Supplementary Materials

Sensory experience selectively reorganizes the late component of evoked responses

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Keywords

Cortical dynamics, sensory perception, spatiotemporal cortical patterns, sensory experience, learning, sensory cortices.

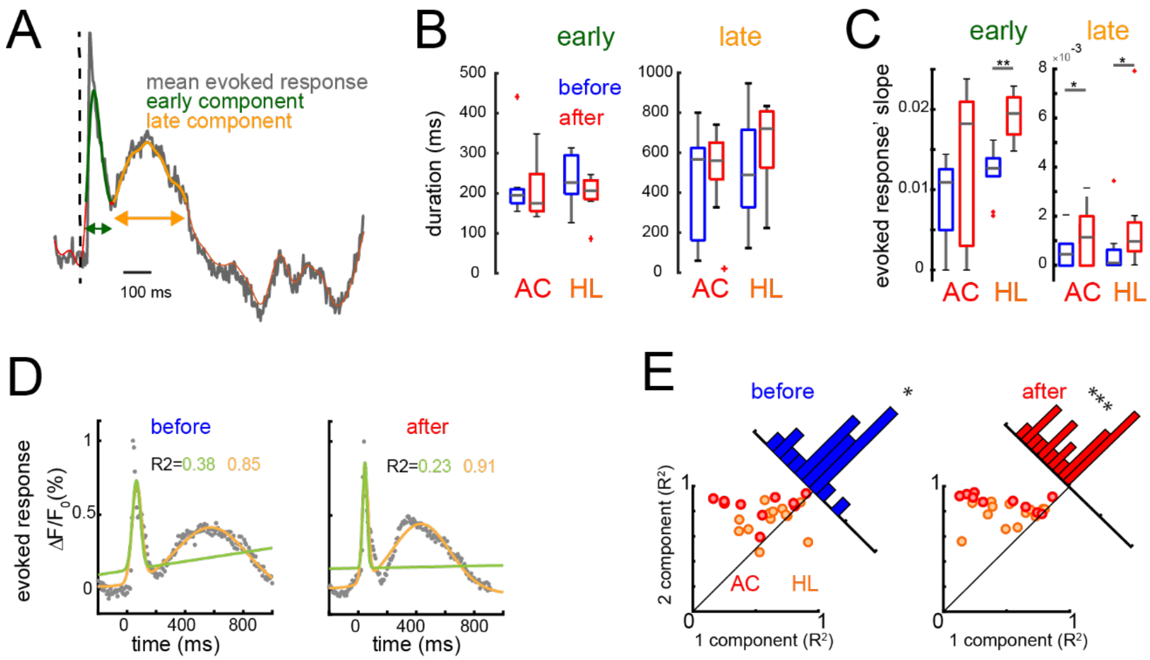

Fig. S1. Organization of the evoked responses. (A) Sensory evoked responses are organized into an early (green) and late (yellow) components. **(B)** Box plots of the duration of the early (left pane) and late components (right pane) of auditory evoked stimulation (AC) and hindpaw stimulation (HL) before (blue) and after (red) repeated auditory and hindpaw sensory stimulation respectively. **(C)** Similar to B but for the slope of the early (left) and late (right) evoked components for the evoked responses to auditory stimulation (AC) and hindpaw stimulation (HL) before (blue) and after (red) repeated stimulation. Stars denote significant differences between the populations ($p<0.05$, $p<0.01$, Wilcoxon rank sum test or t-test depending whether the distributions were normal or not). **(D)** Example of approximation of single-trial evoked responses using a Gaussian Mixture Model with one (green) or two (yellow) components before (left) and after (red) repeated stimulation **(E)** Scatter plots of R-squared using one or two components before (blue) and after (red) repeated auditory or hindpaw stimulation (respectively). Each dot denotes the mean R-squared for the corresponding model (1 or 2 components) across trials of each animal for hindpaw (orange) or auditory (red) stimulation. The stars represent $p<0.05$ and $p<0.001$, t-test).

