



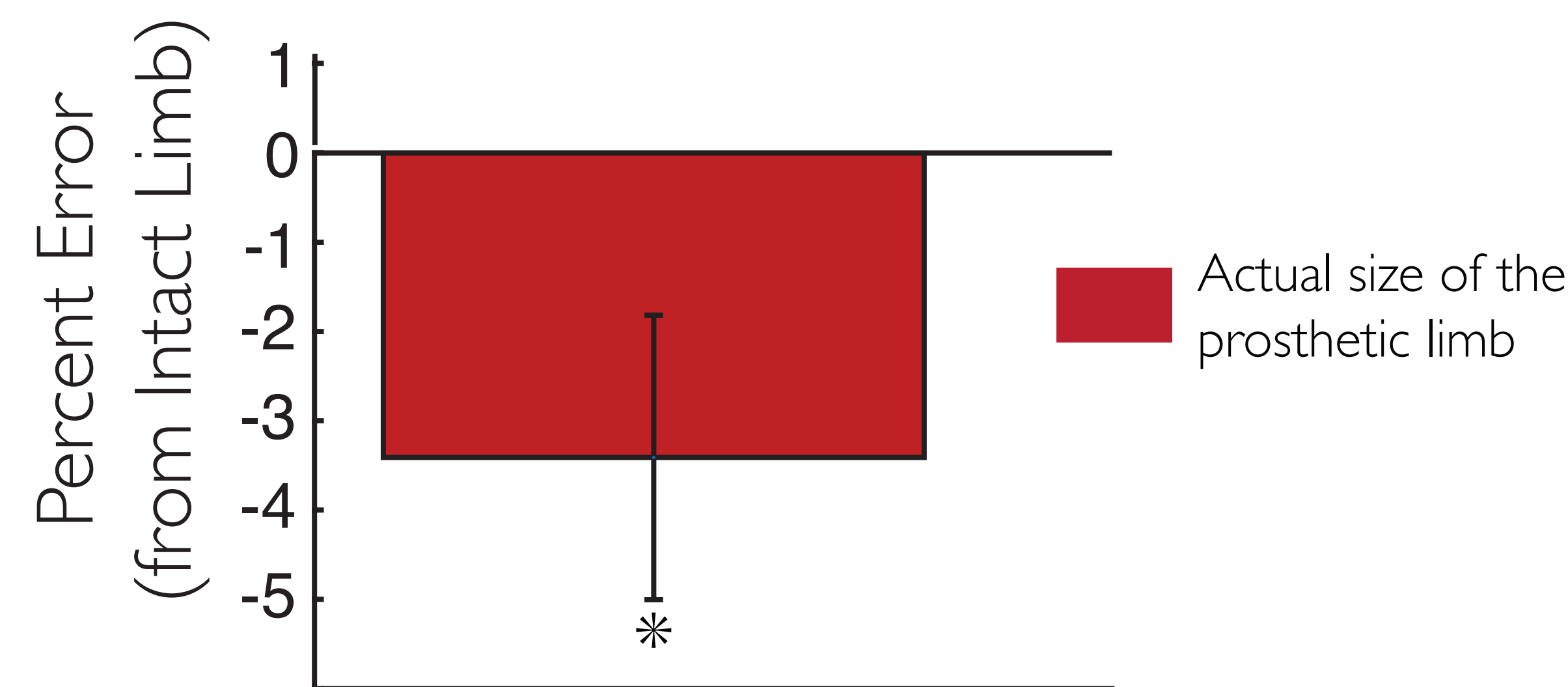
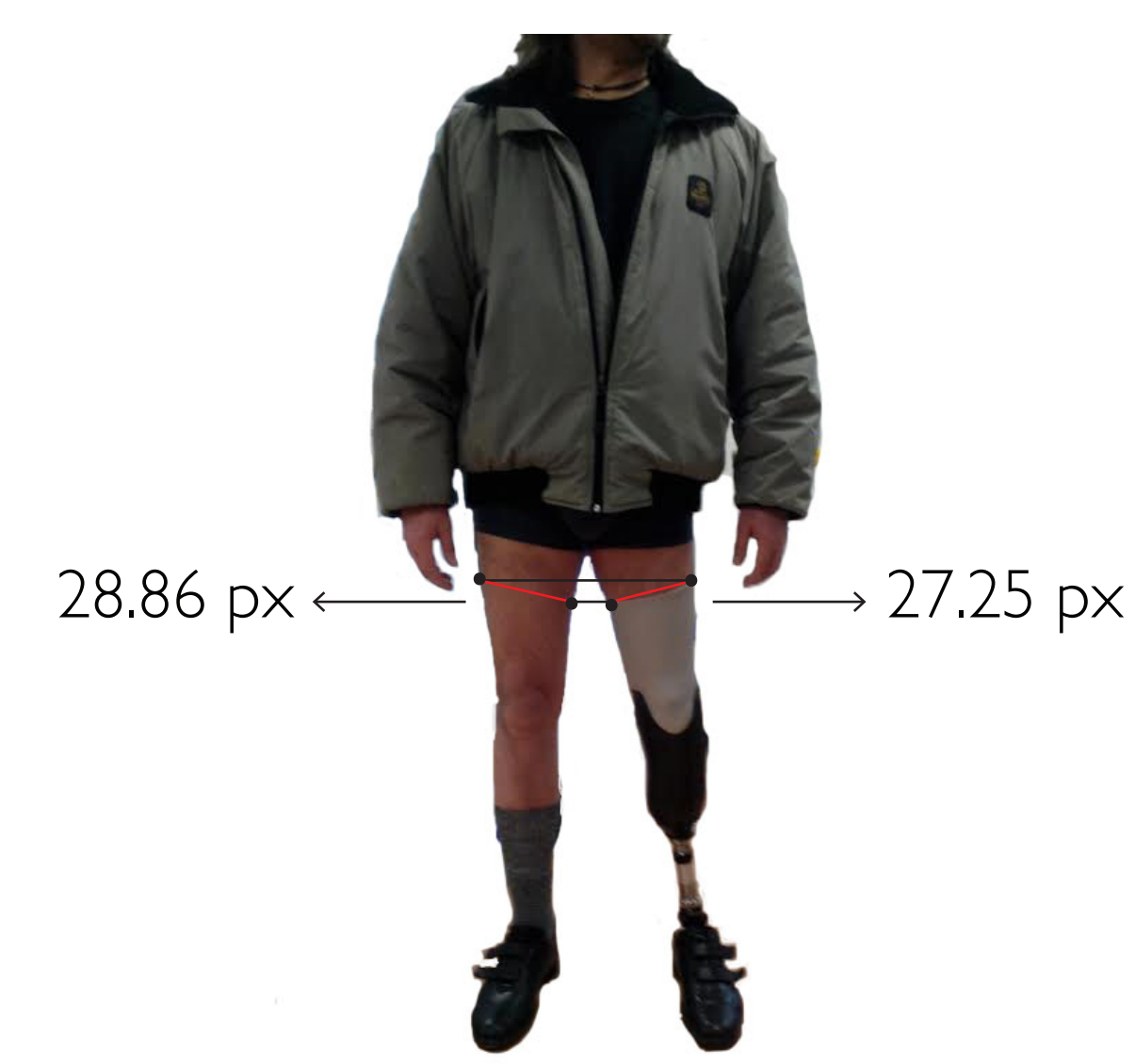
# Observers misperceive the size of artificial limbs

