

Spring 2015

Investigating the Impact of Perturbed Visual and Proprioceptive information in Near-Field Immersive Virtual Environment

Elham Ebrahimi
Clemson University

Bliss Altenhoff
Clemson University

Christopher Pagano
Clemson University

Sabarish V. Babu
Clemson University

J Adam Jones
Clemson University

Follow this and additional works at: https://tigerprints.clemson.edu/grads_symposium

Recommended Citation

Ebrahimi, Elham; Altenhoff, Bliss; Pagano, Christopher; Babu, Sabarish V.; and Jones, J Adam, "Investigating the Impact of Perturbed Visual and Proprioceptive information in Near-Field Immersive Virtual Environment" (2015). *Graduate Research and Discovery Symposium (GRADS)*. 123.
https://tigerprints.clemson.edu/grads_symposium/123

This Poster is brought to you for free and open access by the Research and Innovation Month at TigerPrints. It has been accepted for inclusion in Graduate Research and Discovery Symposium (GRADS) by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.



Investigating the Impact of Perturbed Visual and Proprioceptive Information on Near-Field Depth Perception in Immersive Virtual Environment



Elham Ebrahimi¹ Bliss M. Altenhoff² Christopher C. Pagano² Sabarish V. Babu¹ J. Adam Jones¹

