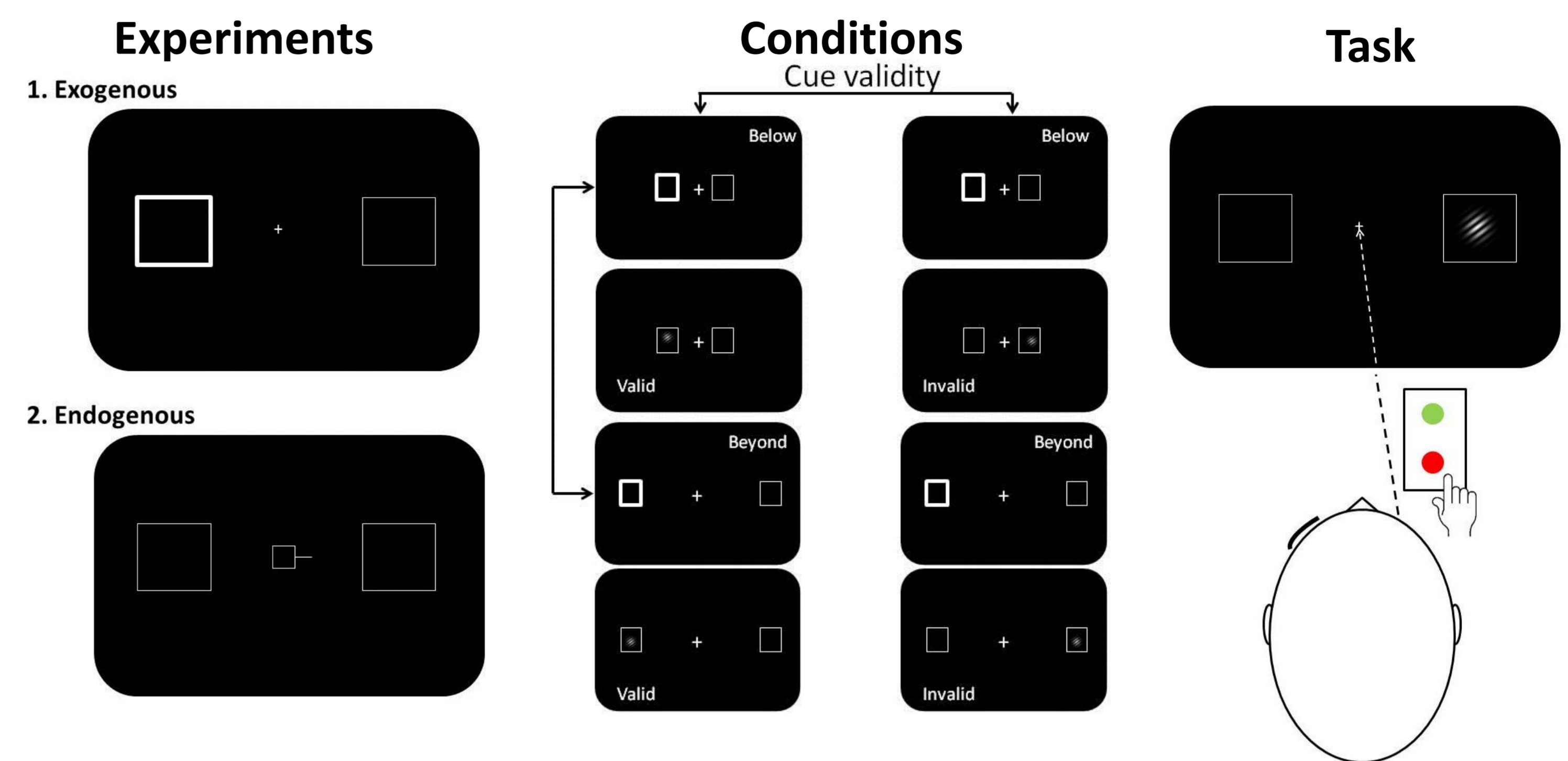


Is shift of spatial attention limited to the Effective Oculomotor Range: a study with Presentation in Extreme Periphery.

Background

- According to the Premotor Theory of Attention (PMTA) spatial attention is caused by activation of the oculomotor system [1]. Covert shift of attention (*i.e.* attending without making an eye-movement) is just a planned but not executed eye movement.
- Patients with defective eye-movements [2,3,4] and neurotypicals with experimentally restricted eye-movements [5] showed a deficit in attentional orienting to spatial locations where the eyes cannot move.
 - This suggests that attention cannot be allocated outside the range of saccadic eye movements (Effective Oculomotor Range; EOMR).
- Original studies showed an impairment of endogenous/voluntary attention [2,5] subsequent studies found selective impairment of exogenous/reflexive attention [3,4, 6]
 - Small groups of neuropsychological patients, or very unusual experimental setup (eye-abduction)
- These experiments compared covert orienting of exogenous and endogenous attention below and beyond the EOMR with **neurotypical** participants without any artificial motor restriction of their eye-movements.
- Predicted a deficit of exogenous orienting when cues appeared beyond EOMR**

