

The Effects of Contrast Polarity and Motion Adaptation on Motion Induced Blindness



University of
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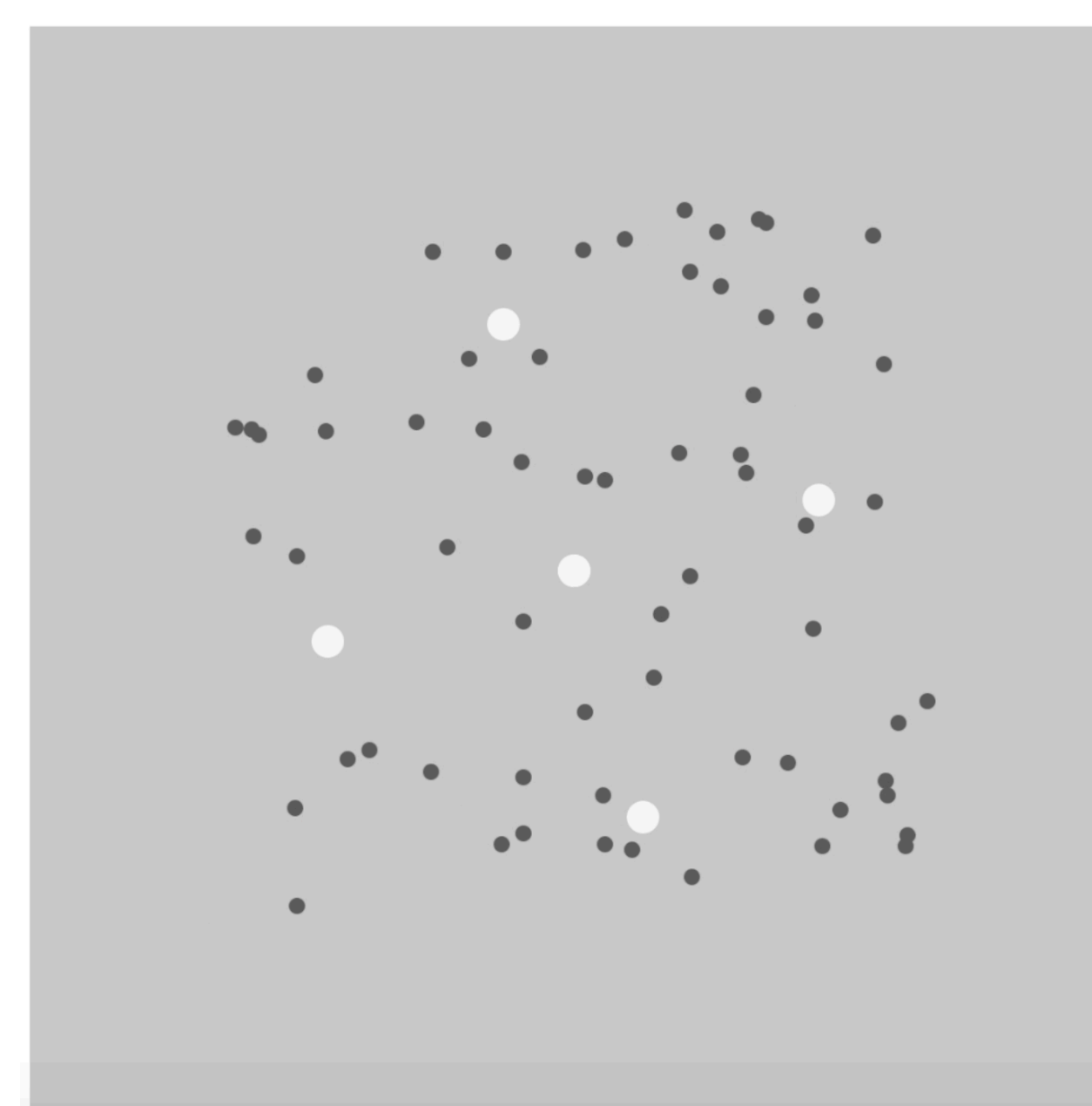
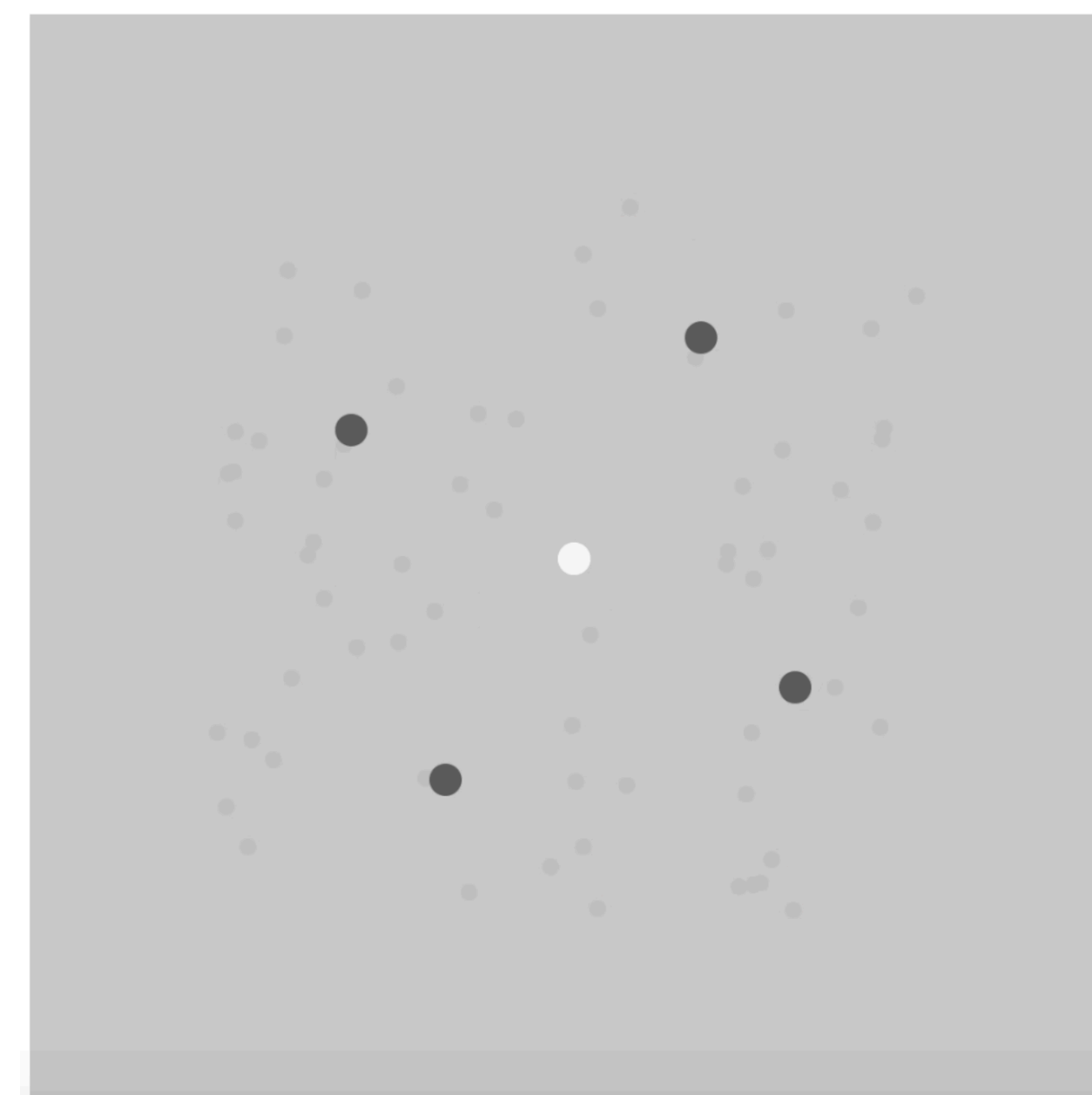
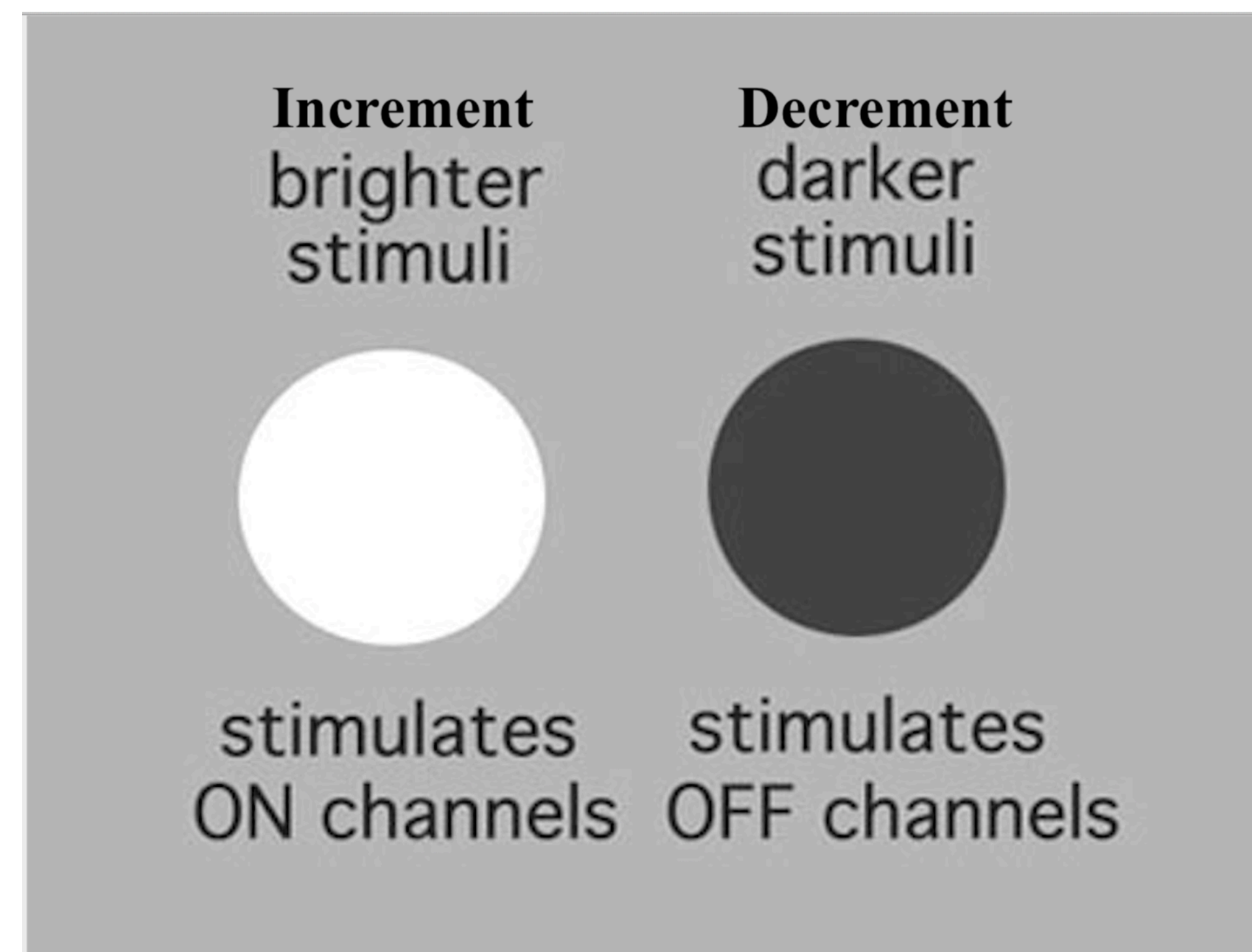
