**Summary of poster at VSS 2002:**

# The vanishing disk; a revealing quirk of the scintillating grid illusion


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**ABSTRACT**

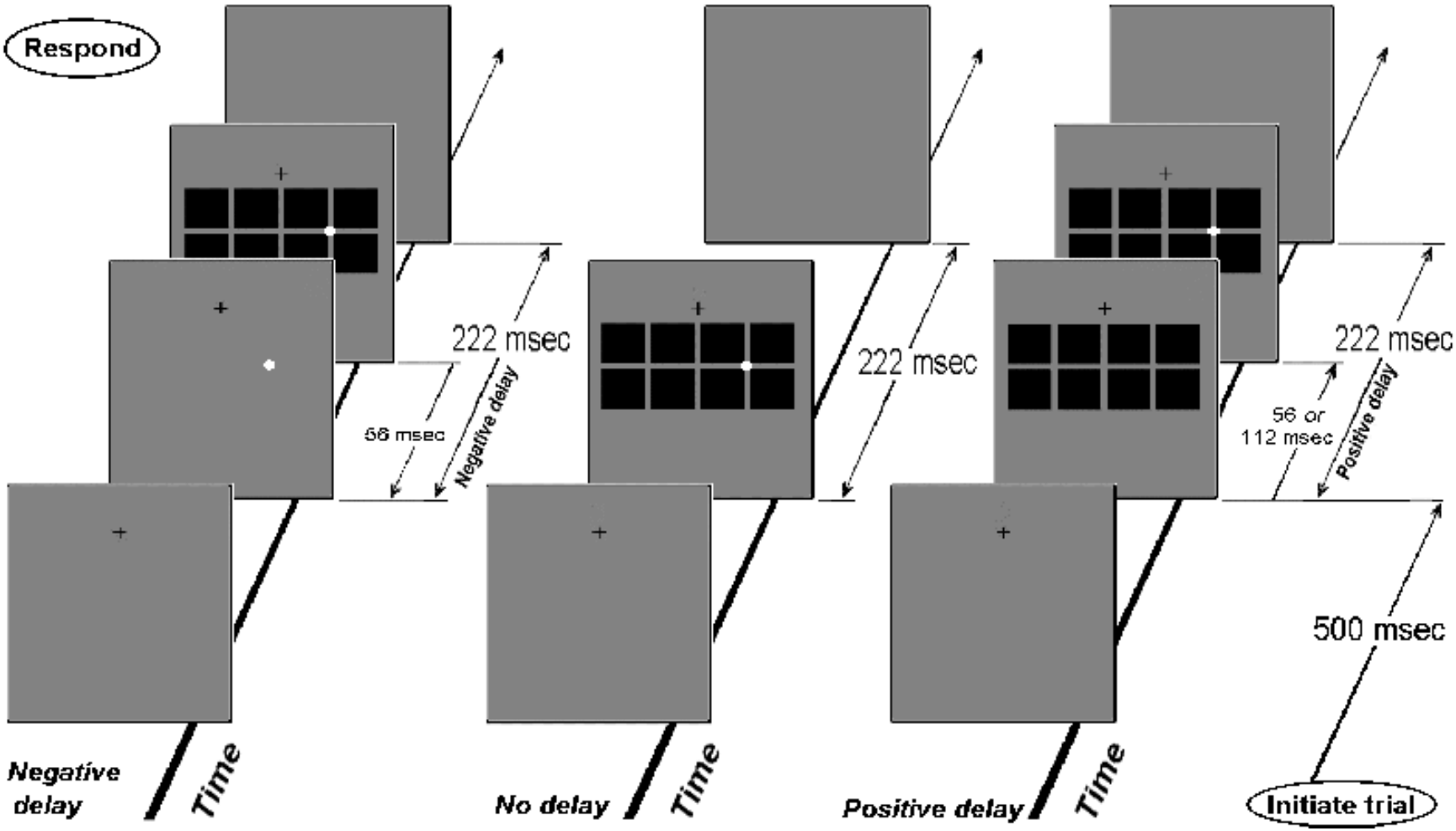
Take a Hermann grid of gray alleys on a black background and place white disks at the intersections; observers report a striking illusion of transient black spots on the disks (scintillation). There is controversy over whether scintillation is an effect of lateral inhibition or of the cortical processing of repeating patterns. To assess the importance of a repeating pattern, we tested a Hermann grid with a single white disk at one intersection. To our surprise, the disk completely disappeared when distant intersections were fixated. We examined the elements of the grid necessary for this effect to occur and compared them to those that produce scintillation.

Subjects fixated on a computer screen; stimulus patterns were then presented randomly above or below fixation. Stimuli, present for 300 ms to preclude changes of fixation, consisted of either a 4´2 or a 2´2 modified scintillating grid pattern that could include a single disk at one intersection. Disks of various luminances were presented with delays of various duration between the onsets of the grid and the disk.

