Effects of Blur on Duration Thresholds for Road Hazard Detection

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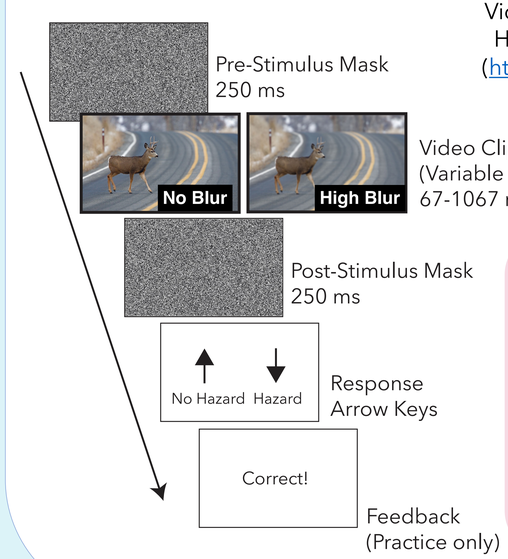
Introduction

Older participants need to look at the road longer to detect a hazard[1], and are more affected by blur in other tasks (e.g., reading[2]). What happens if acuity is reduced in a hazard detection task?

Research Question

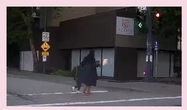
How does blur affect viewing time needed to detect road hazards and does it vary by age?

Methods

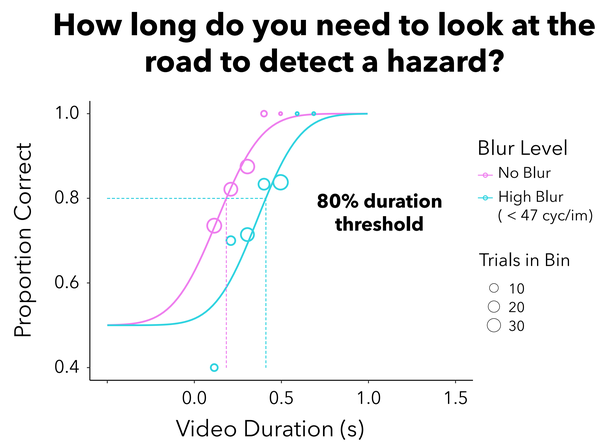


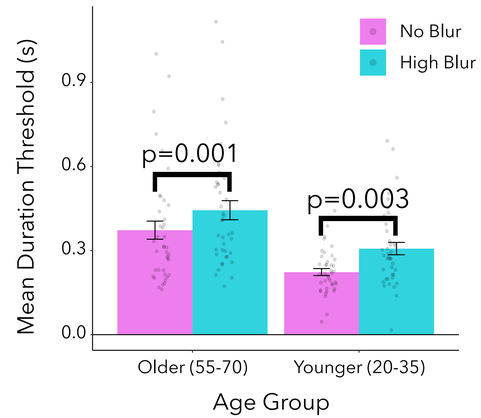
Videos from the Road Hazard Stimulus Set (https://osf.io/uq6pc/)

Other hazard examples



Exp 1: Is it harder to detect dangerous situations under blur?



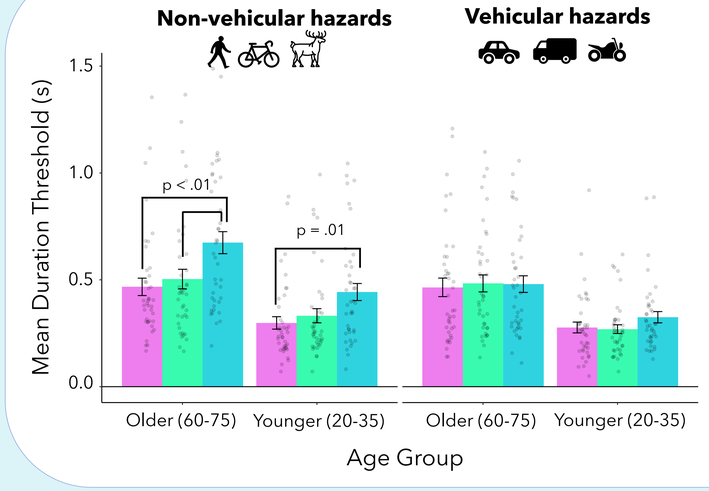


Older and younger participants were **similarly affected by blur**.

Participants needed an average of **78 ms more** to detect a hazard.

Older participants had higher duration thresholds.

Exp 2: Is this driven by specific types of hazards?



Non-vehicular hazards are more affected by blur than vehicular hazards ($p<0.001$), as they are generally smaller and composed of higher spatial frequencies.

Low levels of blur do not affect how long younger or older participants need to look at the road

No Blur
Low Blur (< 94 cyc/im)
High Blur (< 47 cyc/im)

Conclusions

Blur affects duration thresholds **consistently across age groups**, but only at high levels.

For non-vehicular hazards, blur increases duration thresholds by by **176 ms**. This is about 1.25 car lengths at highway speed!

References: 1. B. Wolfe, et al. *J. Exp. Psychol. Gen.* 149, 490–500 (2020). 2. B. Wolfe et al., *Cogn. Res. Princ. Implic.* 1, 1–13 (2016).
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