Validating the Effectiveness of Recursive Blur Enhancement of Symbol Signs using Static and Dynamic Protocols.

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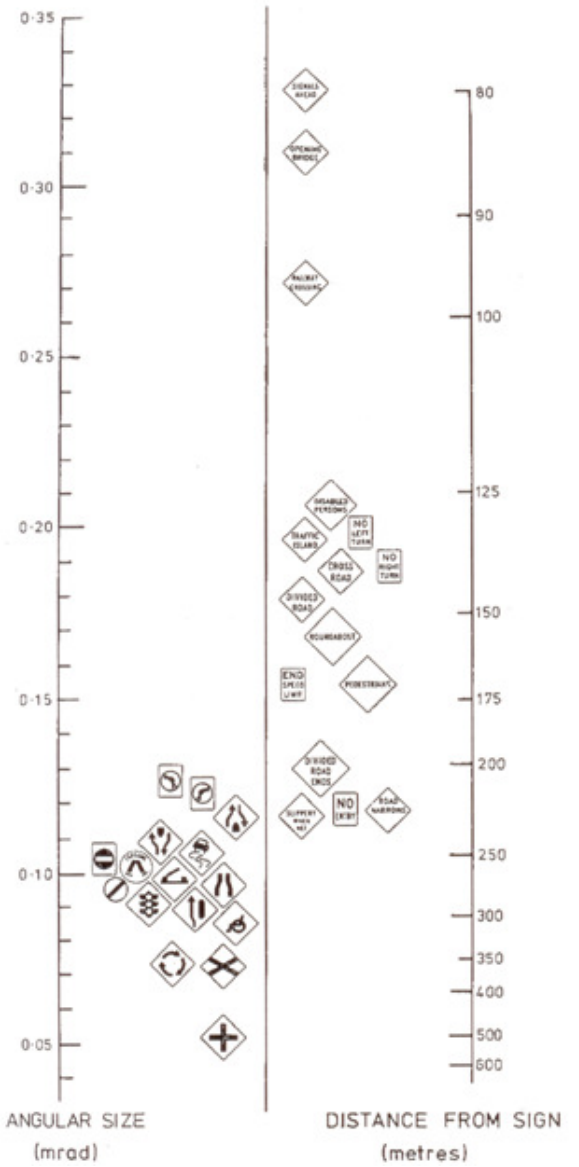
Preview

- 1. Introduction to Recursive Blur
- II. Background
- III. Current Study
- IV. Questions

