Supplemental Figures

Age	Sex	Surgical target	X	Y	Z
69	M	R STN	10.1	-4.19	-6.11
66	M	L STN	-11.59	-2.99	-4.29
51	F	L STN	-8.87	-3.13	-6.3
74	M	L STN	-11.68	-2.31	-5.39
60	M	L STN	-10.12	-0.54	-6.61
64*	M	L STN	-8.83	-2.09	-5.79
64*	M	R STN	8.3	-2.79	-6.83
75**	F	L STN	-9.83	-3.63	-7.3
75**	F	R STN	10.63	-2.19	-5.47
74	M	L STN	-9.45	-3.12	-5.05
66	F	R STN	9.55	-4.96	-7.86
54	F	L STN	-10.05	-4.4	-8.74
69	M	R STN	10.7	-3.26	-6.26

**Supplemental Table 1. Patient statistics.**
Details for patients that participated in the study including age, sex, surgical target, and x, y, z coordinates for the microelectrode recordings relative to the middle cerebellar peduncle (MCP). * and ** represent different sides of the brain for the same patient.
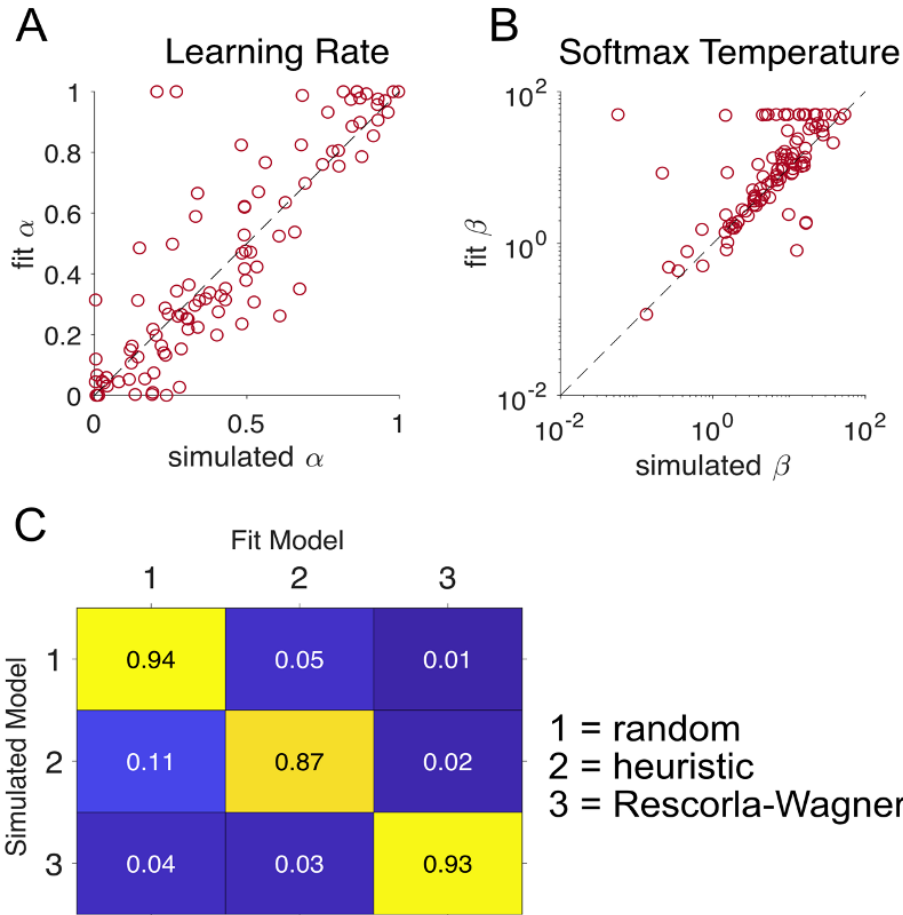
Supplemental Figure 1. Computational modeling of task and RW parameter recovery. Parameter recovery showing correlation between the **(A)** fit and simulated learning rate and **(B)** temperature. **(C)** Confusion matrix shows that all 3 models are distinguishable from each other with the given task parameters. The RW model parameters are recoverable, and all 3 models are distinguishable from each other with the given task parameters.
