

Figures

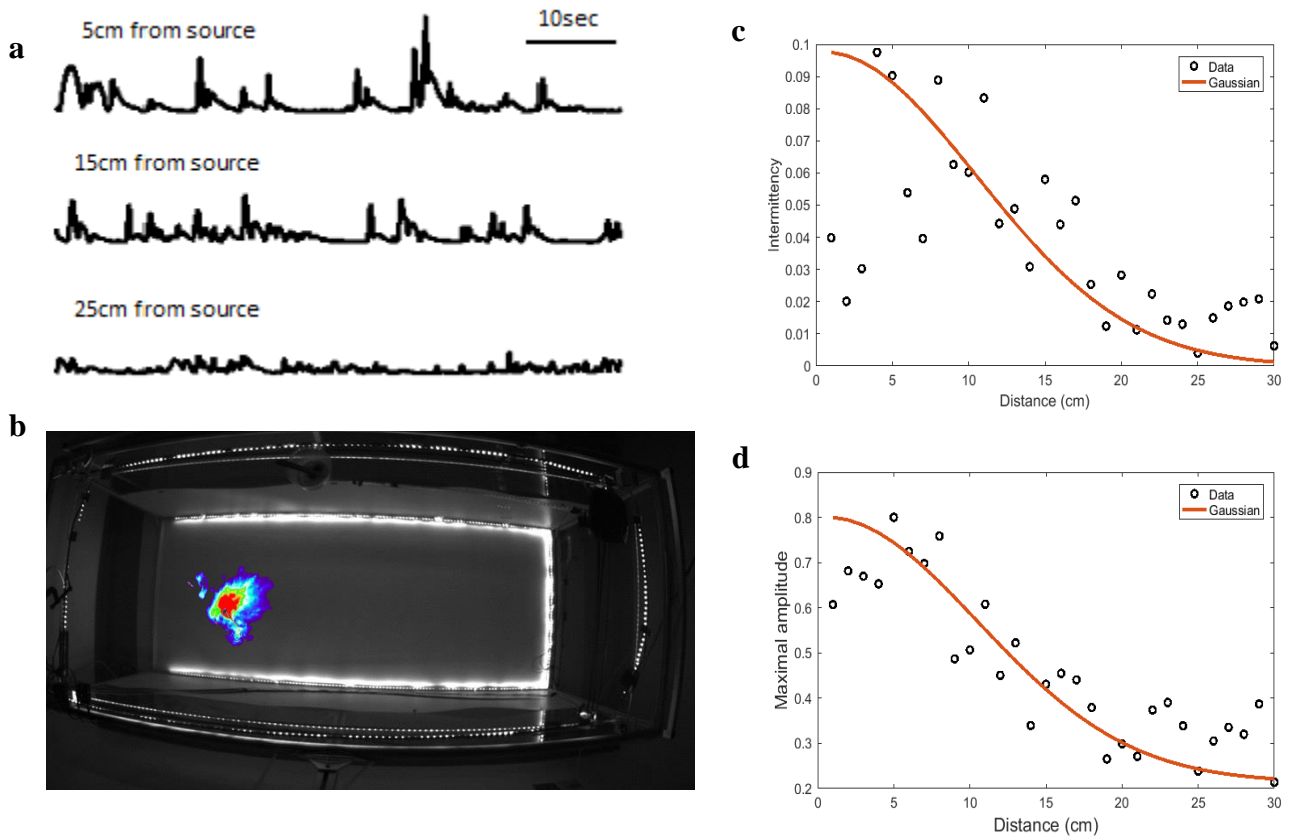
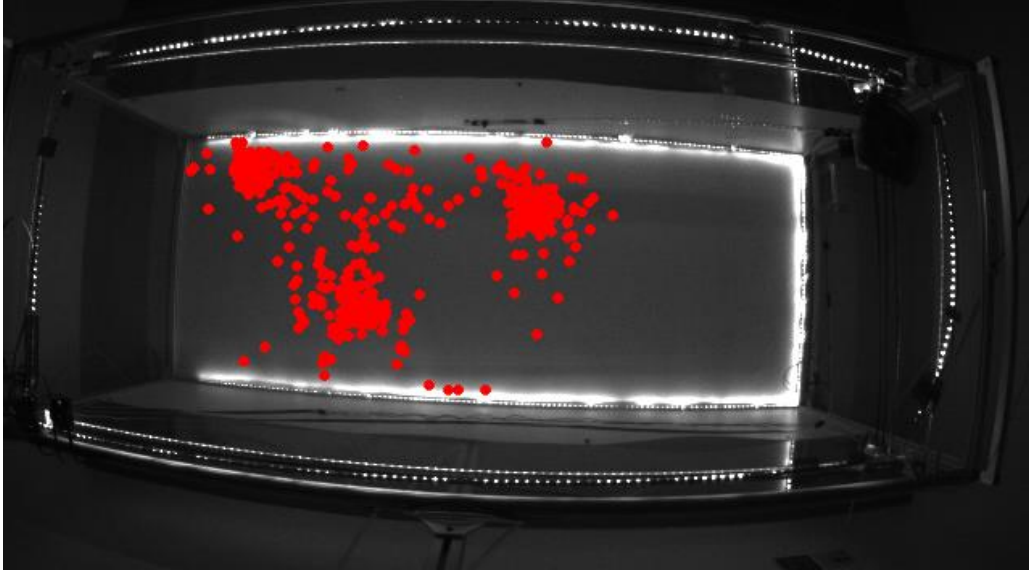


