

Using Motion Induced Blindness to Determine Contrast Asymmetries of ON- and OFF-cells

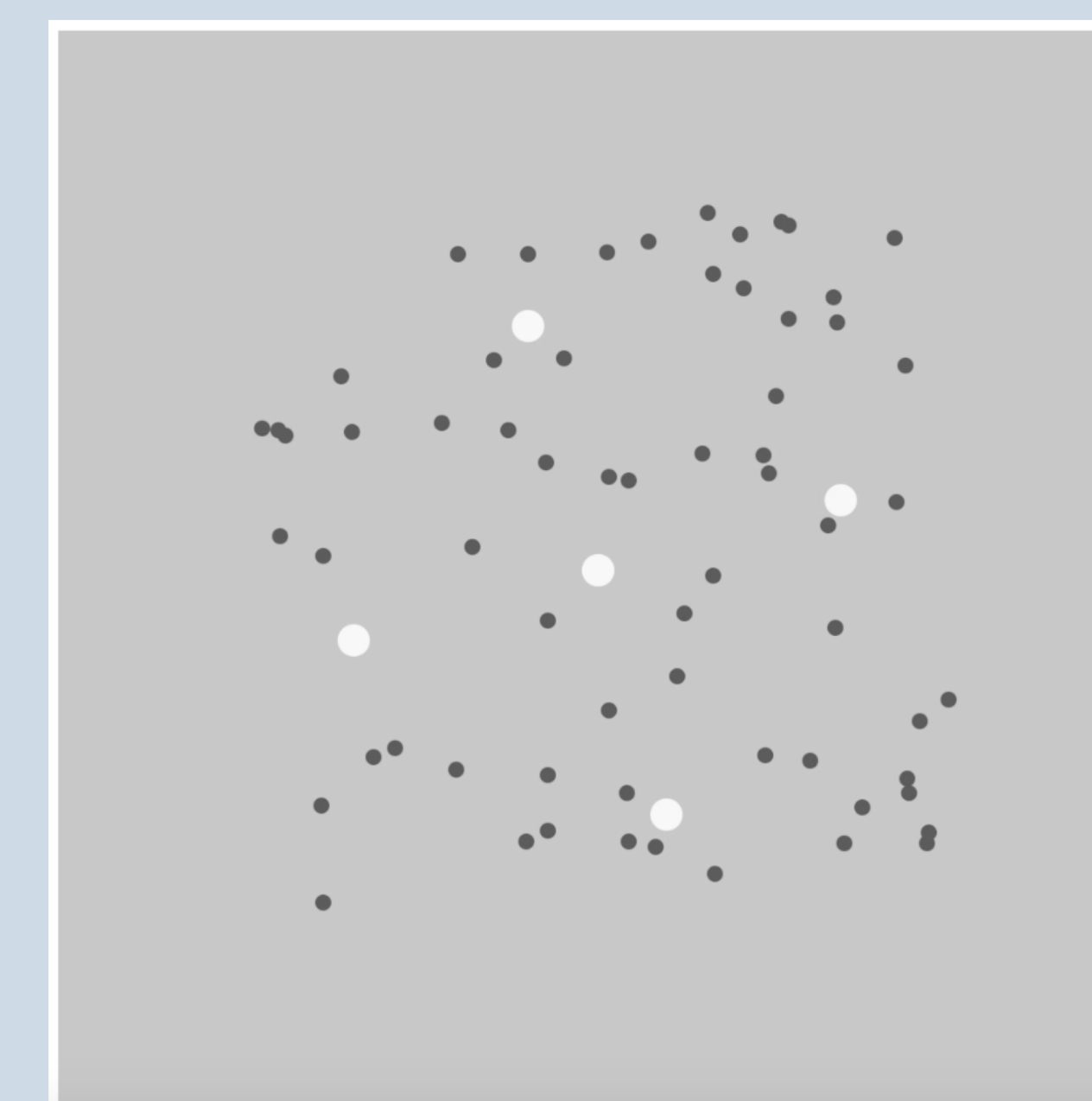
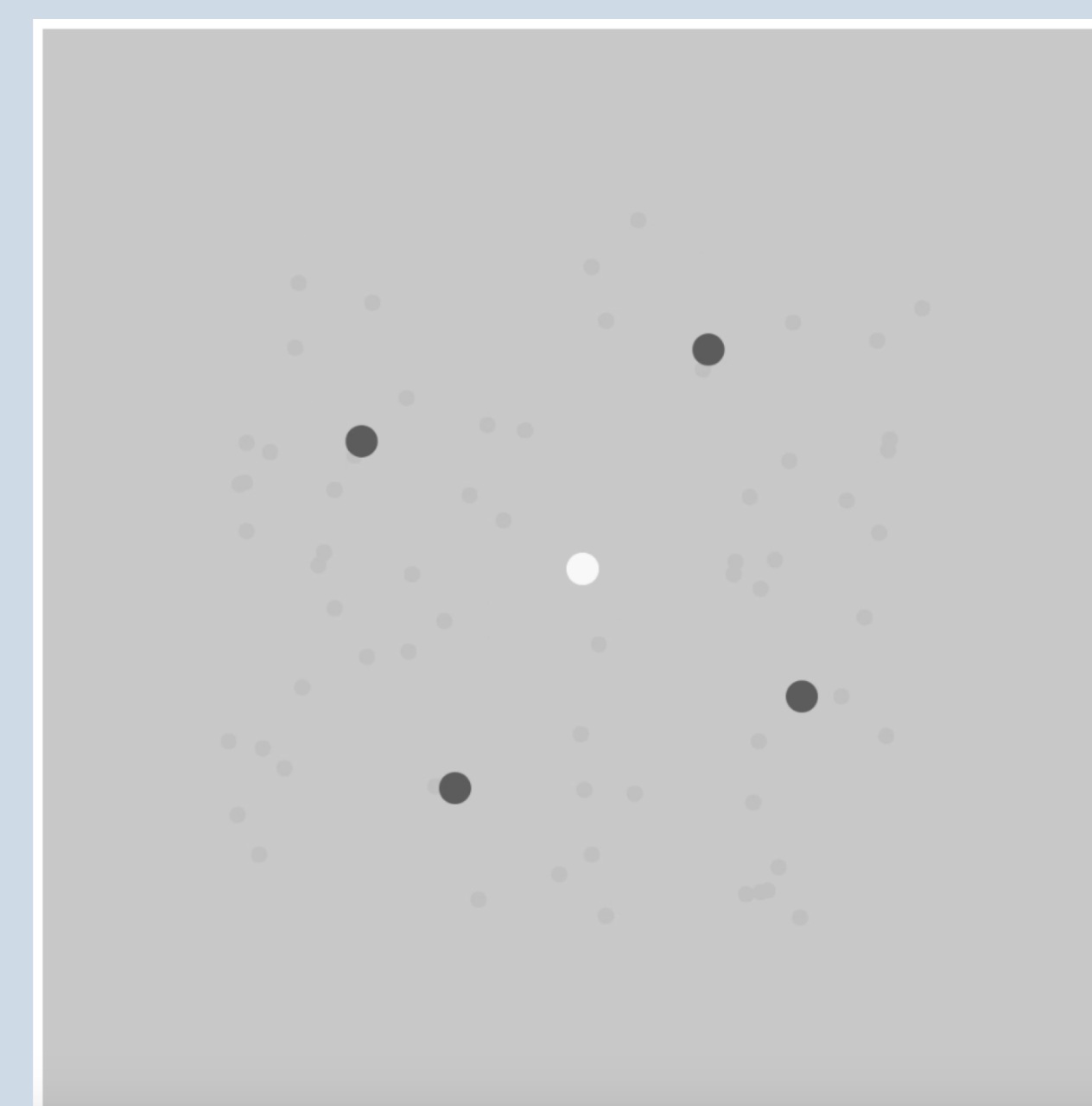
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INTRODUCTION

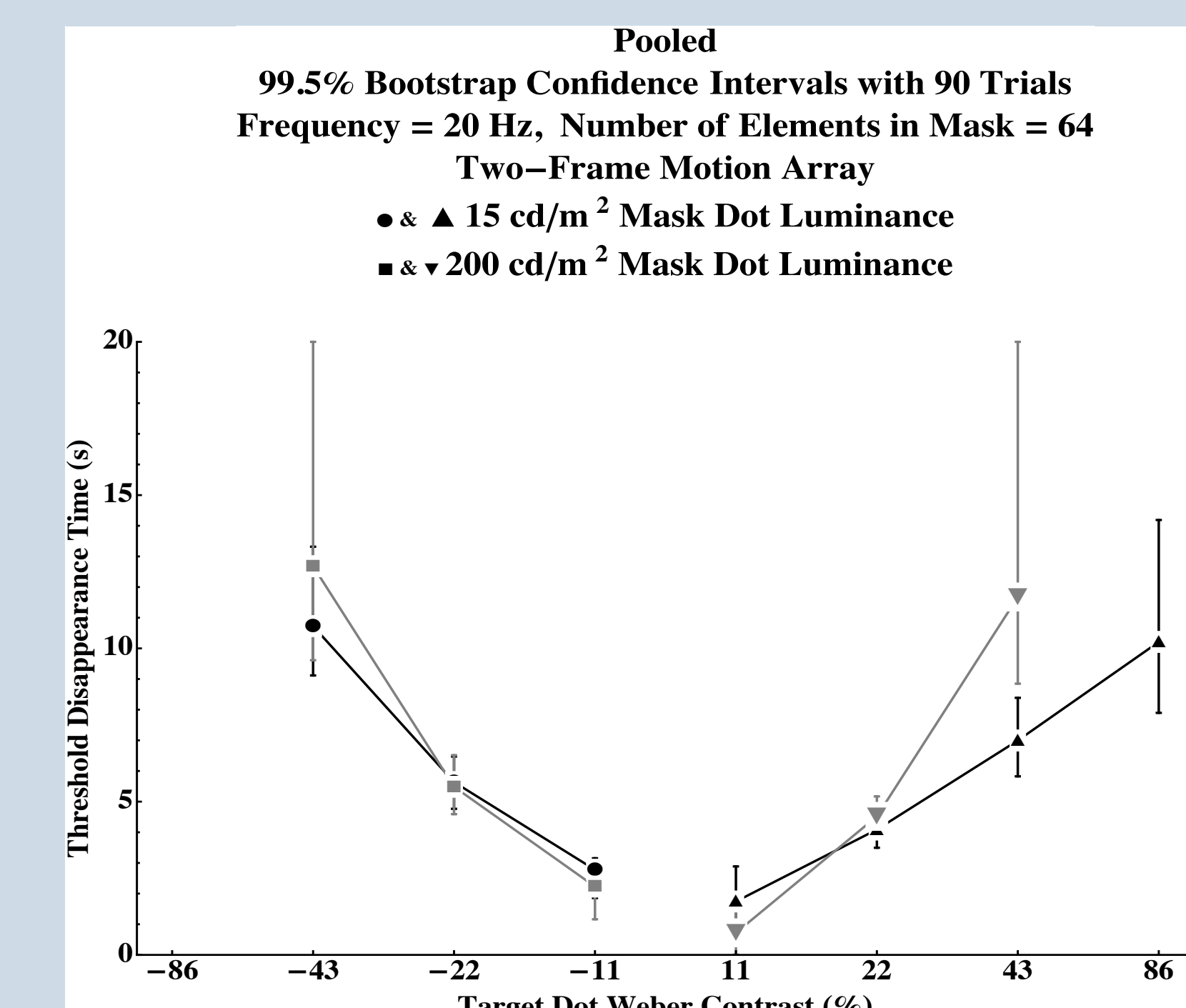
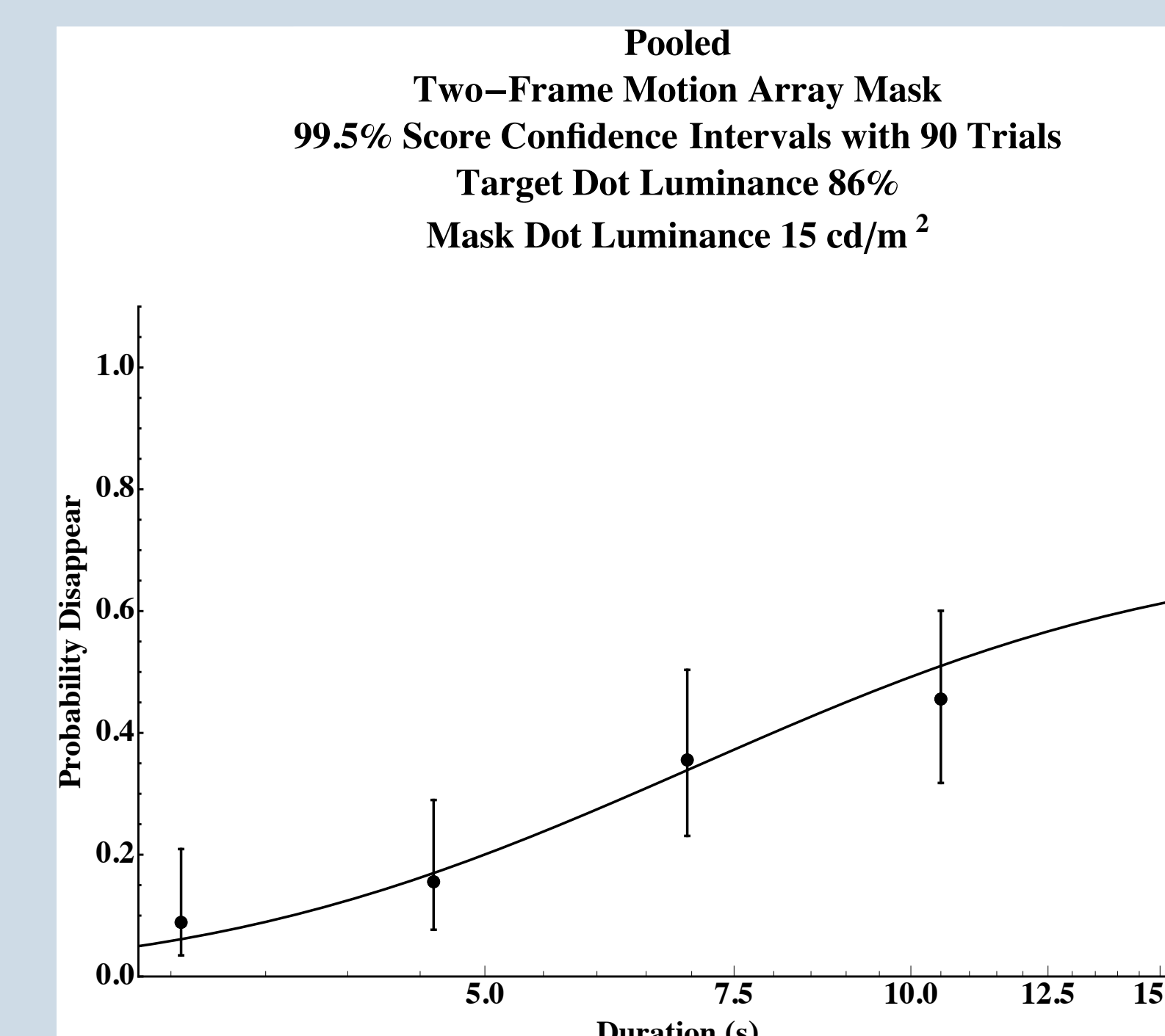
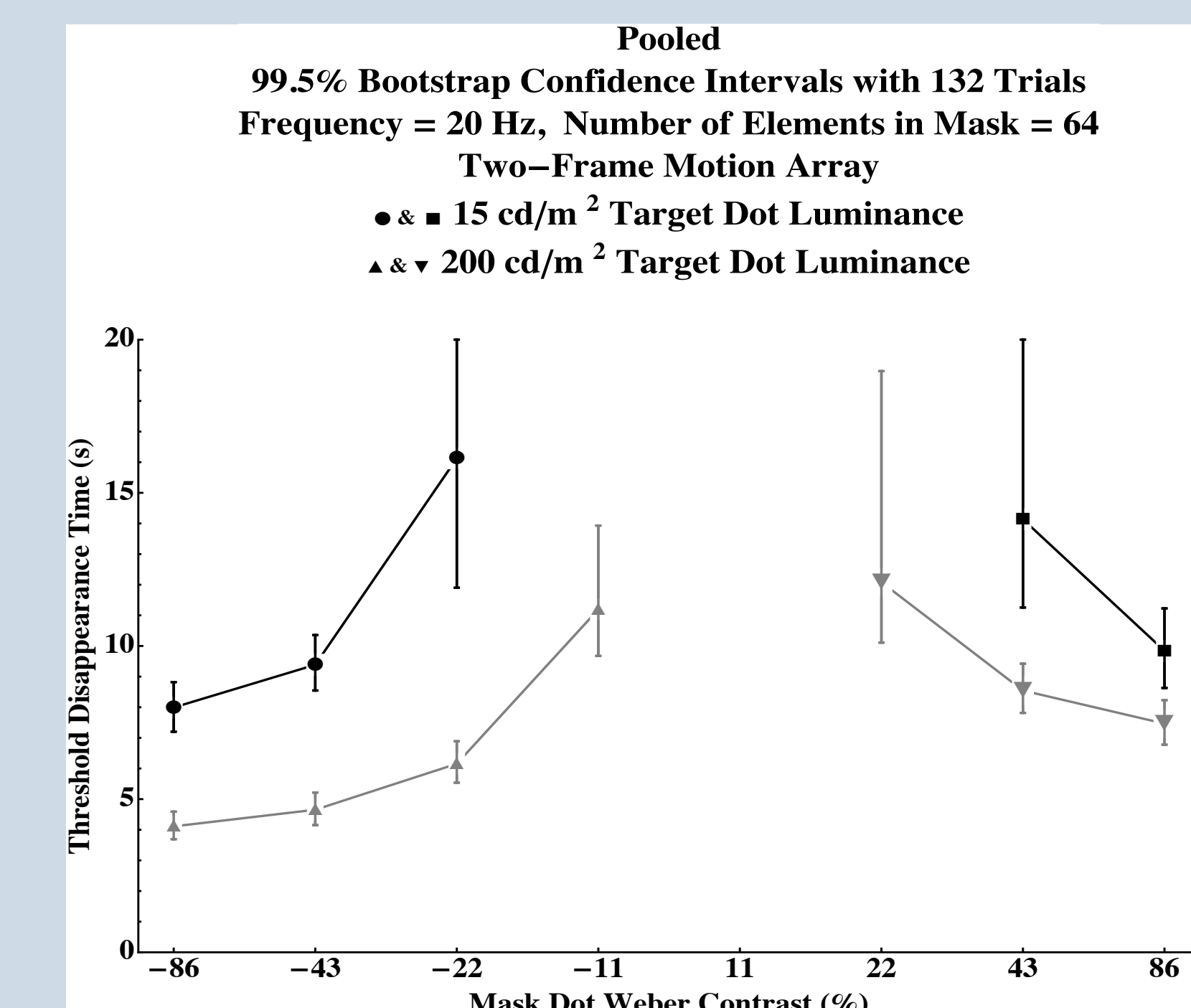
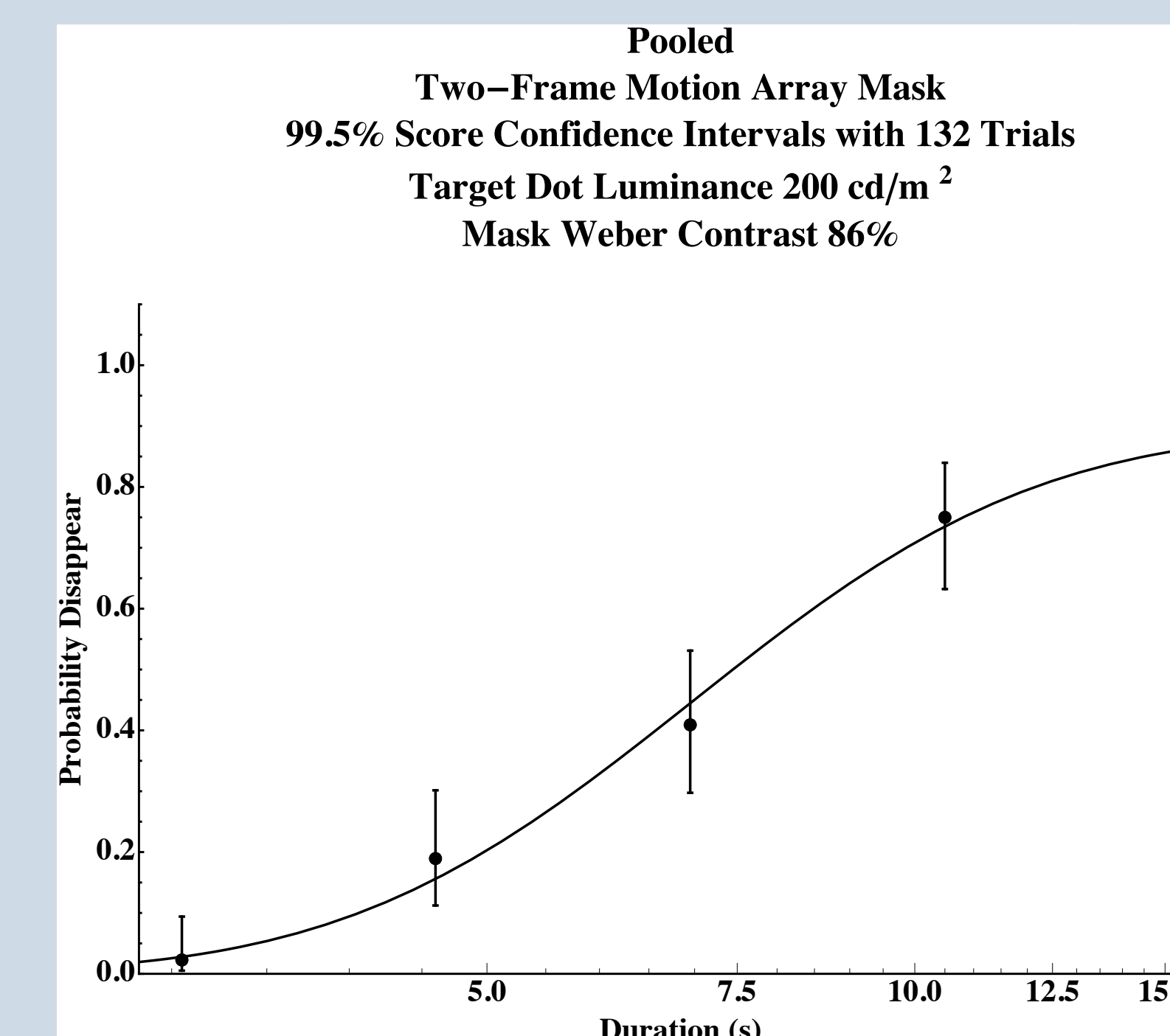