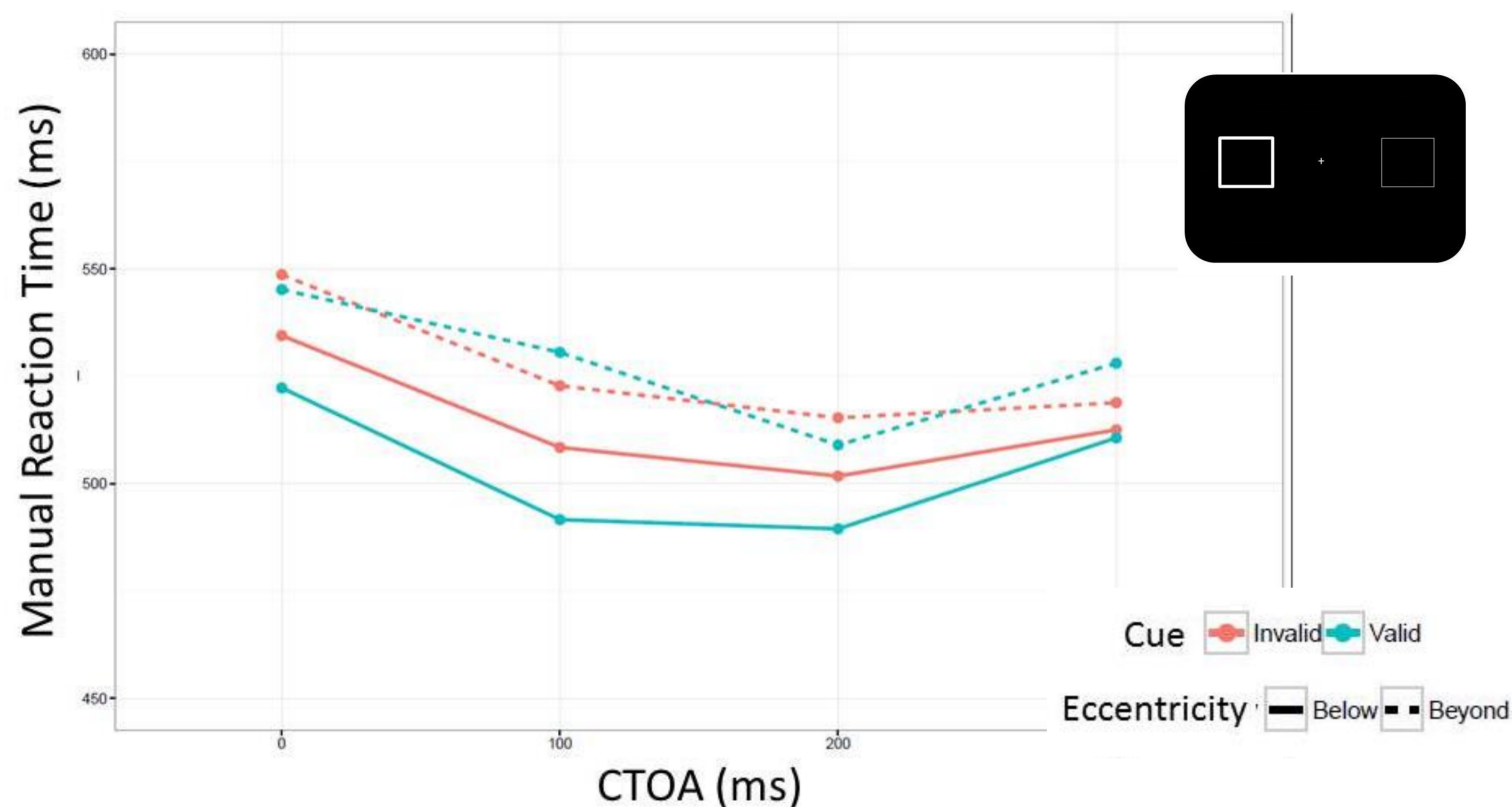
Method



- Experiment had 2 parts:
 - Established individual participants EOMR with a saccade localisation task
 - Then performed attentional cueing task
- Stimulus eccentricities individualised according to participants own EOMR
- Cue sizes were scaled according to the CMF [7]
- Four Cue-Target Onset Asynchrony (CTOA) 0/100/200 & 500ms for Exp.1 and two 300 & 600 ms for Exp.2
- Peripheral cue was 50% valid, Central cue was 75% valid

