Exploration reduces prefrontal target selectivity, but enhances learning in network states and behavior

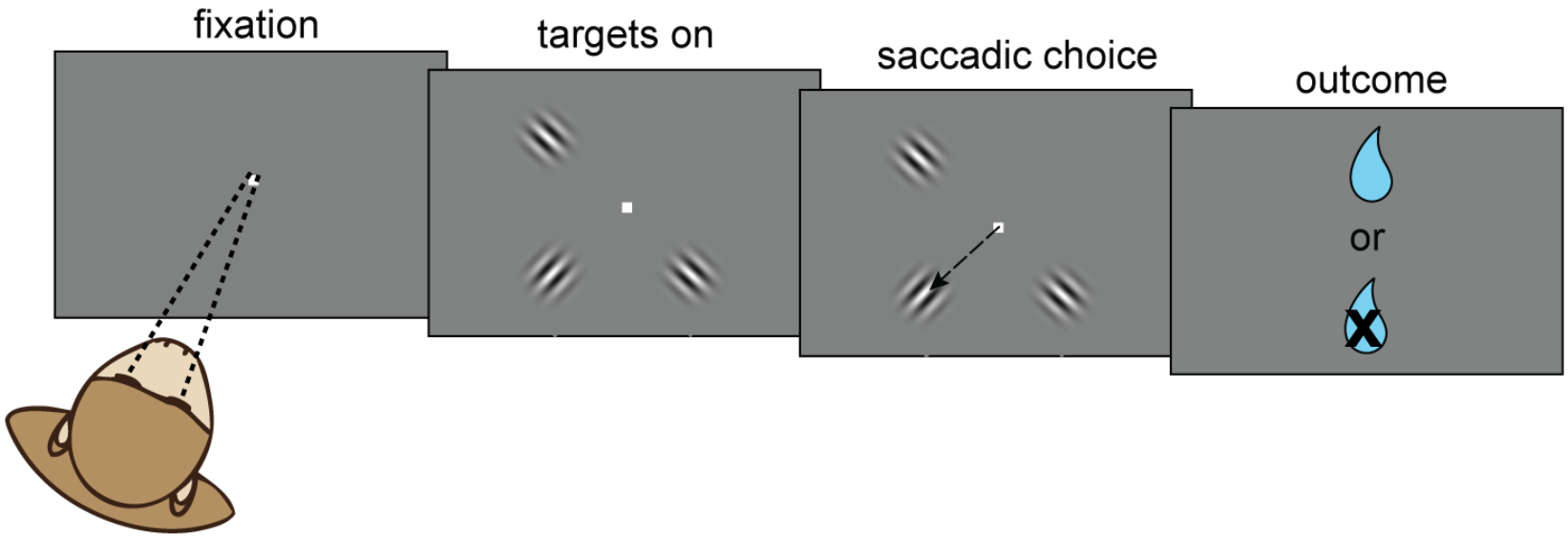
Becket Ebitz

Moore Lab

