

*Data Analysis.* All statistical analyses were performed using Matlab (*Mathworks*) or Oriana (*Kovach Computing Services*) for circular statistics. All linear data were first tested for normality using the Lilliefors test. If they passed this test of normality, we then made comparisons using parametric ANOVA or *t*-tests (Modified-Bonferroni methods). If the data failed to pass normality tests, non-parametric ANOVA (Kruskal-Wallis) or Wilcoxon rank sum tests were used. To test differences between cumulative density functions we used 2 tailed Kolmogorov-Smirnov test (Keppel 1991).

## **RESULTS**

We stimulated at 61 sites in 6 SNrs of 3 monkeys. At each site we documented the response profile of the neuron recorded before introducing electrical stimulation. We observed response profiles similar to those previously reported by us and others (Basso et al. 2005; Basso and Wurtz 2002; Bayer et al. 2002; Handel and Glimcher 2000; Handel and Glimcher 1999; Hikosaka and Wurtz 1983a, 1983b, 1983c). Of the 61 neurons in our sample, 15/61 (26%) were classified as visual neurons. 31/61 (51%) had a reduced level of activity compared to the baseline during all three intervals of the delayed-saccade task and were classified as visual-delay-saccade neurons. 12/61 (20%) of our sample were classified as saccade neurons due to their reduced level of discharge during the saccade interval (see methods). 3/61 (3%) were classified qualitatively due to an insufficient number of trials for statistical classification. We did not encounter neurons with decreases in activity only during the delay period. Of the