

# Steady-state percept durations in bistable auditory stream segregation predict buildup dynamics

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# Auditory streaming

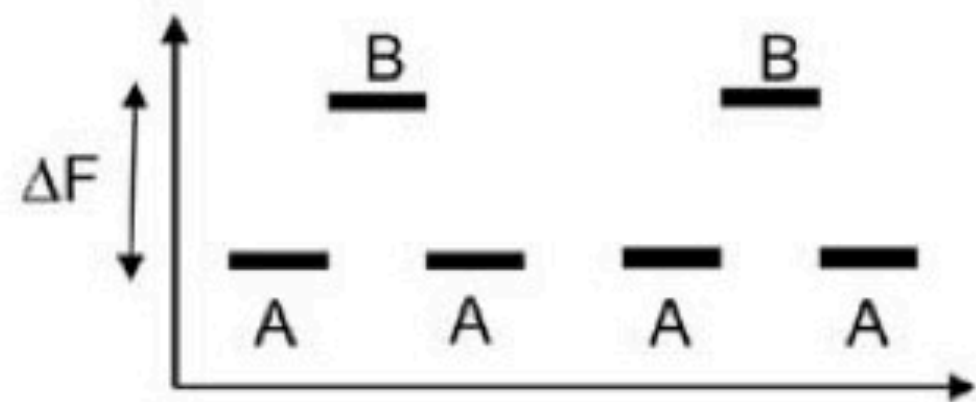
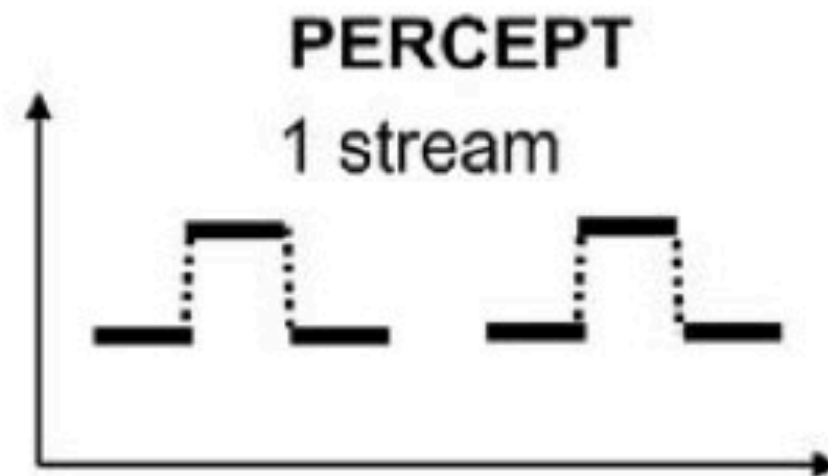
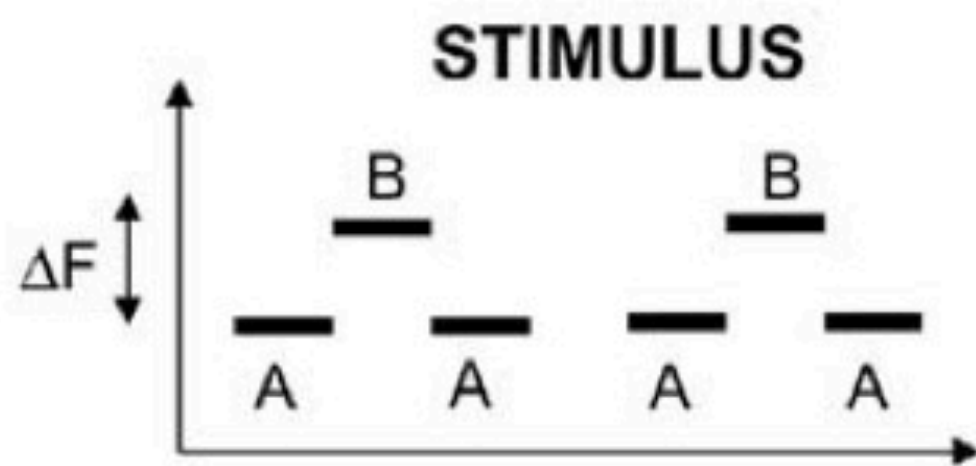
- sound source identification
- easier when different sound objects have different features, especially frequency content
- there is not always one solution

