

# WHAT'S THAT SOUND?

## How Humans vs. AI Hear Shapes in Words

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### Question:

Does generative AI show a human-like Bouba-Kiki effect?

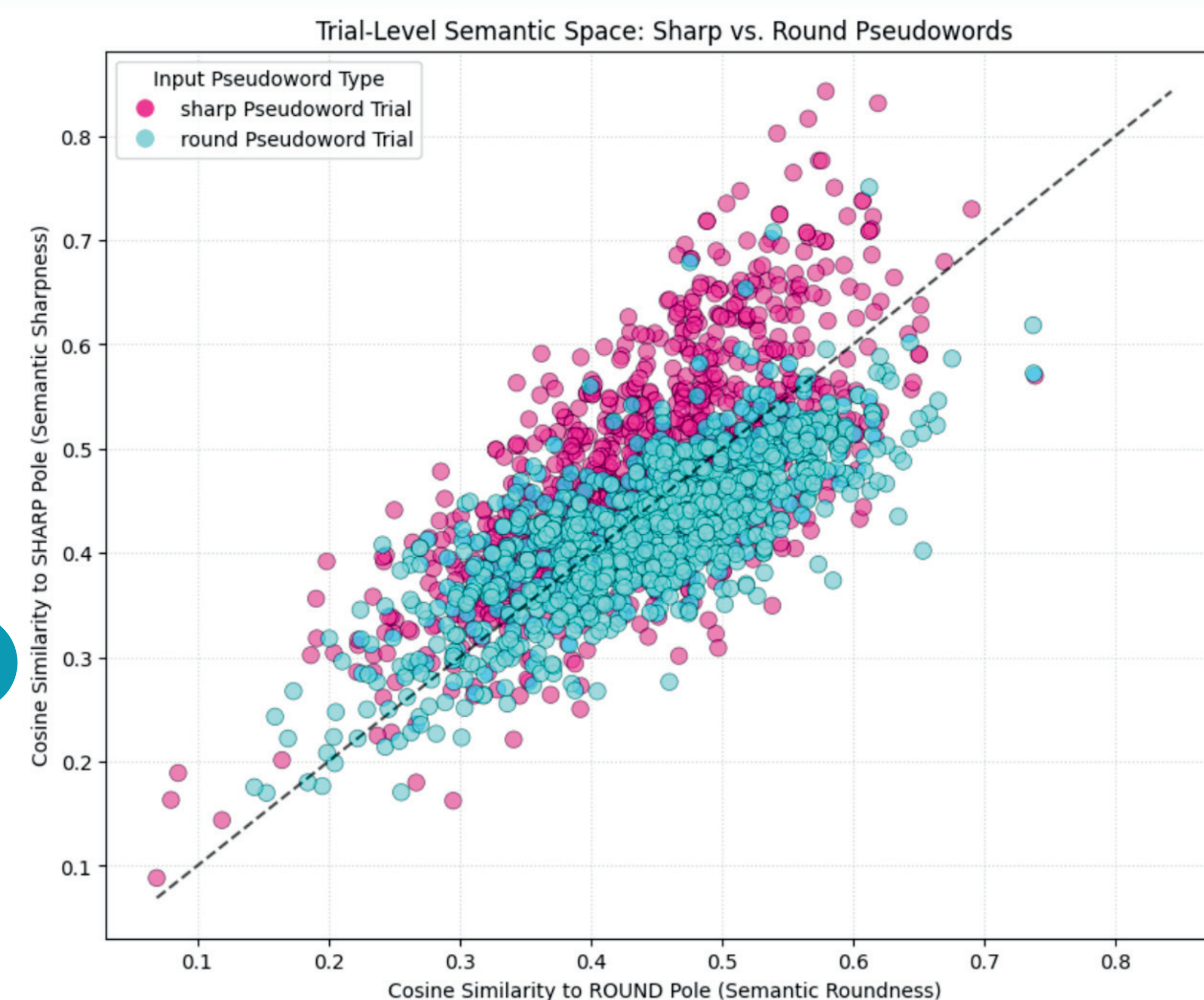
### Introduction

Humans reliably associate certain sounds with particular shapes: softer, lower-frequency sounds are linked to rounded forms, whereas sharper sounds are linked to angular forms (Fort & Schwartz, 2022). This is known as the Bouba-Kiki effect. Said correspondences emerge even with meaningless words and without explicit instruction, suggesting automatic crossmodal processing (Peiffer-Smadja & Cohen, 2018).

Artificial intelligence (AI) learns from statistical patterns, raising the question of whether distributional learning alone can reproduce these structured sound-meaning correspondences. The present study compares human and AI responses to pseudowords and predicts that AI can perform similarly to humans.