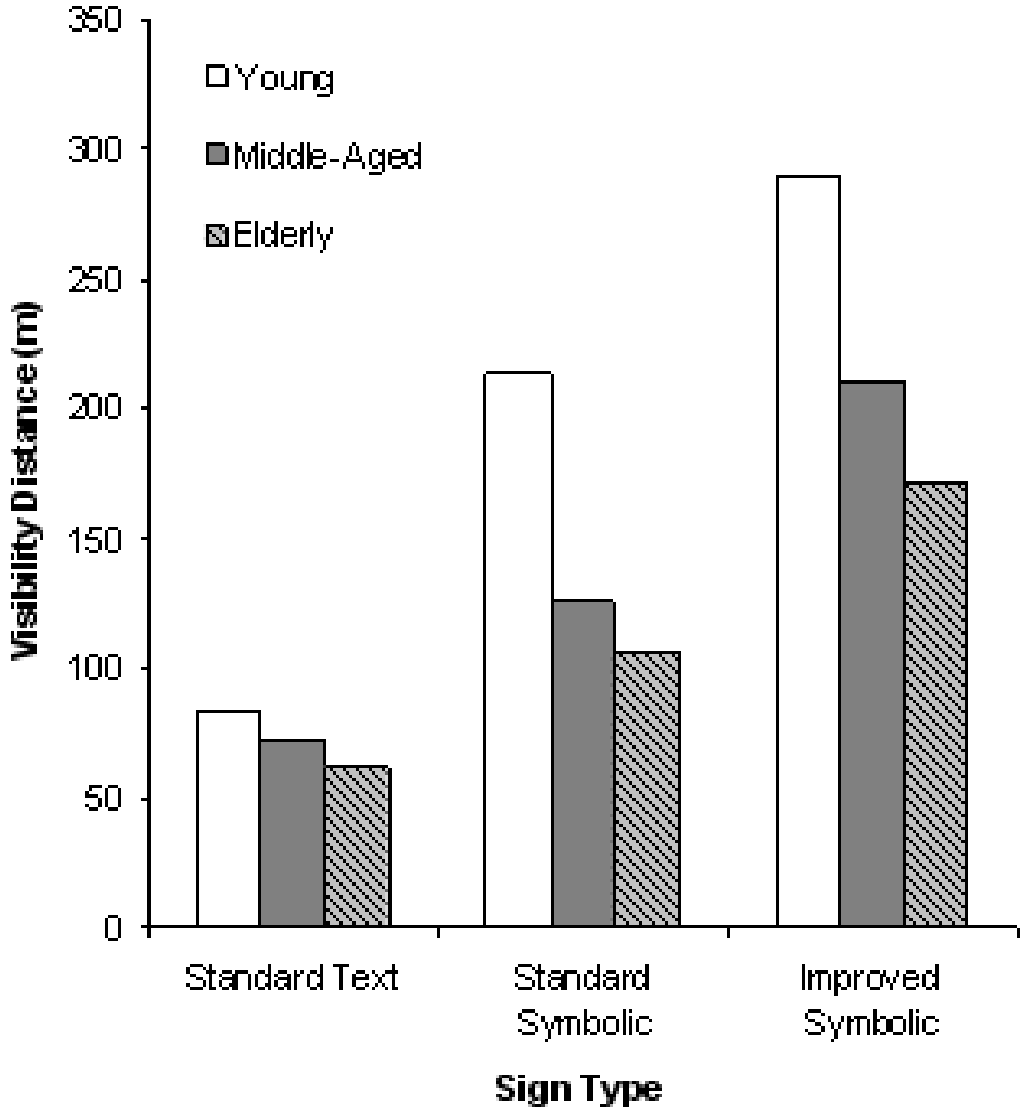
What is Recursive Blur?

General Superiority of Symbol Signs over Text-Based Signs

- Symbol Signs allow more information in less space, and without the constraints of limited characters.
- Symbol signs, on average, have a higher legibility distance than text-based signs.
  - (Jacobs, Johnston, and Cole,1975)
- The “general superiority of symbol signs” extends over a “broad range of environmental conditions.
  - (Dewar and Ells, 1974; Ells and Dewar 1979)