- Motion induced blindness (MIB) is a visual phenomenon in which salient targets disappear when a moving mask is presented (Bonneh et al., 2001).
- ON- and OFF-cells are ganglion cells that detect increments and decrements, respectively.
- These cells synapse in the Lateral Geniculate Nucleus (LGN) where signals are sent to V1.
- The OFF pathway is more sensitive until V1, after which the pathways are thought to be equal in strength (Westheimer, 2007).
- The purpose of this study was to examine asymmetries between the ON- and OFF-cell pathways by measuring the MIB under different increment/decrement conditions.

METHODS

- Subjects sat in a dark room 0.91 m away from a MacBook Pro with their head stabilized using a chin rest.
- An MIB stimulus was presented using Mathematica with one of eight different mask (experiment 1) or target (experiment 2) contrasts and one of five trial durations, randomly ordered.
- Subjects indicated whether or not at least one target disappeared at the end of each trial.
- Each subject ran 15 sessions with 160 trials per session.
- The confidence intervals around the psychometric functions are score confidence intervals.
- The confidence intervals on the mean plots are estimated using bootstraps.



RESULTS



DISCUSSION

- Decrement masks are more effective at causing targets to disappear (Stine et al., 2017).
- Decrement targets are harder to mask than increment targets.
- There is an asymmetry of ON- and OFF-cell pathways that extends beyond V1.

Works Cited:

- Bonneh et al. (2001). Motion Induced Blindness in Normal Observers. *Nature*, 411, 798-801.
Stine et al. (2017). MIB Using Increments and Decrements of Luminance. *Proceedings of the Latvian Academy of Sciences. Section B. Natural, Exact, and Applied Sciences*, 71, 372-379.
Westheimer, G. (2007). The On-Off Dichotomy in Visual Processing: From Receptors to Perception. *Progress in Retinal and Eye Research*, 26, 636-648.