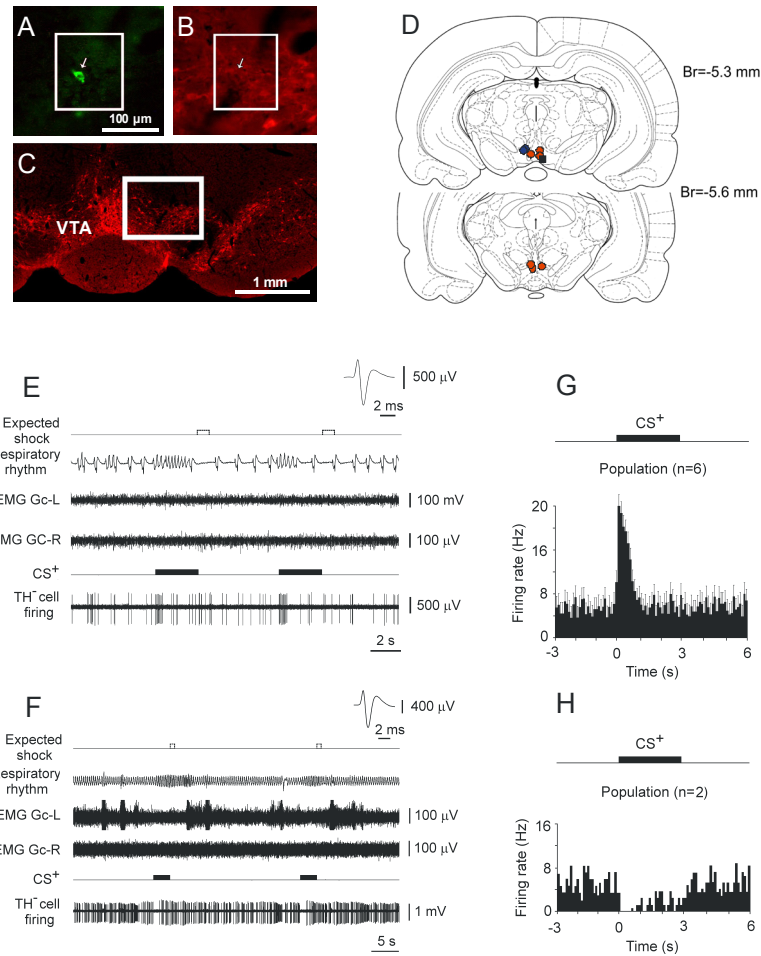


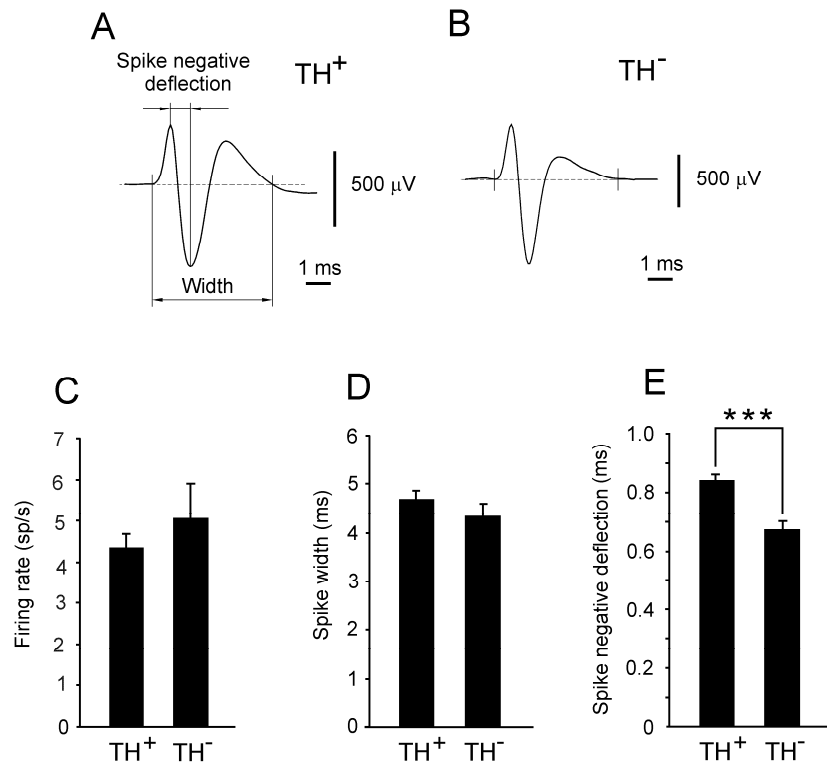
Supplemental Figure S1. Respiratory responses to the CS⁺ and CS⁻ in rats discriminating and non-discriminating between these stimuli. (A, B) Average alterations in respiratory responses to the CS⁺ and CS⁻ during 13 trials in 10 discriminating rats. (C, D) Average alterations in respiratory responses to the CS⁺ and CS⁻ during 12 trials in five non-discriminating rats.

In discriminating rats, the average respiratory responses to the CS⁺ were not significantly different between the initial six trials (One-way ANOVA; $F=0.6689$, $p=0.6487$, $df=5$, 54). In the following 7-13 trials, the average respiratory responses significantly decreased (One-way ANOVA; $F=9.72$, $p<0.0001$, $df=6$, 63). In non-discriminating rats, the average respiratory responses to the CS⁺ were not significantly different between 12 consecutive trials (One-way ANOVA; $F=0.9771$, $p=0.4784$, $df=10$, 39).



Supplemental Figure S2. Excitatory and inhibitory responses of VTA TH-negative (TH⁻) neurons to the CS⁺. (A) A VTA neuron filled with Nb. (B) This neurons does not express TH-immunoreactivity. (C) The location of this TH⁻ neuron in the dorsal VTA. (D) Cumulative data showing the location of nine TH⁻ neurons in the VTA. Six red dots denote neurons showing excitatory responses to the CS⁺. Two blue dots denote neurons inhibited by the CS⁺. The black square denotes one neuron that did not respond to the CS⁺ delivery. (E) Phasic activation of a VTA TH⁻ neuron to the CS⁺. (F) Inhibition of a VTA TH⁻ neuron in response to the CS⁺. (G, H) Population PSTHs (100 ms bin) illustrating excitatory or inhibitory responses of TH⁻ neurons to the CS⁺.

Six of the 9 TH⁻ neurons were excited by the CS⁺ with an average latency of 53 ± 10 ms (min=20 ms, max=82 ms). The number of spikes in excitatory responses ranged from 2 to 11 spikes with a mean of 7 ± 2 spikes. Two TH⁻ neurons were inhibited by the CS⁺ with average latencies of 54 ± 15 ms (min=24 ms, max=80 ms) and 252 ± 49 ms (min=168, max=337 ms). The average durations of inhibitory pauses were 0.74 ± 0.13 s (min=0.49 s, max=1.01 s) and 3.37 ± 0.3 s (min=2.84 s, max=3.9 s). One TH⁻ neuron did not respond to the CS⁺ delivery.



Supplemental Figure S3. Comparison of electrophysiological characteristics of TH-positive (TH⁺) and TH-negative (TH⁻) neurons in the VTA. (A, B) Spike waveforms for TH⁺ and TH⁻ neurons. (C) Average baseline firing rate. Mann-Whitney test, $p=0.3457$. (D) Average spike width. Mann-Whitney test, $p=0.1446$. (E) Average duration of the spike negative deflection. Mann-Whitney test, $***p=0.0004$. Data were collected from 23 TH⁺ and 9 TH⁻ neurons.