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Introduction

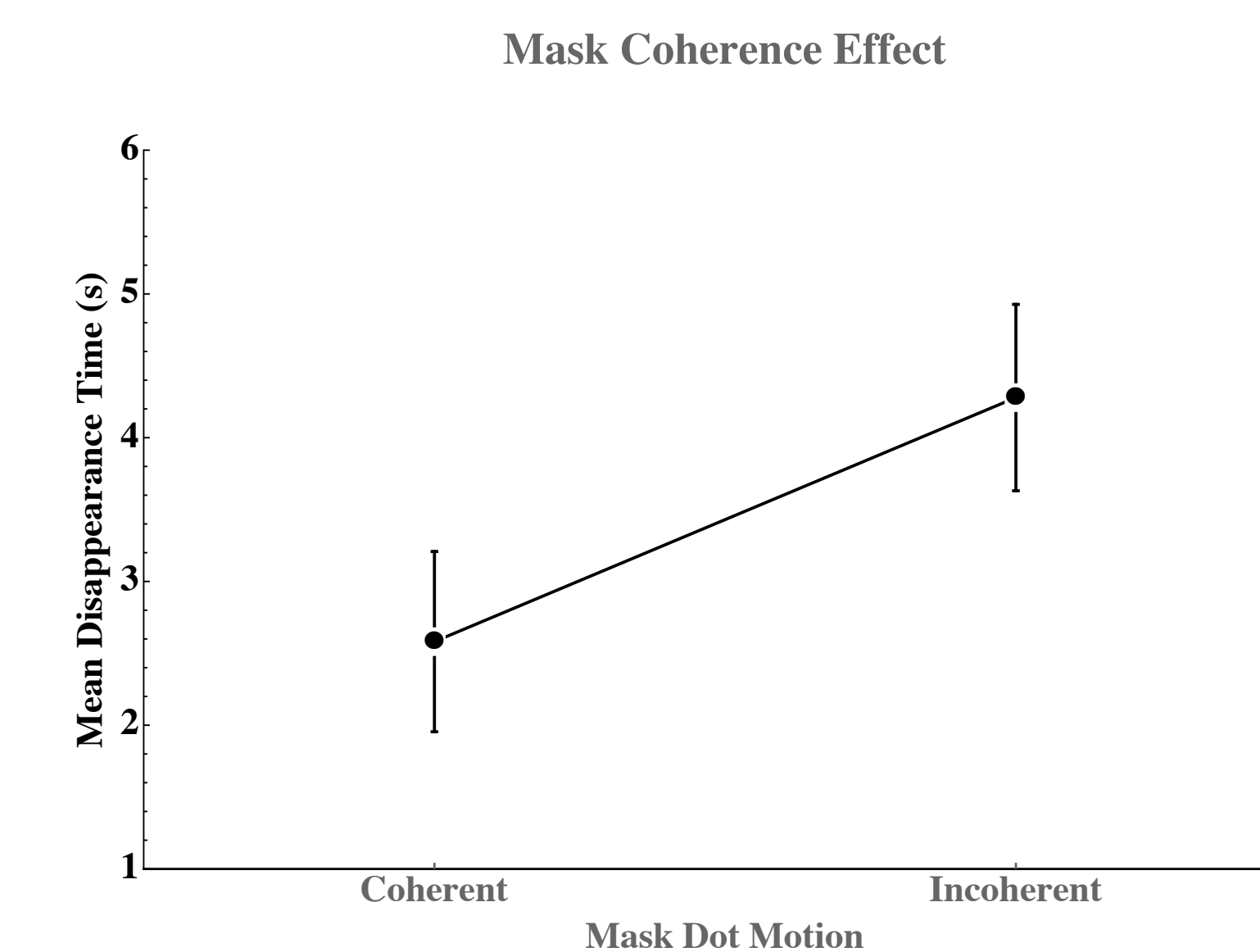
- Motion induced blindness (MIB) is a visual phenomenon in which salient targets disappear when a moving mask is presented (Bonneh et al., 2001).
- ON- and OFF-cells are ganglion cells that detect increments and decrements, respectively.
- These cells synapse in the Lateral Geniculate Nucleus (LGN) where 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).
- Motion aftereffect (MAE) is an illusory sensation of motion in a static stimulus resulting from prolonged adaptation to a moving stimulus (Glasser et al., 2011).
- The purpose of this study was to examine the effects of contrast polarity and motion adaptation on total disappearance during MIB.