Figure 1 Sparse odor cues in an automated open-field arena. **(a)** Sparse odor signals acquired from an ethanol gas sensor in response to surface-deposited ethanol at the indicated distances. **(b)** Graphic detailing a turbulent odor plume by using a laser to scan the molecules emitted from a humidifier. **(c)** Ethanol odor intermittency as a function of distance between source and sensor. **(d)** Ethanol odor maximum amplitude as a function of distance between source and sensor.

a



b

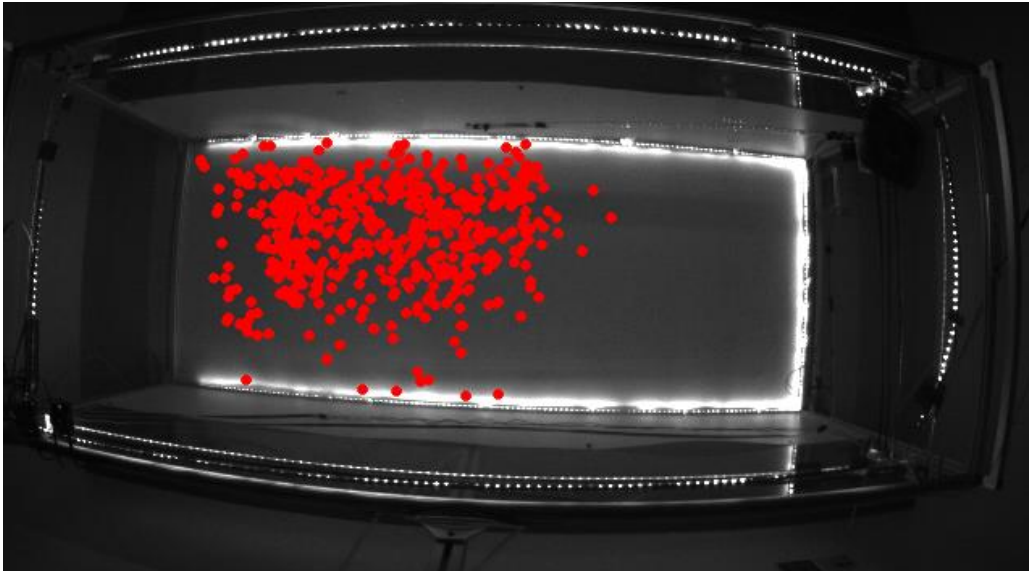


Figure 2 Odor-guided Foraging Task. **(a)** Representative pellet distribution from an animal trained on fixed pellet locations. **(b)** Representative pellet distribution from an animal trained on random pellet locations.