¹School of Computing, ²Department of Psychology, Clemson University, Clemson, SC

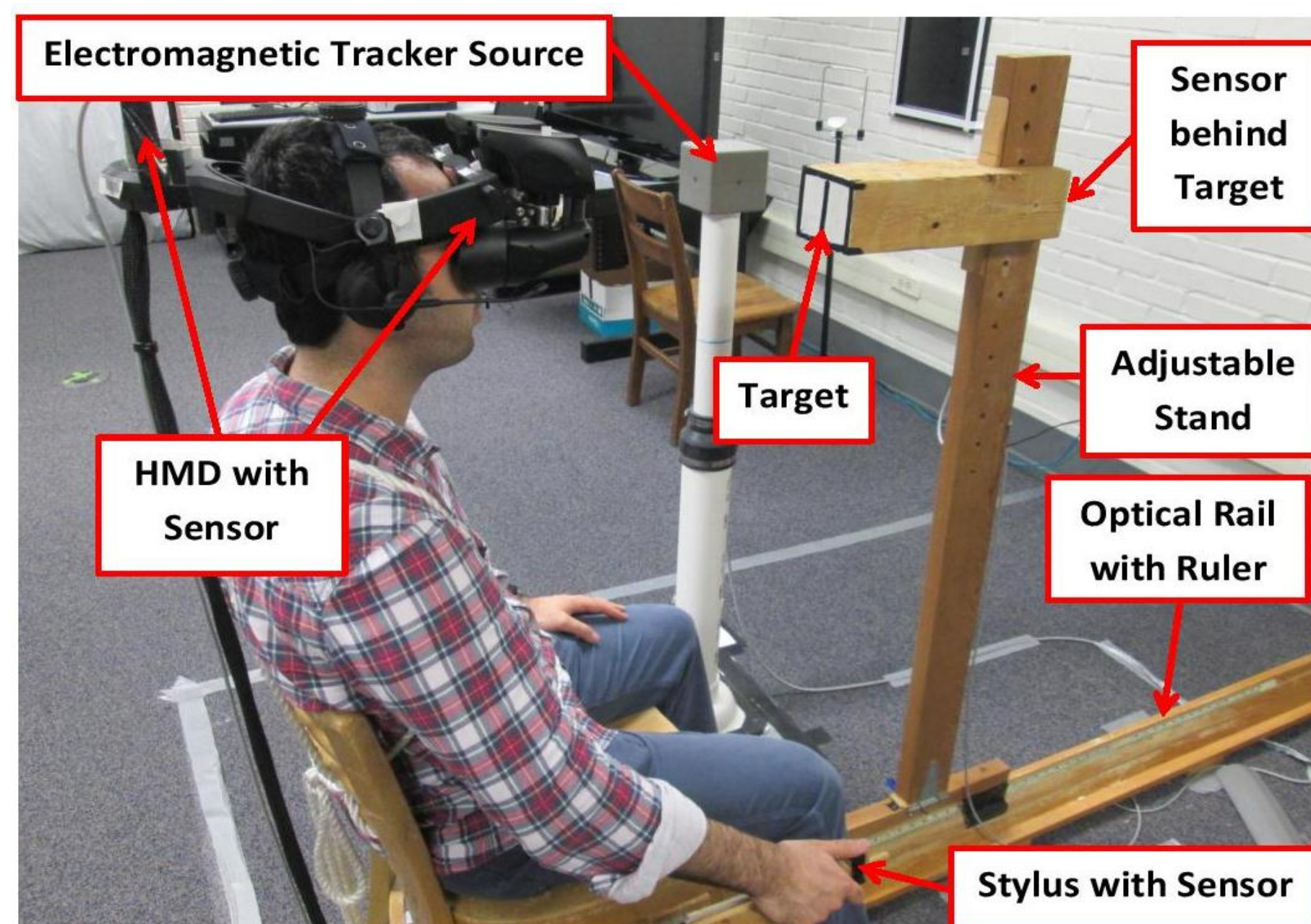
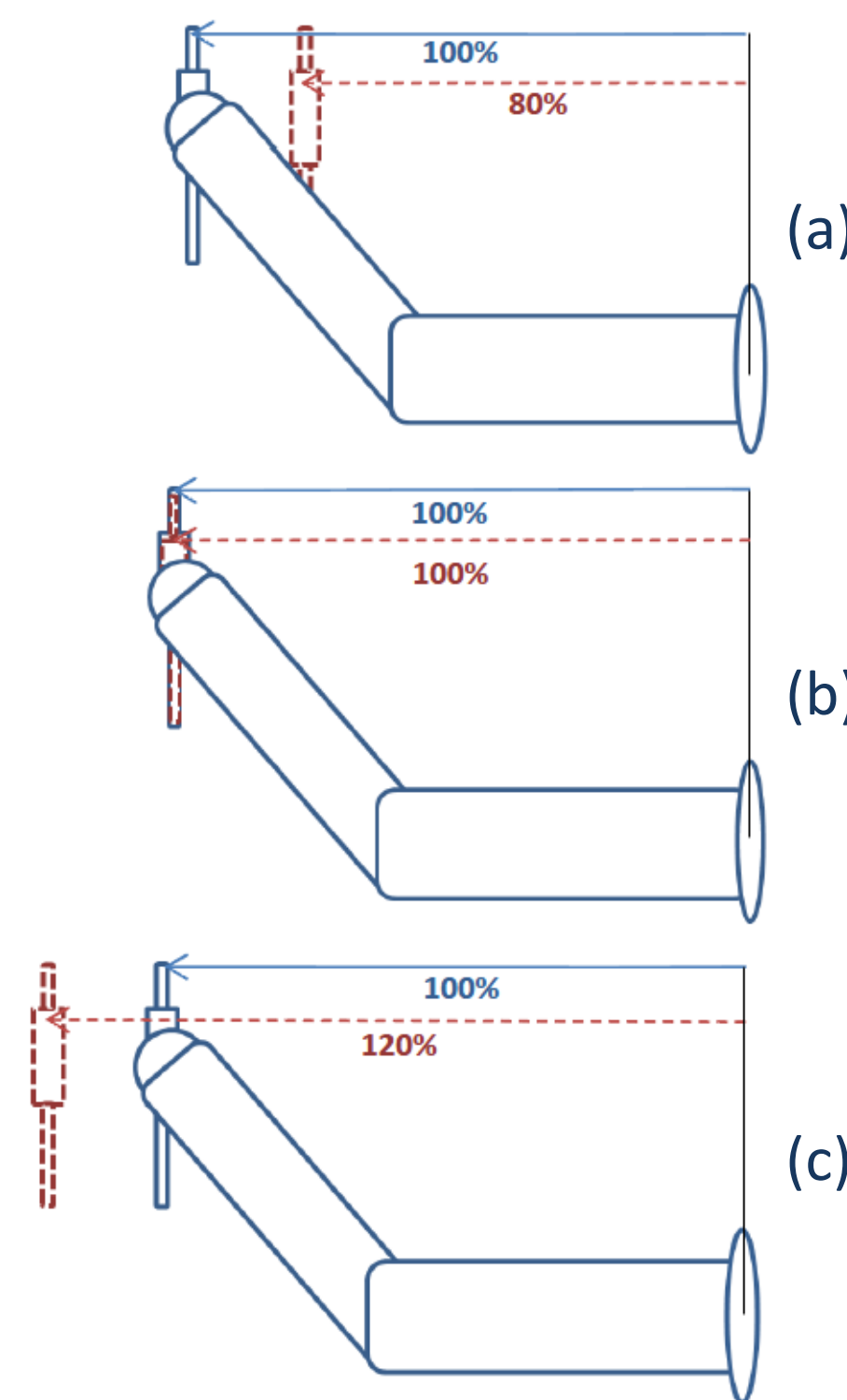
Motivation