Methods

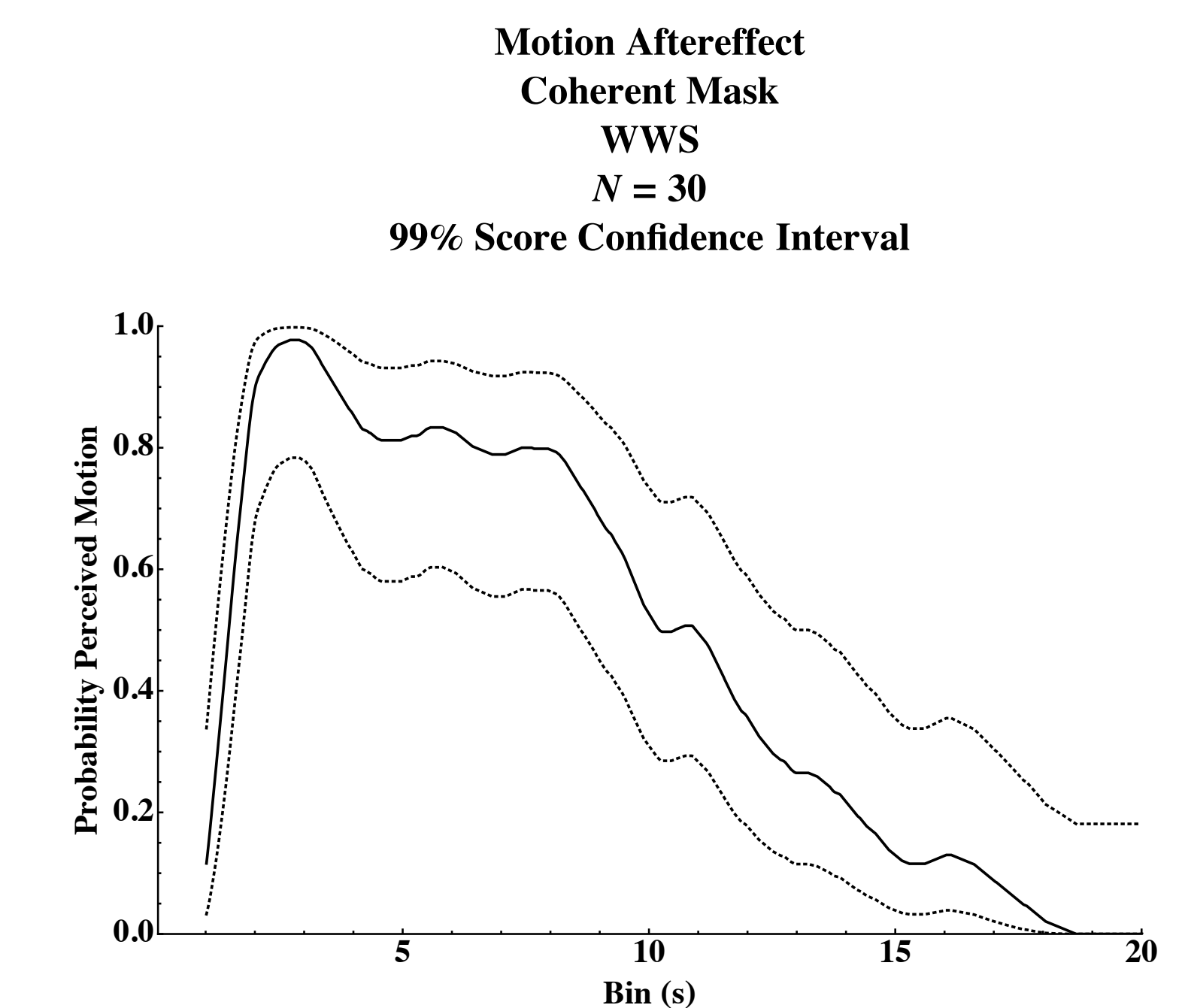
- Subjects sat in a dark room 1 m away from an iMac with their head stabilized using a forehead rest.
- 3 experiments: using the iMac and MATLAB for stimulus generation
 - Exp. 1: examine the difference between coherent and random motion of mask on MIB, 3 sessions, 30 trials.
 - Exp. 2: examine the phenomenon of motion adaptation via motion aftereffect study, 1 session, 30 trials.
 - Exp. 3: L to R adaptation mask motion with congruent or incongruent MIB mask motion, 4 sessions, 32 trials
- Subjects hold space bar for duration of target disappearance
- The confidence intervals around the psychometric functions are score confidence intervals.
- The confidence intervals on the mean plots are estimated using T-test confidence intervals.



