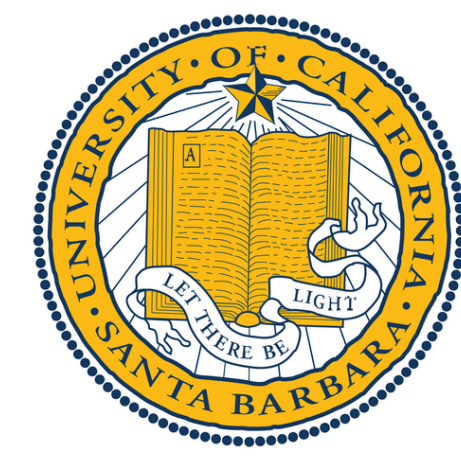# ENVIRONMENTAL SOUND EFFECTS & WORD RECALL

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Research Question

How do environmental sound effects influence gist vs verbatim based processing in memory recall, and do higher confidence ratings correspond to increased false recognitions?

Introduction

- Early studies showed that our memory is reconstructive, meaning we are susceptible to false memories.
- The DRM task involves the study of related words and a non-presented critical lure word that is meant to induce a false memory, followed by free recall and recognition (Roediger & McDermott, 1995)
- Fuzzy Trace Theory (Reyna & Brainerd, 1995): A memory framework that divided memory into having two traces: a gist trace (general and broad) and a verbatim trace (specific and detailed)
- The original DRM task is meant to elicit false memories by the strengthening of the gist trace in participants' memory

Rationale

- Israel and Schacter (1997) changed the mode in which the words are presented by using visual cues (line-drawings) to strengthen verbatim traces and reduce false memory rate.
- The research regarding different ways of manipulating the mode of the words' presentation remains unexplored, limiting our understanding of ecologically valid memory distortions
- This study will explore the use of environmental SFX accompanying words in the DRM word list, creating theoretical tension between gist-trace enhancement and verbatim-trace enhancement

Hypotheses

Main Effect (SFX): Participants in the environmental sound effects group would show more false memories compared to the participants in the no sound effects group.
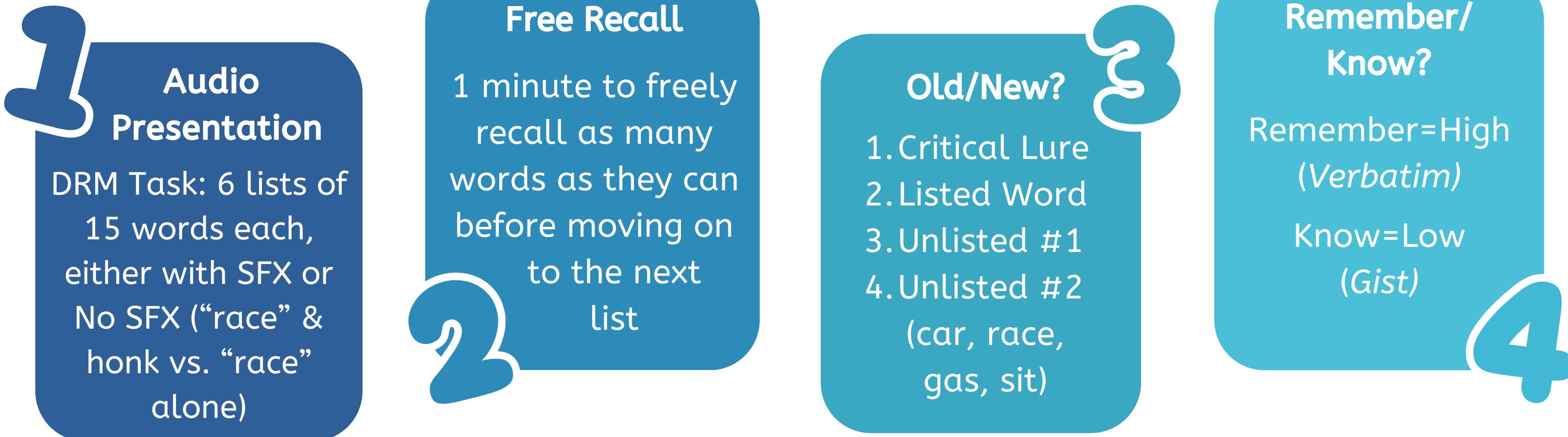
Moderator Effect (Confidence level): Participants report a higher confidence level may result in more false memories, indicating that confidence don't guarantee accuracy

Interaction Effect: The increase in false memories caused by SFX would be strongest in the high confidence level group.

Methods & Materials

DESIGN	2x2 Between-subjects Design
INDEPENDENT VARIABLE	Environmental SFX Condition: Present vs. Absent
MODERATOR	Confidence: Measured by Remember/Know Responses
DEPENDENT VARIABLE	False Recognition Rate: Measured by Old/New Task
SAMPLE POPULATION	65 undergraduate students recruited via convenience sampling, no demographic information collected

Procedure

1 Audio Presentation
DRM Task: 6 lists of 15 words each, either with SFX or No SFX ("race" & honk vs. "race" alone)

2 Free Recall
1 minute to freely recall as many words as they can before moving on to the next list

3 Old/New?
1. Critical Lure
2. Listed Word
3. Unlisted #1
4. Unlisted #2 (car, race, gas, sit)

4 Remember/Know?
Remember=High (_Verbatim_)
Know=Low (_Gist_)

Results

ANOVA Test:

2 (Sounds Effect (SFX): present vs. absent) x 2 (Confidence Level: high vs. low) ANOVA on the rate of false memory recognition

