Supplementary Figure 1.

Grand average horizontal eye position +/- standard deviation per condition of Experiment 1.

We analyzed the data starting from 100ms before the onset of the first disk with a dot and up to the offset of the last disk with dot. We averaged the data over the two eyes to reduce noise. We neutralized samples with invalid data, i.e., where the eye supposedly moved implausibly fast (>750°/s), the point of regard lay outside of the screen bounds and where the pupil was not detected. We classified runs of invalid data longer than 20ms as blinks and additionally invalidated the preceding and following 30ms, to discard invalid data generated during the closing and opening of the eyelid. Invalid samples were not included in any further processing steps like averaging and plotting.

We then fitted a line through the valid horizontal eye positions of each trial in a least-squares sense and subtracted the line from the reported eye positions. This removed some of the variability between trials and participants while maintaining any signs of eye movements. We then calculated single-participant averages and grand-averages per condition.

In trials in which the Ternus-Pikler display was first presented to the left of fixation, tracking of the stimulus with the eyes would show up as an alternation of positive (left) and negative (right) values and in trials in which the stimulus was first presented on the right an alternation of negative (right) and positive (left) values. We therefore inversed the sign of the right-start trials, to be able to analyze all trials in one plot without the left- and right-start trials cancelling each other out during averaging. In the conditions in which the stimulus moved randomly, tracking of the stimulus with the eyes would not show in the averaged data because the random eye movements cancel each other out during averaging. However, the presence of eye movements would be detectable from a higher variance compared to the other conditions.

Even when plotted at the very small scale of +/- 0.2° the grand average does not show an alternation pattern and the variance in Conditions 5 and 6, in which the stimulus moved randomly, is indistinguishable from the other conditions. Hence, there is no evidence for stimulus-tracking in the averaged eye tracking data.
Supplementary Figure 2.

Grand average horizontal eye position +/- standard deviation per condition of Experiment 2.

Data were analyzed as in Experiment 1 (see Supplementary Figure 1). Compliance with the central fixation instruction was again generally good: The small amplitude of the average eye movements shows that the stimulus was not structurally tracked. One subject tracked the stimulus in a small proportion of trials. The eye movements of this subject are the main driver of the “bump” that is visible after 0.5s in the grand average data of Conditions 1-3 with three disks. The remaining subjects fixated well, except for very rare exceptions on single trials.