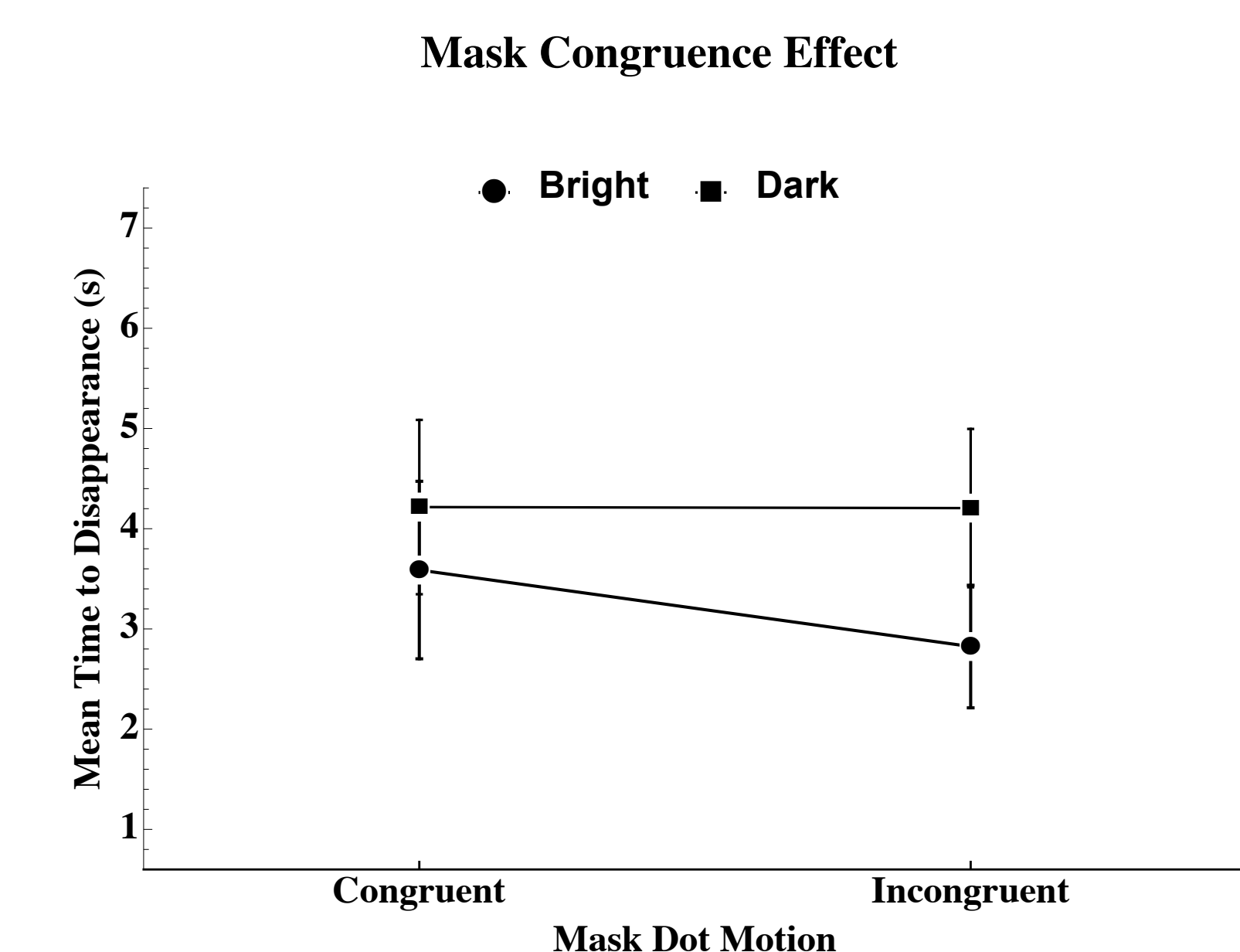
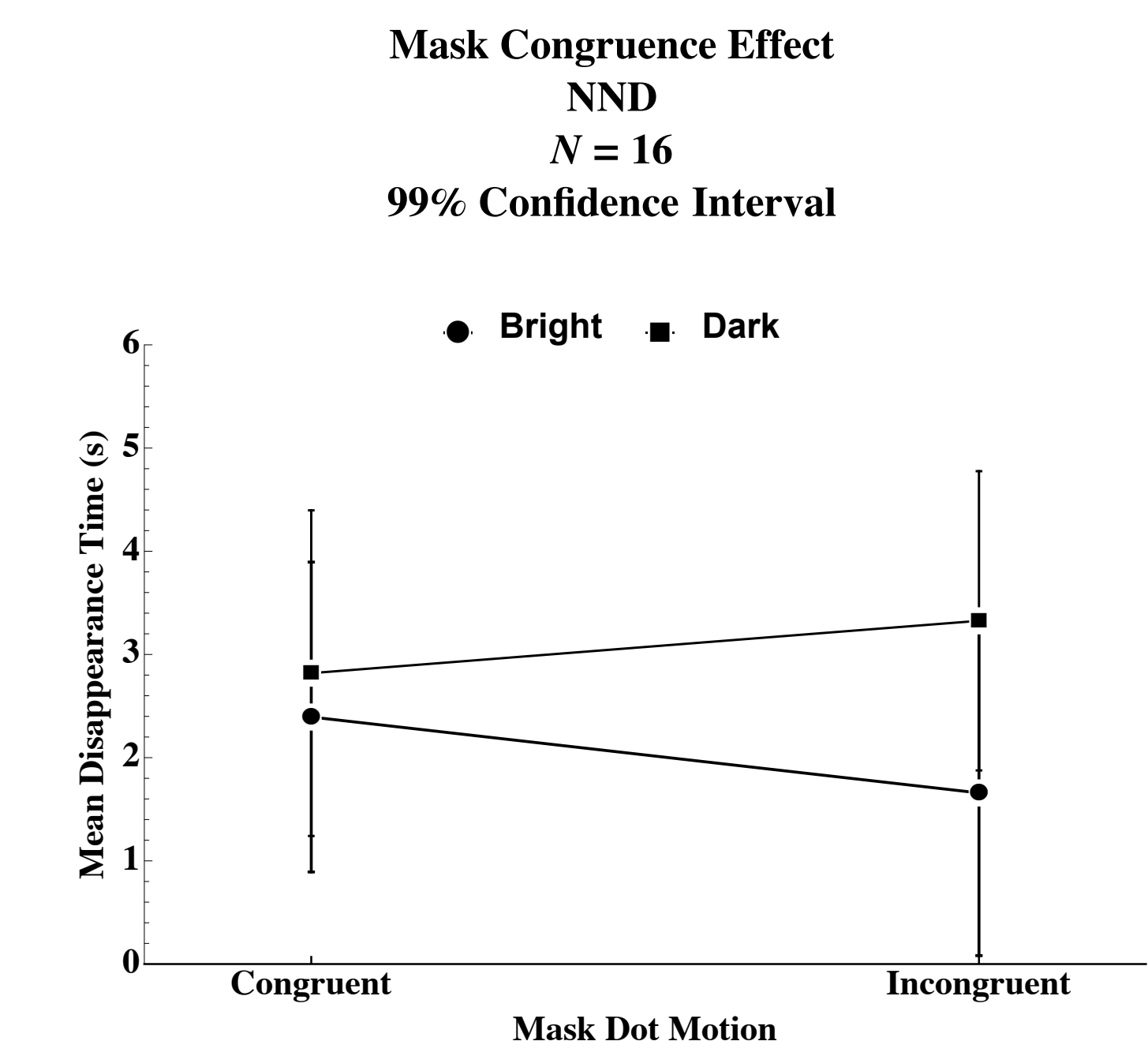
Experiment 1



Experiment 2



Experiment 3



Discussion

- Experiment 1 shows that there is a strong coherence effect (random motion results in more MIB).
- Experiment 2 shows that when there is a coherence effect there is also a MAE.
- Experiment 3 shows that the coherence effect is not due to MAE.
- As a secondary result we found no evidence that off/on cells differ in their involvement in total duration of MIB.

Works Cited:

- Bonneh et al. (2001). Motion Induced Blindness in Normal Observers. *Nature*, 411, 798-801.
- Glasser et al. (2011). Perceptual and neural consequences of rapid motion adaptation. *Proceedings of the National Academy of Sciences of the United States of America*, 108(45), 18215
- Westheimer, G. (2007). The On-Off Dichotomy in Visual Processing: From Receptors to Perception. *Progress in Retinal and Eye Research*. 26, 636-648.