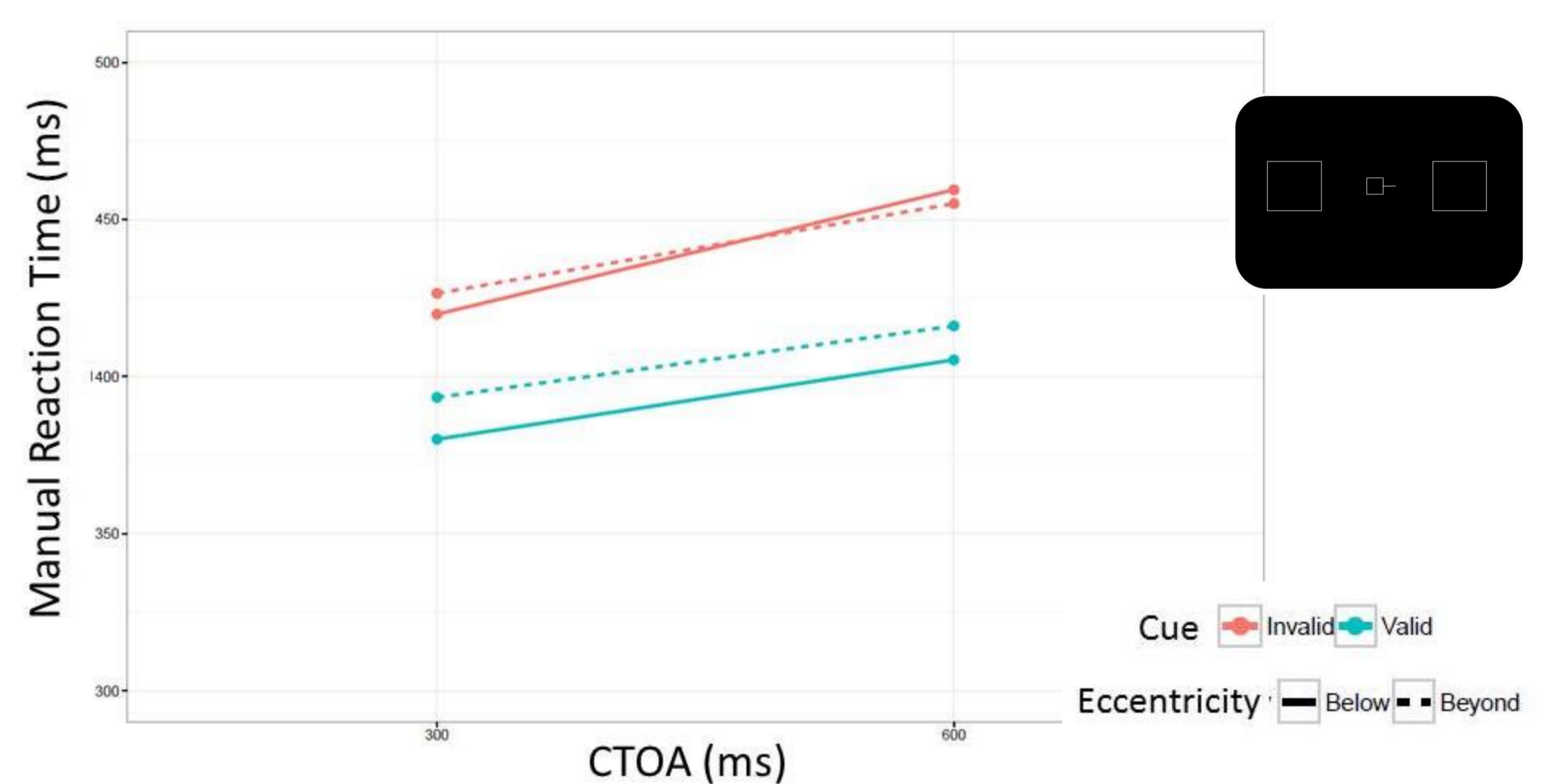
Results

Experiment 1 – Exogenous attention



- Effect of **cue eccentricity** : MRT were longer for cues presented Beyond the EOMR
- Effect of **CTOA**: MRT were longer for CTOA of 0 and 500 ms
- Interaction **cue*eccentricity**:
 - Normal** cueing effect for cues **presented** within EOMR
 - No** cueing when cues presented **beyond** the EOMR

Experiment 2 – Endogenous attention



- Effect of **cue validity** : MRT were shorter for valid cues compared to invalid
- As observed for exogenous attention, there is an effect of **CTOA** and an interaction **cue*eccentricity**

Conclusion

- As predicted, we observed a deficit in spatial attention for cues presented beyond the EOMR only for **exogenous** shifts of attention [3,4,6].
- Normal **endogenous** orienting of attention to stimuli presented beyond the EOMR is inconsistent with the PMTA.
- Consistent with view that the saccade preparation is necessary for exogenous but not for endogenous spatial attention [6].
- Where PMTA argue a strong **mandatory** coupling between shift of attention and eye-movement, our assumption is that eye-movement only **influence** the processing of shift of attention.

➡ **Motor Bias Theory of Attention (MBTA)**

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