Ritika Mazumder & Jason Haberman  
Visual Cognition Laboratory, Rhodes College



**Introduction:** The size of a prosthetic device is of great concern to its wearer, not just from a functional standpoint, but also from an aesthetic one. Clinicians respond to this by purposely making the limb smaller than the corresponding intact limb, suggesting that viewers overestimate the size of prosthetic devices. Here, we empirically examine whether viewers truly experience this perceptual bias.

**Experiment 0 Question:** Do prosthetists make artificial limbs smaller than the corresponding intact limb as reported by the patients?

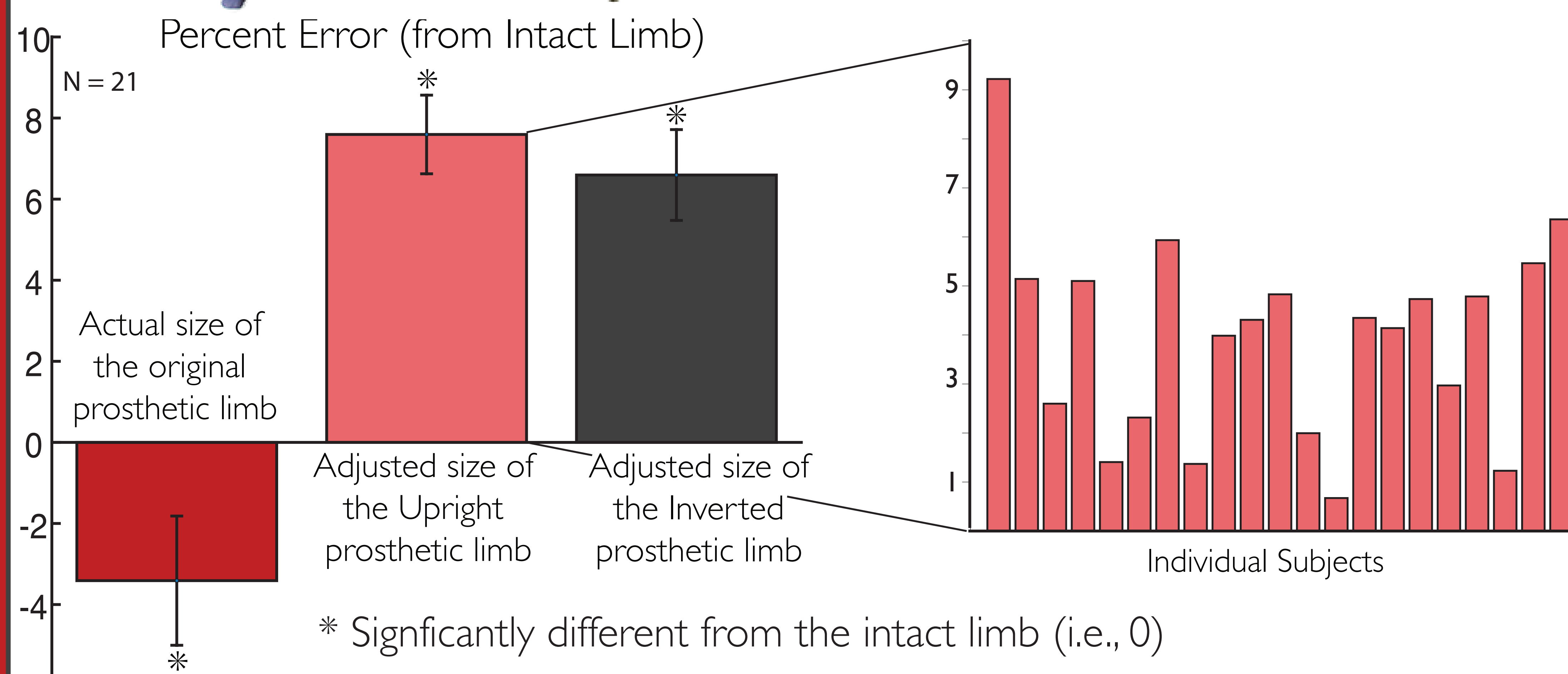
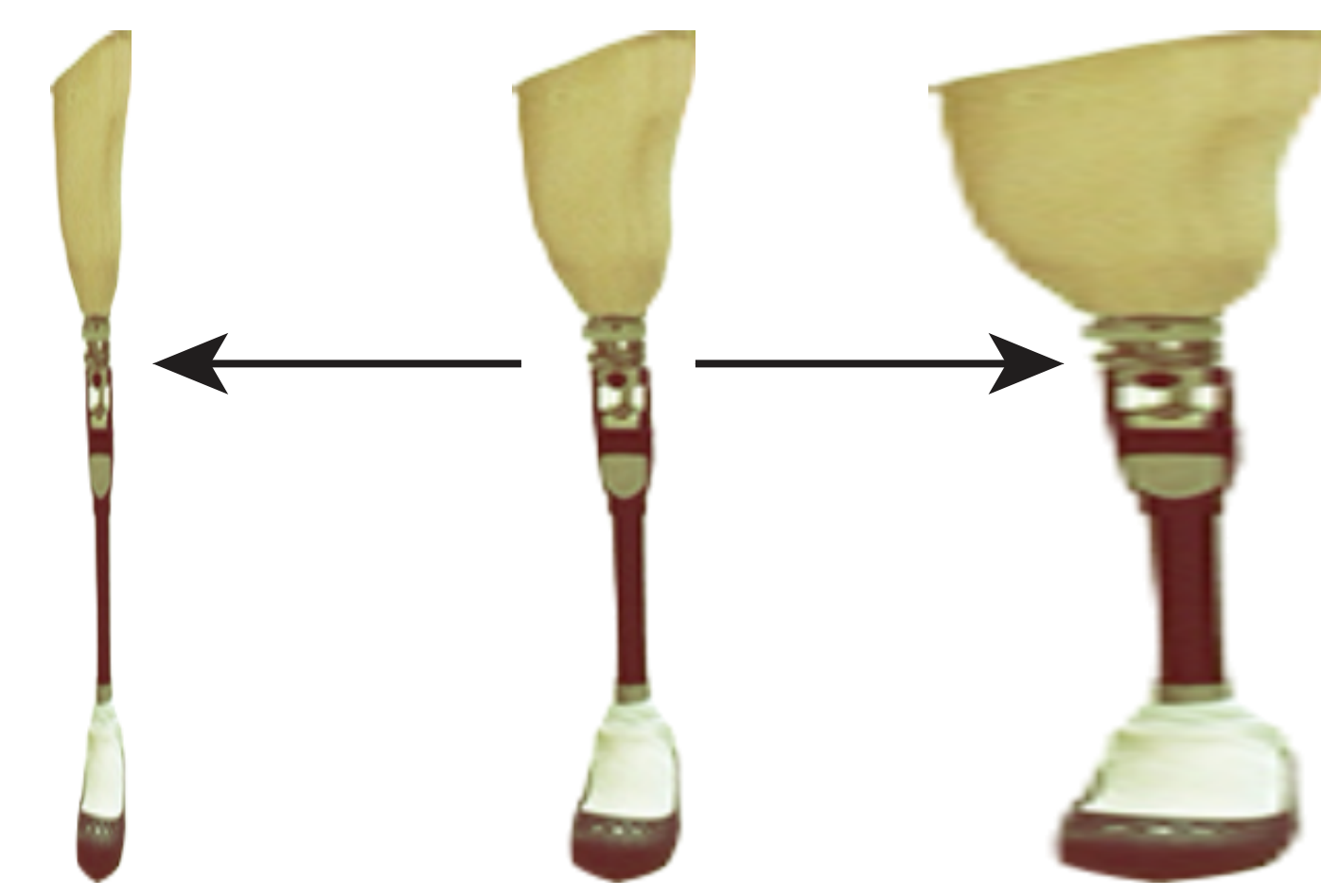