Opera Cat

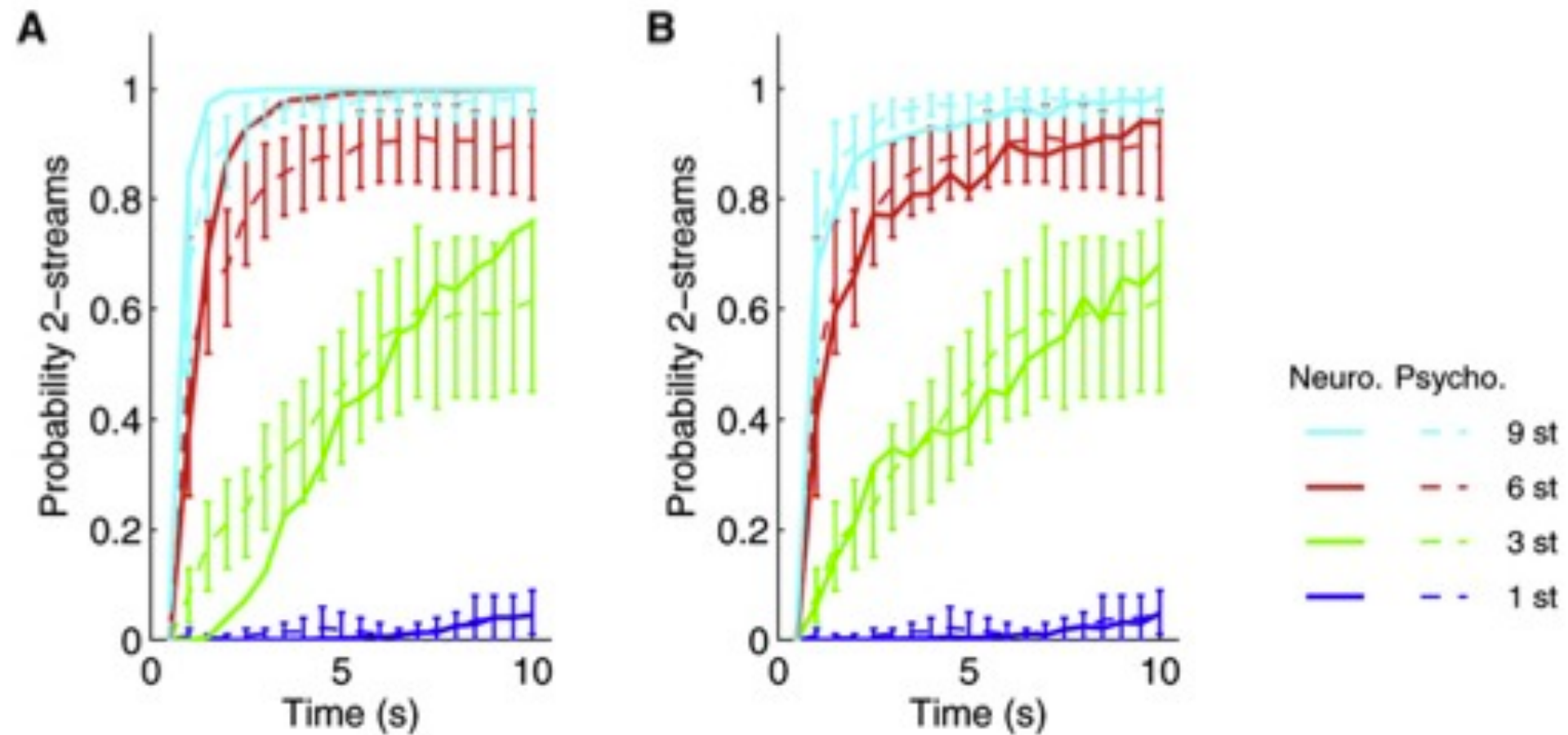
Singing with  
passion

more awesome pictures at [THEMETAPICTURE.COM](http://THEMETAPICTURE.COM)

