Supplemental Methods

Calibration procedure

A 9-point calibration routine was used to collect monocular calibration data for the two eyes separately. The stimulus was a white circular dot with a 1° diameter, placed on a black background. Each trial consisted of a two-step procedure with the first stimulus always being presented at the center of the screen for 1 second, and the second stimulus at one of the nine possible target locations for 5 seconds. Stimuli in the four cardinal directions (0, 90, 180, and 270°) were placed at 10° eccentricity. Stimuli in the four diagonal positions (45, 135, 225, 315°) were placed at 14°. Finally, a central target was used to determine central viewing position. Subjects were asked to fixate the targets to the best of their abilities. The non-viewing eye was patched during the complete calibration routine, which lasted 54 seconds.

After calibration data were collected, post hoc calibrations were performed by fitting a calibration model to the data. Towards that end, target foveation periods were identified by the experimenter by using a mouse tool which marked the beginning and end of stable foveation epochs. After foveation periods were identified for all nine calibration points, the raw horizontal and vertical gaze position data were mapped onto the horizontal and vertical target coordinates using two separate 1st-order polynomial surface fits, one for each component. In this way, the calibration algorithm adequately accounted for cross-talk between horizontal and vertical signal components. The fit procedure used for calibration of the data from children with normal vision was the same as the one described above, but for these children fixation data were extracted for all target foveations in the 2D saccade task (38 peripheral locations and 1 central point).