- Do participants calibrate to misaligned visual and proprioceptive information in near-field distances in the IVE?
- Examining the carryover effects of calibrations to one of three perturbations of visual and proprioceptive feedback to distance perception.

(a) Minus Condition: the virtual stylus appears 20% closer than its physical position.

(b) Neutral Condition: physical and virtual stylus are co-located.

(c) Plus Condition: the virtual stylus appears 20% farther than its physical position.

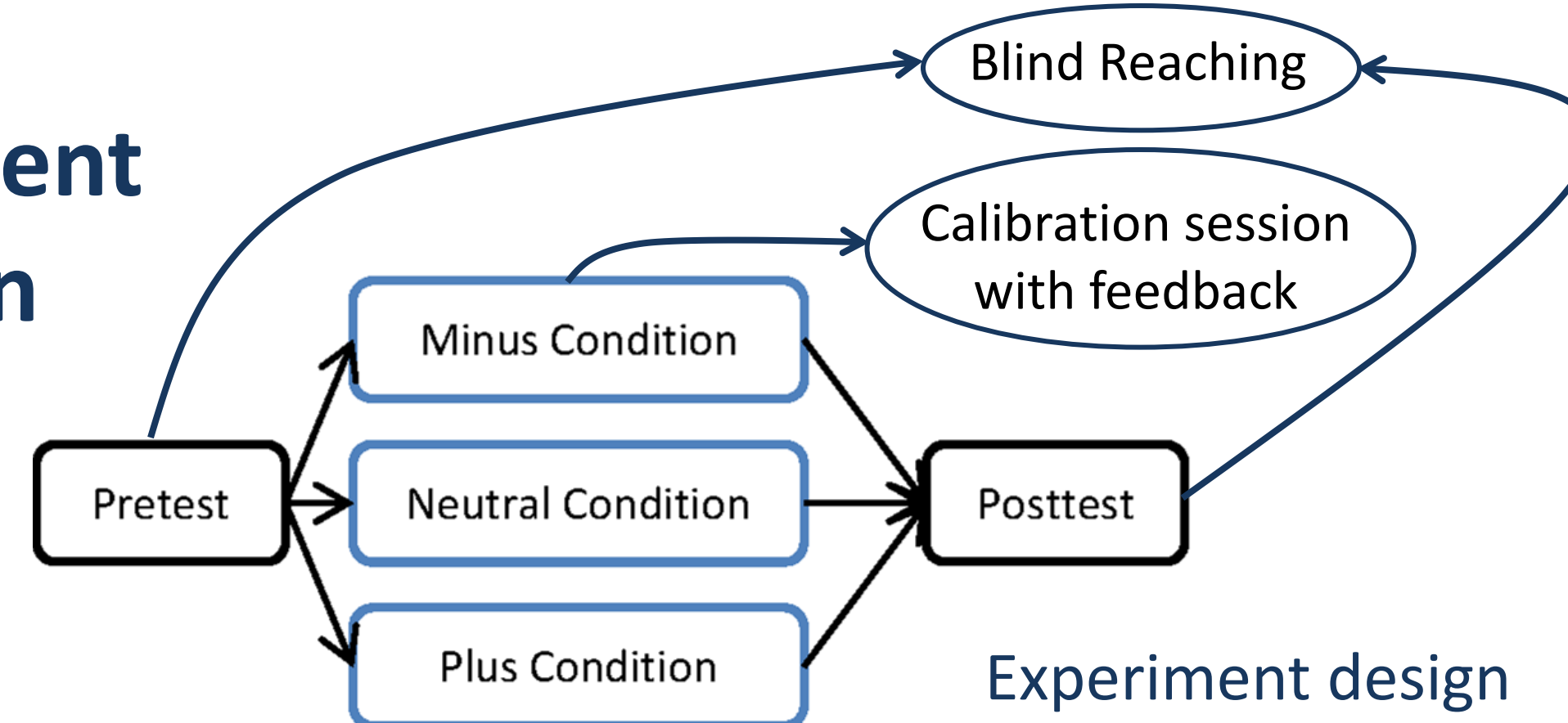


The near-field distance estimation apparatus

Hypotheses

- In Minus Condition, participants believe they are under-reaching, and thus will reach farther after the calibration.
- In Plus Condition, Participants believe they are overreaching, and thus will reach shorter after the calibration.