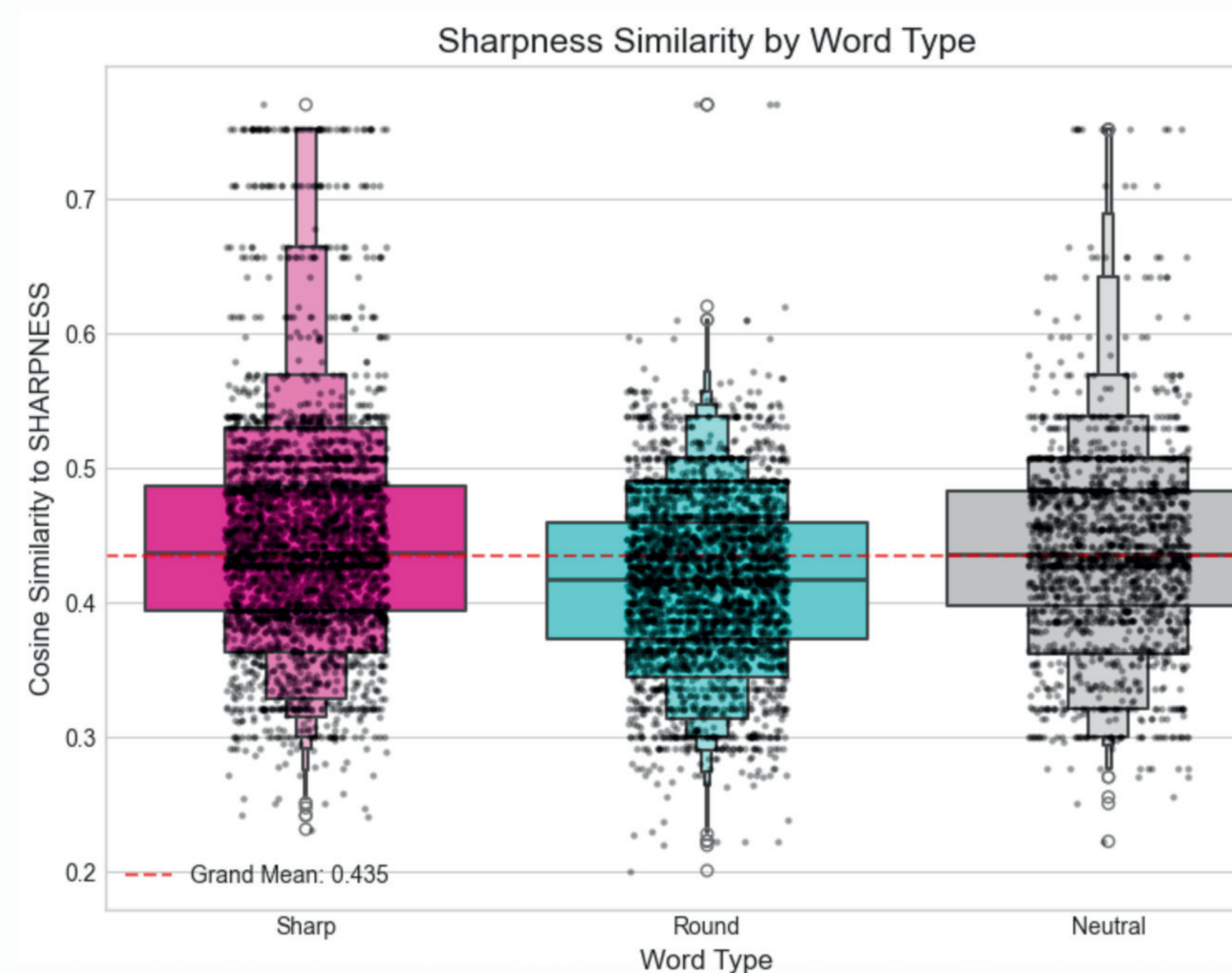
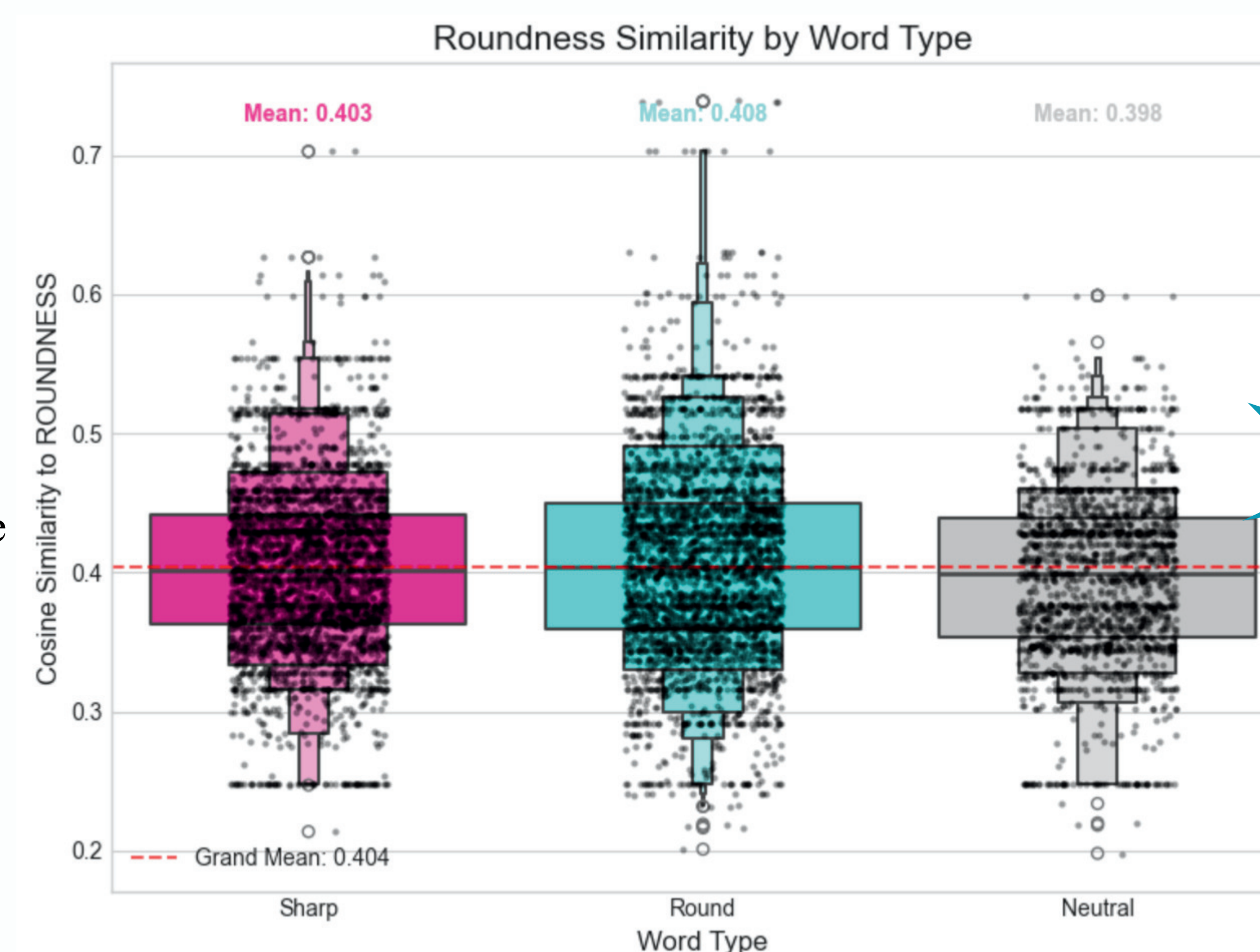
### Methodology

