# Boundary Extension: Replicating the Perceived Distance Effect and Re-Examining the Coding of Object Counts

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## Research Question

Boundary extension is an error people make when they look at pictures. Instead of seeing and remembering the original picture, they extend the borders and fill in parts at the edges that were not there (Intraub & Richardson, 1989).

Pictures that are zoomed in closer and have a smaller number of objects have the greatest amount of boundary extension (Bainbridge & Baker, 2020).

**Q: Do subjective distance and number of objects independently affect boundary extension?**
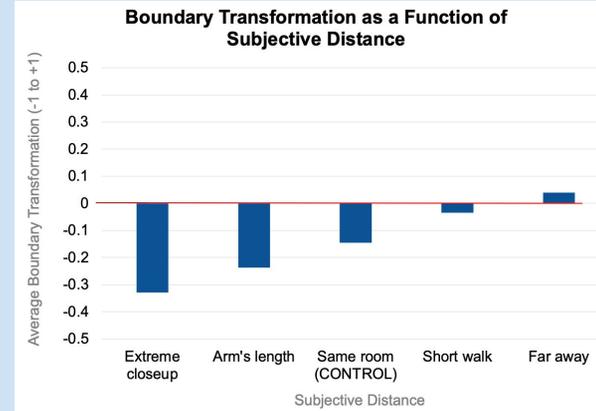
H1: Boundary extension will decrease as subjective distance increases.

H2: Boundary extension will change as the number of objects increases (prior findings conflict on the direction of the effect).

## Data Analysis & Results



**Boundary Transformation as a Function of Subjective Distance**

Average Boundary Transformation (-1 to +1); Subjective Distance: Extreme closeup, Arm's length, Same room (CONTROL), Short walk, Far away

More negative values in the boundary transformation score indicates greater boundary extension.

This graph was made in excel by the student researcher.

| Counting Method | 1 | 2 | 3 | 4 | 5+ |
|---|---|---|---|---|---|
| Original | 306 | 103 | 32 | 19 | 40 |
| Human | 50 | 94 | 69 | 50 | 237 |
| GPT-5.2 | 148 | 114 | 67 | 19 | 152 |

This chart was made in excel by the student researcher

## Methodology

- Secondary analysis of 500 natural images of objects from Bainbridge and Baker (2020), publicly available on OSF.
- Independent variables:
  - *Subjective distance (extreme close up to far away)*
  - *Number of objects (recoded as 1, 2, 3, 4, 5+)*
- Dependent variable:
  - *Boundary transformation scores* (-1 to +1)
- Recoding for this study:
  - Distance was grouped into five categories
  - "Number of objects" were coded based on the number of objects a human would perceive at a glance and compared to GPT-5.2 counts.

## Interpretation & Conclusion



Recoding the number of objects; photo taken by student researcher

Boundary extension decreased as subjective distance increased, even when controlling for the number of objects. When subjective distance was controlled, number of objects was not statistically significant. H1 was supported, but H2 was not.

Application: Boundary extension shows the limits of visual memory; it may contribute to distortion in eyewitness memory.

Future Work: Experimentally manipulate distance and number of objects independently to test causal effects.