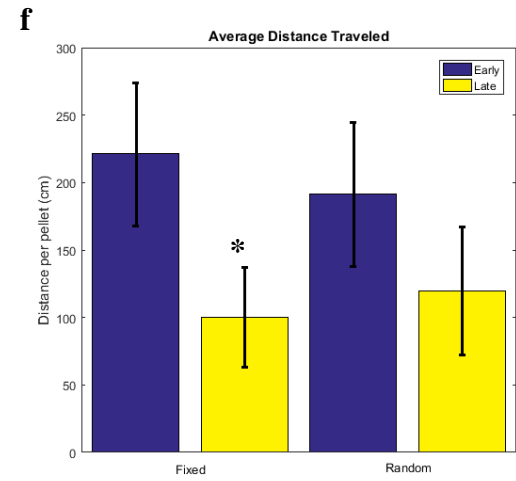
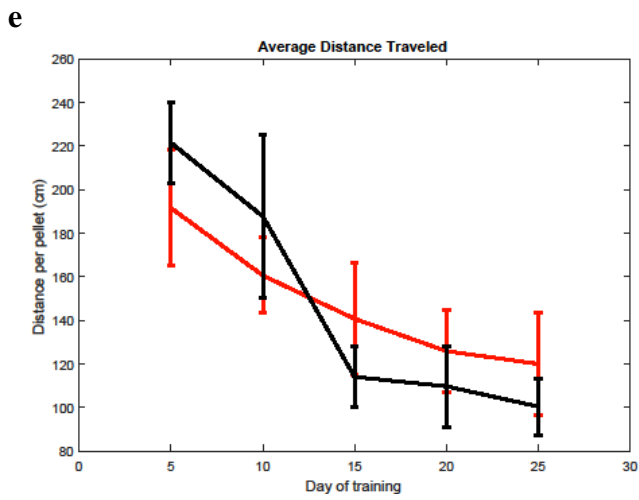
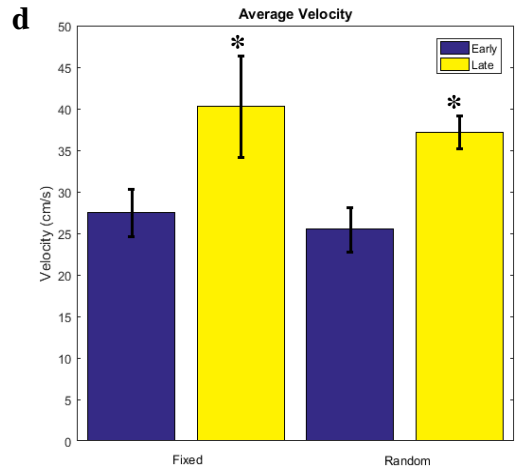