# Bistability: Horse-Morse



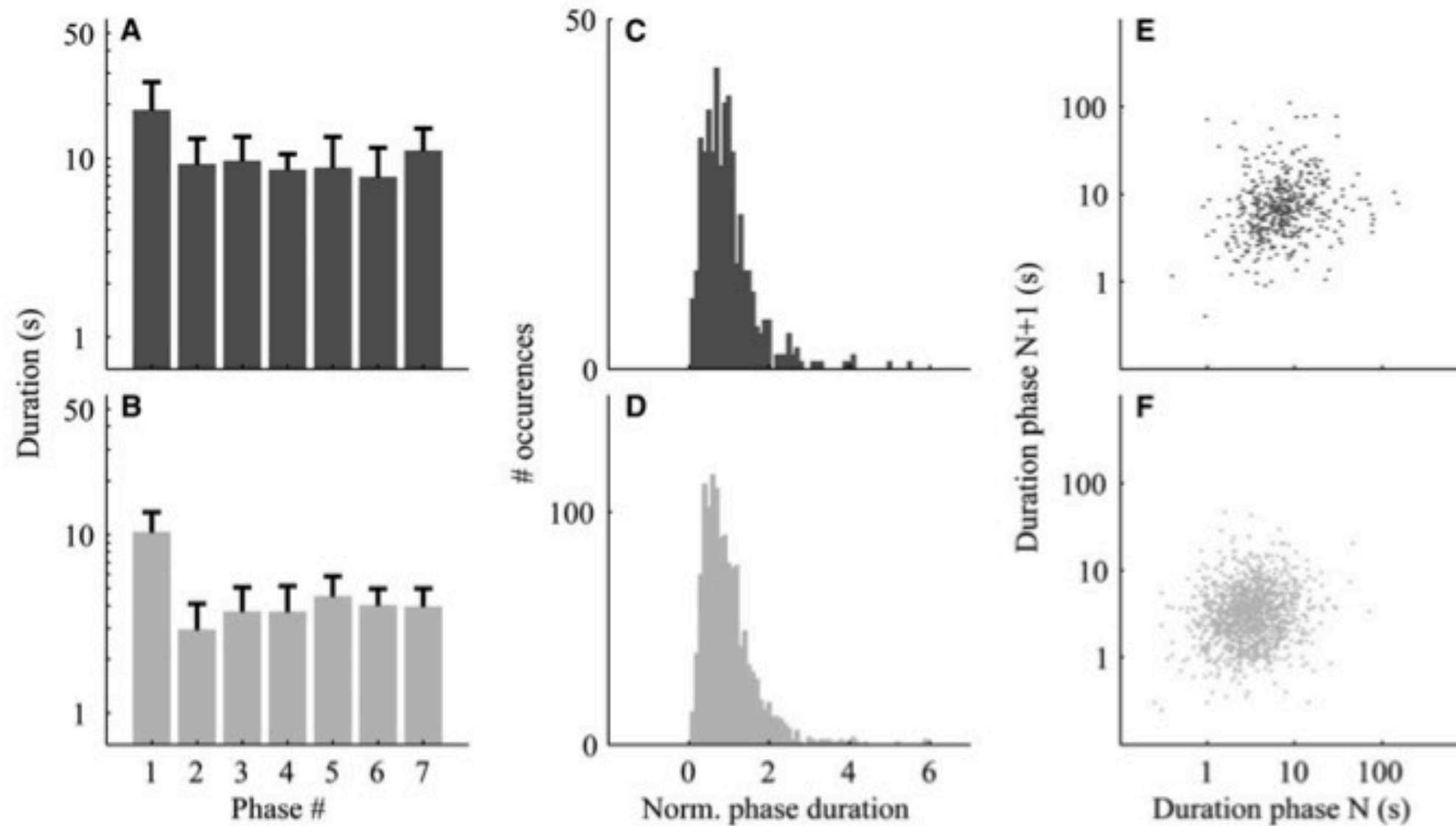
# Buildup



Pressnitzer et al 2008

# Dominance Durations

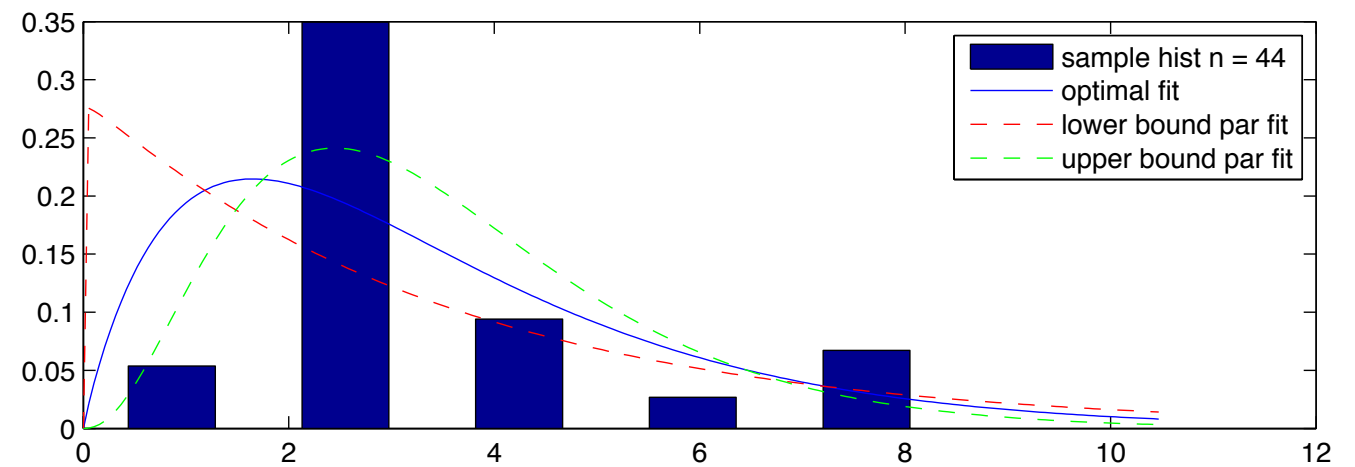