Experiment Design

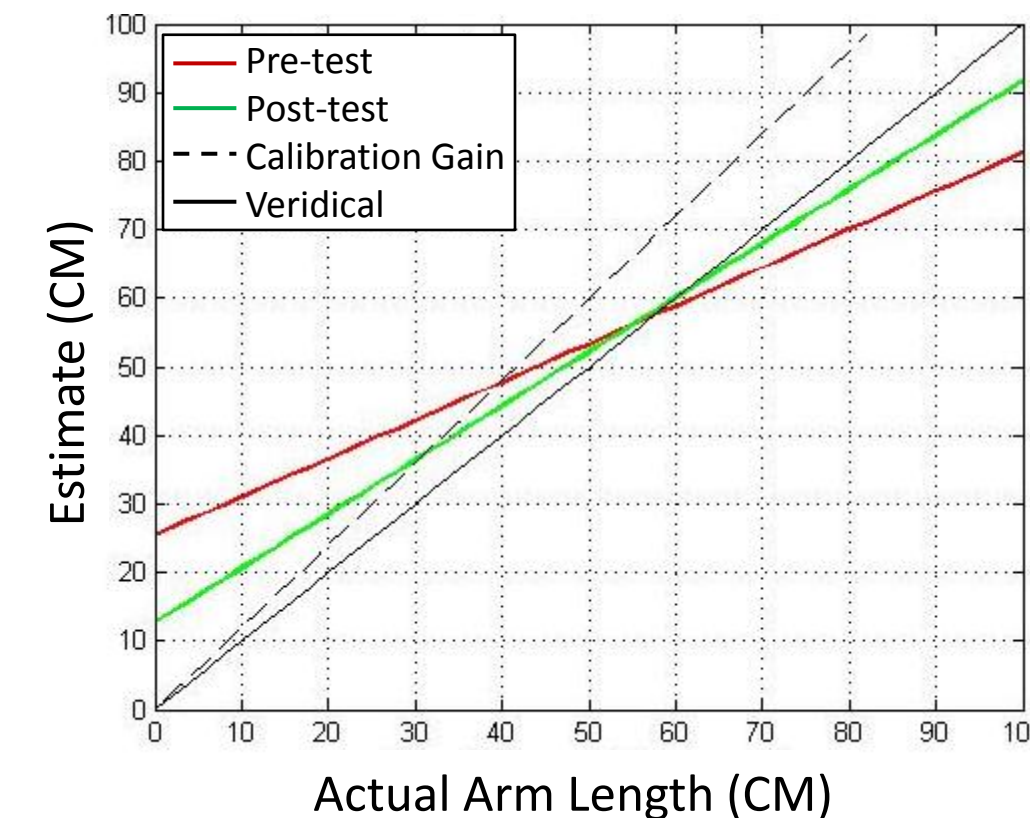


Results

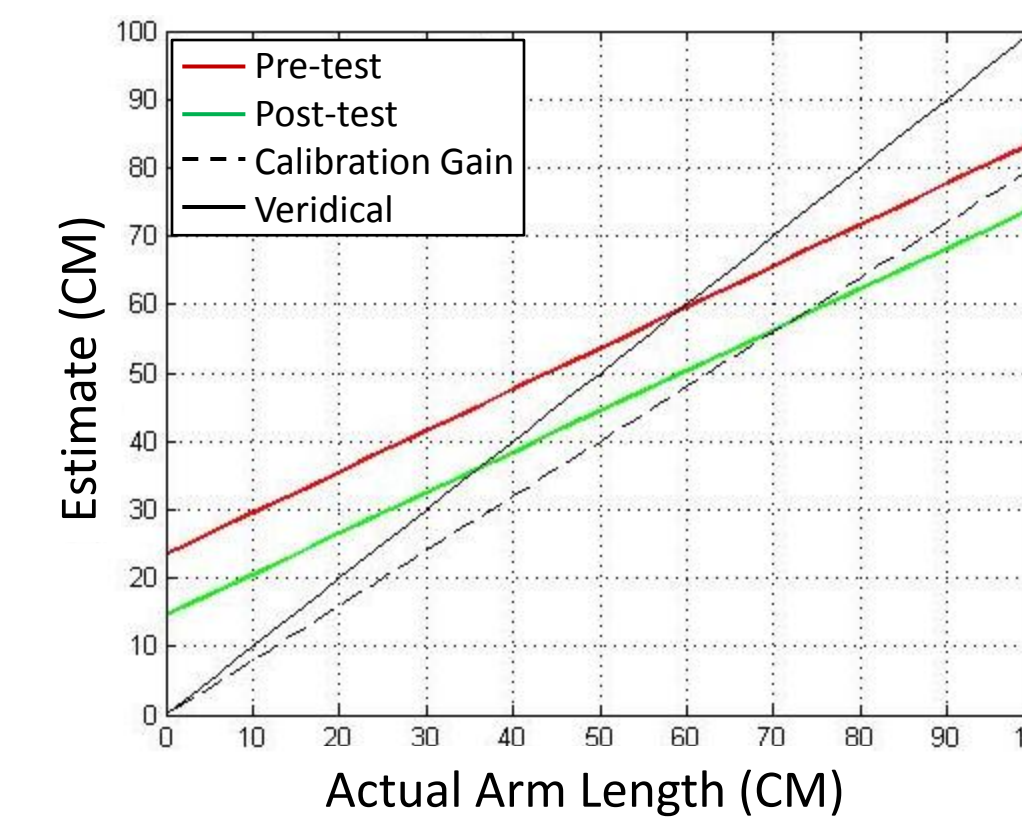
A. Test for calibration to determine if the participants' performance improved as a function of the feedback received during the calibration session.

	Pre-test			Post-test		
	r ²	Slope	Intercept	r ²	Slope	Intercept
Minus	.53	.47	29	.72	.65	19.1
Neutral	.46	.49	25.4	.68	.67	12.8
Plus	.54	.53	25.2	.68	.65	12.4

