

Social gaze

The social gaze task is an eye-tracking task at all waves (except pregnancy) that measures a subject's sensitivity to another person's gaze direction as a possible cue to predict the location of a next event. Sensitivity to gaze direction is taken as a marker of social competence. In a trial, children see a face with direct gaze, followed by an eye gaze shift to one side, followed by a small object ('target') that appears on the cued side or the opposite side. The dependent variable is the latency with which the child detects the target. Generally, people detect targets on the cued side faster than targets on the opposite side. The reaction time differences between cued and opposite-side targets have been taken to reflect better social skill.

Stimulus

Face stimuli consisted of 10 photographs of faces with neutral facial expression taken from the MacBrain Face Stimulus Set (Development of the MacBrain Face Stimulus Set was overseen by Nim Tottenham and supported by the John D. and Catherine T. MacArthur Foundation Research Network on Early Experience and Brain Development. Please contact Nim Tottenham at tott0006@tc.umn.edu for information concerning the stimulus set). Face images included 5 males and 5 females, of which 6 European-American, 3 African-American and 1 Asian-American model. Face pictures were trimmed to remove external features (neck, ears, and hairline). Using Photoshop straight and averted gaze were created, and all faces were cropped, turned into gray-scale and matched for size (571 by 386 pixels; 13.2° by 9° of visual angle at a viewing distance of 65 cm). The background was dark grey. There were 5 different targets, equally often appearing as cued target or incongruently cued target; equally often per side and roughly the same

size: approximately 150 x 150 pixels ($3.5^\circ \times 3.5^\circ$), appearing 845 pixels cm (19°) away from center. Each trial consists of multiple phases, with some of them infant-controlled (gaze-contingent), and some of them do not. Figure 2 depicts the trial structure

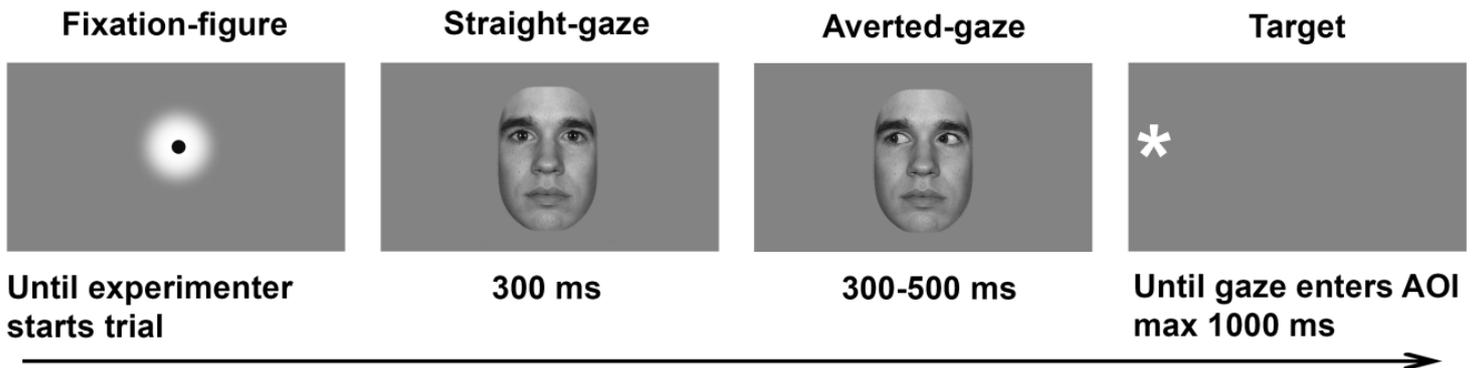


Figure 2: Schematic overview of the trial structure.

The trial consisted of the following phases:

1. Fixation cross – until 20 ms worth of gaze samples are in the fixation cross AOI. Fixation dot is within a red coloured Gaussian envelope and pulses and back and forth following a sinusoid with a period of 36 frames, i.e. 0.6 seconds, the 'amplitude' (border not fixed) is 0.9° of visual angle. The entire fix cross image's 'borders' vary between 1.3° and 2.2° (degrees of visual angle) and the inner dot varies between approx. 0.2° and 0.35° .
2. Straight face – fixed timing 300 ms
3. Averted gaze – random timing between 1300 and 1700 ms for the infant version, between 300 and 500 ms for the child version.