Prosthetic limbs are on average 3.4% smaller than the intact limb (from a sample of 35 images) \* Significantly different from the intact limb (i.e., 0)

**Experiment 1 Question:** How do observers perceive the size of prosthetic limbs?

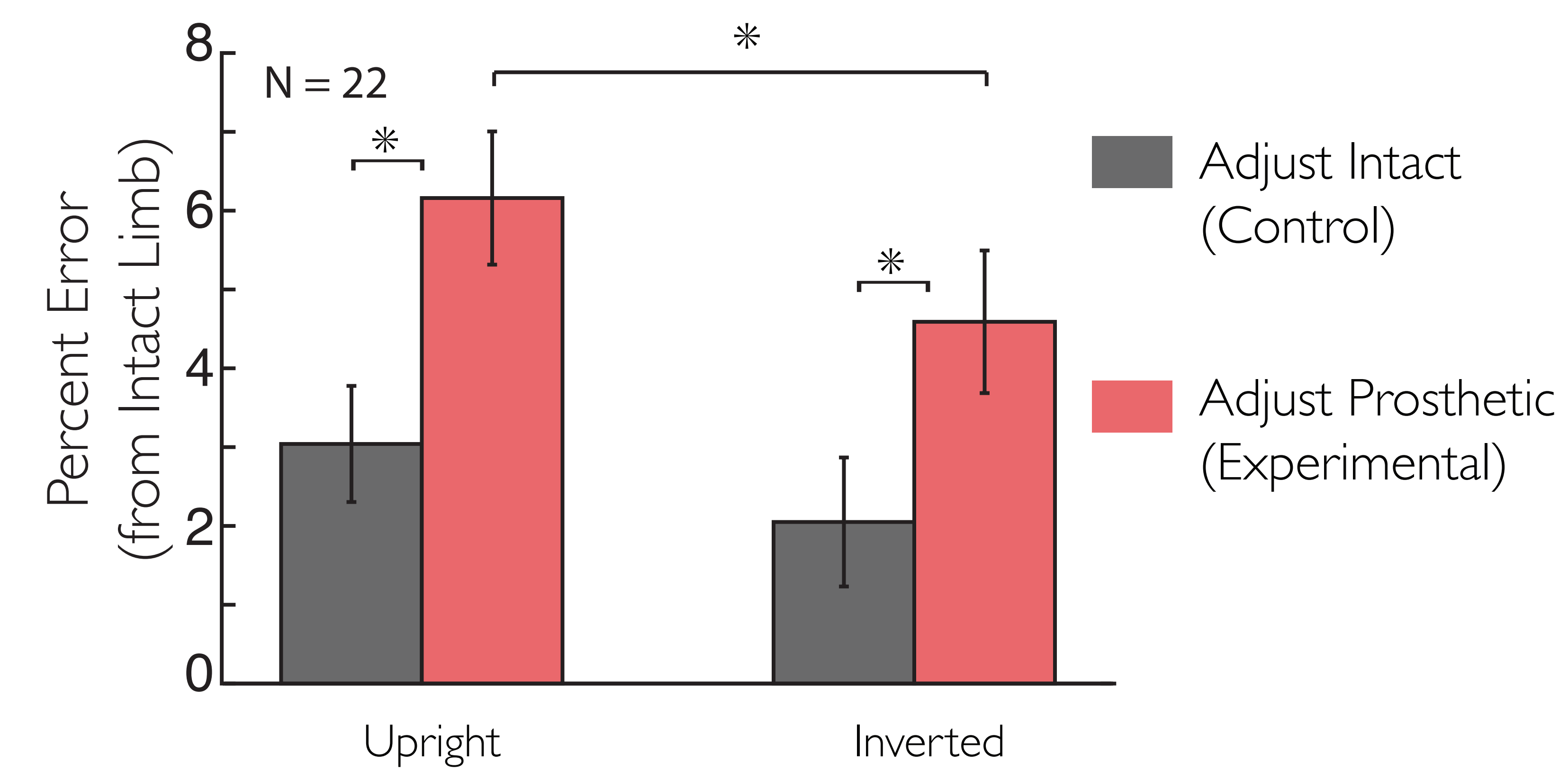
Adjust location of limb until it looks right

