**Figure 1: Visit rates heat maps.**

**(a)** The percent of time per trial participants spent in each region of the image for Large shapes, Natural viewing (average of 5 participants x 4 trials). **(b)** Same as in (a) for the Large shapes, Tunneled viewing (average of 5 participants x 6 trials). **(c)** Same as (a, b) for Small shapes, Natural viewing (average of 5 participants x 4 trials). **(d)** Same as in (a b, c) for the Small shapes, Tunneled viewing (average of 5 participants x 10 trials).

**Figure 2: Motor characteristics of saccades and drifts.**

**(a)** Comparison of mean saccadic rates between Natural and Tunneled viewing for Large (blue) and Small (magenta) image sizes. Five participants separately and all together, 6th column (asterisks, t-tests, p<0.05). **(b)** Comparison of populations of mean drift speeds in the four experimental conditions, for each participant separately and all together (asterisks, t-tests and Wilcoxon rank sum tests, p<0.05. one participant showed a reversed effect, see red asterisk). **(c)** Comparison of mean instantaneous drift speeds in the four experimental conditions (error-bars denotes STEs). **(d)** Variances of mean drift speeds in the four experimental conditions (error-bars denotes STEs).

**Figure 3: Trajectories of saccades and drifts.**

**(a)** Example trials for the different large shapes – circle, parallelogram, rectangle, square and triangle, Natural and Tunneled viewing. Saccades are colored in lighter blue, fixational pauses in dark blue. The horizontal and vertical movements are presented next to each example trial (full trial movies of Tunneled viewing in sup). **(b)** Fraction of Border-following saccades in the four experimental conditions. **(c)** Comparison of curvature index of drift trajectory shape between border drifts (colored brown) and non-border drifts, in the four experimental conditions.

**Supplementary Figure 1: Variations of the saccadic main sequence.**

The maximum velocity of a saccade linearly depends on its amplitude in all experimental conditions (mean R^2 is 0.68 and 0.72 for the Natural and Tunneled conditions, respectively). The figure shows comparison between the variations of the saccadic-main-sequence in the four experimental conditions.

**Supplementary Table 1:**

Comparative analyses were verified using only the first 3 s of all Tunneled trials, to control for trial length confounds.

**Extra Figure 1: Instantaneous drift speed.**

**(a)** Autocorrelations of the instantaneous drift velocity (horizontal and vertical) in Natural vision tasks. The upper row shows the sum of significant correlation values for each time step. The lower row shows trial by trial significant correlation values. The percent of single periodic trials (higher significant correlation at 100ms compared with earlier and later time steps) is presented above the lower row. **(b)** Same as (a) for the Tunneled vision tasks. A peak in the autocorrelation can be seen in 100ms time step for both horizontal and vertical movements in both Large and Small conditions, as well as the presence of many more single periodic trials. **(c)** Autocorrelations of the distance traveled by each drift (horizontal and vertical) in the Natural (black) and Tunneled (blue and magenta) tasks. The decay of the sum of significant correlations is faster for both horizontal and vertical movements in both Large and Small conditions, as indicated by the Tau decay of the exponential fit presented.