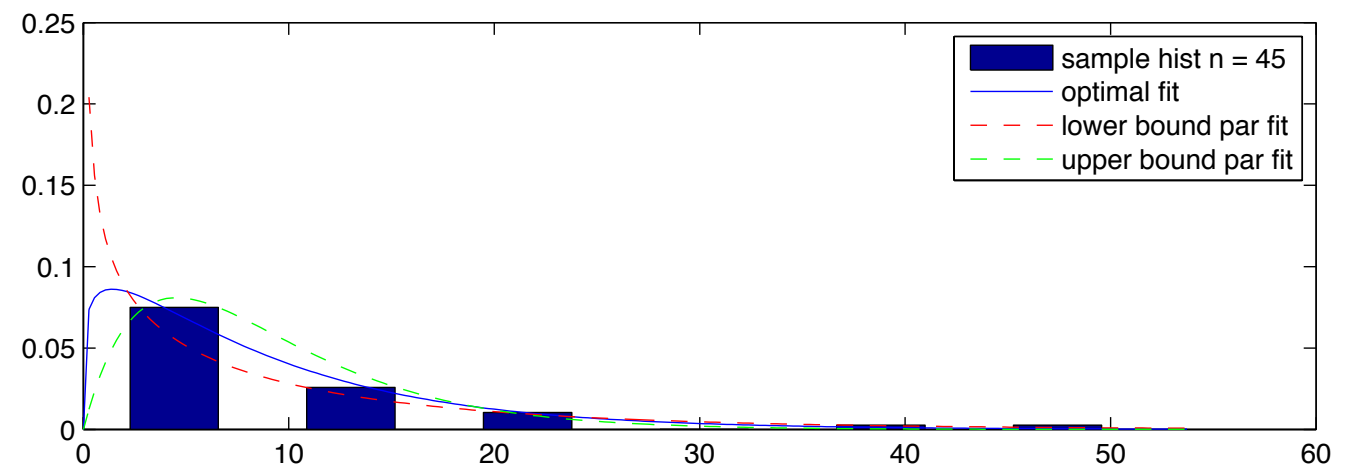
- Follow a gamma or lognormal distribution
- Could lead to buildup, if first epoch is lawfully set to “coherent percept”



