

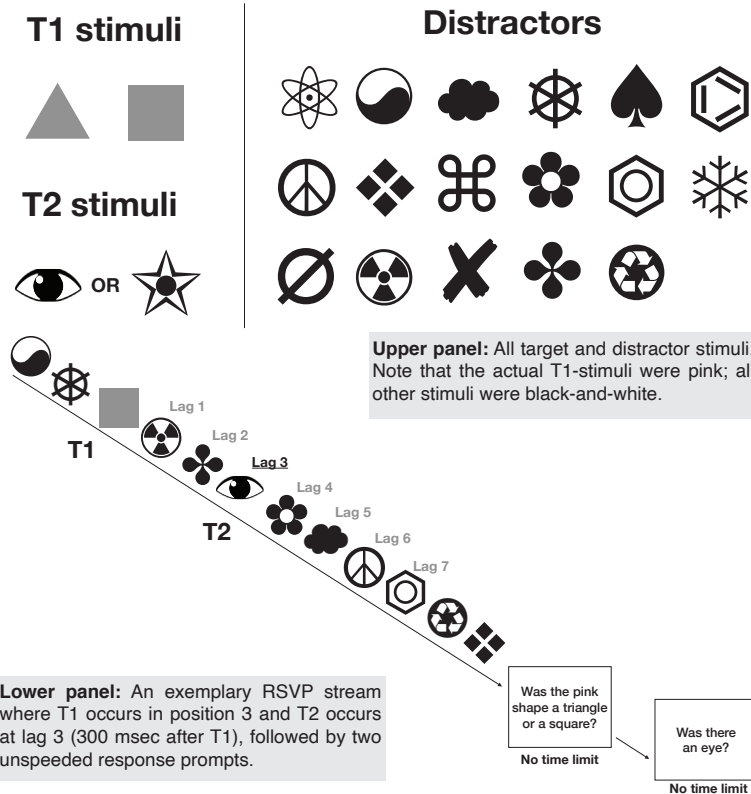
Introduction

Eye contact serves as an important social signal and humans show a special sensitivity for detecting eyes [1, 2]. Here, we asked whether people's sensitivity to eyes would enable them to overcome temporal limitations in visual attention. Thus, we used an "attentional blink" (AB) paradigm [3] to test whether people detect an image of an eye even when their visual attention is temporarily diverted.

Can people detect an eye within the attentional blink period, thereby overcoming fundamental limitations in visuotemporal attention?

Methods

In a RSVP task, participants saw a rapid stream of 12 symbols consisting of distractors and targets. The 1st target (T1) was a pink shape (triangle or square); the 2nd target (T2) was an eye (experimental condition) or a star (control condition). T2 occurred with a lag of 100-700 msec after T1. Crucially, T2 was only present in 50 % of all trials. In two out of four blocks of trials, participants performed a **dual-task**: a **two-choice discrimination task** ("Was the pink shape a triangle or a square?") followed by a **detection task** ("Was there an eye / a star?"). In the other two blocks, participants performed only the detection task (**single-task**). Thus, our experiment followed a 2 (Condition: experimental, control) × 2 (Task: dual-task, single-task) × 7 (Lag: 1-7) within-subjects design.



Predictions

We expected participants to have difficulties in detecting T2 within the critical period (i.e., lags 2-5) in the dual-task (attentional blink; AB). No such difficulties should occur in the single-task. Our aim was to compare the size of the AB (i.e., the difference in T2-detection rate between single- and dual-task as a function of lag) between the experimental and the control condition [4].