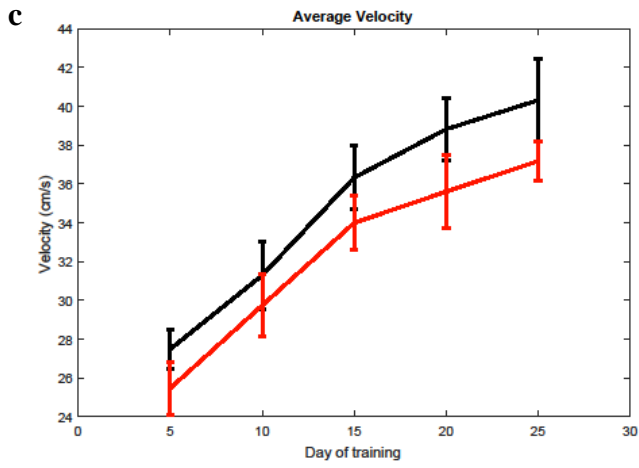
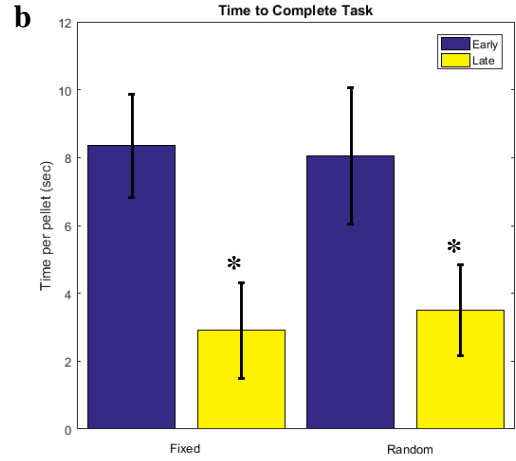
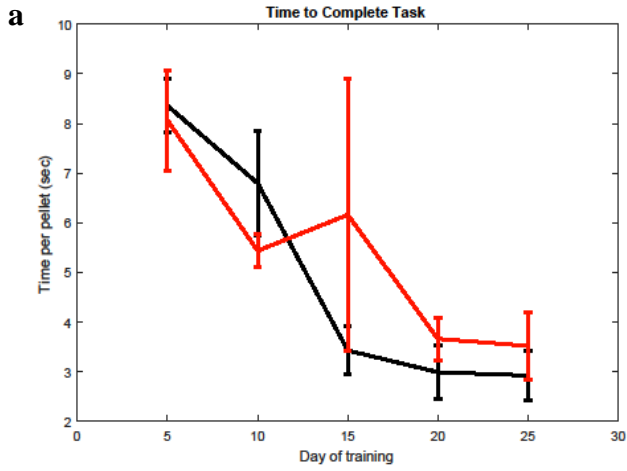
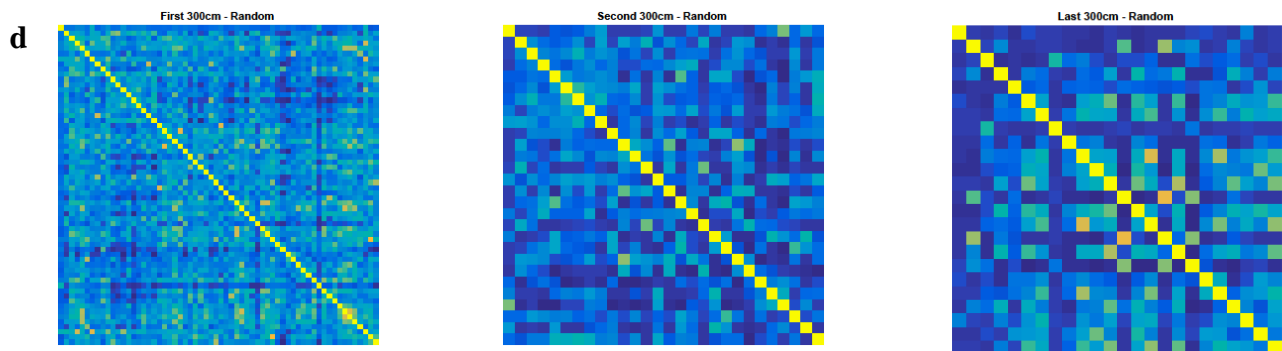