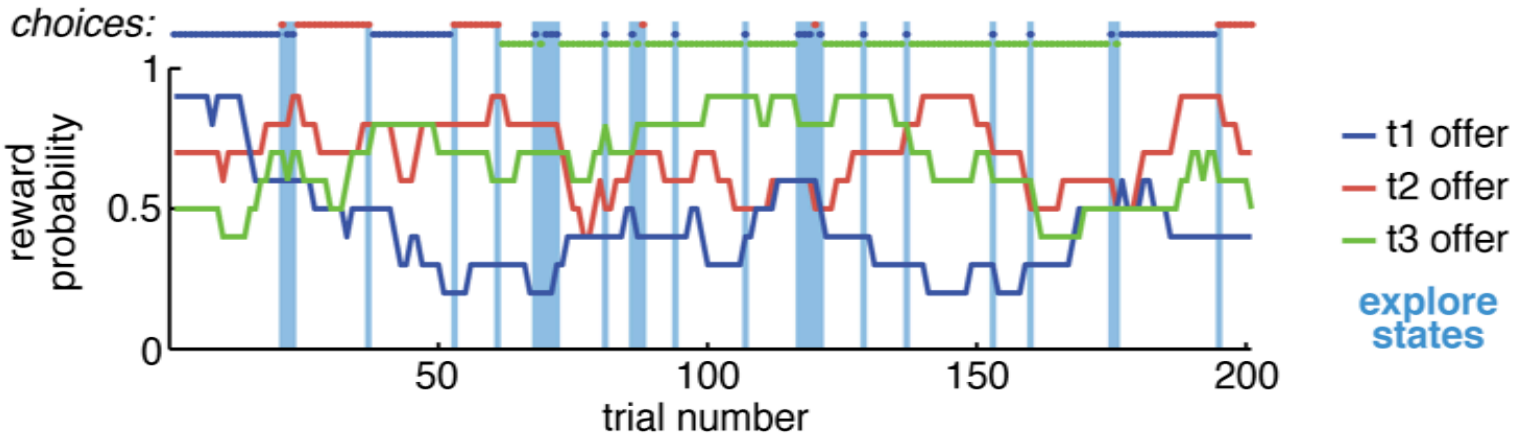
exploit ***explore***

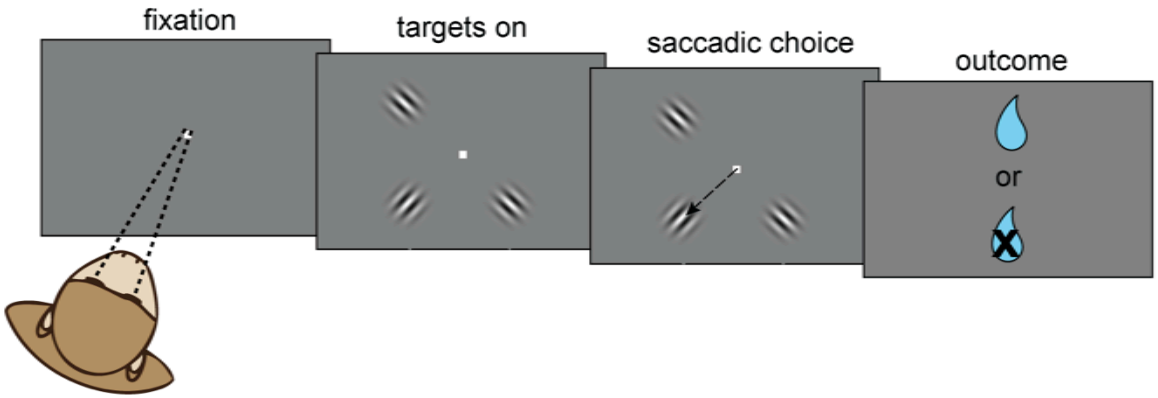
Different states?

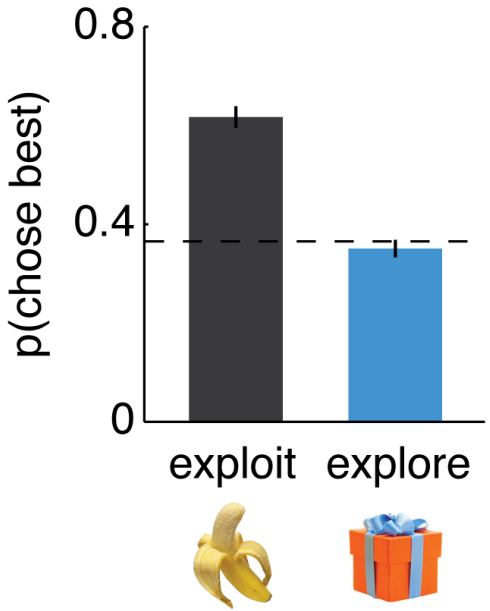
Three-armed bandit task:



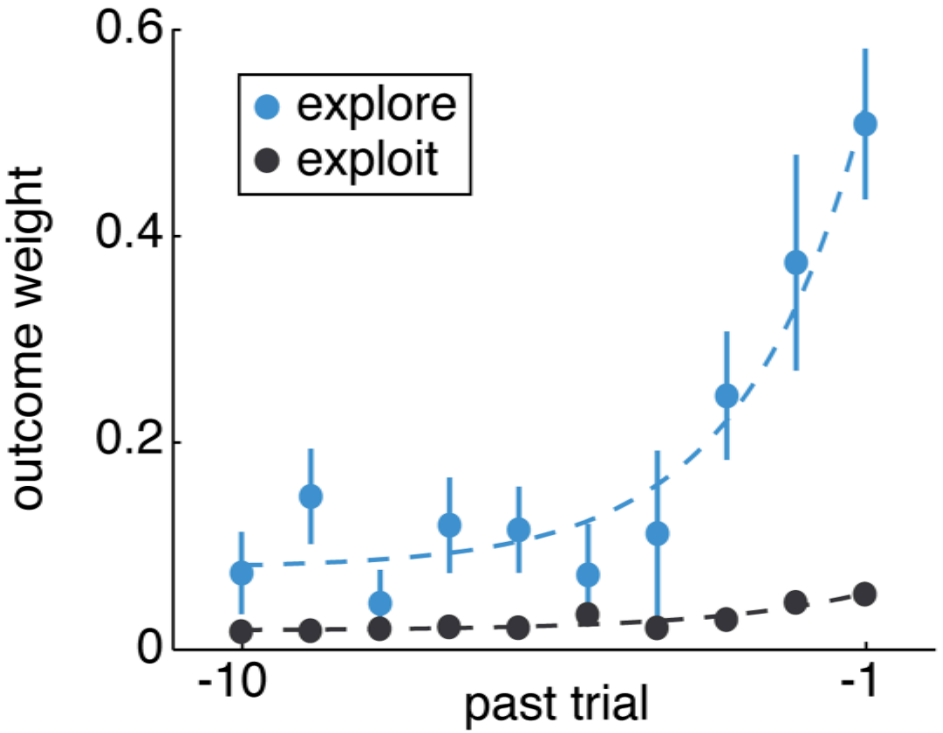
Reward schedule:



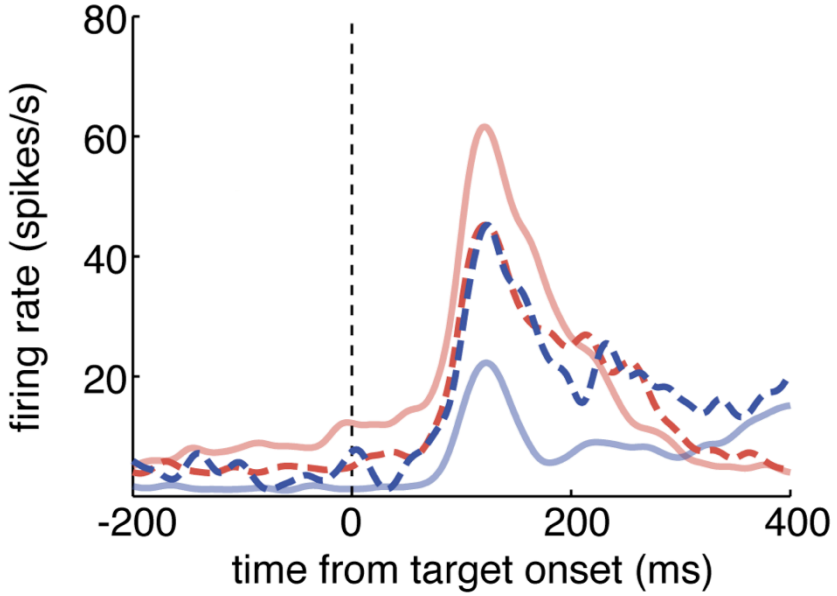


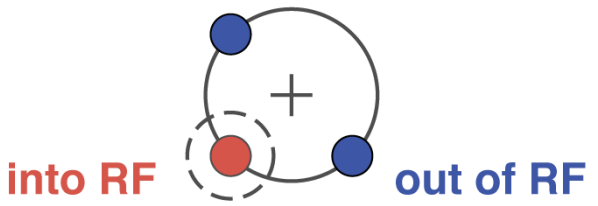


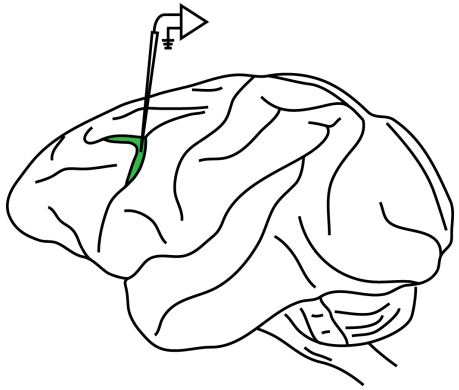
Increased reward learning during exploration:



How are explore states implemented?



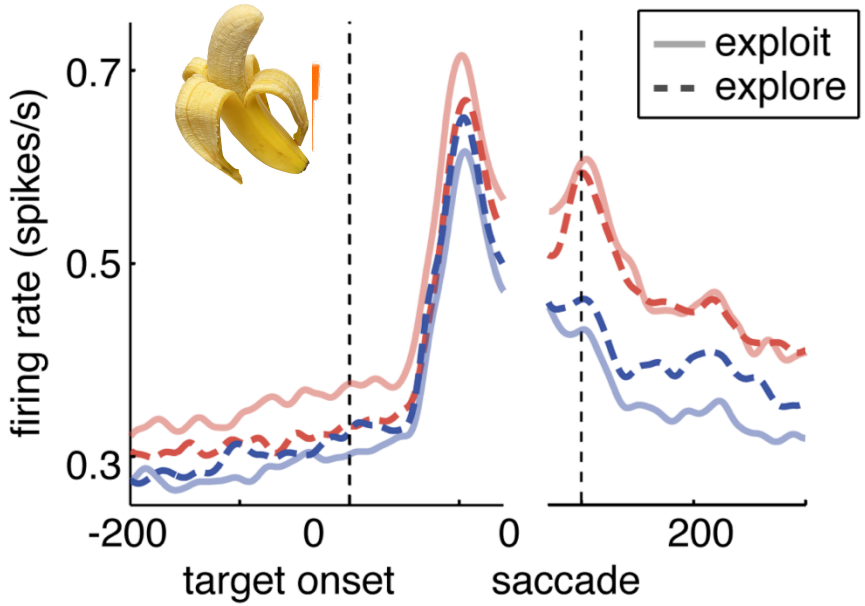


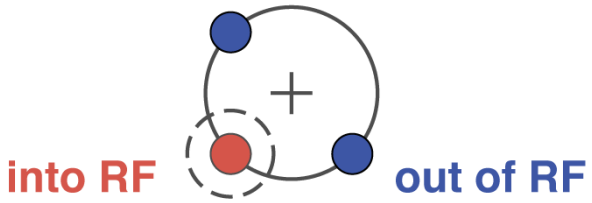


Increased target selectivity?

Reduced target selectivity!

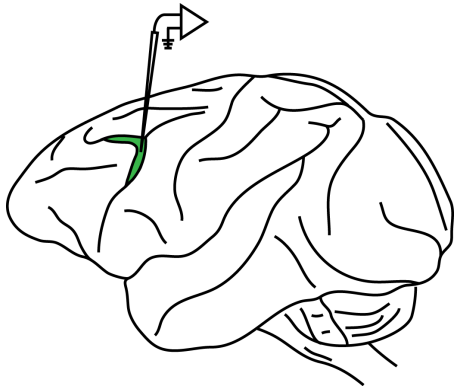
How are explore states implemented?



