants recall as many of the words previously seen as possible
5. 3 minute break
6. Repeat steps with the Cognitive Load Task participants did not complete first

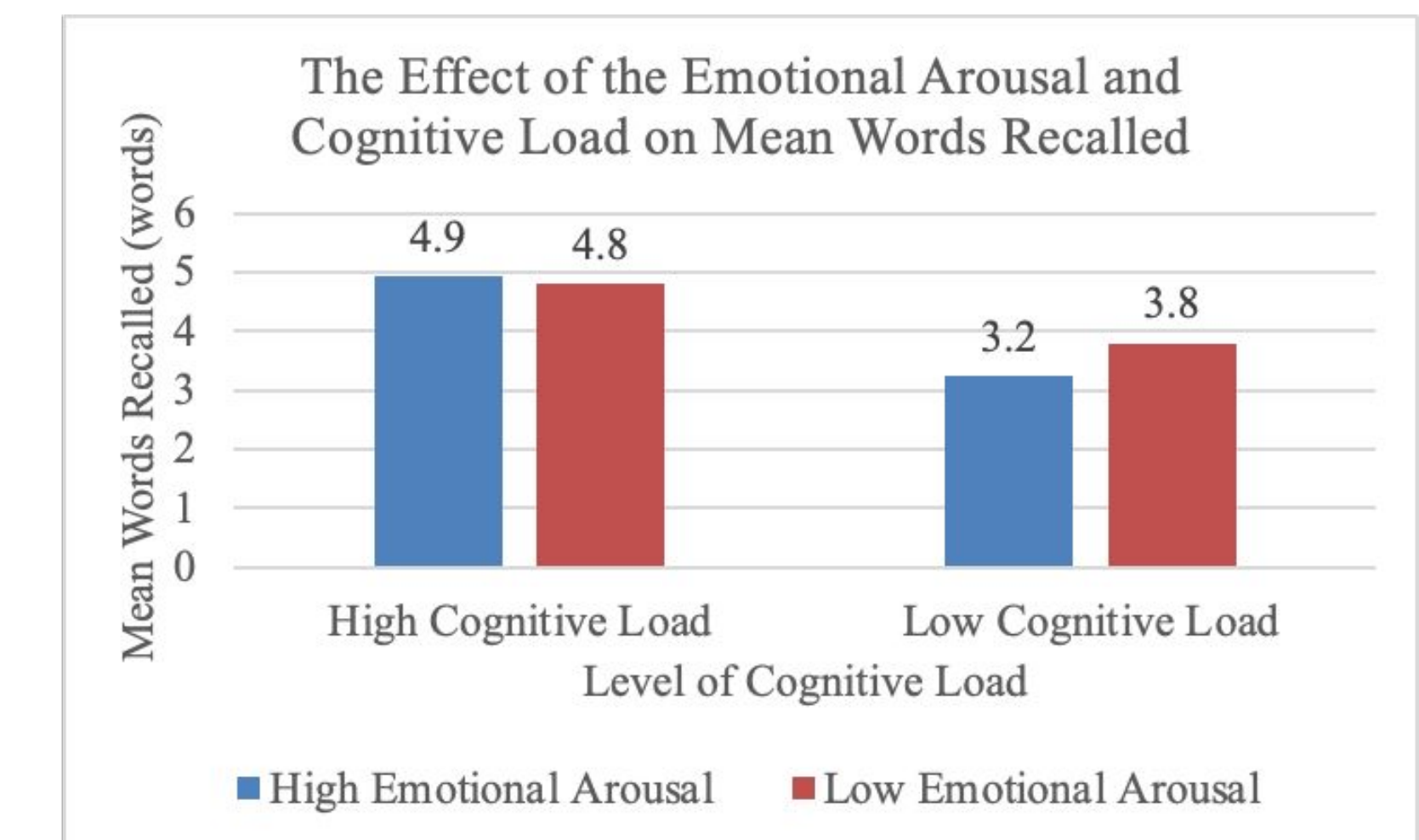
Low Cognitive Load Task



High Cognitive Load Task



## Results



1. **Emotional Arousal & Memory Recall:** No significant effect
2. **Cognitive Load & Memory Recall:** Significant positive effect. Contrary to our hypothesis, participants performed better (>1.5 mean accuracy) under higher cognitive load
3. **Interaction:** No significant effect

## Conclusion

Our study reveals the following complex and unexpected interactions between emotional arousal, cognitive load, and memory recall, as well as limitations:

**Diminishing Emotional Arousal:** The emotional arousal task was separated from the recall task by a significant delay. This gap may have enlarged individual differences in how emotional arousal affected memory.

**Different Memory Pathways:** The tasks may have involved different memory pathways. The unexpected enhancement of recall under high cognitive load might be due to the lack of direct competition between these tasks.

**Cognitive Load Limit:** The cognitive load might not have been high enough to impair memory. The results suggest that staying within cognitive load limits could lead to unexpected benefits rather than detriments.

This implies that cognitive load, when not overwhelming, might not negatively impact recall as expected.

**Load Theory of Selective Attention:** Under high perceptual load, cognitive resources are fully occupied, which enhances focus and improves task performance, while low perceptual load leaves excess resources available and greater susceptibility to distractions, resulting in mixed results. (Lavie, 2005)

Given our findings, the **Dual Competition Model** might not fully account for our results. Instead, the **Load Theory of Selective Attention** could better explain the unexpected outcomes observed in our study, where cognitive load did not interfere with, and may have even enhanced, memory recall. Further research is needed to clarify these interactions.





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