**Supplemental Material**

**Figure legends:**

**Figure 2 Supplement. Population activity during fear conditioning.** (**A**) Histogram of firing rate of an example neuron on day one of fear conditioning illustrating increased activity following presentation of the US. Arrow indicates onset of first footshock. (**B**) Proportion of activated neurons is highest in control mice on day 1 and decreases with subsequent conditioning. *P <* 0.001, *Chi-*square. (**C-D**) Heat plots of normalized firing rate for individual cells in control and DAT-NR1 KO mice during CS+/US (**C**) and CS- (**D**) presentation and subsequent ITI.

**Figure 3 Supplement. US-inhibited LA neurons do not change across days of conditioning.** (**A**) Average normalized firing rate of US-inhibited neurons in control mice across days of conditioning (Control: n=8, 16, and 14 Days 1-3, respectively; DAT-NR1 KO: n=8, 8, and 9 Days 1-3, respectively). (**B**) Average normalized firing rate of US- inhibited neurons in DAT-NR1 KO mice across days of conditioning. (**C**) Average area under the curve (AUC) of inhibited response for control and DAT-NR1 KO mice across days. (**D-F**) Comparison of inhibited responses of control and DAT-NR1 KO mice during day 1 (**D**), day 2 (**E**), and day 3 of conditioning (**f**). Data are presented as the mean ± S.E.M.

**Figure 4 Supplement 1. Plasticity in CS activated LA neurons is absent in DAT-NR1 KO mice.** (**A**) Average normalized firing rate of CS+ activated neurons in control mice across days of conditioning. (**B**) Average normalized firing rate of CS+ activated neurons in in DAT-NR1 KO mice across days of conditioning. (**C**) Average normalized firing rate of CS- activated neurons in control mice across days of conditioning. (**D**) Average normalized firing rate of CS- activated neurons in in DAT-NR1 KO mice across days of conditioning. (**E**) Average normalized firing rate of activated neurons during presentation of unpaired CS+ in control mice across days of conditioning. (**F**) Average normalized firing rate of activated neurons during presentation of unpaired CS- in control mice across days of conditioning.(**G**) Average normalized firing rate of CS+ and CS- activated neurons in unpaired Ctrl mice on day 1 of conditioning. (**H**) Average normalized firing rate of CS+ and CS- activated neurons in unpaired Ctrl mice on day 3 of conditioning. Data are presented as the mean ± S.E.M. Repeated measures ANOVA, \*\*\*\**P* < 0.0001,Bonferroni post-test.

**Figure 4 Supplement 2 CS activated LA neurons are not different at the start of conditioning.** (**A**) Average normalized firing rate of CS+ and CS- activated neurons in Ctrl and KO mice during trial 1 of the first day of conditioning. (**B**) Average normalized firing rate of CS+ and CS- activated neurons in Ctrl and KO mice during trial 10 of the first day of conditioning.

**Figure 4 Supplement 3. Differential response latencies in CS activated neurons between control and DAT-NR1 KO mice. A**) Average cumulative distribution of latency to increase activity in response to CS+ presentation in control mice does not change across days. (**B**) Average cumulative distribution of latency to increase activity in response to CS+ presentation in DAT-NR1 KO mice decrease across days. (**C**) Average cumulative distribution of latency to increase activity in response to CS- presentation in control mice decrease across days. (**D**) Average cumulative distribution of latency to increase activity in response to CS- presentation in DAT-NR1 KO mice decrease across days. (**E**) Average cumulative distribution of latency to increase activity in response to CS+ presentation in control versus DAT-NR1 KO mice on day 1. (**F**) Average cumulative distribution of latency to increase activity in response to CS+ presentation in control versus DAT-NR1 KO mice on day 3. (**G**) Average cumulative distribution of latency to increase activity in response to CS- presentation in control versus DAT-NR1 KO mice on day 1. (**H**) Average cumulative distribution of latency to increase activity in response to CS- presentation in control versus DAT-NR1 KO mice on day 3. Average normalized firing rate of CS+ and CS- activated neurons in unpaired Ctrl mice on day 3 of conditioning. Data are presented as the mean ± S.E.M. Repeated measures ANOVA, \**P* < 0.05, \*\*\*\* *P* < 0.0001,Bonferroni post-test.

**Figure 5 Supplement. Plasticity in CS inhibited LA neurons is absent in DAT-NR1 KO mice.** (**A**) Average normalized firing rate of CS+ inhibited neurons in control mice across days of conditioning. (**B**) Average normalized firing rate of CS+ inhibited neurons in in DAT-NR1 KO mice across days of conditioning. (**C**) Average normalized firing rate of CS- inhibited neurons in control mice across days of conditioning. (**D**) Average normalized firing rate of CS- inhibited neurons in in DAT-NR1 KO mice across days of conditioning. (**E**) Average normalized firing rate of CS+ and CS- inhibited neurons in Ctrl and KO mice during trial 1 of the first day of conditioning. (**F**) Average normalized firing rate of CS+ and CS- inhibited neurons in Ctrl and KO mice during trial 10 of the first day of conditioning. Data are presented as the mean ± S.E.M. Repeated measures ANOVA,\*\* *P* < 0.01 and ,\*\*\* *P* < 0.001, Bonferroni post-test.

**Figure 6 Supplement. mEPSC and mIPSC amplitude does not change in LA neurons following fear conditioning.** (**A**) Average amplitude of mEPSCs in naïve and fear conditioned (shock) control and DAT-NR1 KO mice. (**B**) Average amplitude of mIPSCs in naïve and fear conditioned (shock) control and DAT-NR1 KO mice.