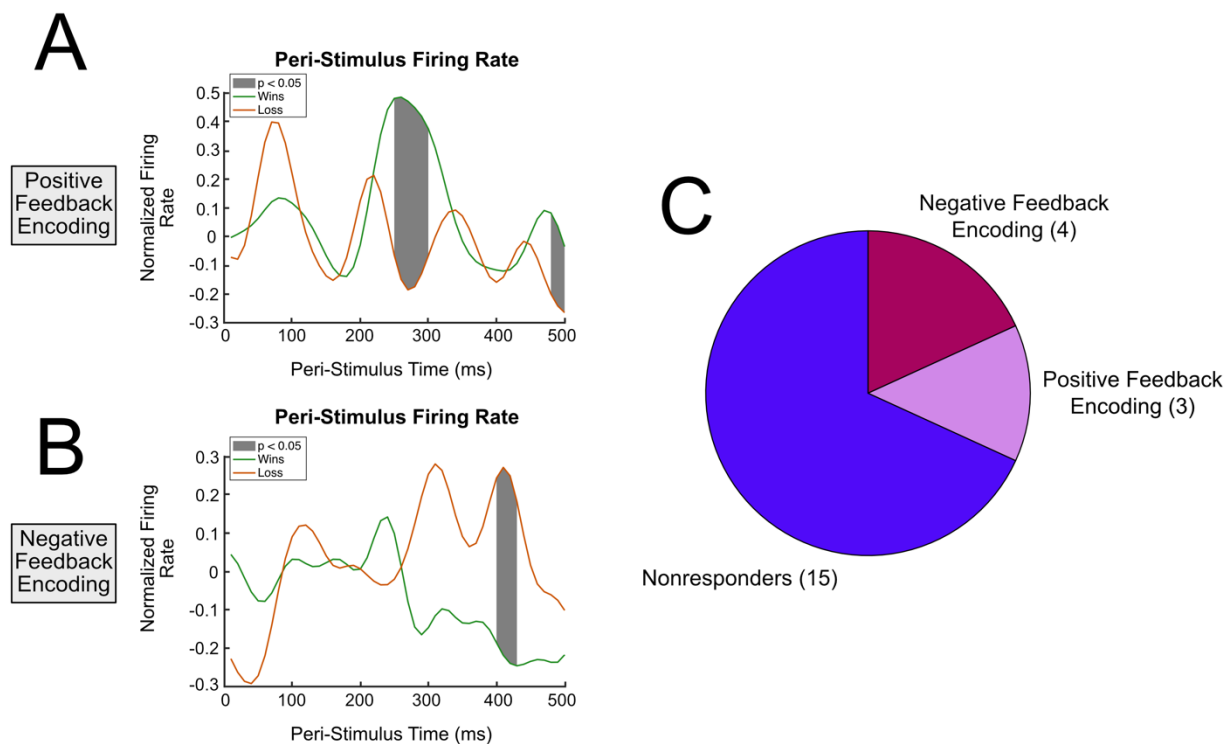
Supplemental Figure 2. Breakdown of encoding properties for individual neurons shows heterogeneity in responses. (A) A positive feedback encoding neuron. **(B)** A negative feedback encoding neuron. **(C)** Distribution of individual neuron encoding properties. Majority of neurons were non responders.