Previous Work with Recursive Blur

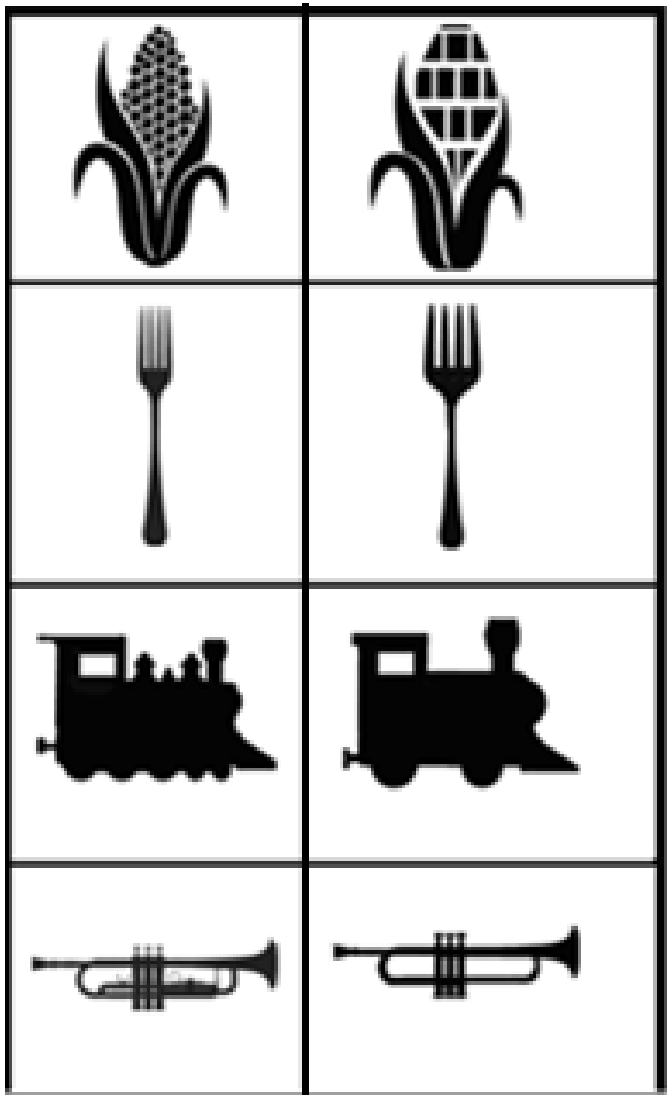


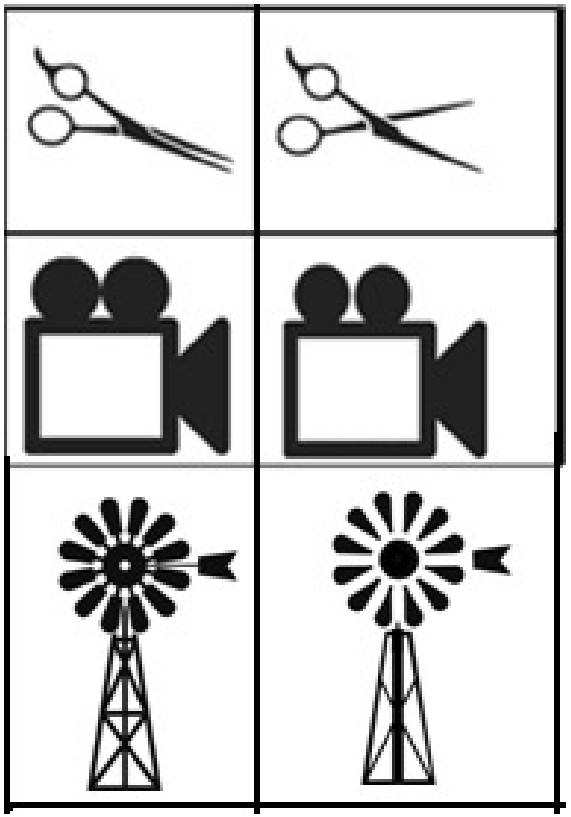
Data From Kline and Fuchs, 1993

Goals of Present Recursive Blur Study

- I. Replicate findings of previous studies using the critical detail identification protocol and previously used stimuli.
- II. Extend those findings to a new set of images.
- III. Examine the effects of Recursive Blur using a less temporally demanding protocol.
- ~~IV. Test the effects of the Recursive Blur Technique on the road using an instrumented vehicle~~.

