1995; Nowak and Bullier, 1997; Schmolesky et al., 1998; Maunsell et al., 1999; Raiguel et al., 1999), but our results demonstrate advantages of measuring latency for rate decreases. Not only is offset latency generally shorter than onset latency, but it may also be less variable. For V1 simple cells, which had large Δ_{AP}, offset latency was significantly less variable across cells (SD 9 msec compared with 18 msec, F test, $p = 0.01$, $n = 16$, orientation stimulus). Saul (1995) showed that onset timing in simple cells was affected by adaptation, whereas offset timing was not. There is also evidence that offset latency is more consistent than onset latency in the somatosensory system (Ahissar et al., 2000). In other experiments, we found that offset latency changed significantly more than onset latency in the LGN when spatial frequency was varied and in cortical DS cells when stimulus velocity was varied. Together, these observations indicate that offset latency is less malleable, it lacks much of the dependency that onset latency has on the previous state of the cell and network, and could provide a reliable estimate of the minimal latency from a change in the peripheral stimulus to a change in output of the recorded cell. The use of response onset, which varies greatly with stimulus parameters and the previous state of the neuron, may be partly responsible for large discrepancies between latency measurements in V1 (for review, see Nowak and Bullier, 1997). For very transient responses, however, offset latency may be difficult to measure. Alternatively, latency to an increase in an already suprathreshold response should have similar properties to offset latency.

Offset latency may be more than just a useful tool for studying visual processing. The earliest cortical signals to indicate a change in the visual scene will arise in neurons that lose their preferred stimulus when the scene changes. Therefore, we propose that the offset of the responses of strongly driven cells to the previous scene acts as a reference signal for the visual system to interpret the waves of action potentials that follow a sudden scene change. The change may be induced by a sudden change in the environment or an eye movement. Response onset is known to carry information about stimulus features in vision (Gawne et al., 1996) and audition (Middlebrooks et al., 1994), and making use of this information is aided by a temporal reference (Hopfield, 1995; Gautrais and Thorpe, 1998).

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