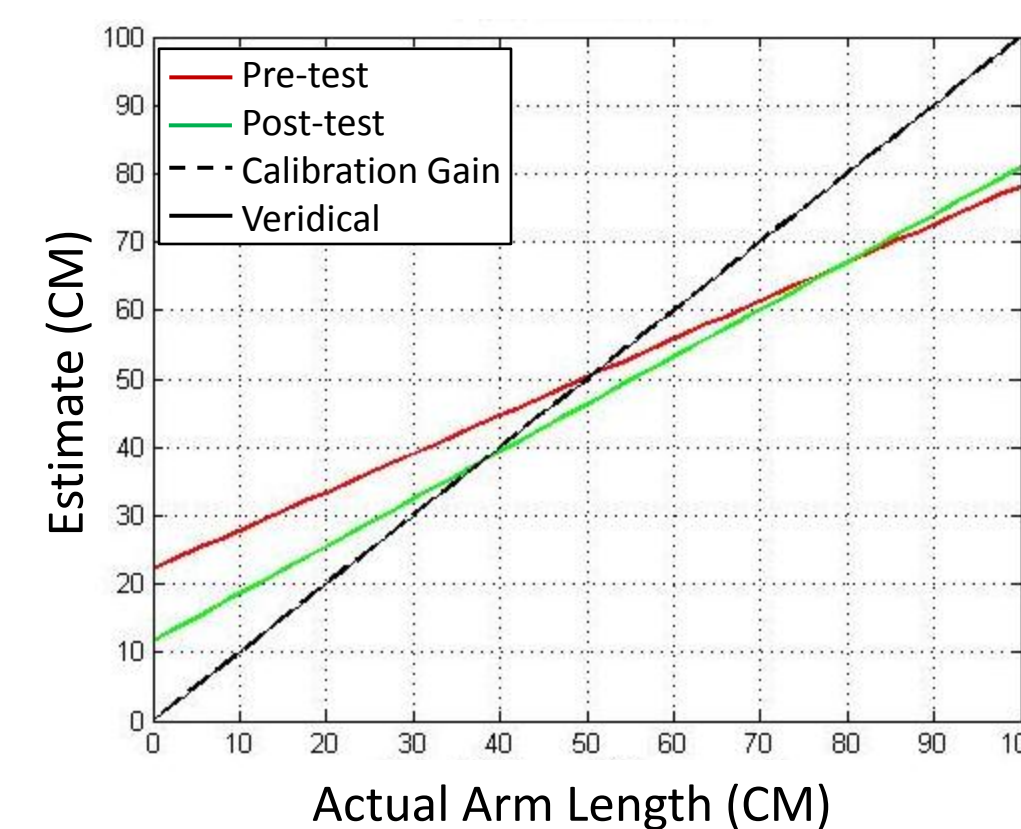
Minus Conditions



Plus Conditions

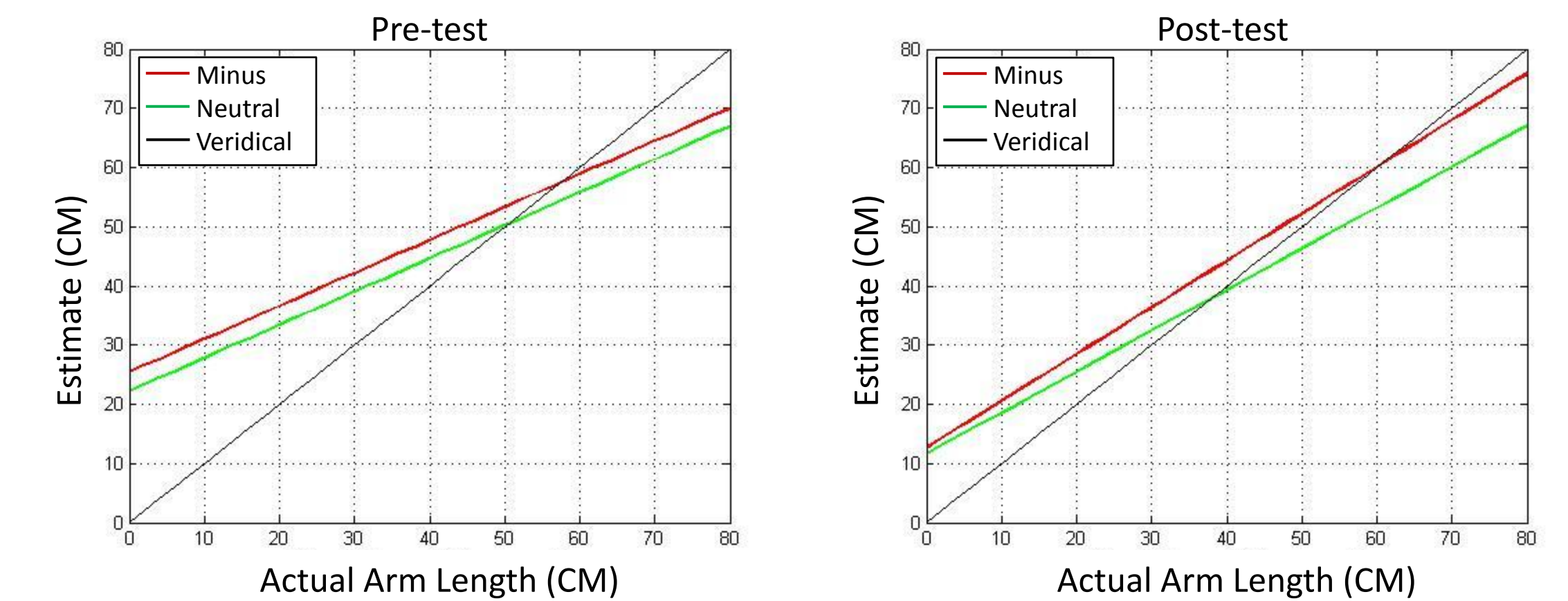


Neutral Conditions

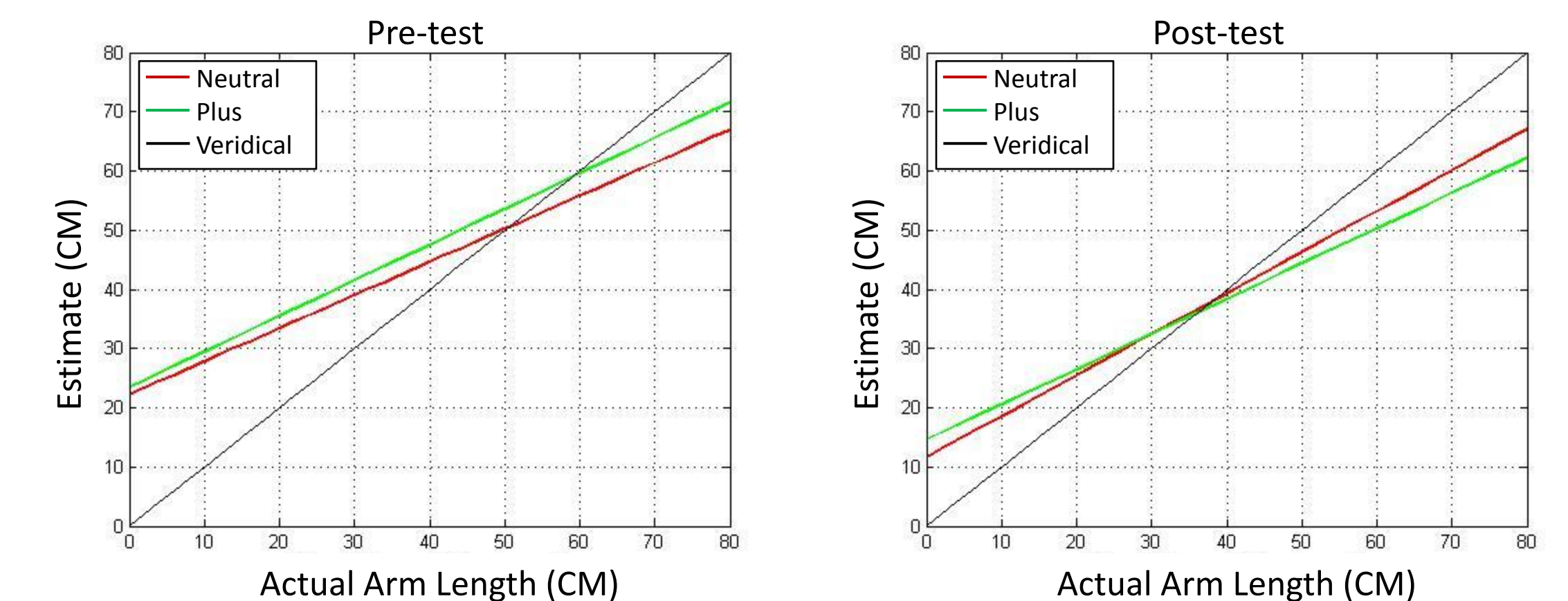


B. Test for a difference effect of calibration as a function of the calibration condition (Minus, Neutral, and Plus).

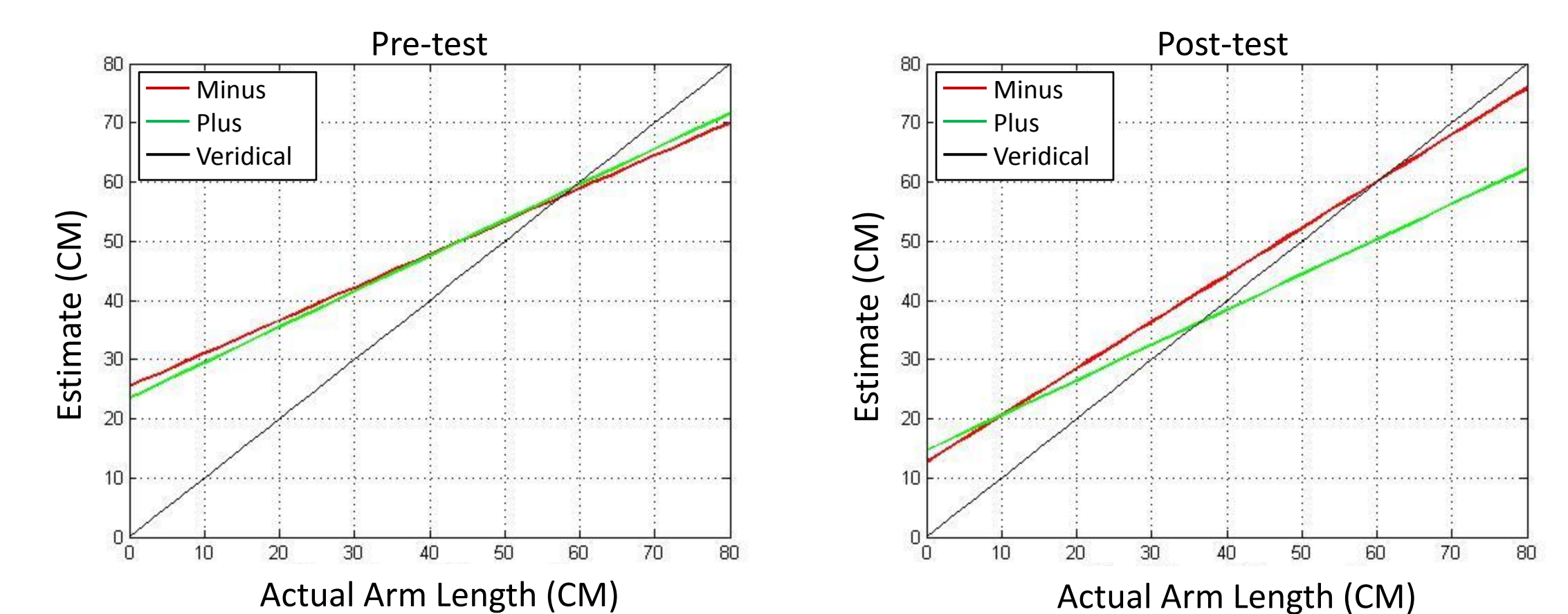
Minus and Neutral Conditions



Neutral and Plus Conditions



Minus and Plus Conditions



Conclusion

- The mismatched between visual and proprioceptive information could alter users depth judgment in near field.
- Users of virtual environments will likely be able to reasonably adapt to virtual reality systems that may not have tightly corresponding visual and physical movements.

- Performance improved as a function of the feedback received during the calibration session.
- Reaches became nearer after they were manipulated to appear farther in Plus Condition.
- Reaches became farther after they were manipulated to appear closer in Minus Condition.