

# Conceptual Distortions of Hand Structure are Resistant to Changes in Stimulus Information

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## Introduction

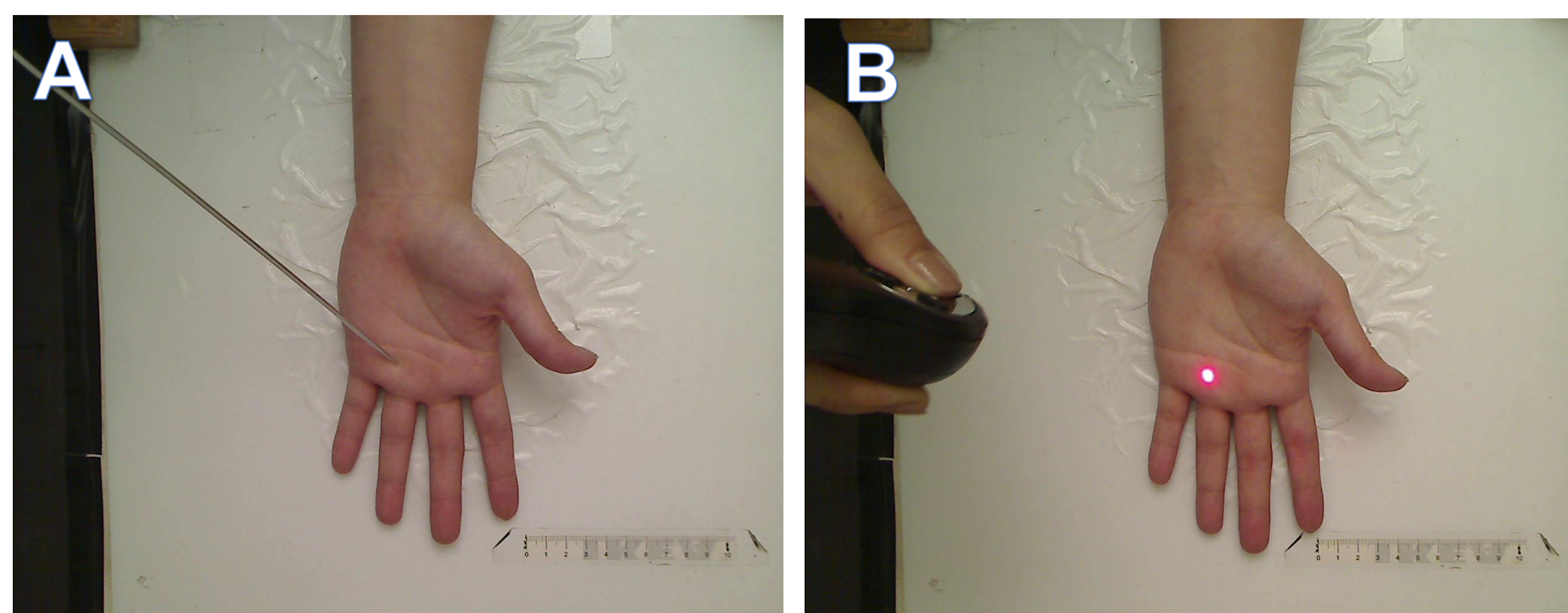
- Hands are held up as an exemplar of well-known, familiar objects – “I know it like the back of my hand”
- However, conceptual knowledge of the hand shows **highly stereotyped distortions** (Longo, 2015)
- People judge their knuckles as farther forward in the hand than they actually are (**distal bias**).
- The cause of this effect remains unclear.
- **Goal Exp. 1:** To test whether both visual and tactile information contribute to the distortion.
- **Goal Exp. 2:** look whether judgments might be influenced by visual landmarks such as the creases at the base of each finger

## Methods

### Experiment 1

Participants judged the location of their knuckles by pointing to the location on their palm directly opposite each knuckle with:

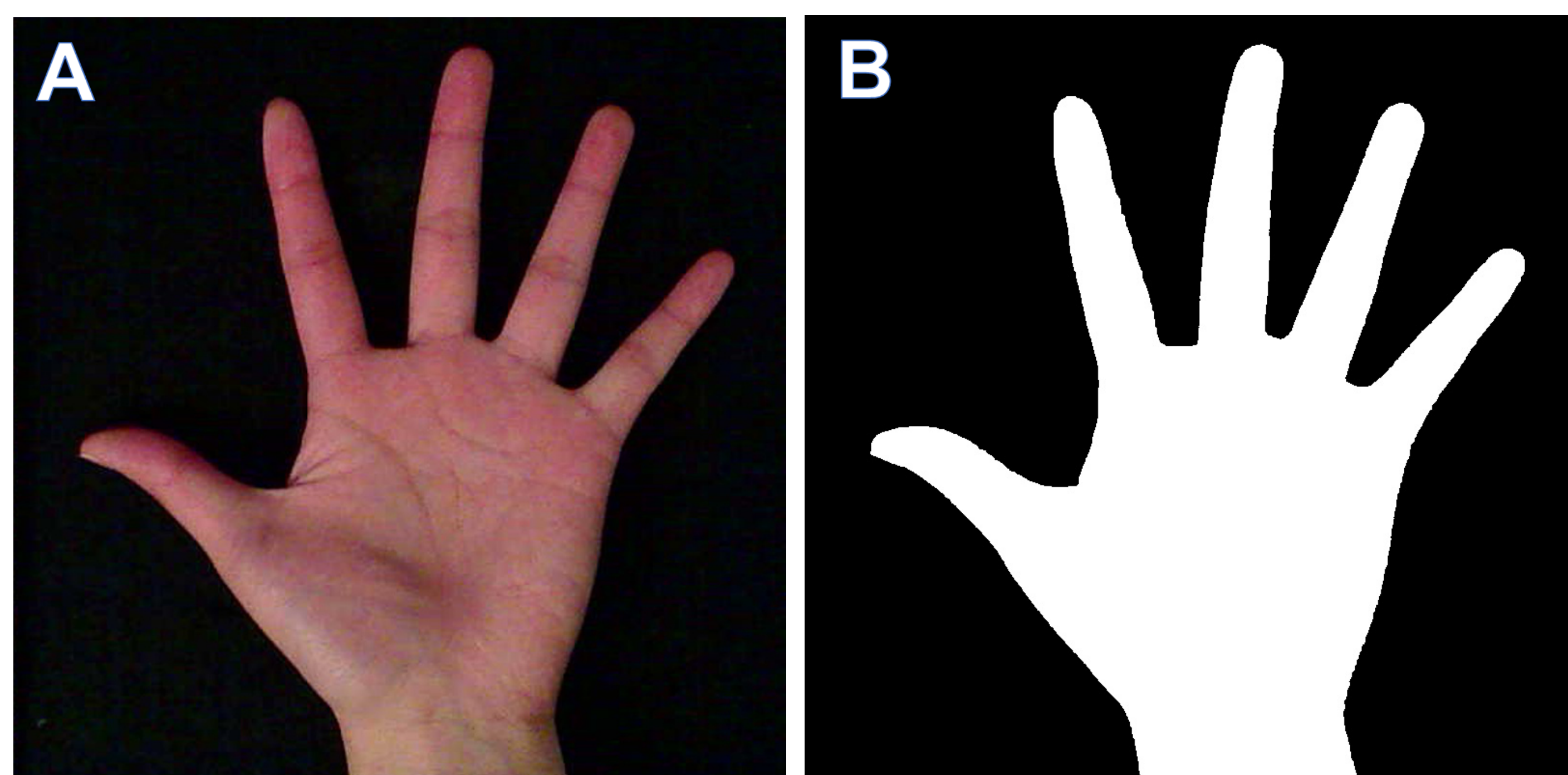
- 1) a metal baton, using vision and touch – **VisuoTactile** condition
- 2) a metal baton while blindfolded, using touch – **Tactile** condition
- 3) a laser pointer, using just vision – **Visual** condition



**Figure 1:** Conditions in experiment 1, subjects used either A) metal baton (**VisuoTactile** and **Tactile** condition) or B) laser pointer (**Visual** condition) to localize their knuckles.

### Experiment 2

Participants localized their knuckles on either a photograph or a silhouette of their hand (with creases removed) and indicated the response by a button click.