The Stimuli

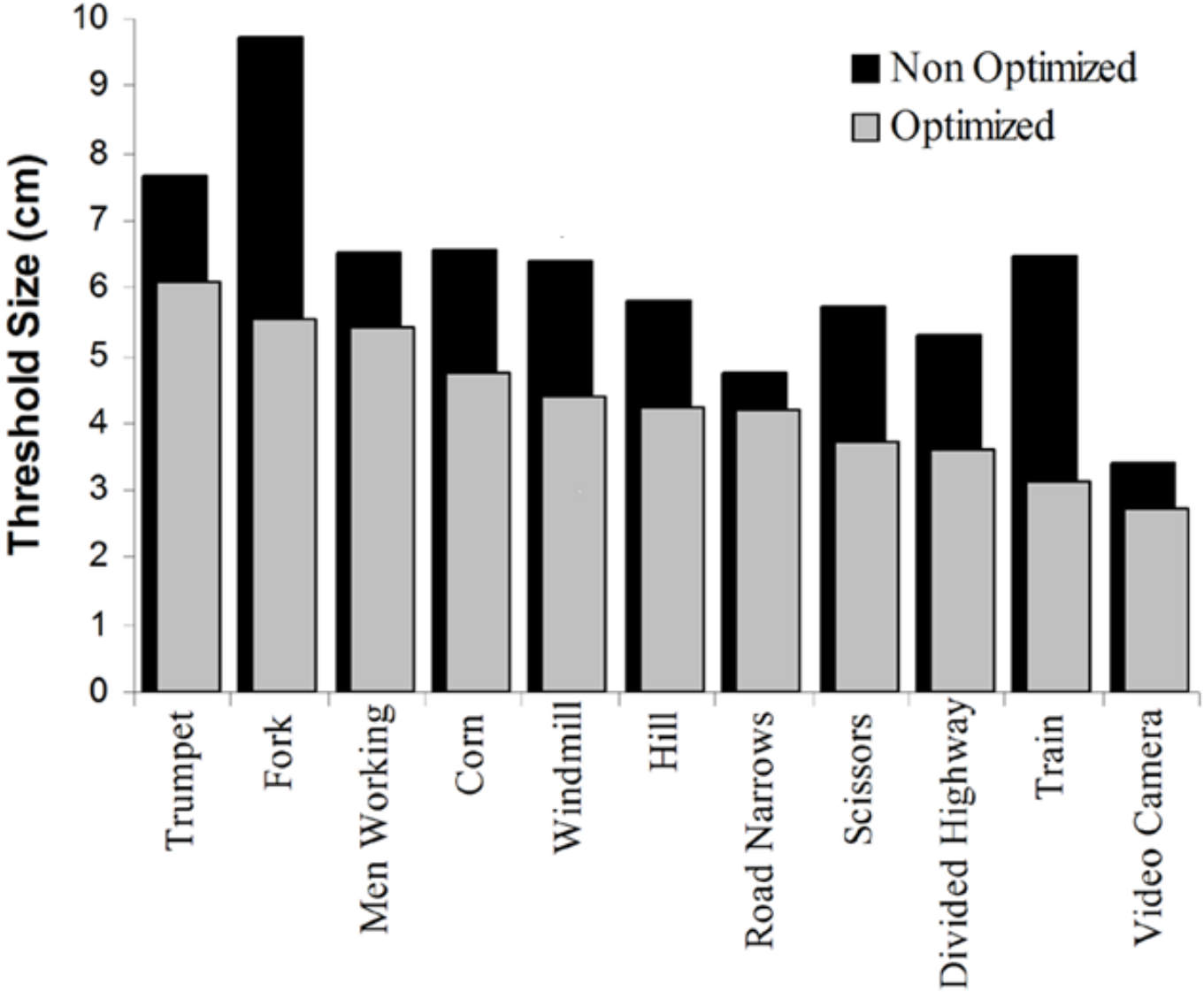




Methods

- Participants: 96 (8 x 12) undergraduates from the University of South Dakota ranging in age from 18 – 33 (68 females). All participants demonstrated normal visual acuity of 20/25 or better.
- Conditions: Optimized vs. Non, Critical Detail vs. Holistic, Brief Glance vs. Unlimited Time.
- Procedure: Participants were seated at a table 7.6 meters (25 feet) from a CRT Monitor.
- The monitor displayed a fixation point for 1 second, then a brief flash and finally the stimulus for either 600 msec or unlimited time depending on the condition.
- Participant was asked whether they could describe the content of the sign based upon their given identification task.
- If they could not, the stimulus was increased by 7% of its size on the previous trial until successful identification was achieved. This continued until correct identification was achieved.

Results



Main Effect of optimization

- [$F(1,22) = 13.366$, $p < 0.001$, $\eta^2 = 0.378$]

The Study in a Nutshell

- RBT enhanced symbols are legible from further away than their non enhanced counterparts when using critical detail identification task.
- Enhancement seems to benefit a critical detail task more than a global (holistic) one.
- The effects afforded by RBT enhancement are robust to differing glance times.
- Insensitive effect or insensitive measure?
- Future studies should employ a forced choice occlusion paradigm instructing participants to choose from optimized and non optimized stimuli in a real-time environment.

Questions?