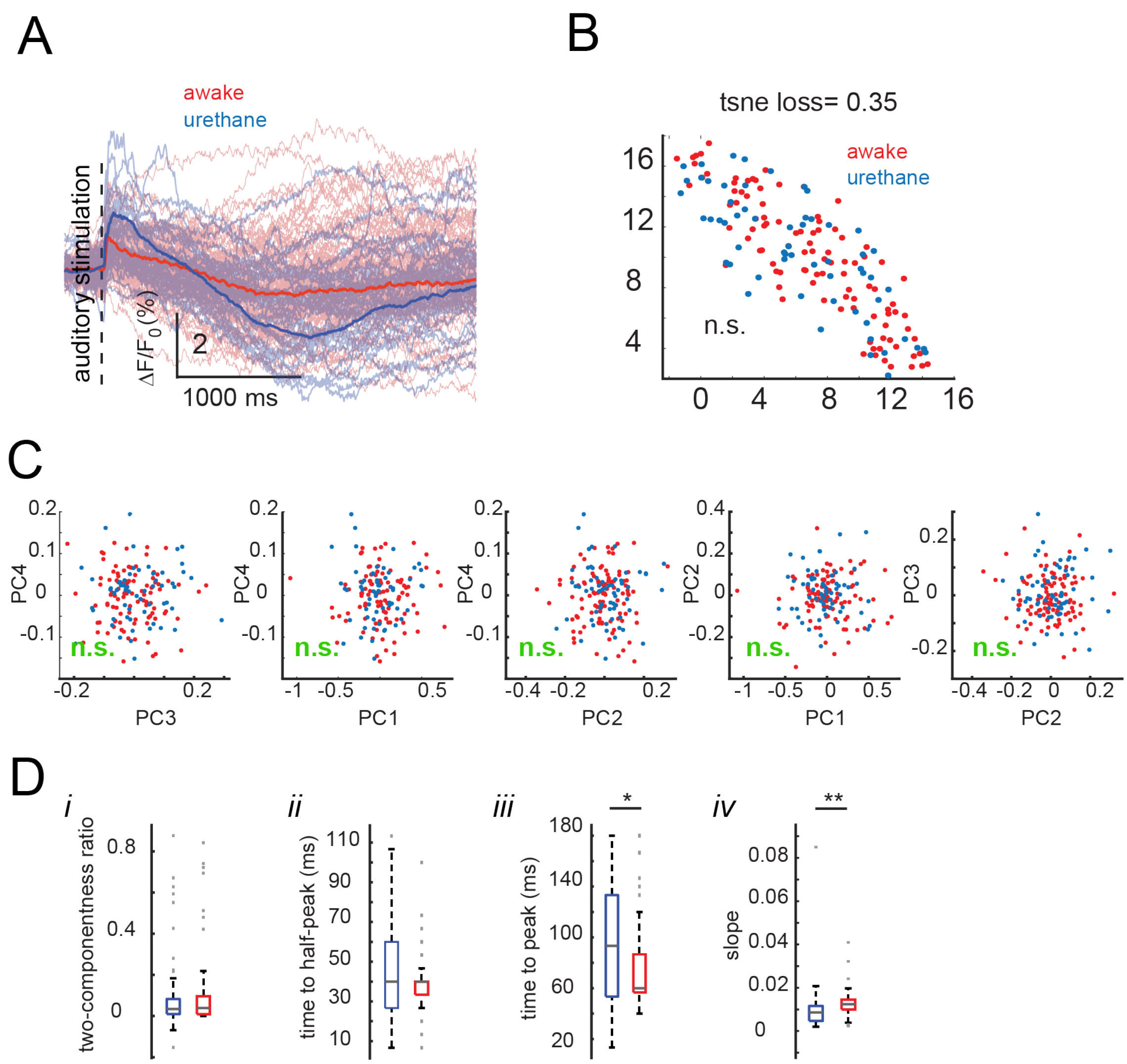

Figure S2. Sensory evoked activity in awake and anesthetized animals. (A) Tone-evoked responses in the auditory cortex in awake (red) and anesthetized (blue) mice (n=60 trials) thick traces correspond to the mean across trials, thin traces correspond to the evoked trials. **(B)** T-SNE projection of single-trial evoked responses during wakefulness (red) and urethane-anesthesia (blue). **(C)** Comparison of the four principal components of single-trial evoked responses (n. s. denotes not significantly different correlation coefficient using the Fisher's z transformation). **(D)** Comparison of the early evoked responses in awake (red) and urethane anesthetized (blue) mice. (i) Two-componentness (mixture of Gaussian model). (ii) time-to-half-peak (iii) time-to-peak. (iv) Slope of single-trial evoked responses from stimulus onset to peak.

