**Supplementary Figures**

**Supplementary Figure 1.** Average (± SD) eye, head, and gaze traces for observers M.G. (A) and S.N. (B), in the 5 head-unrestrained conditions. Figure conventions, as well as onset and offset criteria, are the same as in Figure 2.
Supplementary Figures 2. Raw data for all conditions for observers M.G. (A) and S.N. (B). Figure conventions are as in Figure 3.
Supplementary Figure 3. Subject CP. Perceptual data for different times relative to gaze saccade onset for observer C.P. for the eye-aligned fast (A) and slow (B) conditions. Figure conventions are as in Figure 4.
Supplementary Figure 4. Subject MG. Perceptual data for different times relative to gaze saccade onset for observers M.G. and S.N., respectively, for all experimental conditions (A-F). Figure conventions are as in Figure 4.
Supplementary Figure 5. Subject SN. Perceptual data for different times relative to gaze saccade onset for observers M.G. and S.N., respectively, for all experimental conditions (A-F). Figure conventions are as in Figure 4.
Supplementary Figure 6. Comparison of the velocity and spatial criteria used to calculate gaze duration for all head-restrained and head-unrestrained conditions. **A**, Comparison of the difference between the gaze durations obtained using the space and velocity criteria. The abscissa gives the values of mean gaze duration using the velocity threshold: onset: 60 °/s, offset: 30 °/s. The ordinate gives the mean gaze duration taken from a spatial criterion, defined as ± 5% of gaze amplitude. Data are shown from C.P. (*black*), M.G. (*blue*), and S.N. (*red*). Dashed black oblique line is the unity relationship. **B**, Box-plot of all HU conditions, summarizing data across all observers. The horizontal red line gives the median; with the box plot boundaries corresponding to the upper and lower quartiles. Whiskers on either side of the box extend to the most extreme values.