Value encoding in single neurons in the human amygdala during decision-making

SUPPLEMENTAL MATERIALS

Rick L. Jenison[1], Antonio Rangel[2,3]
Hiroyuki Oya[4], Hiroto Kawasaki[4], Matthew A. Howard[4]

[1] Department of Psychology, University of Wisconsin
[2]Computational and Neural Systems, Caltech
[3] HSS, Caltech
[4] Department of Neurosurgery, University of Iowa

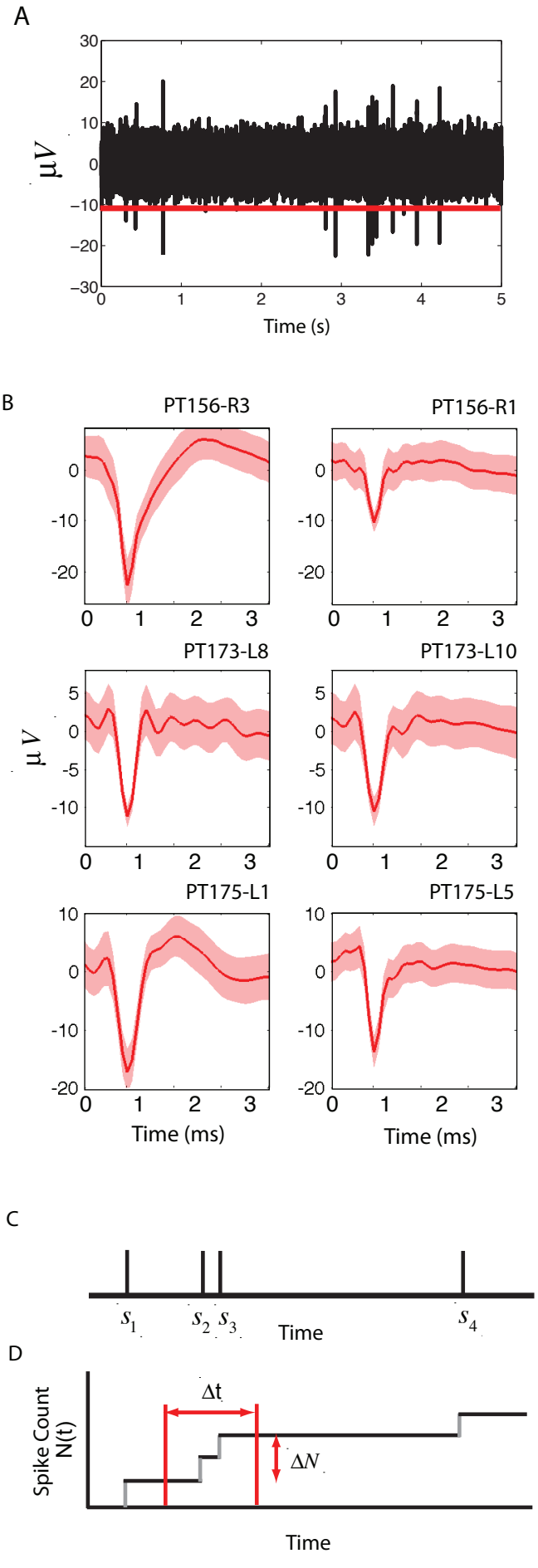
A
30
20
10
0
−10
−20
−30
μV
0
1
2
3
4
5
Time (s)
B
PT156-R3
PT156-R1
PT173-L8
PT173-L10
PT175-L1
PT175-L5
μV
Time (ms)
Time (ms)
C
s_1
s_2
s_3
s_4
Time
D
Spike Count
N(t)
Δt
ΔN
Time

Figure S1. (A) Example recording from a high-impedance micro-wire contact showing representative threshold (red). (B) Representative sorted clusters from raw recording. Candidate spikes were selected by amplitude thresholding, decomposed using wavelet analysis, and clustered using the algorithm developed by Quiroga and colleagues [1-3]. The wavelet analysis was based on a Haar wavelet that decomposed the candidate spikes into a 9-dimensional feature space. Spikes were clustered with similar shapes to the same unit using a stochastic nonparametric superparamagnetic approach [3]. The mean (dark red) and standard deviation (ribbon) computed across the dominant cluster waveforms for representative contacts for patient-participants 156, 173, and 175. (C) Example point process of spike events S_k (D) the corresponding counting process. In this framework the spike train is characterized by a sequence or set of individual spike times $[s_1,....,s_m]$. $N(t)$ denotes the spike counting process measuring the number of spikes that have occurred from time 0 to *t*, and $\Delta N(t) = N(t) - N\left(t\text{-}\Delta\text{t}\right)$ denotes the amount of spikes observed during the interval Δt.

1 Quiroga, R. Q., Nadasdy, Z. & Ben Shaul, Y. Unsupervised spike detection and sorting with wavelets and superparamagnetic clustering. *Neural Computation* **16**, 1661-1687 (2004).

2 Quiroga, R. Q., Reddy, L., Kreiman, G., Koch, C. & Fried, I. Invariant visual representation by single neurons in the human brain. *Nature* **435**, 1102-1107 (2005).

3 Domany, E. Superparamagnetic clustering of data - The definitive solution of an ill-posed problem. *Physica A* **263**, 158-169 (1999).