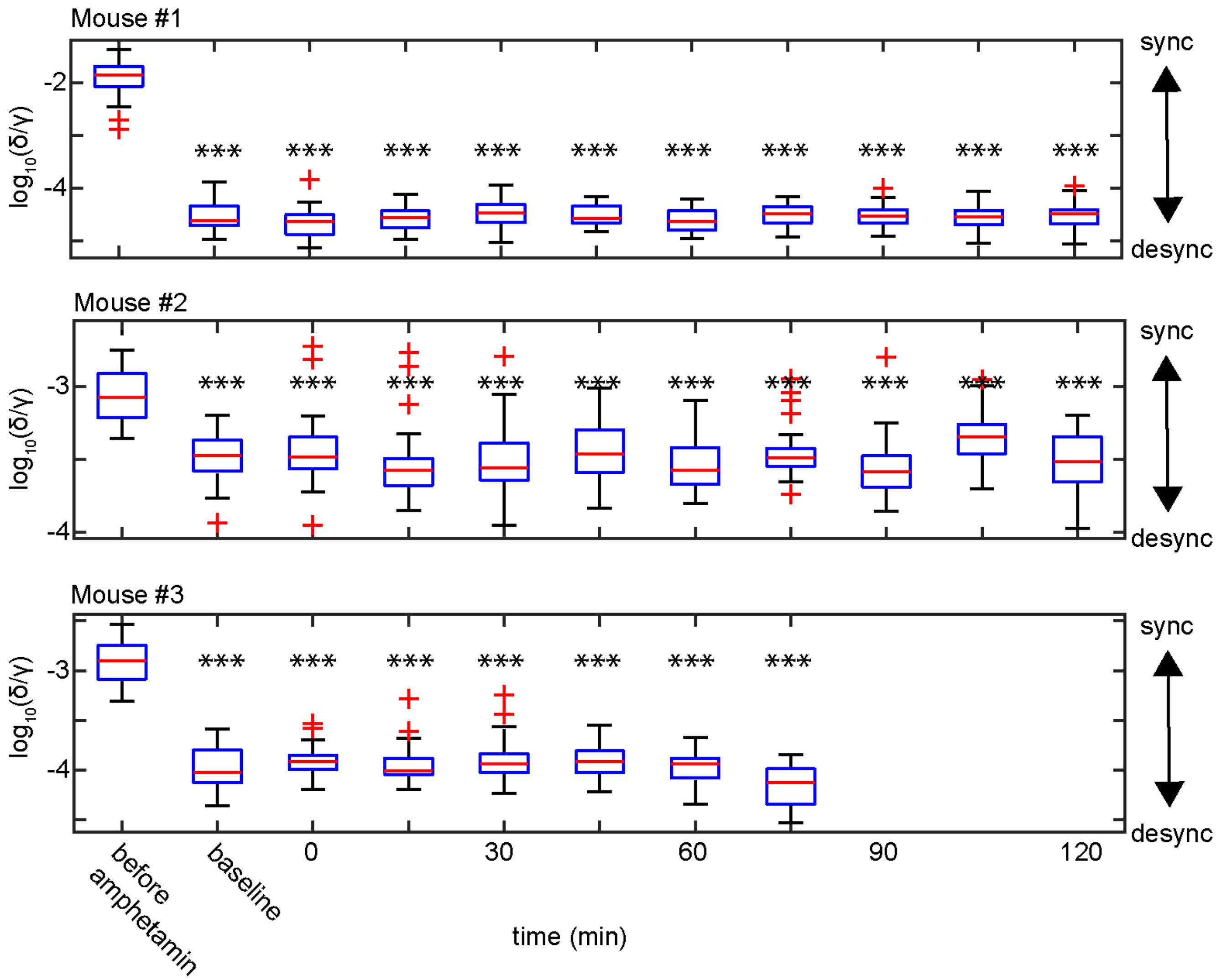

Figure S3. Cortical state stability. Each panel shows the brain state for separate animals across the corresponding recordings. The brain state before amphetamine was injected was significantly different from every recording for up to two hours (one-way ANOVA, Bonferroni correction, *** represents $p<0.001$). In contrast, the brain state was not significantly different across recordings after amphetamine injection.