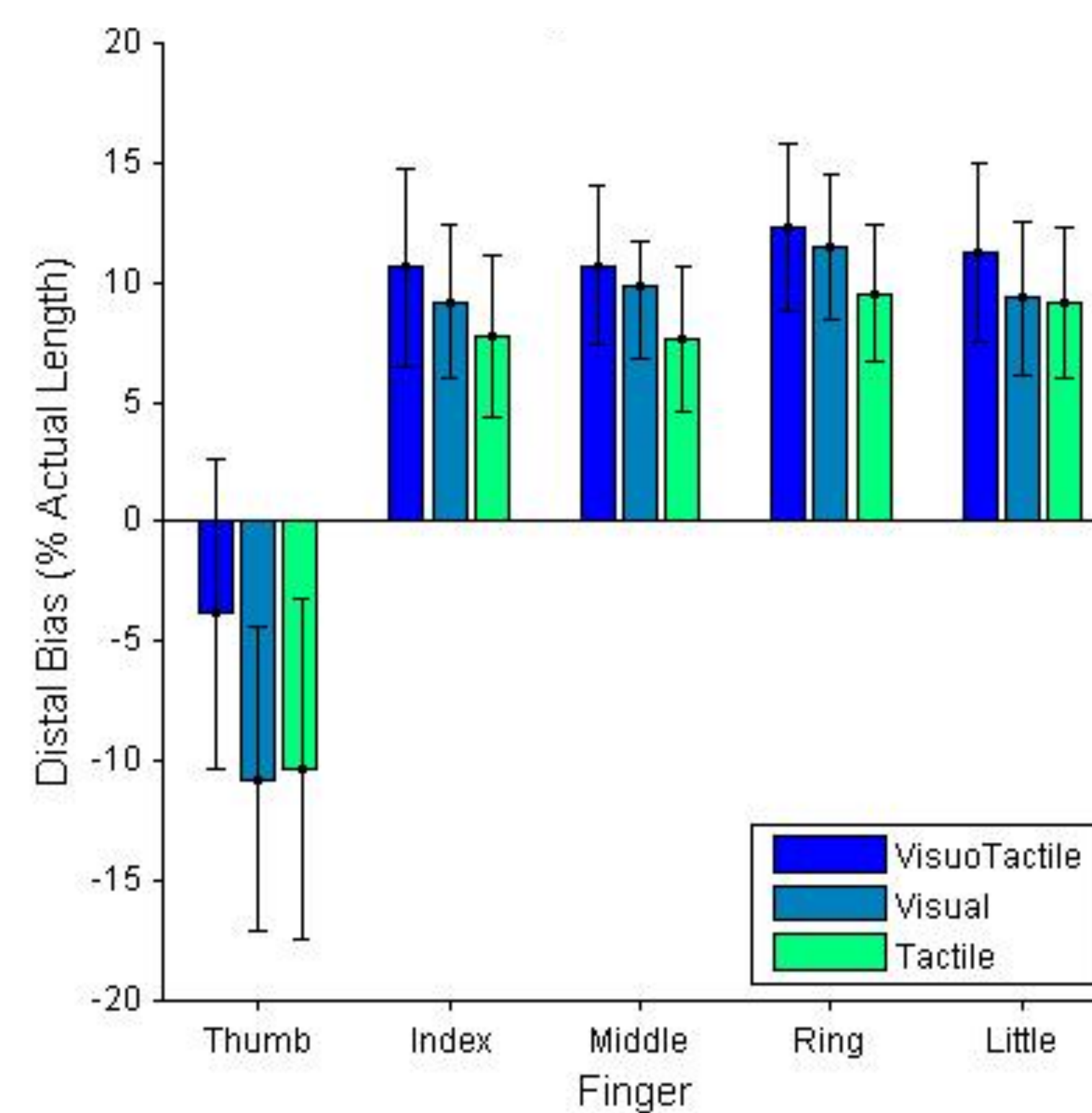


**Figure 2:** Conditions in Exp. 2. Participants judged the location of their knuckles on a A) photograph and B) silhouette of their hand.