- 1 **Participants:** Undergraduate adults recruited via SONA and a multimodal AI model
- 2 **Stimuli:** 500 pseudowords varying in phonetic features: round, sharp, and neutral
- 3 **Task:** On each trial, one pseudoword was presented and participants were asked to provide the first three word associations that came to mind
- 4 **Procedure:** Humans completed 75 randomized open-response trials, generating three associations per word; the AI received equivalent prompts and generated three associations.
- 5 **Analysis:** Representational Similarity Analysis (RSA) quantified semantic similarity of associations and phonological similarity of pseudowords to compare human and AI structure.



**Figure 1.** Trial-level similarity to Round (x-axis) and Sharp (y-axis) poles. Partial separation with substantial overlap suggests weak semantic polarization.

**Figure 2.** Round-intended pseudowords show modestly greater cosine similarity to the Round pole. Dashed line indicates the grand mean.



**Figure 3.** Sharp-intended pseudowords show slightly greater cosine similarity to the Sharp pole compared to round and neutral words. Dashed line indicates the grand mean.

### Results

#### Expected Human Results (Data Not Yet Collected)

- Strong sound symbolism effects
- Round words → smooth/curved associations
- Sharp words → angular/pointed associations
- Neutral words → more variable response

#### AI Model Results

- Round pseudowords aligned more with the round pole and sharp with sharp role
- Sharpness appeared to be a more salient feature compared to round and neutral categories
- Large overlap between categories across trials.

### Discussion

- RSA showed weak but emergent sound-symbolic structure in the AI responses.
- Effects were small and inconsistent across trials
- Statistical learning may produce limited iconic structure
- Prior research has demonstrated sound-shape symbolism in humans using pseudowords, but relatively little work has compared these effects directly between humans and LLMs

### References



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