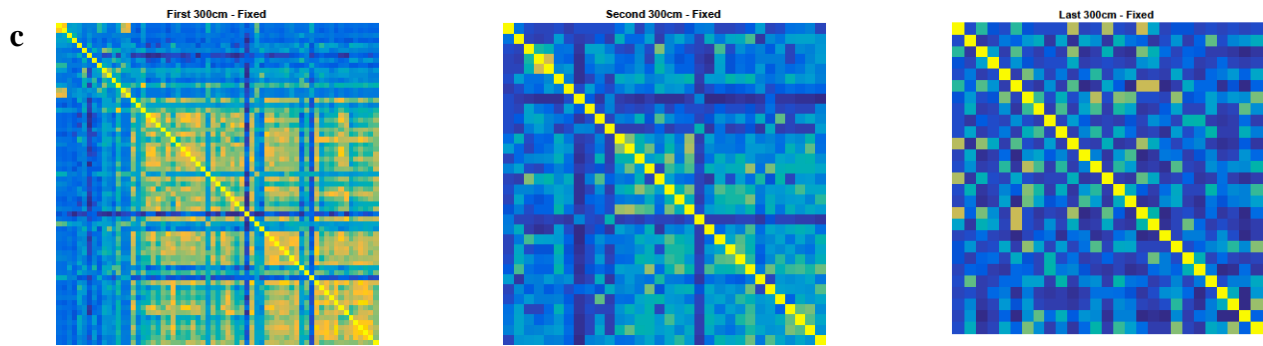
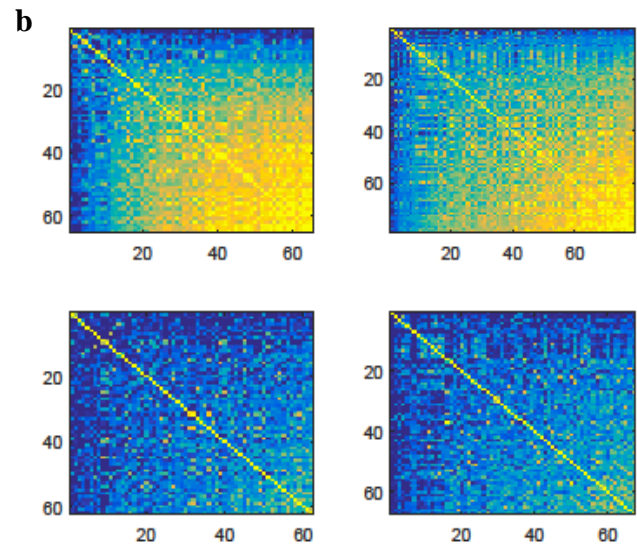
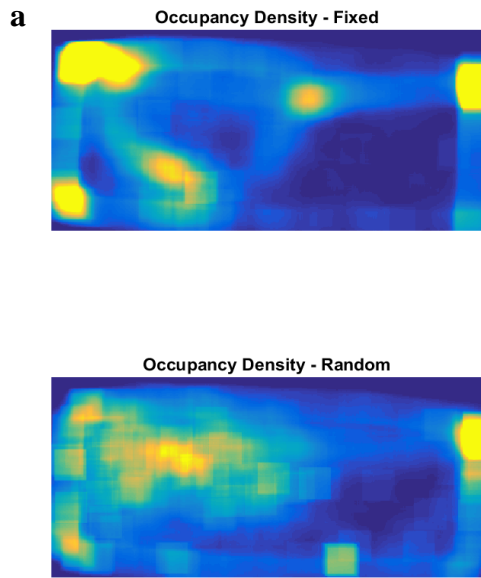