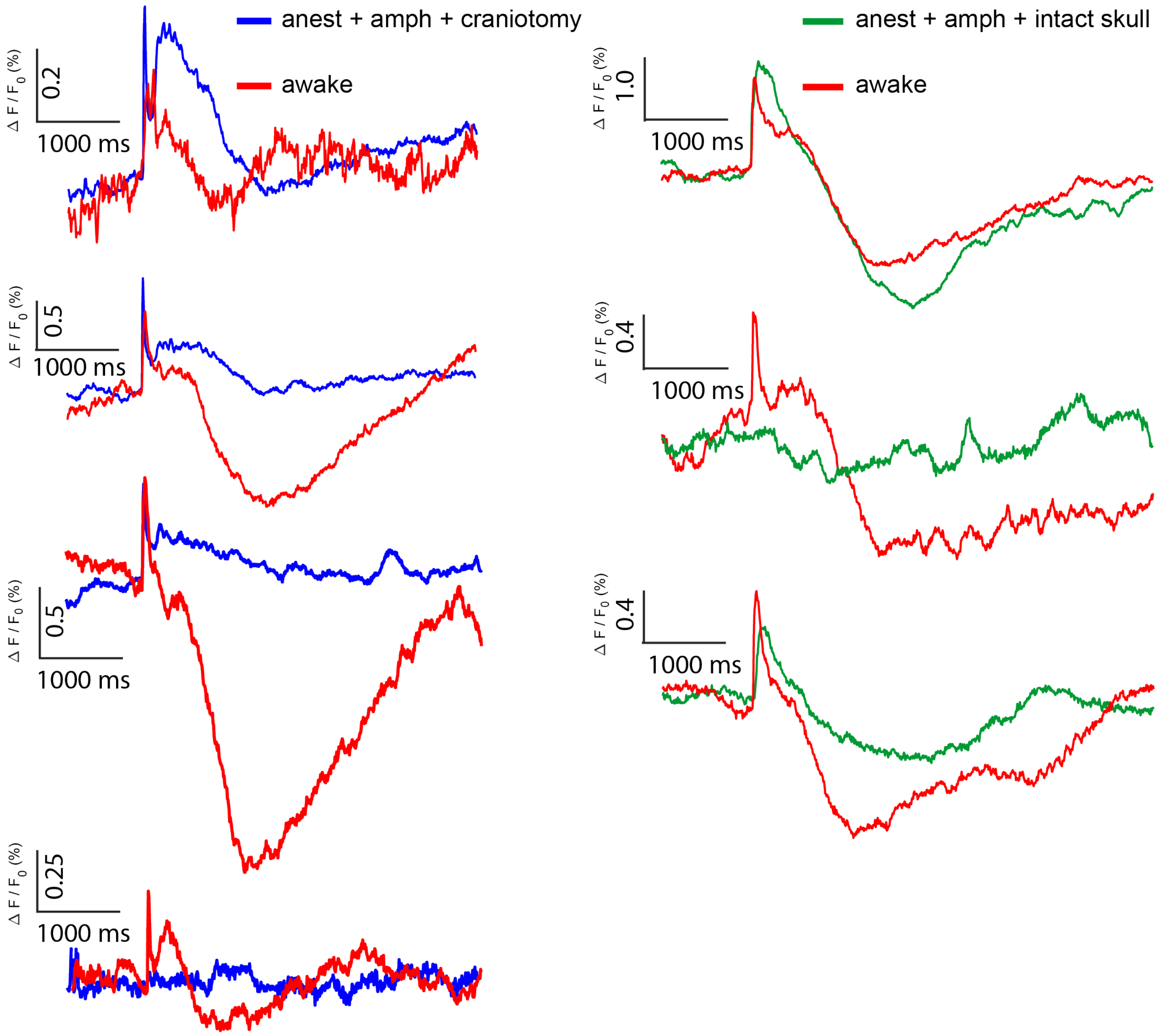

Figure S4. Average evoked responses in awake and anesthetized animals. The evoked responses to a single tone stimulation were recorded in awake or anesthetized (blue) animals with a cranial window (red, left column) and also in anesthetized (green) with skull intact or awake (red, right column) preparations. Each trace represents the average evoked response over trials (n=30 trials) for seven animals.