

Legends to Supplemental Figures

Supplemental figure 1: Verification of criteria for scoring connections and non-connections. Histogram of average EPSP amplitude for 10 consecutive repetitions measured for identified synaptic connections (connected, empty bars), and for an equal number of randomly selected “potential connections”, not identified as connections (non-connected, filled bars). Left: WT, Right: *Mecp2*-null. For both genotypes, the largely non-overlapping distributions of “connected” and “non-connected” amplitudes shows that monosynaptic connections could be readily detected by our criteria.

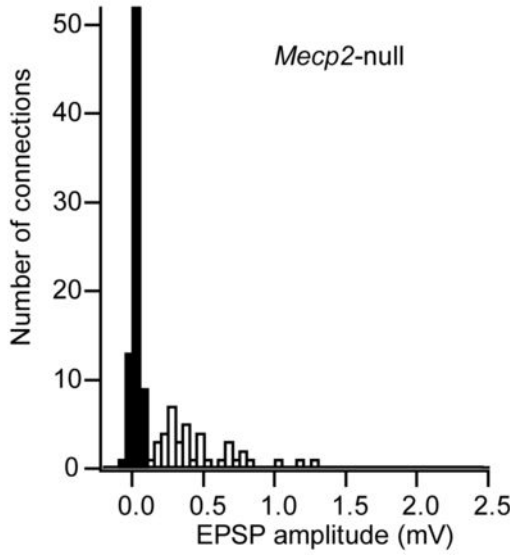
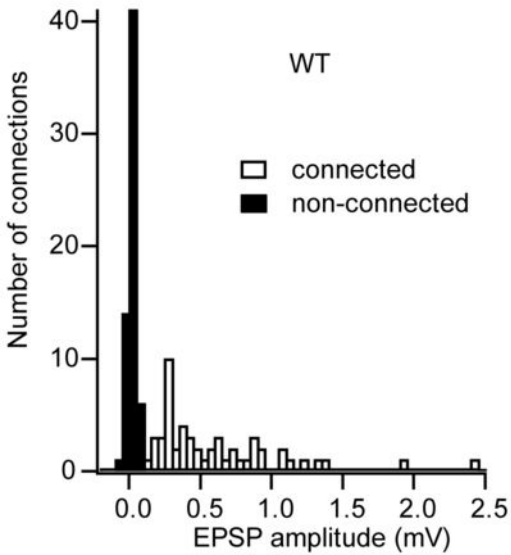
Supplemental figure 2: Sample LTP experiments from 4-week-old mice. Plots of Normalized EPSP amplitude vs. time for a monosynaptic connection in slices from a WT (left, filled circles) and *Mecp2*-null (right, open circles). Inset on top of each graph shows corresponding averaged EPSP responses (average of 30 consecutive trials) before (grey) and after (black) induction.

Supplemental figure 3. : Analysis of changes in quantal content (CV^{-2}) and quantal amplitude after LTP induction can give information about presynaptic (increase in normalized CV^{-2}) vs. postsynaptic (increase in normalized EPSP amplitude) locus of change. Plots of CV^{-2} vs. normalized EPSP amplitude for the 1st EPSP in the train for 2-week old (A) and 4-week old (B) WT and *Mecp2*-null mice. Points falling above the diagonal (dashed line) usually indicate a presynaptic locus of change (Malinow and Tsien, 1990; Faber and Korn, 1991; Larkman et al., 1992; Sjostrom et al., 2007). Both