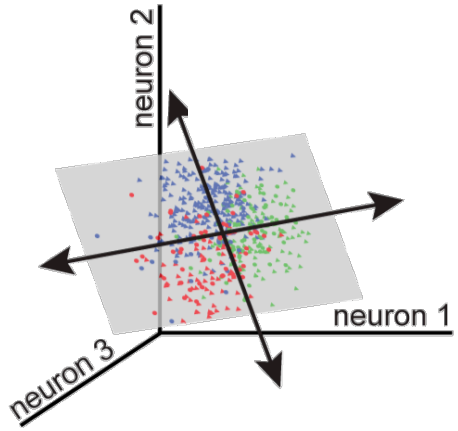


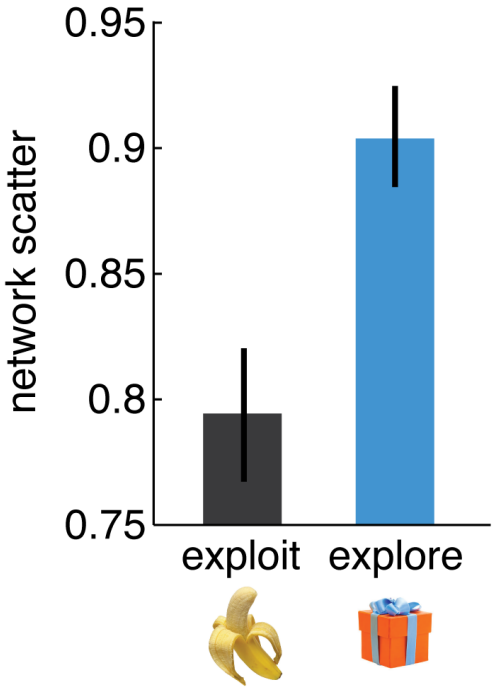
Increased target selectivity?

Reduced target selectivity!



A single-trial measure of the network's choice-predictive state:





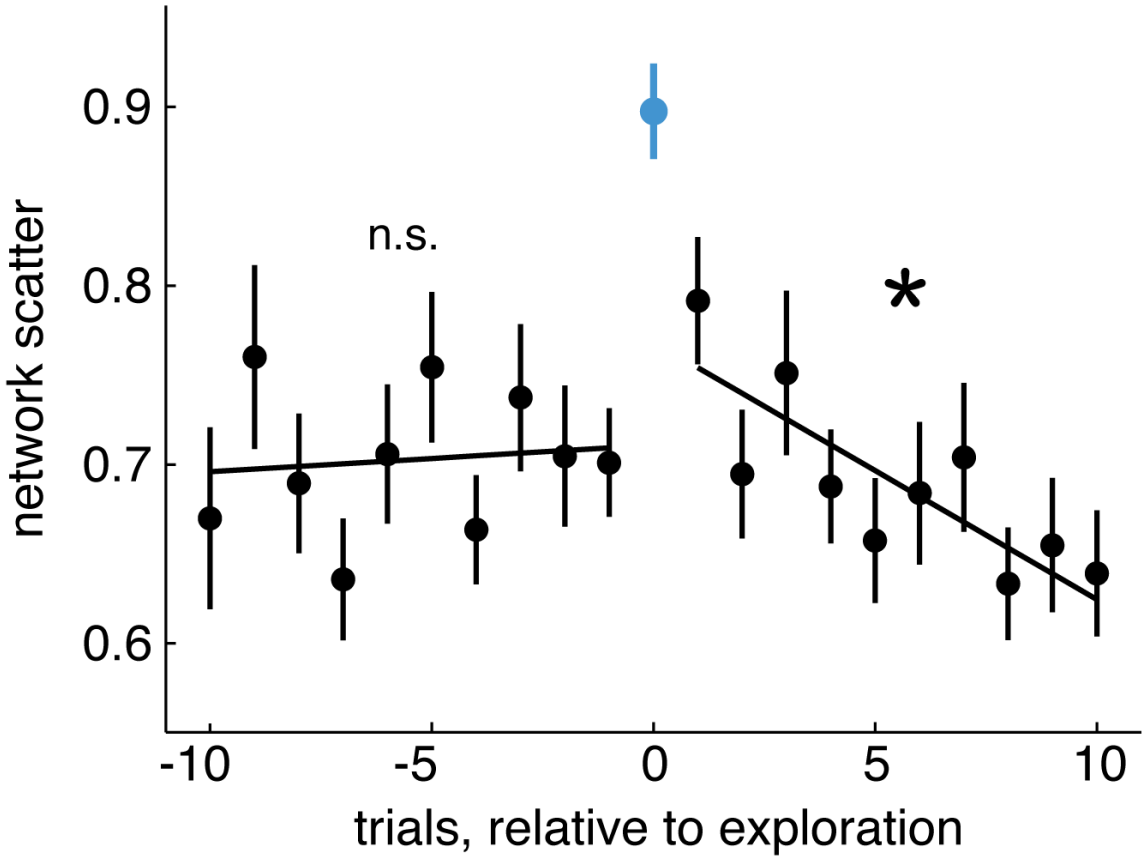
scatter = 1

disorganized network state

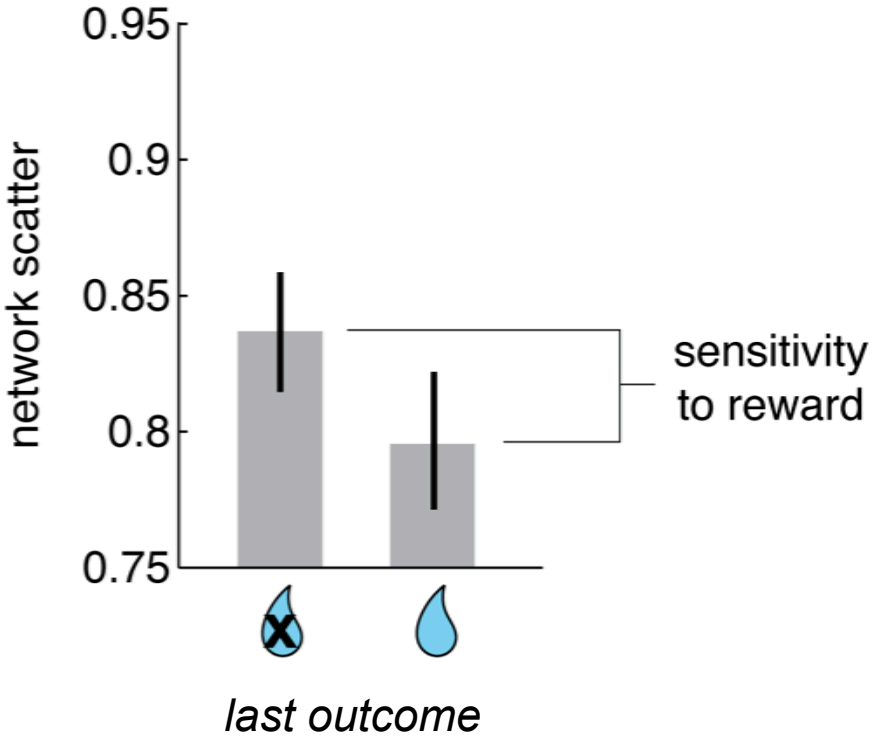
scatter < 1

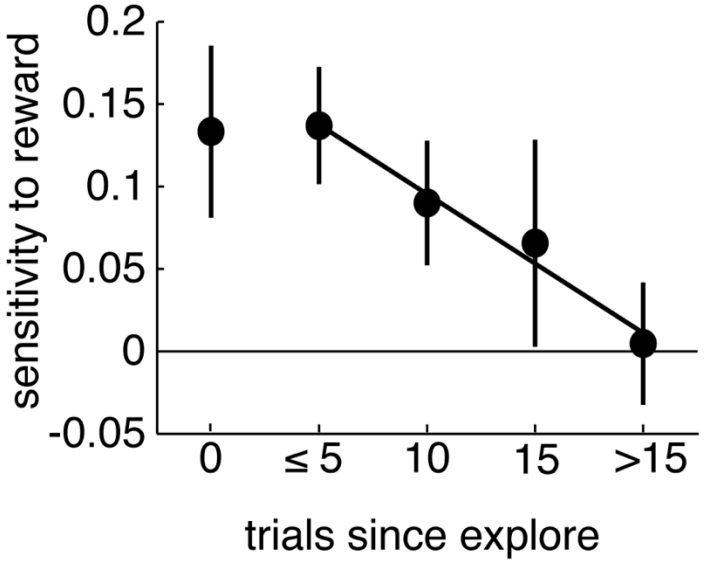
choice-predictive network state

Sudden transition into exploration,



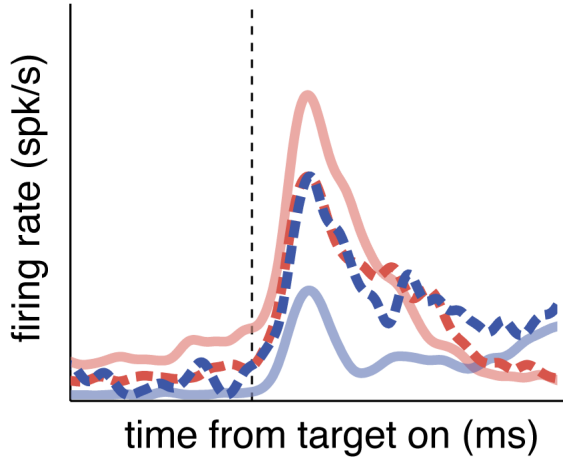
Rewards decrease network scatter



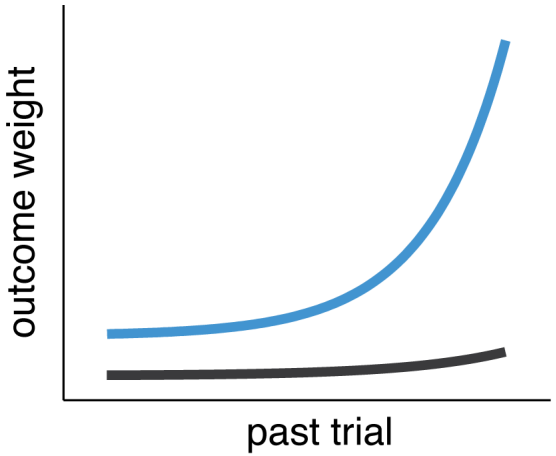


Exploration:

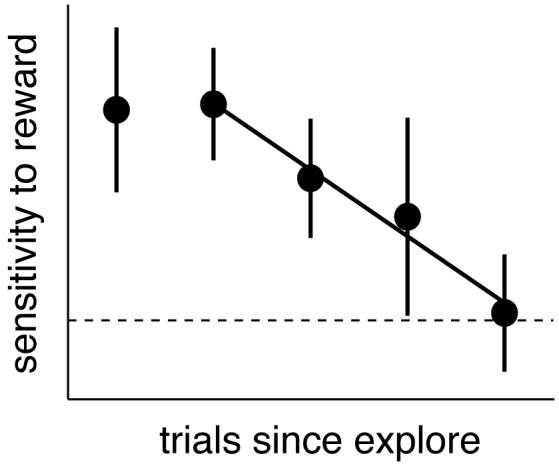
reduced target selectivity:



increased reward learning:



increased network sensitivity to rewards:



Thanks!

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Buschman lab
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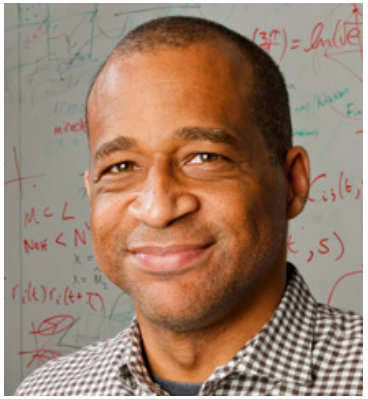

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NIH National Eye Institute