Figure 3 Performance of rats when trained on a limited number of food locations (fixed) or when trained on unpredictable food locations (random). **(a-b)** Animals trained on both fixed (black) and random (red) locations navigate more efficiently and procure pellets faster after overtraining. **(c-d)** Animals trained on both fixed and random locations travel faster while completing the foraging task. **(e-f)** Animals trained on the fixed locations travel less while navigating to procure pellets. Asterisks indicate significance at $p < 0.05$, Wilcoxon rank-sum test followed by False Discovery Rate test.



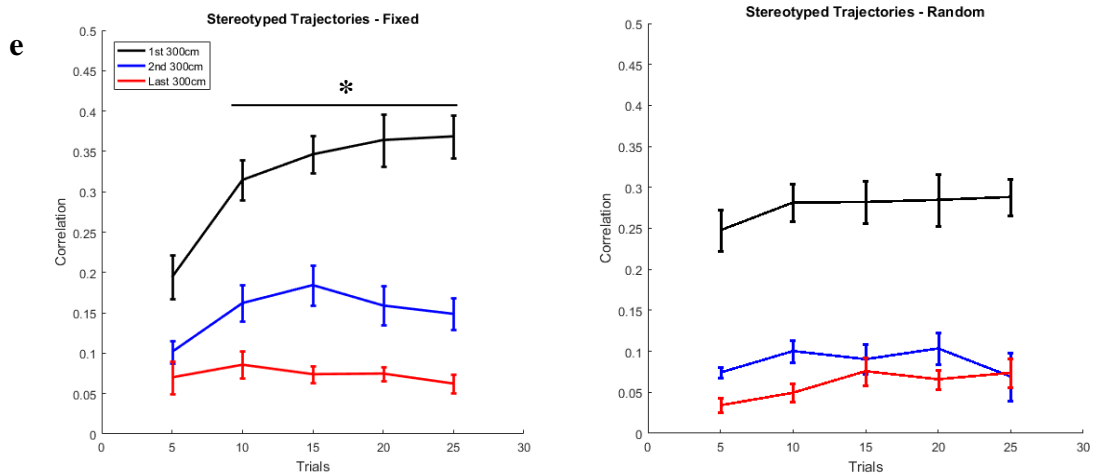


Figure 4 Trajectories throughout task. **(a)** Density plots for occupancy times throughout the arena for representative fixed (top) and random (bottom) animals. **(b)** Matrices of correlation coefficients for representative animal trajectories under fixed (top) and random (bottom) conditions. **(c-d)** Matrices of correlation coefficients for representative fixed (c) and random (d) animal trajectories during the first 300cm (left), second 300cm (center), and final 300cm (right) of their path. **(e)** Animals trained on fixed distributions (left) significantly increased the frequency of stereotyped trajectories during the first 300cm. Asterisks indicate significance at $p < 0.05$, Wilcoxon rank-sum test followed by False Discovery Rate test.

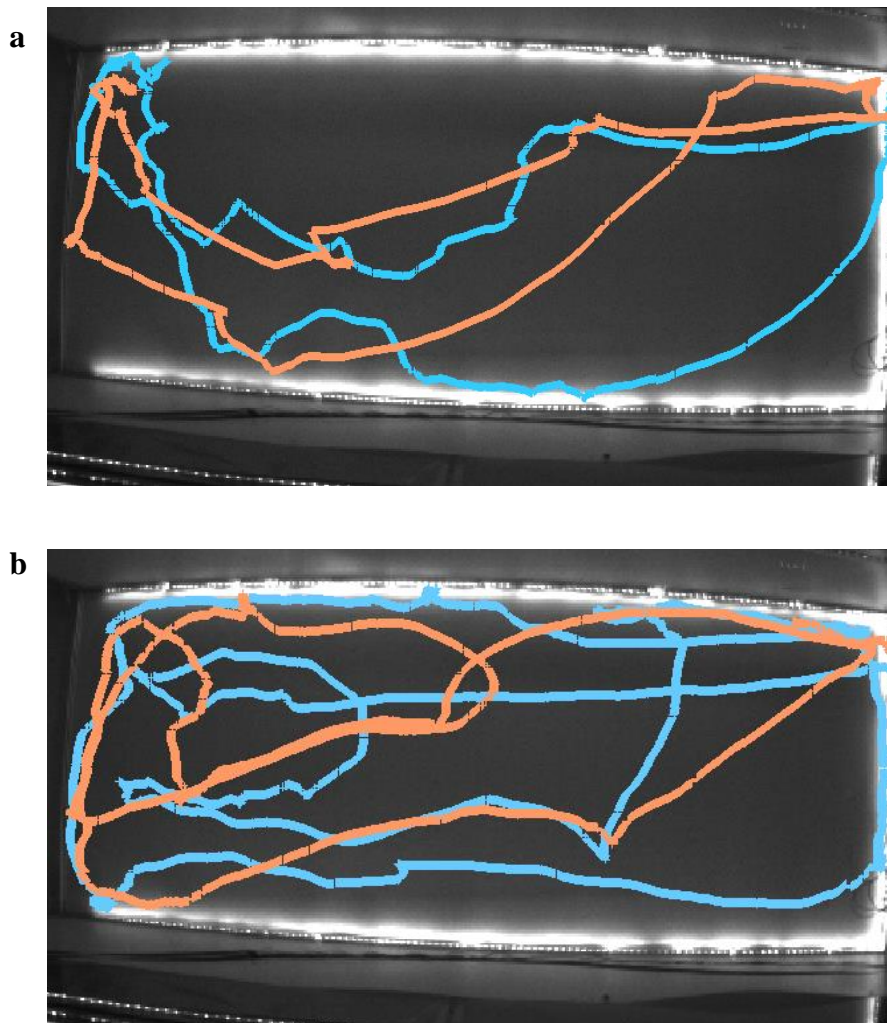


Figure 5 Representative trajectories of animals during blank trials where no pellets were available. **(a)** Animals trained on the same fixed distribution had overlapping trajectories during the blank trial. **(b)** Animals trained on the same random distribution did not have overlapping trajectories.