Adjust width of limb until it looks right



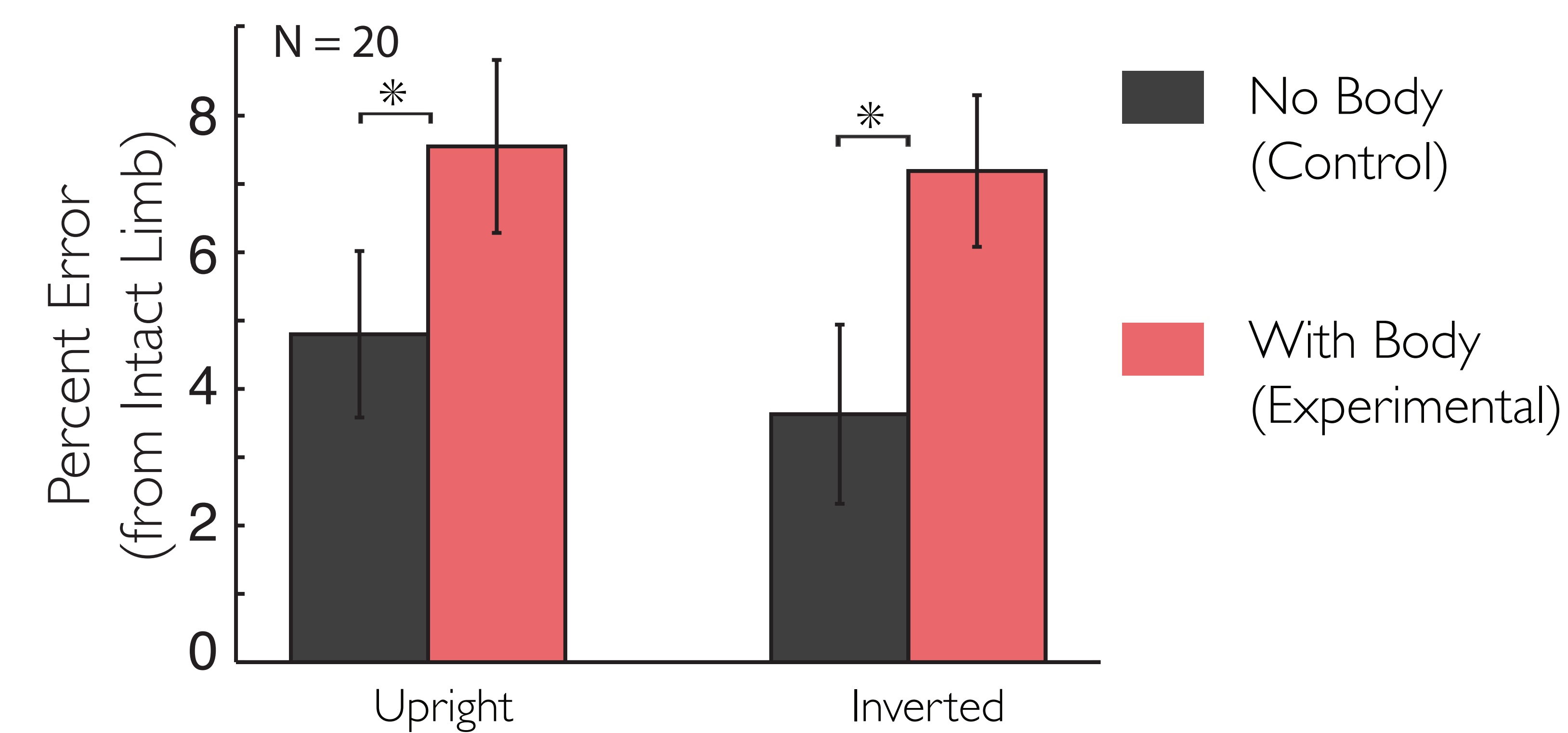
**Conclusion:** There is a striking disconnect between what observers perceive and what prosthetists practice.