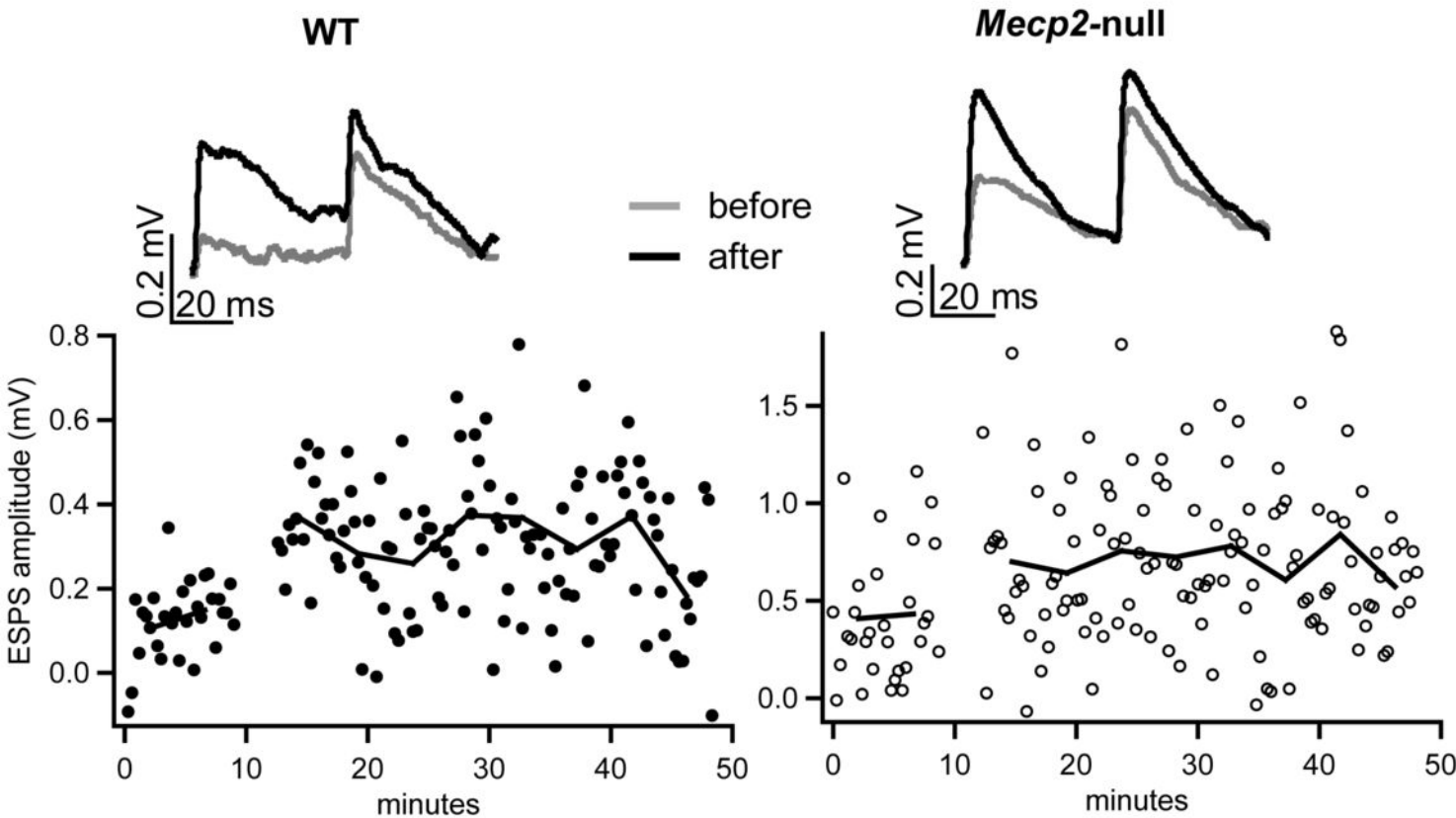
pre- and post-synaptic forms of LTP seem to be present at L5 synapses from either genotype.