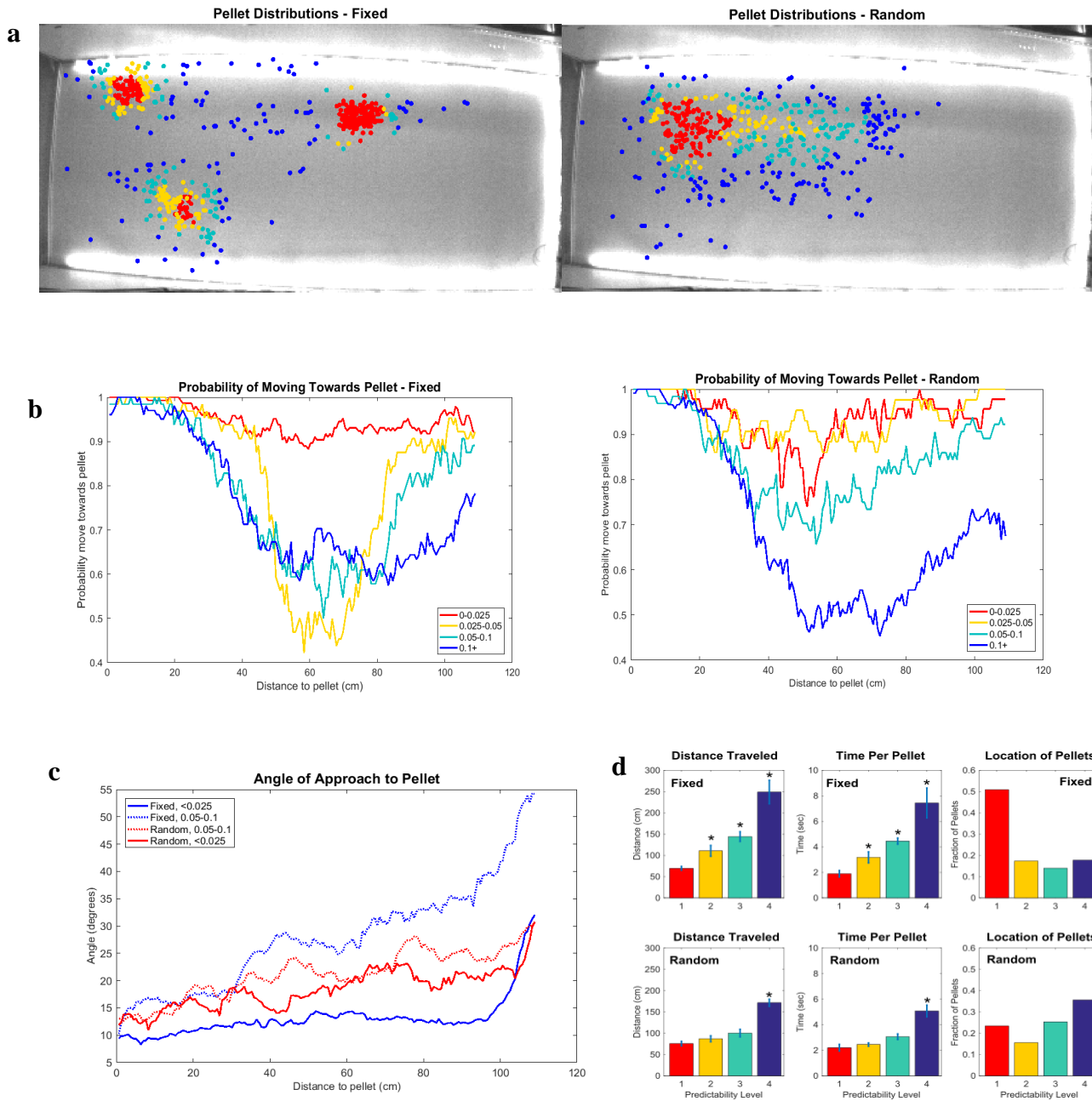


Figure 6 Approaches to pellet locations. **(a)** Pellet distributions based on predictability for fixed (left) and random (right) rats. **(b)** Probability of moving towards a pellet as a function of distance from the pellet for fixed (left) and random (right) rats. **(c)** Angle of approach towards pellets based on predictability levels. **(d)** Average distance traveled and time per pellet as function of predictability levels. Asterisks indicate significance at $p < 0.5$, multi-factor ANOVA test.

