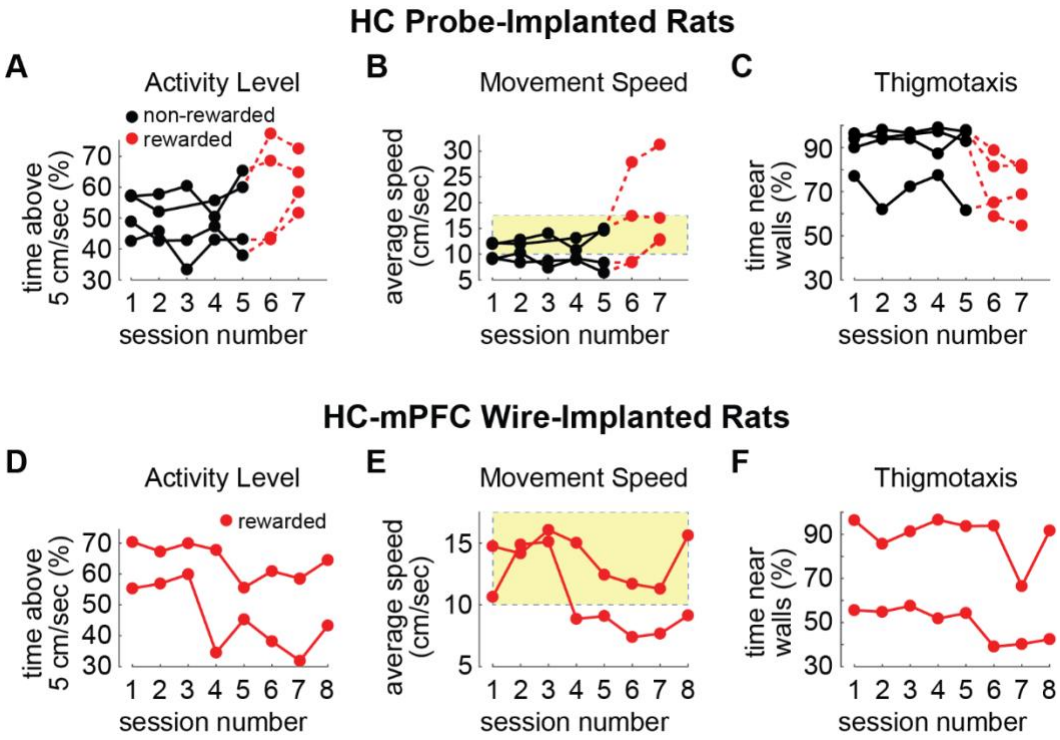
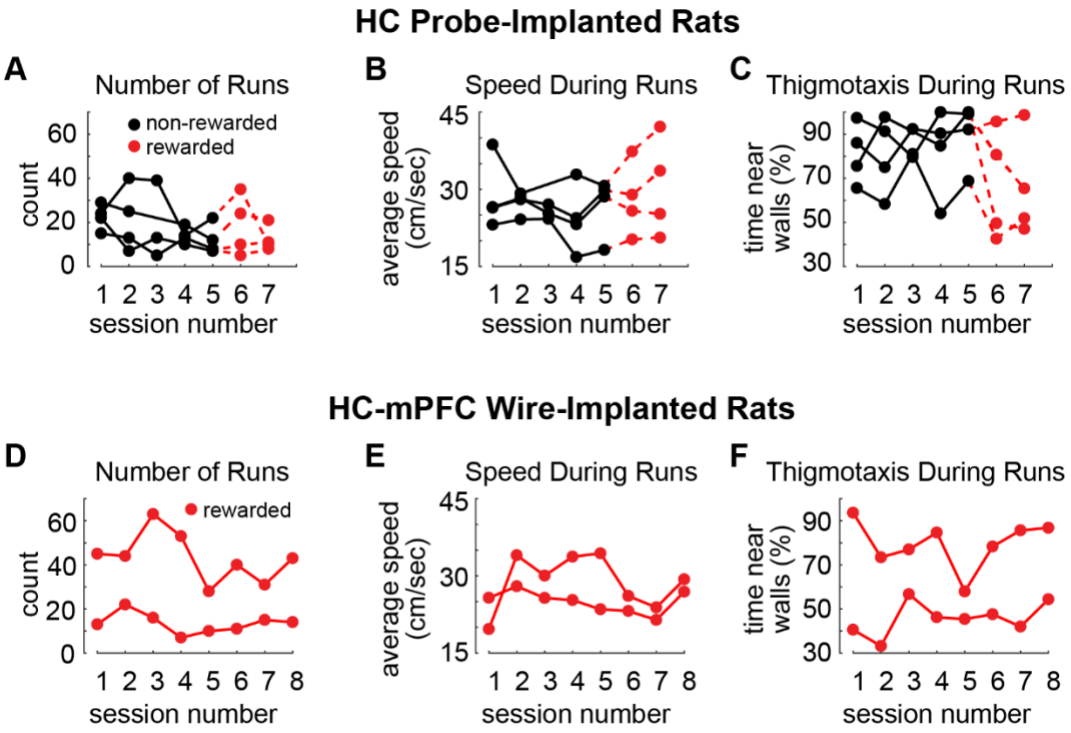
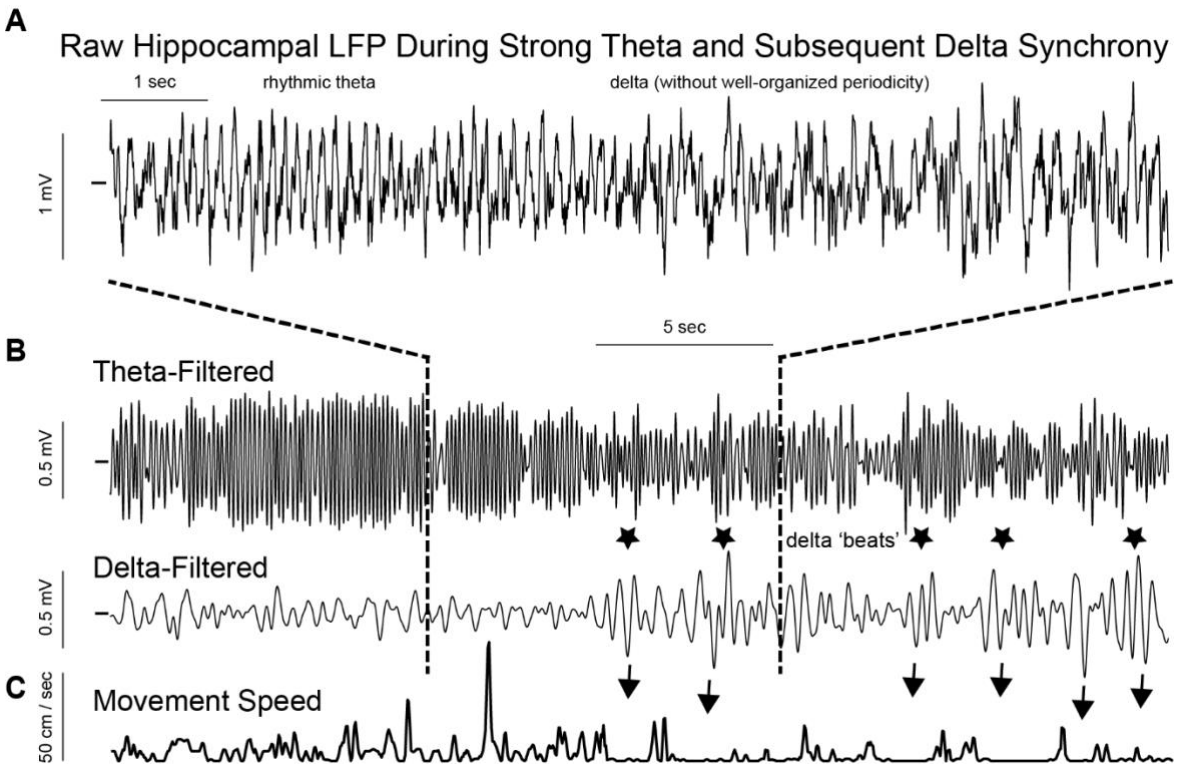
Supplemental Figures



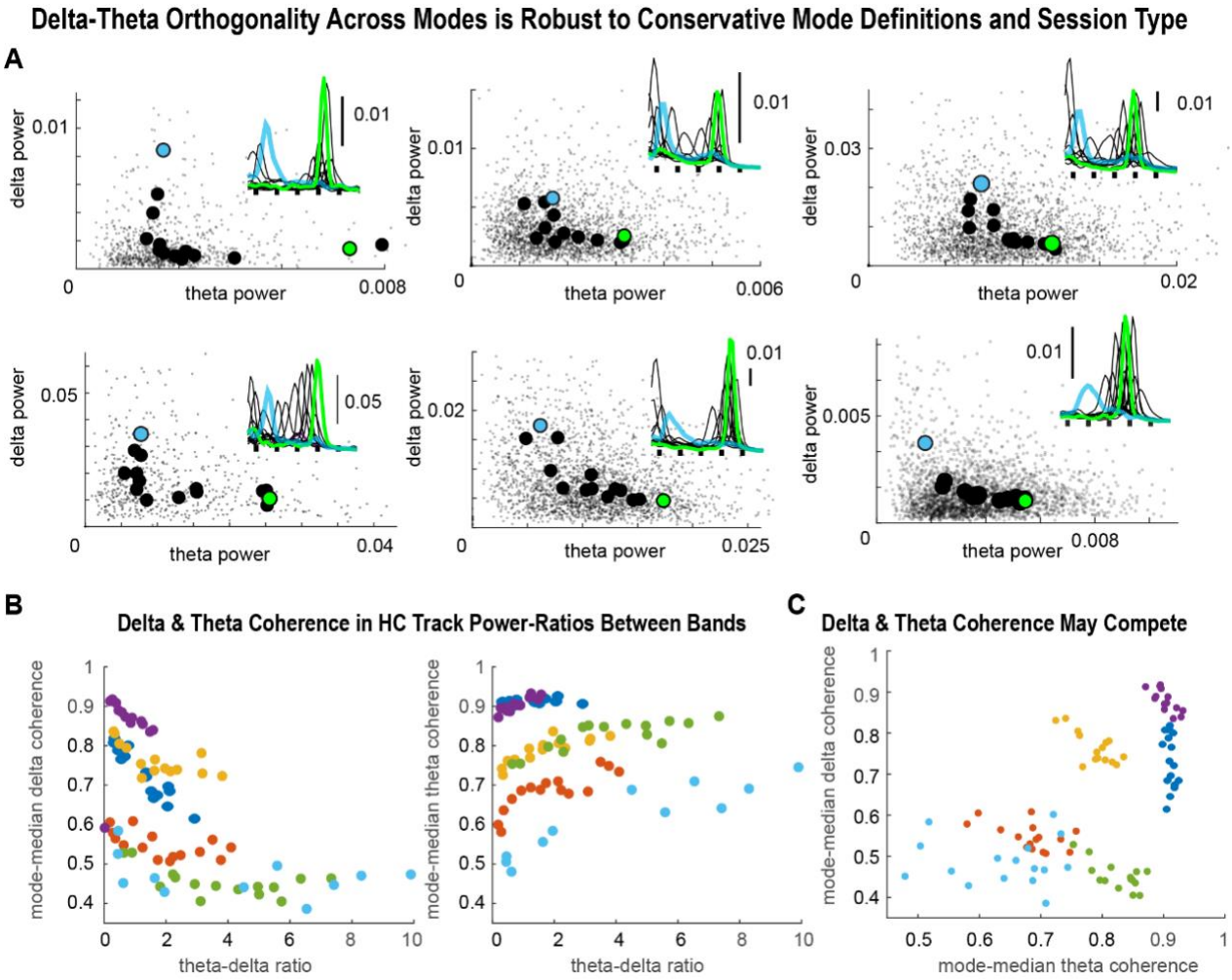
Supplemental Figure 1. Behavioral effects of session type and number. A. Proportion of time that individual probe-implanted rats (n=4) spent moving faster than 5 cm/sec during five *non-rewarded* sessions (**black**) and during two subsequent *rewarded* sessions (**red**). **B.** Average movement speed and thigmotaxis (**C**) of probe-implanted rats across sessions. **D.** Activity level of mPFC-HC implanted animals (n=2) during eight *rewarded* behavioral sessions. **E.** Average movement speed and thigmotaxis (**F**) of dual implanted animals across sessions. Yellow areas in **B** and **E** highlight differences in scale.



Supplemental Figure 2. Influence of session type and number on running bouts. A. The number of running bouts exhibited by probe-implanted rats (n=4) was relatively constant across five *non-rewarded* behavioral sessions (black) and two subsequent *rewarded* sessions (red). **B.