DIVERGENT NAMING TASK AND CREATIVITY IN HUMANS VS. ARTIFICIAL INTELLIGENCE

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INTRODUCTION

- Human cognition is flexible and context-dependent, while AI systems rely more on statistical learning and struggle when context changes (Bolander, 2019).
- Humans usually recognize objects based on global shape (i.e., the overall shape), while AI often relies more so on local properties (i.e. the parts), such as texture details in one area (Geirhos et al., 2022).
- AI systems tend to make consistent error patterns, while human mistakes vary depending on task difficulty and context (Liu et al., 2025).
- Limited research has been done on a divergent naming task on amorphous two-dimensional shapes.

ABSTRACT

Artificial intelligence (AI) systems increasingly perform tasks that resemble human perceptual processing, yet differences remain in how visual information is interpreted. Prior research suggests that humans rely primarily on global shape features when categorizing objects, whereas AI systems often rely more heavily on texture-based features.

The present study examines differences between human participants and AI outputs in the interpretation of abstract visual stimuli lacking recognizable real-world meaning. Abstract two-dimensional images were presented to college-aged participants via a Qualtrics-based survey platform. Participants generated novel names and perceptual ratings for each image. AI systems separately produced names for the same stimuli using structured prompts. Responses will be evaluated using quantitative creativity scoring and statistical comparisons. This study aims to provide insight into perceptual and generative differences between humans and AI, specifically in cases of zero and few-shot learning (in which prior training data is sparse or non-existent.)

CENTRAL HYPOTHESIS

Human participants will demonstrate significantly greater variability and divergent creativity in naming abstract visual stimuli compared to AI, reflecting fundamental differences in biological vs. artificial perceptual processing.

REFERENCES

METHODS

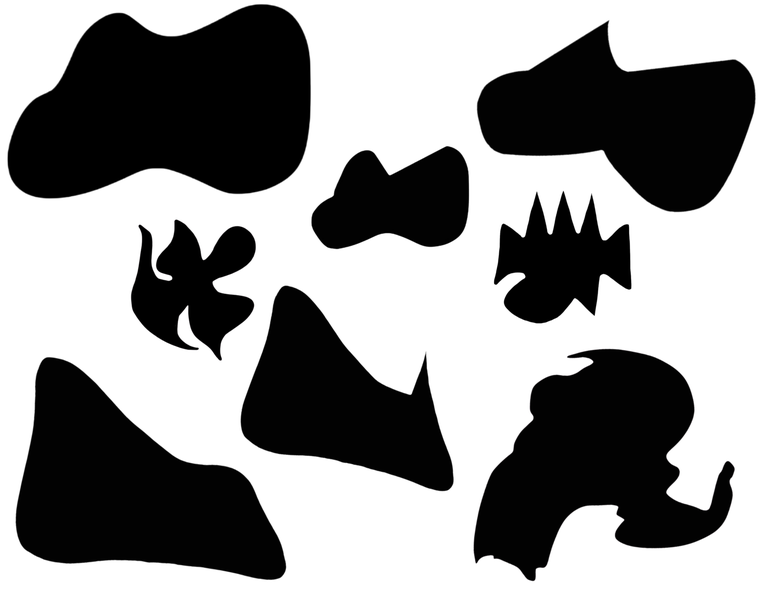
PARTICIPANTS

- ~100 Florida State University undergraduate students via Qualtrics
- AI Condition: (Insert AI images are inserted into) provided the identical stimuli and prompts for parallel data collection.

MATERIALS AND PROCEDURES

- 71-question (50 max randomized) Qualtrics survey on a 50-minute time limit, featuring abstract 2D amorphous silhouette images
- Each image prompted five participant responses:

1. Write the **first 3 words** that come to mind when first looking at the image
2. Rate **sharpness**: 0 (rounded) to 1 (sharp)
3. Rate **roundness**: 0 (not round) to 1 (very round)
4. Rate **complexity**: -1 (not complex at all) to 1 (very complex) with 0 being neutral
5. Generate **5 completely original names:** non-English dictionary words, imaginative and unique.



DISCUSSION

EXPECTED RESULTS

- We expect humans to produce responses that are more driven by visual perception and tangible artifacts, but less orthographically diverse than AI.
- We expect the changes based on differences in sharpness and curvalinearity to be more pronounced in humans (i.e. more grounded in what the shape resembles.)
- We also expect the original names generated by humans to make use of more pop cultural and social references.

LIMITATIONS

Measures of creativity assessment are not objective, so although AI may produce more seemingly novel results, we cannot necessarily attribute that to creativity (likewise in humans, since novelty on its own ≠ creativity.)

FUTURE RESEARCH

Our experiment generates novel data on divergent thinking and creativity to inform what cognitive principles and strategies are most salient. We hope this provides insight into what perceptual features drive the naming of new and previously unnamed concepts, especially in fields like technology and medicine, which are in constant flux.

CONCLUSION

This study compared human and AI interpretations of abstract two-dimensional stimuli (divergent naming task). We analyzed image ratings for sharpness, roundness, and complexity, and examined answers for shape resemblance. We predict humans will generate names similar to the shape, as humans rely on global shape features for object categorization, while AI relies on texture-based features. Since texture is removed (black amorphous two-dimensional images), it's interesting to see how AI interprets stimuli lacking recognizable real-world meaning.

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