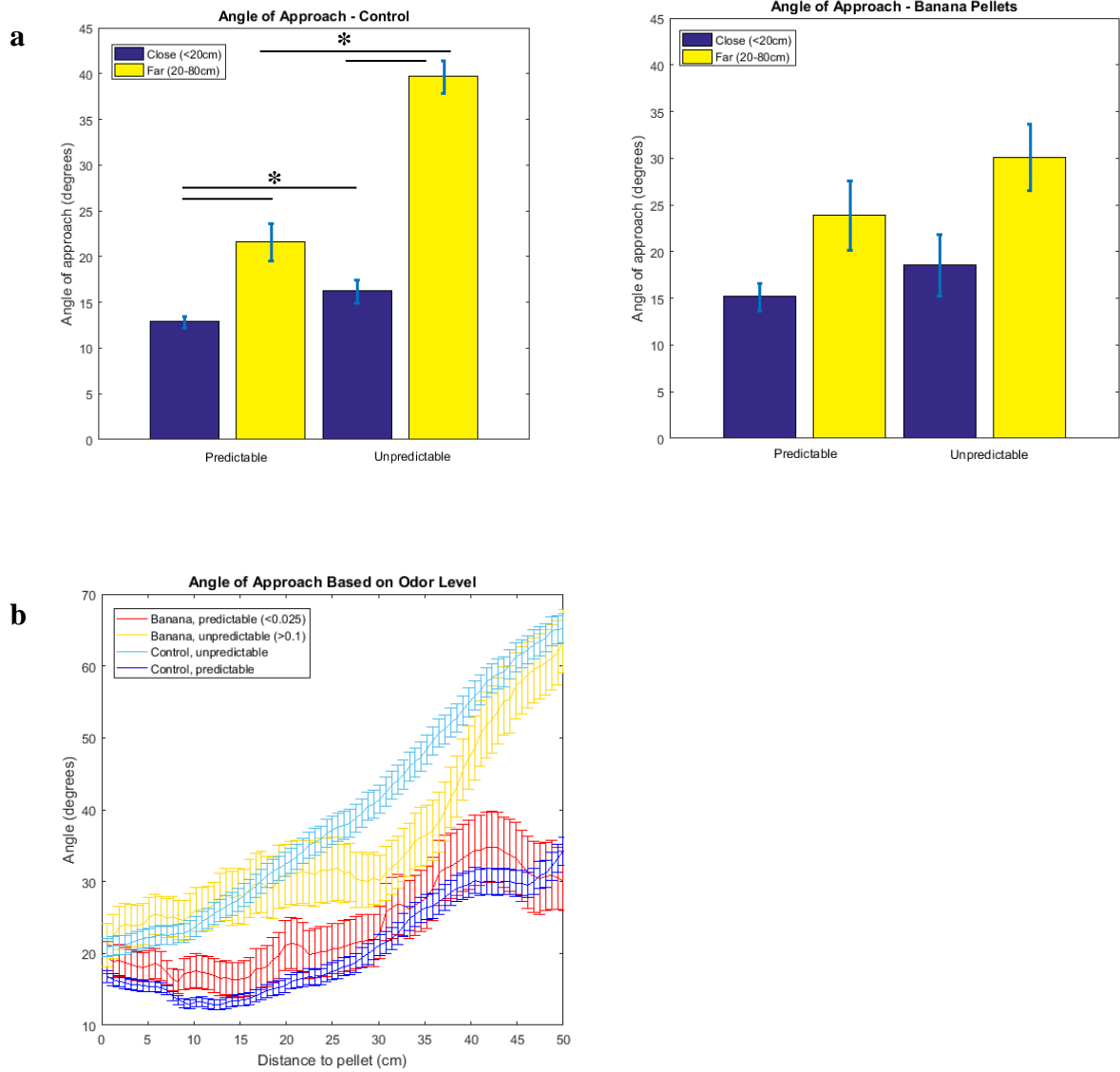


Figure 7 Foraging for banana-scented pellets. **(a)** Angle of approach towards regular sucrose pellets (left) and banana-scented sucrose pellets (right). **(b)** Using banana-scented pellets positively impacted search from far distances when navigating to pellets in unpredictable locations. Asterisks indicate significance at $p < 0.05$, multi-factor ANOVA test.