Timescales of inference in visual adaptation
Supplemental Material

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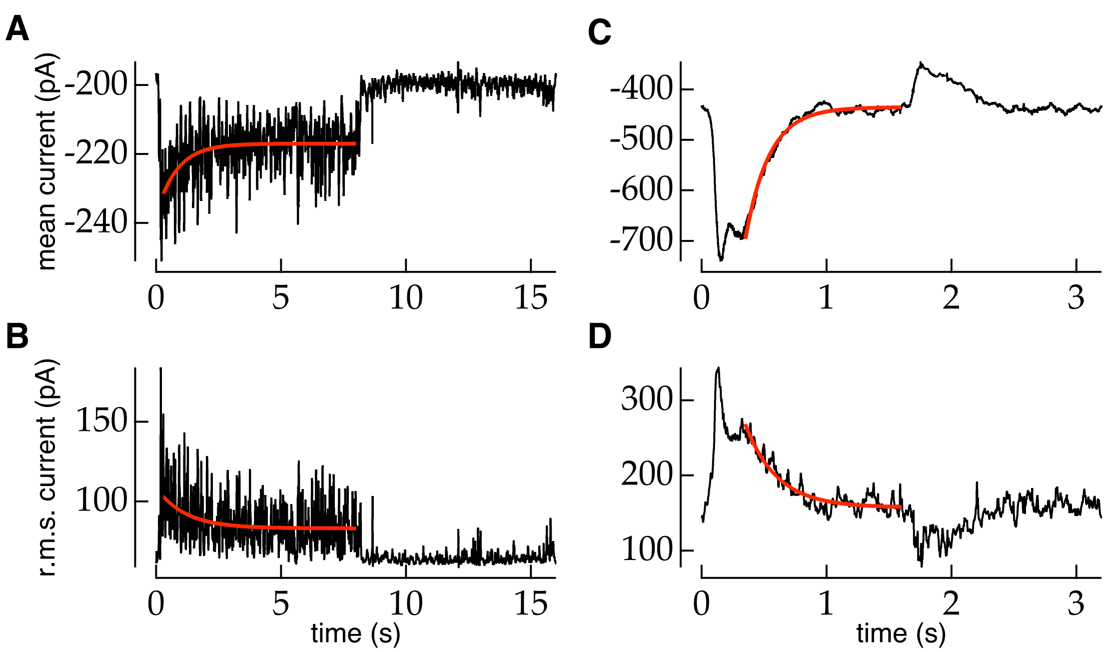
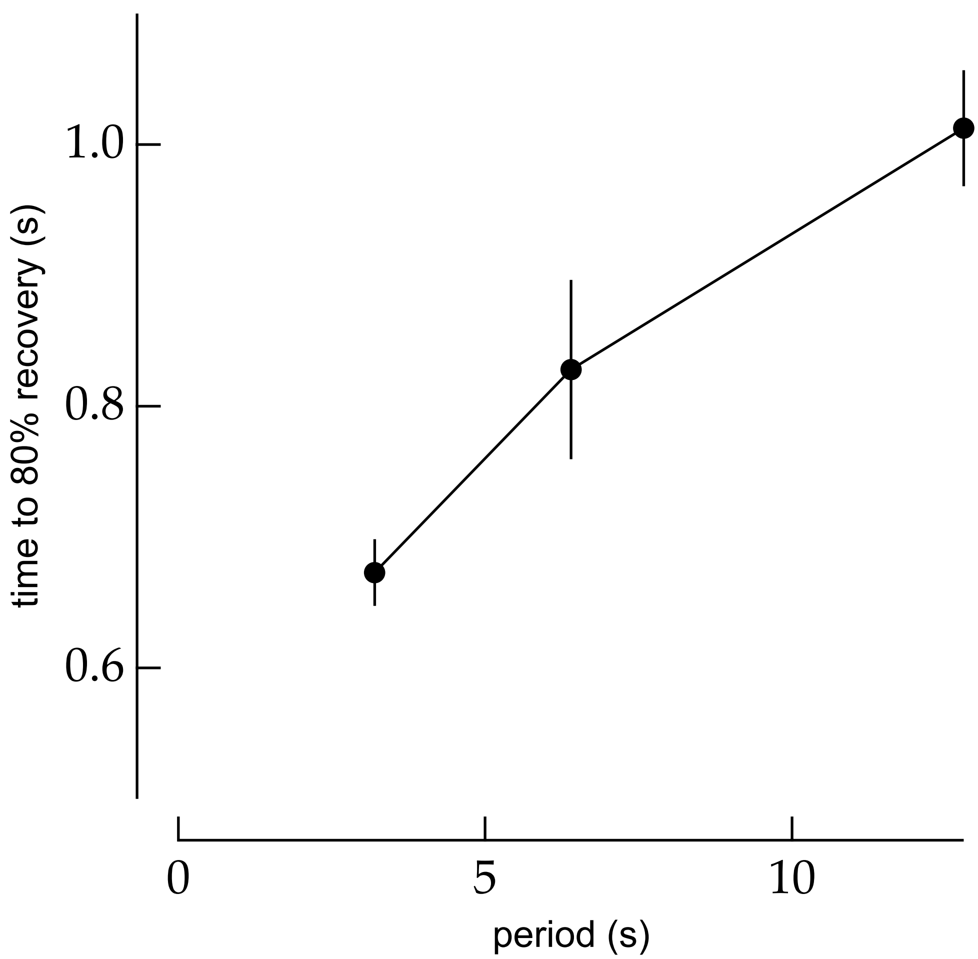
Supplemental Figure S1

