

## How do emotion and gaze direction interfere with overt orienting of visual attention?

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### Background

Several studies using spatial cueing paradigms have demonstrated that observing gaze direction may trigger a reflexive visual orienting in the direction of the other person's gaze. Recently, it has been reported that facial expression may enhance the reflexive orienting of attention to gaze stimuli. However, some researchers have also suggested that, rather than facilitating attentional orienting away from the face, emotional expressions may, in fact, delay or prevent orienting. In the present study we investigated the effects of facial expression and gaze direction on a visual orienting oculomotor task to test whether an angry face may or may not interfere with visual orienting.

### Method

Participants performed an oculomotor task in which they had to make a saccade towards one of two lateral targets, depending upon the colour of the fixation dot which appeared at the centre of the computer screen. The instruction dot remained visible for 50 ms and then disappeared. At different time intervals (stimulus onset asynchronies, SOAs: 50, 100, 150 ms) following the onset of the instruction cue, a real face (gazing either to the right or to the left) was presented at the centre of the monitor. Gaze direction could be congruent or incongruent with respect to the instruction and target

location. Facial expression was also manipulated. In half of the trials the diverted gaze (i.e., congruent or incongruent) appeared with an angry expression, whereas in the other half the face had a neutral expression. Participants were instructed to saccade either to the target on the left or to the target on the right (the targets were visible throughout the trial), as indicated by the instruction dot, while completely disregarding the face because it was irrelevant for the task.

### Results

Eye movement recordings on correct trials showed that saccades congruent with the direction of the distracting gaze had shorter latencies than incongruent ones. However, the time-course of this effect varied depending on the facial expression. With a neutral expression, the congruency effect was found only at the shortest SOA (50 ms). On the contrary, for the angry face the congruency effect occurred at the longer SOAs. These findings suggest that gaze direction (even when task-irrelevant) is capable of interfering with the orienting of visual attention, and that faces with an angry expression may hold attention and affect its orienting longer than a neutral expression.

**Keywords** Gaze direction • Emotion • Orienting of attention • Eye movements

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