4. Target appears – until 20 ms worth of gaze samples are in the peripheral AOI. If no gaze samples are recorded in the peripheral AOI, the target starts spinning after 1500 ms.
5. Target spins – The target rotates until the total time after peripheral onset is 2500 ms. It rotates around its center at 0.5 rotations per seconds.

The infant version contains 40 trials (10 faces x 2 conditions (congruent, incongruent cuing) x 2 sides (left, right). Experimenters could play attention getters (sounds, or small animations) to regain the infant or child's interest whenever deemed necessary (practically never used in the child version). The child version contains double as many trials (80), with the 40 trials in the second block being in a different order than those 40 in the first block. There was a child-controlled break between the two blocks. The order is random.

Procedure

Participants come to the Child Research Center for an entire testing day (R9) or for half a day (R0) to participate in a battery of tasks. The social gaze task is always the first task in the set of our eye-tracking tasks. Infants sit in a car seat (10 month-olds; R3) or maxicosi (5-month-olds) approximately 65 cm away from the eyetracker. Children (R9) sit in a comfortable chair, with a chin rest, approximately 65 cm away from the eyetracker. A white curtain divides the room in a testing area, and an area in which the experimenter controls the experiment.

Testing occurs in a bright small room (300-400 Lux, Temperature 18-25 C), which does not have windows. The Tobii TX300 eye tracker was used with a sampling rate of 300 Hz. A 23" monitor attached to the Tobii TX300 was used,

with a resolution of 1920 by 1020 pixels, with a refresh rate of 60 Hz. Stimuli were presented with MATLAB R2015a (child version) and R2015b (infant version) and the PsychToolbox (version 3.0.12; Brainard, 1997) using a MacBook.

Both children and infants are calibrated using 5 points (center plus 4 corners). For the infant version, calibration stimuli are colourful spirals (as outlined in Hessels et al., 2015). For the child version, calibration stimuli are small dots. Once the child is calibrated, the experimenter closes the curtain that divides the room in two halves, and sits in the other half of the room, behind a desk with the stimulus computer. The experimenter can also see the child via a closed-circuit webcam.

After the calibration, the task starts automatically for the infants. Parents receive the following instruction beforehand: *“We laten uw kind dadelijk eerst gezichten zien. De gezichten bewegen hun ogen naar de zijkant van het scherm. Vervolgens komt er een plaatje. We willen hiermee onderzoeken hoe uw kind kijkt naar deze verschillende gezichten en plaatjes.”* (“we will show your child first some faces. These faces will move their eyes to the side of the screen. Then there will be a picture. With this task we want to investigate how your child will look at these different faces and pictures”). Parents are instructed not to interfere (not to point at the screen, or describe what is present on the screen; they are allowed to hold their child’s hands).

In contrast to the infant set-up, the R9-children receive explicit instruction, as follows:



In dit taakje moet je zo snel mogelijk een voorwerp vinden dat links of rechts van een gezicht verschijnt. Let goed op: je moet nu zo snel mogelijk in de richting van het voorwerp kijken! Kun je mij vertellen wat je moet doen?

“First you will see a face, then you should look at the object “ – in writing. (verbal instruction) – “In this task you need to find as quickly as possible an object that appears to the left or to the right of a face. Pay attention: you need to look as quickly as possible in the direction of the object! Can you tell me what to do?” Once the child understands the idea, the task starts. For the infants, the task lasts around 4 minutes (given that infants are paying attention); for R9-children, the task lasts around 7 minutes.

References:

Brainard, D. H. (1997). The psychophysics toolbox. *Spatial Vision*, 10, 433–436.

Hessels, R. S., Andersson, R., Hooge, I. T. C., Nystro€m, M., & Kemner, C. (2015). Consequences of eye color, positioning, and head movement for eye-tracking data quality in infant research. *Infancy*, 20, 601–633.