Mean and r.m.s synaptic input current to RGCs decrease with similar time scales following an increase in stimulus luminance or temporal contrast. **A**,**B**, Mean (top) and r.m.s. (bottom) excitatory synaptic input current to an ON RGC (holding potential -60mV) following a periodic increase in temporal contrast (6-36% at time 0) followed by a decrease (36-6%) at time 8s (black). Exponential fit to the response following an increase in contrast is shown in red (τ =.8s, top, and 1.1s, bottom). **C**,**D**, Mean (top) and r.m.s. (bottom) excitatory synaptic input to an ON RGC (holding potential -60mV) following a periodic increase in stimulus luminance (~40-80 R*/rod/s) at time 0 followed by a decrease (~80-40 R*/rod/s) at time 1.6s (black). Exponential fit to the current following an increase in luminance is shown in red (τ =.19s, top, and .25s, bottom).



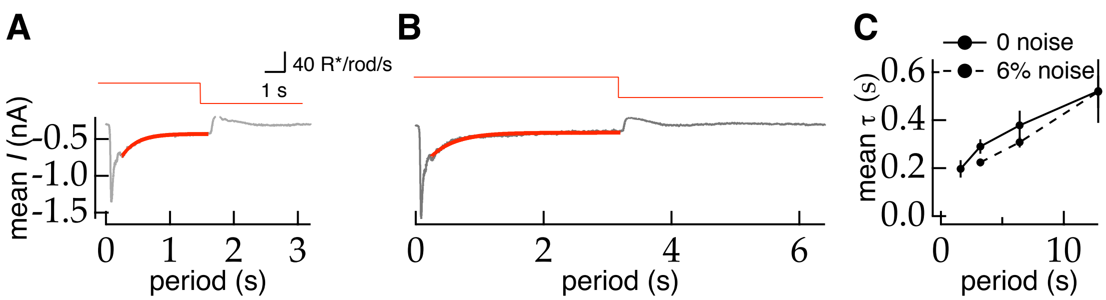
Supplemental Figure S2

Because the gain trajectory following a luminance step has multiple components, we verified the results presented in Figure 2 by measuring time to 80% recovery from the peak of the mean response following a luminance step for the cells presented in Figure 2E. This measure is insensitive to the exact functional form of the gain trajectory. As with the time constant of an exponential fit to the second (slower) component of the mean response, we found that the time to 80% recovery in the same population of cells scaled monotonically with the switching period. Error bars denote standard error of the mean.



Supplemental Figure S3

The time course of adaptation following an increase in luminance depends on the period between luminance switches. This result does not depend on the 6% to 3% change in contrast of the stimulus in Figure 2. Under zero noise stimulus conditions, the results are qualitatively similar to those of Figure 2. **A**,**B**, Mean excitatory synaptic current to an ON RGC (holding potential -60mV; black) in response to a approximately 50 periodic switches in stimulus luminance (~40-80 R*/rod/s; red). The switching period was 3.2 s in A and 6.4 s in B. The mean current shows a stereotyped component followed by a slow adaptation component. The exponential fit to the slower of these two components is shown in red. **C**, Population-average (n≈6 for each period) time constant (mean ± sem) of adaptation in synaptic input currents to ON RGCs increases approximately linearly with increasing switching period. Solid line shows data collected with no added noise. Dashed line re-plots data from Figure 2 showing adaptation to luminance steps with added noise.



Supplemental Figure S4

The timescale of adaptation to periodic switches in stimulus luminance scales approximately linearly with switching period across a range of light levels. We repeated experiments described in the main text (see "Dynamics of adaptation to luminance", Figure 2) at a range of light levels. The data presented in Figure 2 is shown in grey. The average time constant of adaptation for separate populations of ON RGCs (n=5-10 cells at each light level and switching period) at light levels 0.1 and 10x the original experiment are shown in red and blue respectively. Error bars denote standard error of the mean.