Pressnitzer & Hupe (2006)

# MLE fits to data

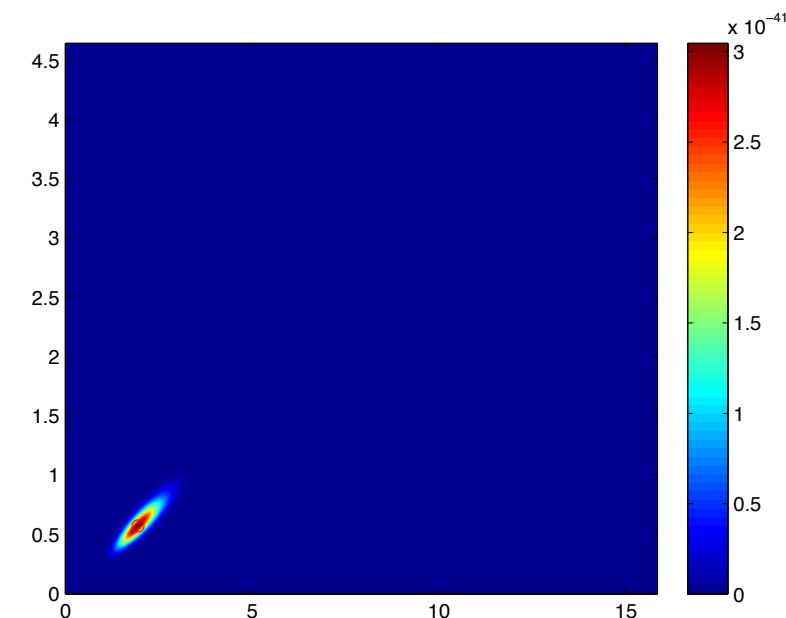
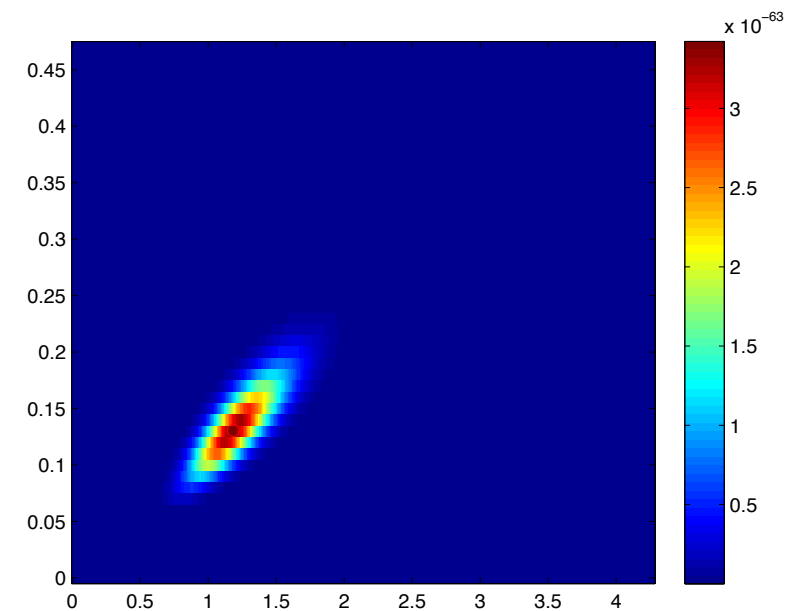
- **Maximum Likelihood Estimation**