Disks significantly darker than the grid alleys were detected with near perfect accuracy. As disk color approached alley color, detectability was reduced for disks relatively distant from fixation, while disks nearer fixation showed scintillation. Increasing the delay improved detection of light disks that otherwise would not be detectable, but did not preclude scintillation. The blanking effect apparently decays rapidly after presentation of the grid. The lack of effect upon dark disks demonstrates that this is not a result of inattention or limited visual capability. Both scintillation and complete cancellation of a light disk at an intersection are possible with minimal repetition of a pattern. In contrast, scintillation does not require simultaneous presentation of the grid and disk, implying a somewhat different mechanism.

## Brief summary of VSS 2002 poster:

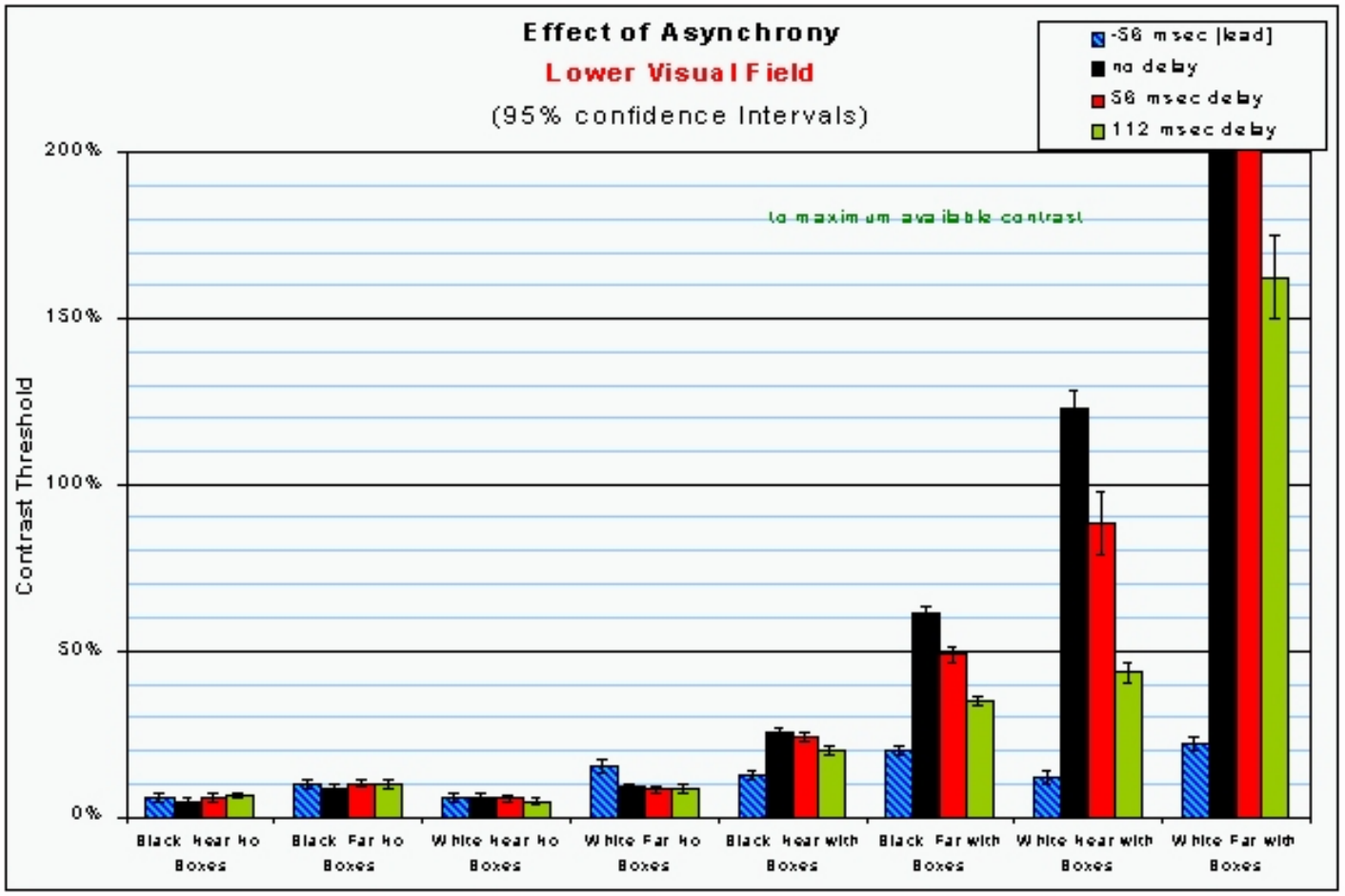
**Stimuli were presented with various delays between the disk and the squares, as shown below:**



