



Figure S2. **Spatial responses determined using an artificial raster trajectory are strongly correlated with responses to a naturalistic trajectory.** We simulated the spatial map for a single grid/place-network pair as usual (Methods) and compared it to the real-time output of a smoothed random-walk trajectory (average speed 15 cm/s). **A.** The 30-s trajectory through the 1 sq. m. environment (blue circle: start location; red circle: end location). **B.** Correlation strength between corresponding population rates in the raster-scan spatial map and the random-walk responses across time. The naturalistic trajectory was simulated with five different values for the integration time-constant  $\tau$  (Equation 3), ranging from 50–250 ms. **C.** Box-and-whiskers plots of the distribution of trajectory correlations across time for each  $\tau$ .