# Confidence tests for MLE

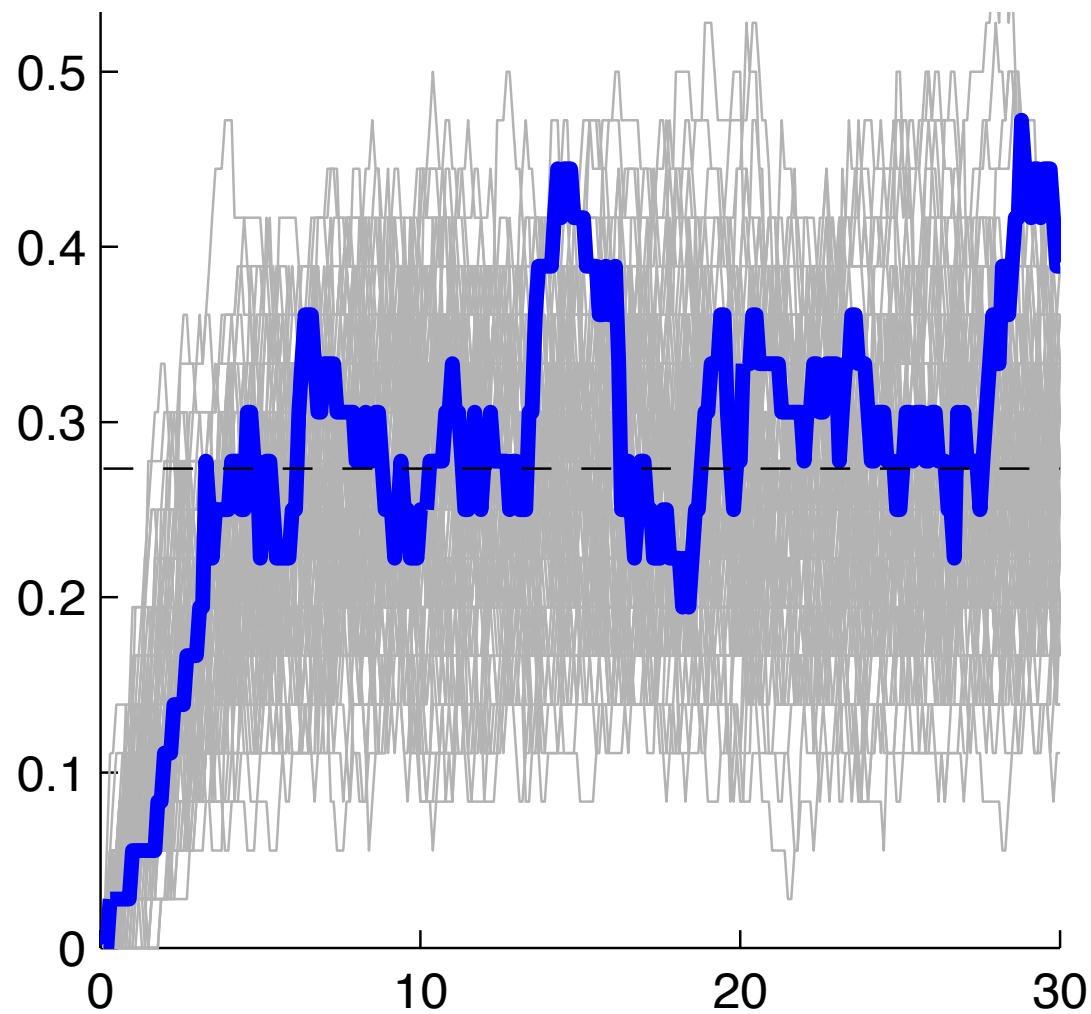
- plot likelihoods for every point in parameter space and see if it's shallow or sharp