## Results

### Experiment 1

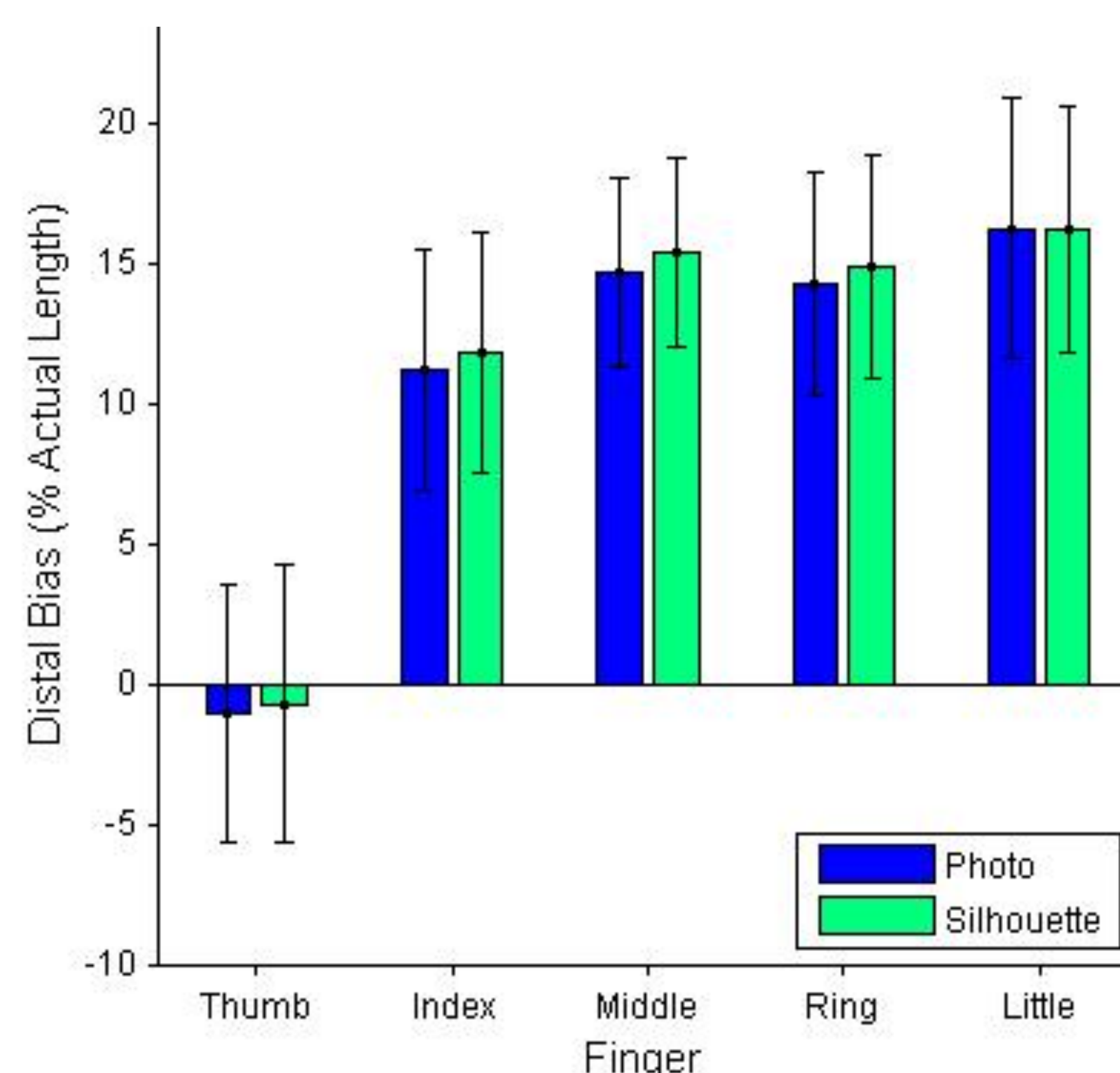
Clear distal mislocalisations were found in all 3 conditions, but were largest when both vision and tactile cues were present.



**Figure 3:** Results from Exp. 1 error bars represent 95% confidence intervals.

### Experiment 2

As in Exp. 1, clear distal bias were apparent in both photograph and silhouette conditions.



**Figure 4:** Results from Exp. 2 error bars represent 95% confidence intervals

## Discussion

- Distal mislocalisation of the knuckles is **highly resistant to changes in the stimulus information** available for responses.
- The effect does not rely on any specific stimulus cue or any single sensory modality.
- These results provide further evidence that distal mislocalisations reflect a **conceptual misrepresentation** of hand structure.

## References

Longo, M. R. (2015). Intuitive anatomy: Distortions of conceptual knowledge of hand structure. *Cognition*, 142, 230–235.