Insignificant Main Effect of SFX on false memory:
$F(1, 65) = 0.69$, $p=0.410$, $\eta^2 = 0.010$, M_sfx=0.453 and M_nosfx=0.428

Significant Moderator Effect of Confidence Level on false memory:
$F(1, 65)=4.06$, $p=0.048$, $\eta^2 =0.059$, M_high=0.472 and M_low=0.410

Insignificant Interaction Effect of SFX and confidence level on false memory:
$F(1, 65)=0.77$, $p=0.385$, $\eta^2 =0.012$ (see Figure 1)
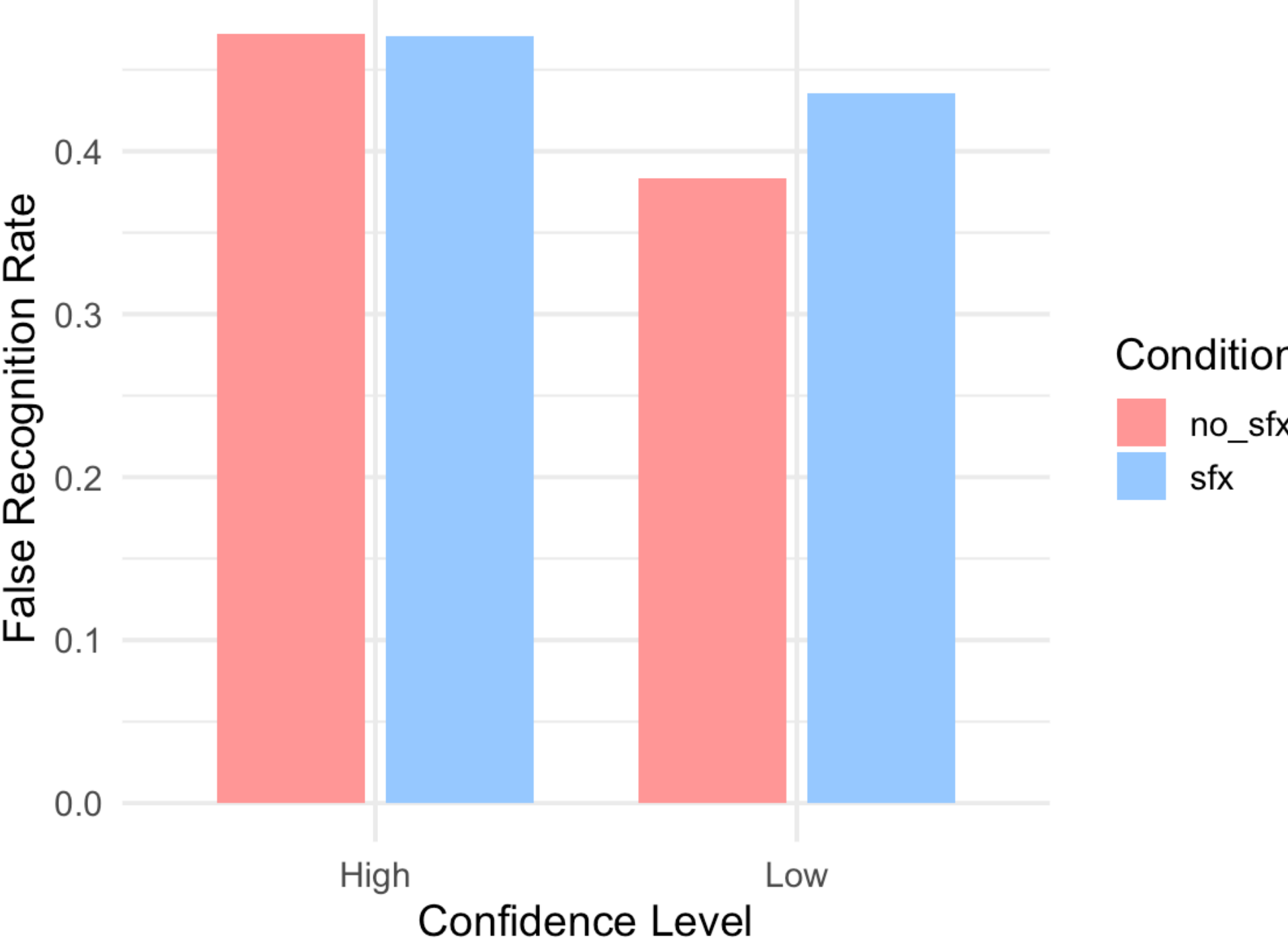
Figure 1.
Interaction Effect of SFX and confidence level on false memory

Discussion

Main Findings:
- Participants were about equally likely to falsely recognize items, whether sound effects were present or absent, and the environmental sound effects did not impact confidence
- Participants with higher confidence showed a greater tendency to falsely recognize items compared to those with lower confidence.
- Non-verbal auditory cues fail to provide the same effect as Israel and Schacter's (1997) line-drawings did. Environmental SFX were unable to assist with the participant's distinctiveness heuristic to reject false memories.
- Instead of this, environmental SFX likely merged with the semantic gist rather than standing out as a verbatim tag.

Limitations:
- ESFX may have differed from visual cues due to the possibility of ambiguity, and the stacking of two different types of audio may have caused cognitive overload within the participants

Future Directions:
- Use a clearer confidence measure (Surely vs Maybe O/N)
- Manipulate the length of time in the free recall portion
- Adjust audio formatting in Qualtrics so participants can complete the study without missing; use the honor system

Conclusions

- Environmental SFX did not predict an increase in false recognition rates, as we predicted.
- Confidence, though treated as a moderator, was found to have a positive relationship with false recognition rates, as we predicted.

Acknowledgements

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