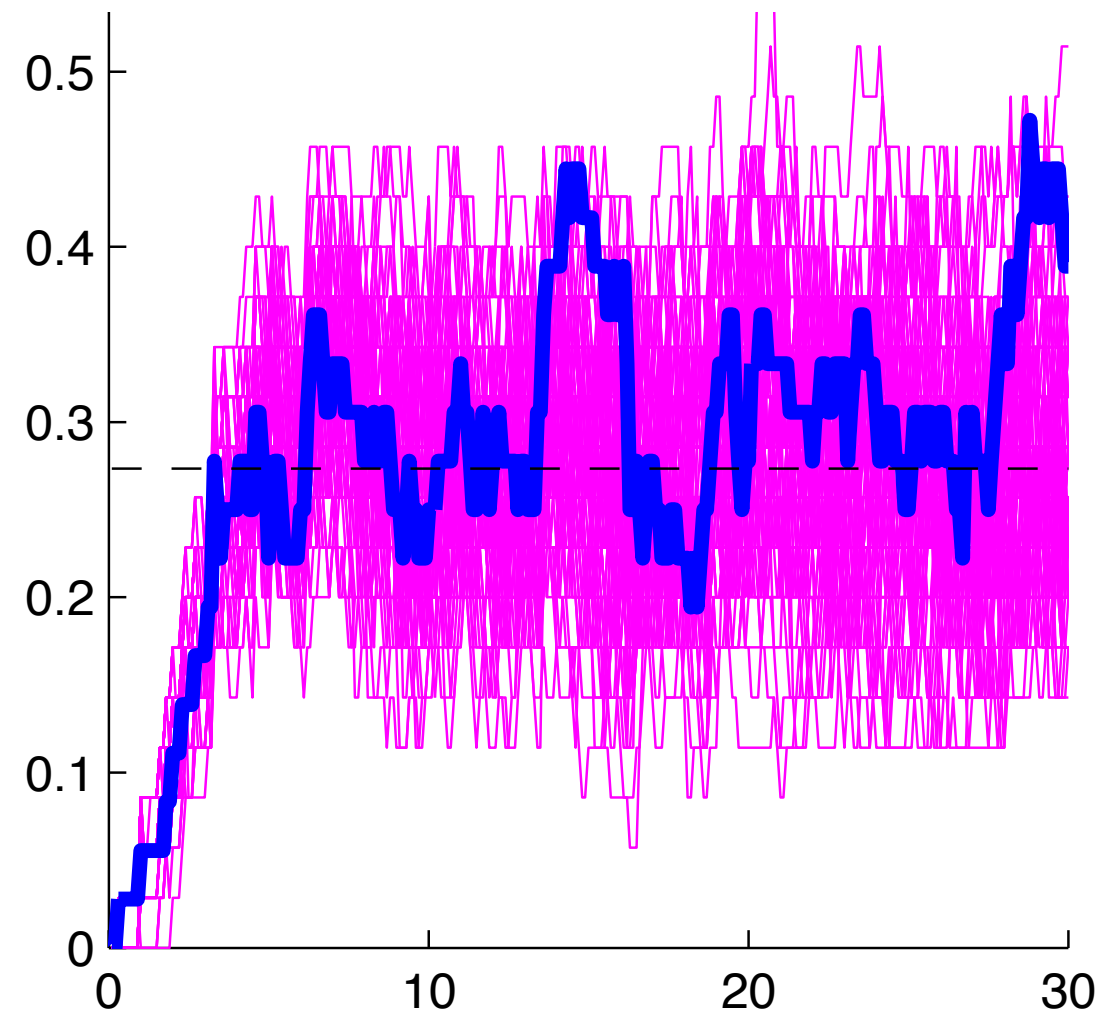
# Construct empirical buildup functions

- $P(P(t)=\text{segregated} | P(t=0)=\text{integrated})$
- “switch triggered average” excluding first percept duration