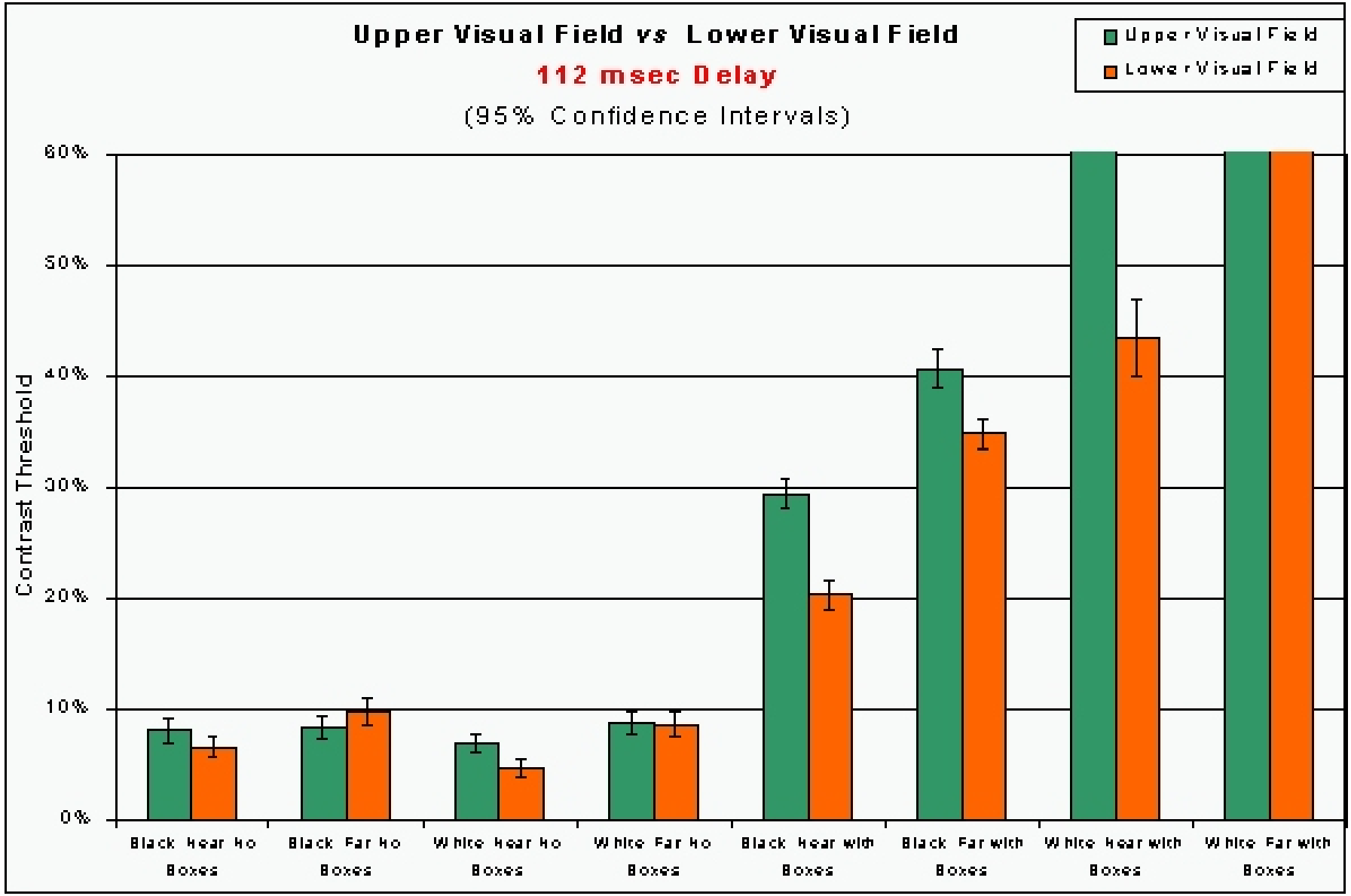
**The blanking effect, like the scintillating grid, is an effect of high contrast squares upon opposite contrast disks**

**Same-contrast disks are somewhat less visible, but the increased threshold may be due to reduced effective contrast**

**Blanking depends upon nearly simultaneous presentation of the disk and squares; asynchrony in either direction diminishes the effect**



**Blanking is stronger more peripherally in the visual field  Blanking is more pronounced in the upper visual field than in the lower visual field**



**Blanking can be achieved with a minimally repeating pattern, and is thus not a result of repeating units of cortical architecture**

*A manuscript incorporating these results has been published:* **A psychoanatomical investigation of the blanking phenomenon.** J. Jason McAnany, and Michael W. Levine. (2005). *Vision Research.* **45**; 193-203..

**In 2003, we present results of dichoptic presentations that further tease apart the mechanisms of this phenomenon. The 2003 VSS poster is available in its entirety at** http://tigger.uic.edu/~mikel/VSS/VSS2003.pdf**.**