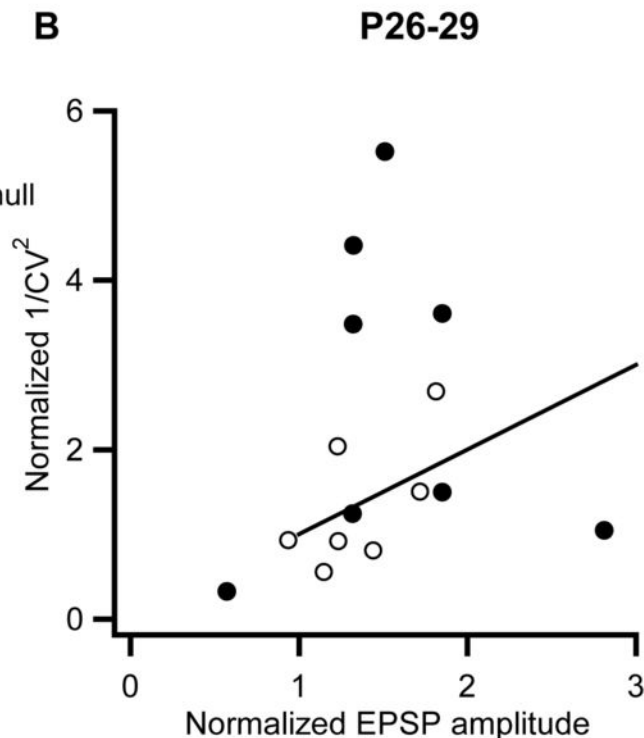
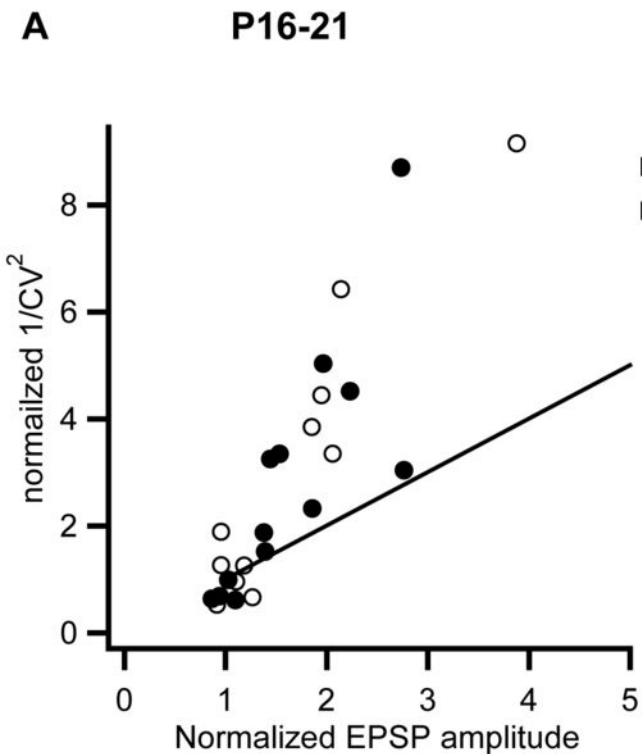
Supplemental Figure 4. Short term plasticity of peak EPSP amplitude using a train of 5 APs at 20 Hz. WT (filled circles) and *Mecp2*-null (open circles) synapses do not show significant differences in the paired pulse ratio at any of the 5 EPSPs in the train.

Supplemental Figure 1

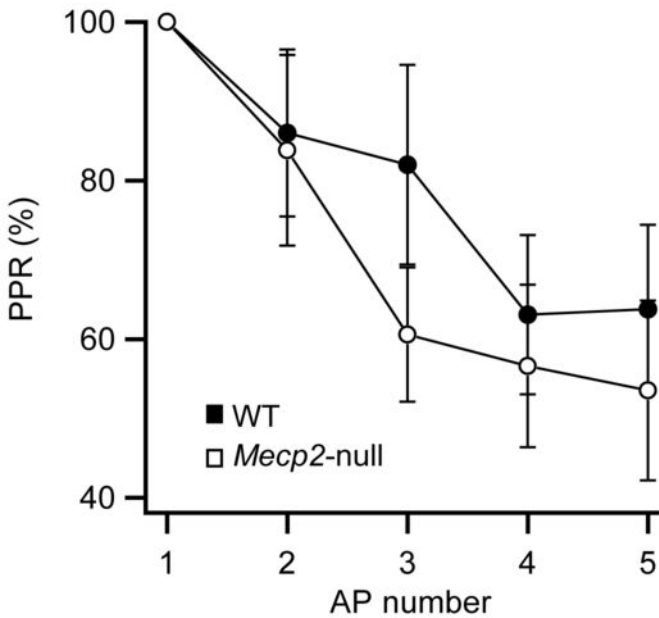


Supplemental Figure 2





Supplemental Figure 4



Supplemental Table, T1 : Properties of the EPSP waveform (first in the train) in WT and *Mecp2*-null monosynaptic connections.

		WT	<i>Mecp2</i> -null	P-value (Students t-test)
P16-21	Rise time (ms)	2.6±0.4	1.8±0.1	0.1
	Latency (ms)	2.1±0.2	2.0±0.2	0.8
	Decay τ (ms)	39.1±3.4	51.5±8.2	0.17
P26-P29	Rise time (ms)	1.5±0.1	1.5±0.1	0.85
	Latency (ms)	2.3±0.2	1.9±0.3	0.30
	Decay τ (ms)	36.5±6.8	38.6±5.5	0.81