**Experiment 2 Question:** Do observers show a similar bias in perceiving the intact limb?



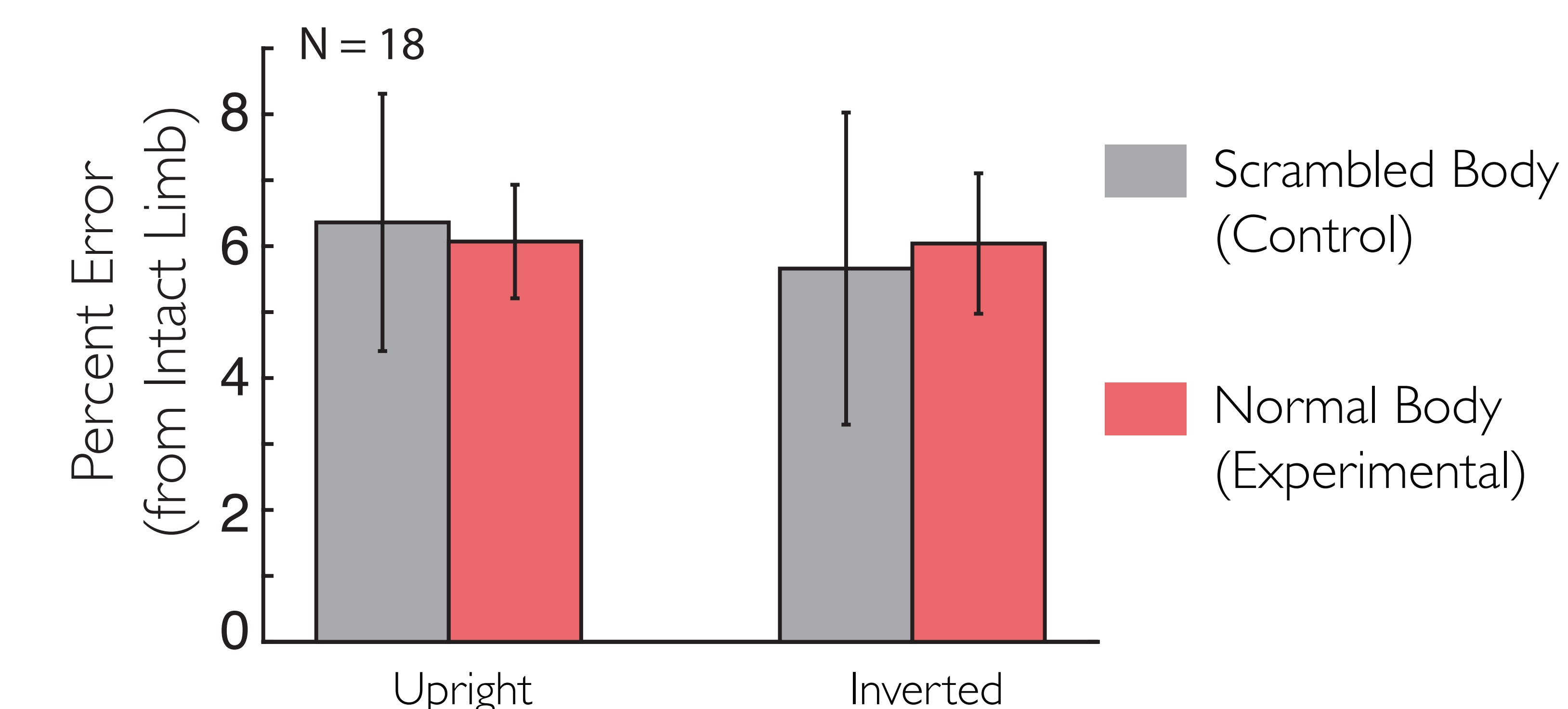
**Conclusion:** While observers still exhibit a perceptual bias in adjusting the intact limb, this bias is reduced relative to the prosthetic limb. Therefore, some aspect of the bias may be uniquely attributed to how we perceive prosthetic limbs.

**Experiment 3 Question:** Is there still a perceptual bias in the absence of a bodily context?



**Conclusion:** The bias is significantly mitigated without a bodily context. This suggests the configuration of a body in part drives the perceptual bias of the prosthetic limb.

**Experiment 4 Question:** How important is the configuration of the body?



**Conclusion:** The perceptual bias persists even when seeing a scrambled body. It may be that proper configuration of the body is not critical to elicit the prosthetic limb bias. The mere presence of bodily information is sufficient.

**Acknowledgements:** Thank you to Dr. David Whitney for suggestions on experimental design.

**Phase II:** Test the perceptual bias in amputee subjects and compare with Phase I