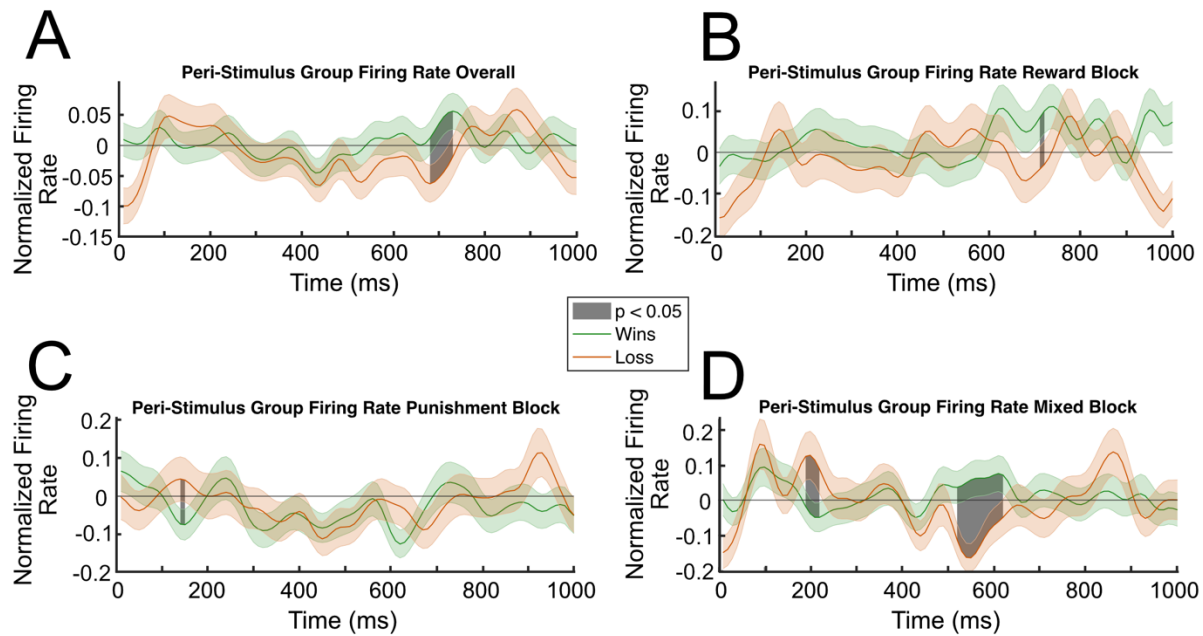
Supplemental Figure 3. Win and loss trials show no consistent significant difference in firing rates. **(A)** Win and loss trials, collapsed across all blocks. Win and loss trials for **(B)** rewards block, **(C)** punishment block, and **(D)** mixed block. Significance was found using a permutation test.
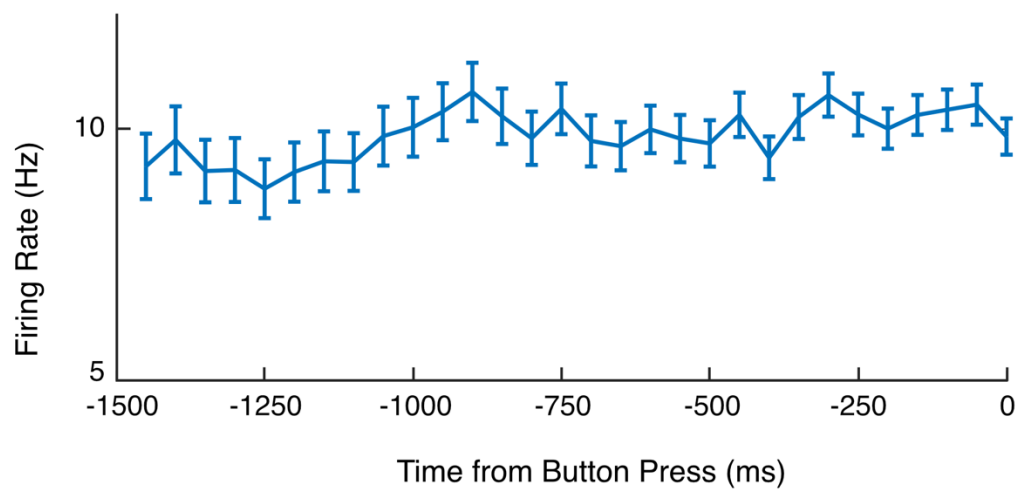
Supplemental Figure 4. Average firing rate across all trials leading up to button press shows no movement related activity.
The average firing rate in the 1.5s leading up to the button press. There is no increase or ramping effect of neuronal activity related to movement as the participant gets ready to press the button.