** Average movement speed and thigmotaxis (**C**) during running bouts were also stable across *non-rewarded* sessions and showed weaker differences between session types than did measures taken without restriction to precisely-defined behavioral bouts (as in Supp. Fig. 1). **D.** The number of running bouts exhibited by dual-implanted rats (n=2) during *rewarded* behavioral sessions was relatively constant across eight sessions. **E.** Average movement speed and thigmotaxis (**F**) during running bouts were also predominantly stable across sessions.



Supplemental Figure 3. Alternating periods of theta and delta during intermittent running. **A.** HC LFP showing strong theta during the first half and strong delta afterwards. **B.** Theta band-pass and delta band-pass filtered traces of the LFP in **A**. Note the appearance of 'delta beats' (stars) with relatively large amplitudes, corresponding to periods when the rat was very still (arrows) and punctuated by brief movements (**C**).



Supplemental Figure 4. Robustness of delta-theta orthogonality and intrahippocampal coherence. A. Delta and theta power were orthogonal across spectral modes derived using normalized windowed PSDs from rewarded sessions for each rat. Small grey points indicate delta and theta power for each windowed PSD. Large black, blue, and green points plot power measures for each mode. Spectral modes, i.e. average PSDs, are inset. Blue and green points in power scatterplots correspond to inset modes of the same colors. **B**. Median delta (**left**) and theta coherence (**right**) among six pairs of simultaneously-recorded HC LFPs averaged across all instances of each mode. Intrahippocampal delta coherence decreased monotonically, while theta coherence increased with increasing theta-delta ratios across modes. **C**. Intrahippocampal delta and theta coherence may be negatively correlated with slopes specific to each rat.