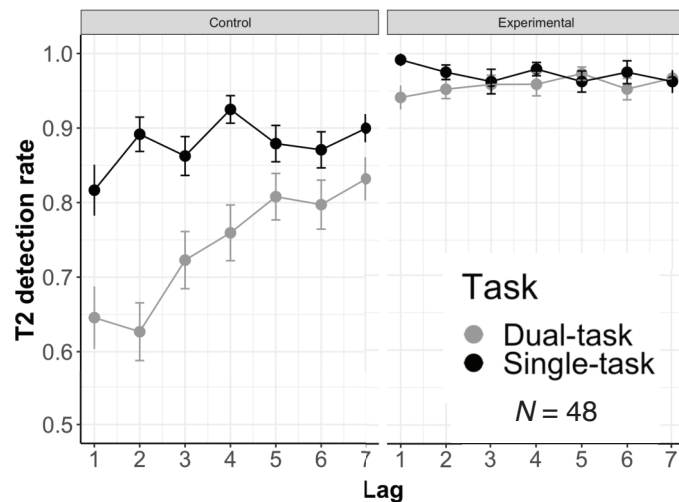
If direct gaze can be detected even when attention is temporarily suppressed, participants should display no (or a reduced) AB in the experimental condition compared to the control condition.

References

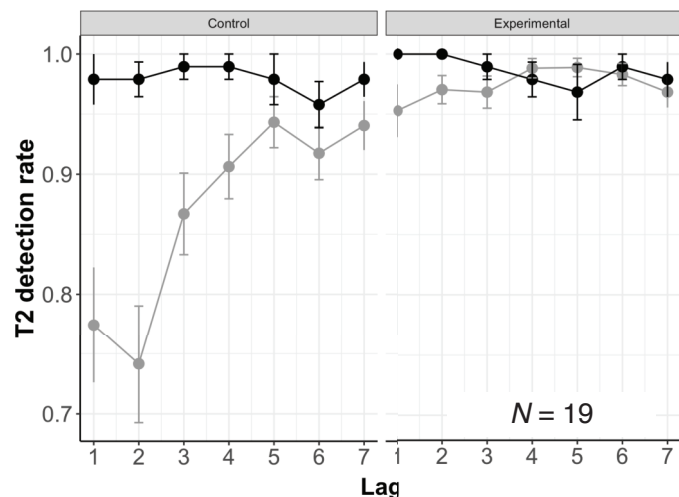
[1] Senju, A. & Johnson, M. H. (2009). The eye contact effect: mechanisms and development. *Trends in Cognitive Science*, 13, 127-134.
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 [4] MacLean, M. H., & Arnell, K. M. (2012). A conceptual and methodological framework for measuring and modulating the attentional blink. *Attention, Perception, & Psychophysics*, 74(6), 1080-1097.
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Results

When T1 and T2 occurred in close succession, participants had difficulties detecting T2 in the control condition (T2 = star), thus showing the typical AB effect. **Crucially, the AB was largely reduced in the experimental condition (T2 = eye).** This pattern of results also held when controlling for task difficulty. A 1st control experiment (N = 36) ruled out that a specific perceptual difference between the images of eye and star (i.e., a reflection point in the eye) may have led to the observed difference in detection rates. A 2nd control experiment (N = 36) showed that the oval shape of the eye played a crucial role in facilitating its detectability. Thus, **eyes and eye-shaped stimuli (such as fish) can be detected exceptionally well under high attentional load.**



Upper panel: T2 detection rate is shown as a function of Lag for the control condition (left) and the experimental condition (right), separately for dual-task (grey) and single-task (black). Detection rate is defined as the number of detected T2-stimuli relative to the number of trials in which T2 was present and participants' T1-response was correct. **Lower panel**: Only data from a subset of participants is included to match task difficulty between the two conditions. Error bars = SEM.



Overview of main findings:	Experiments	Stimuli for T2	Results
Participants showed a reduced AB when T2 was an eye or eye-shaped symbol (fish) compared to when T2 was a star.	Main Experiment:		Attentional Blink < Attentional Blink
	Control Experiment 1:		
	Control Experiment 2:		

Conclusion

Our findings extend previous research on gaze perception and visual attention by demonstrating that the AB is modulated by eyes. Hence, the **human predisposition for the detection of eyes is strong enough to circumvent fundamental limitations in visuotemporal attention.**