

Contrast valence effects in motion-induced blindness

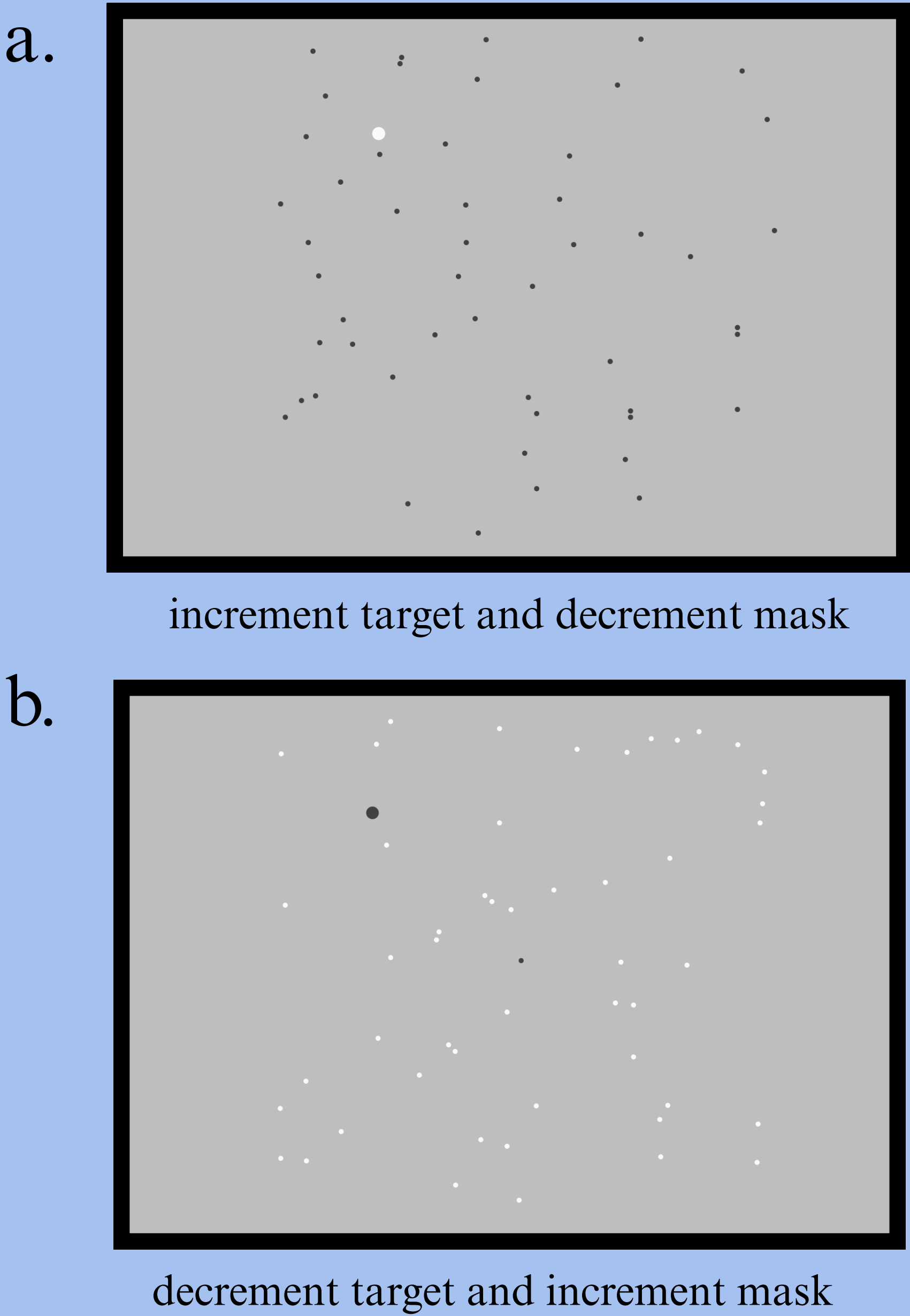
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Background:

- Motion-induced blindness (MIB) is a visual phenomenon in which stationary objects disappear from visual awareness when motion is present in the visual field (Bonneh et al., 2001)
- The contrast valence of target dot and motion masks in comparison to the background can influence frequency, duration, and timing of MIB disappearances (Stine et al., 2017)
- Motion is deemed more salient than stationary dots and therefore the target dot is ignored by the visual system in favor of the motion mask (Caetta et al., 2007)
- Changes in both local and global processing occur with age, including reduced ability to identify objects in the presence of distractors (Doucet et al., 2024)
- It follows that occurrences of MIB could change with age

Figure 1. Example stimuli



Participants:

- 13 individuals (5 female, 8 male) with an average age of 47
- 21 individuals were excluded from the study for having a median disappearance time of less than 0.75 seconds

Stimuli:

- As shown in Figure 1, a static focal dot was placed at the center of the screen with a static target dot in the upper left quadrant
- The mask was placed behind these dots, and each dot moved in a random fashion at 4 degrees per second
- Luminance of both the mask and target dot varied
- A 5 minute adaptation period was followed by 100 trials lasting 10 seconds each, with 5 seconds of adaptation between trials

Procedure:

- Participants were placed in a dark room at a distance of 1 meter from the screen.
- Participants were instructed to remain looking at the focal dot
- Participants reported perceived disappearances of the target dot by pressing and holding the space bar for the duration of a disappearance

Analysis:

- Multi-factor ANOVAs were run for each dependent variable
- A Holms-Šidák procedure was used to hold the familywise type I error rate to 0.05
- A logarithm transform was applied to all variables to normalize the distribution

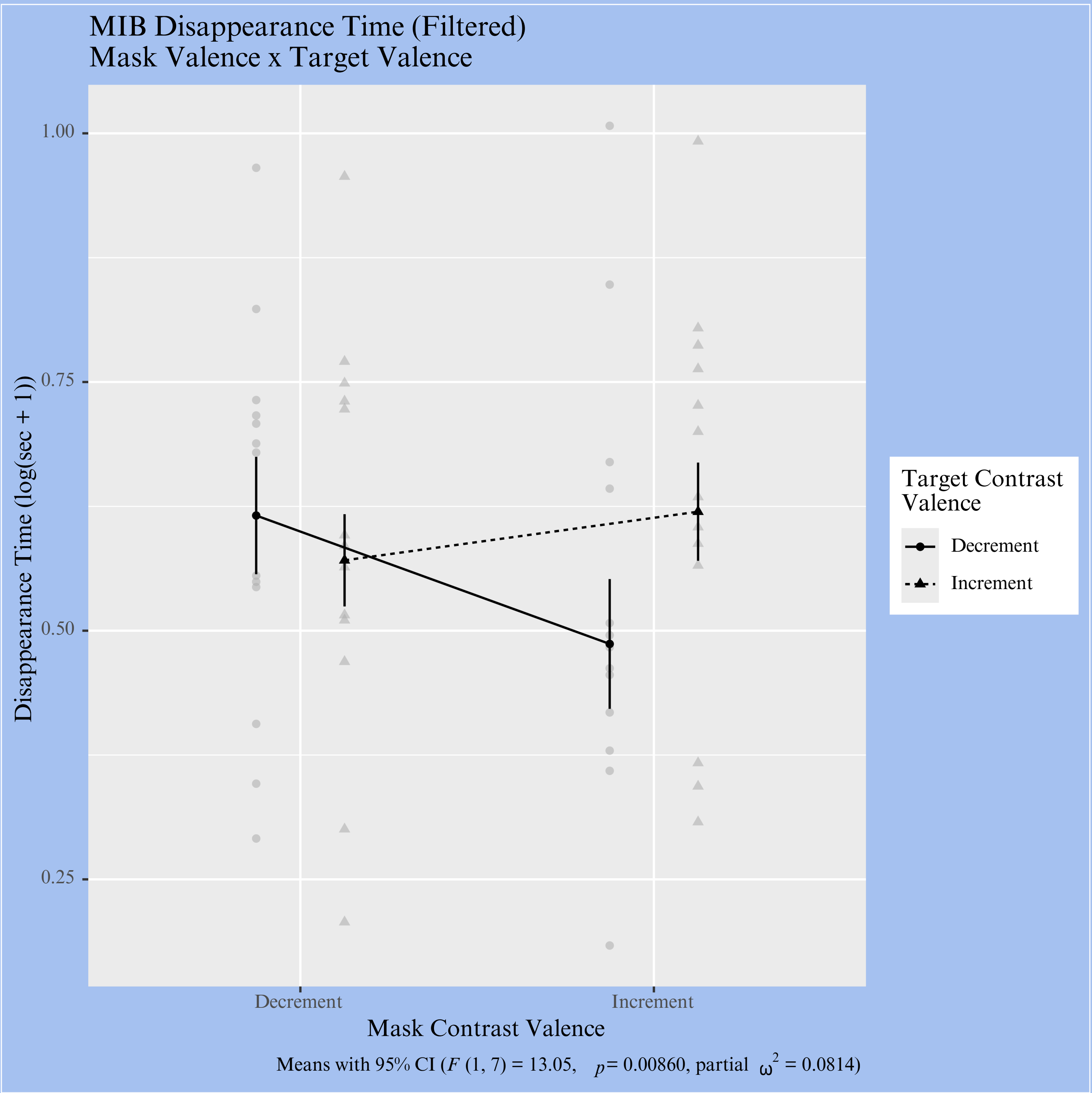
Results:

- Total disappearance time decreases when the mask is at an increment and the target is at a decrement ($F(1, 7) = 13.05$, $p = 0.00860$, partial $\omega^2 = 0.0814$)
- Outside of this interaction, disappearance time is constant
- Age and gender have no impact on the occurrence of MIB
- More disappearances are seen on trials with decrement targets than increment targets if using a 0.05 type I error rate for individual tests ($F(1, 7) = 6.404$, $p = 0.0392$, partial $\omega^2 = 0.0736$)

Conclusions:

- These results support the idea that ON/OFF retinal distinction influence suppression between the ventral and dorsal streams (Donner et al., 2008, 2013)
- The results of this study are sensitive to how the data was filtered
- Future research can make stronger conclusions using a larger sample size

Figure 2. Interaction between Mask and Target Valence



References

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