# buildup fxn from data

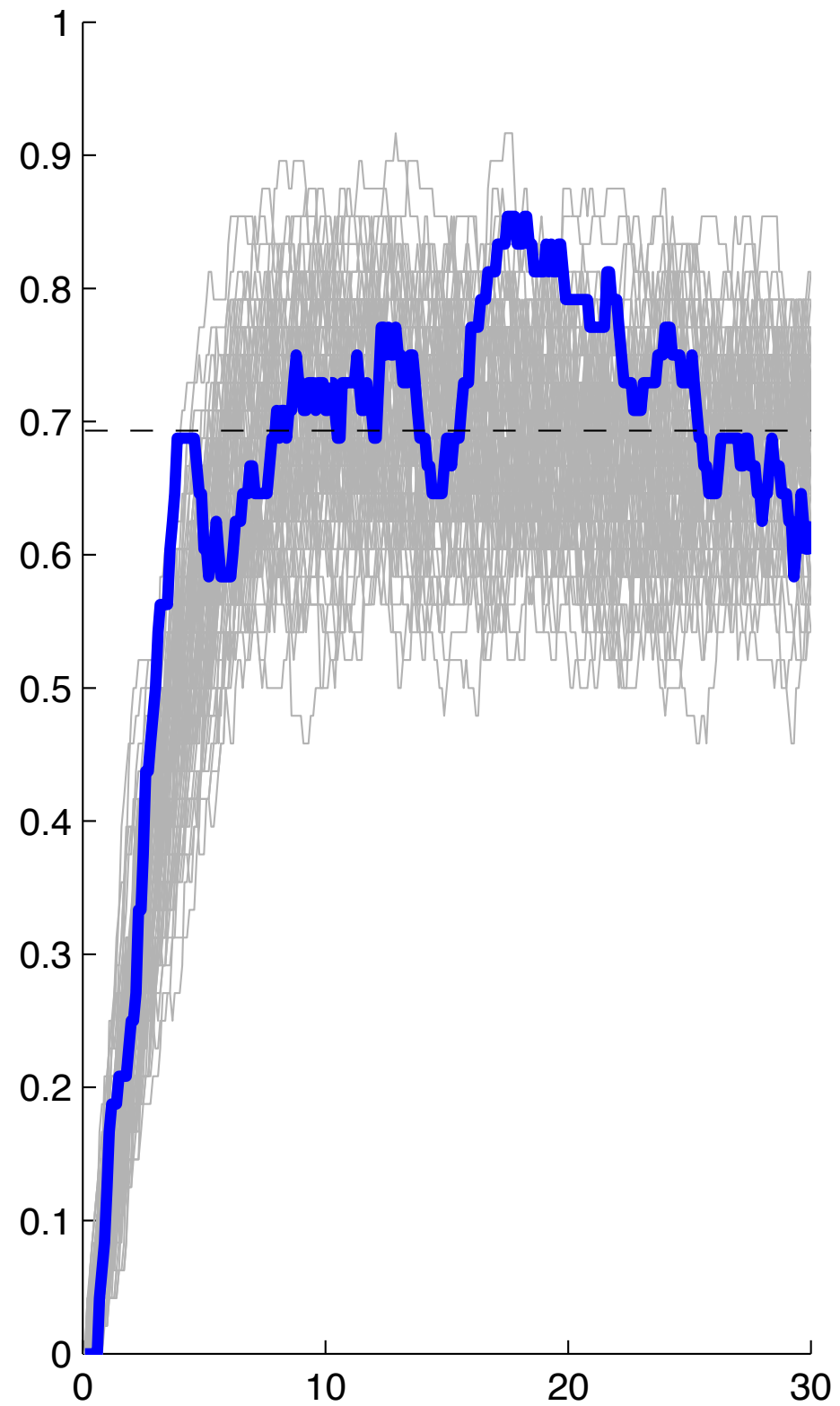


simulated

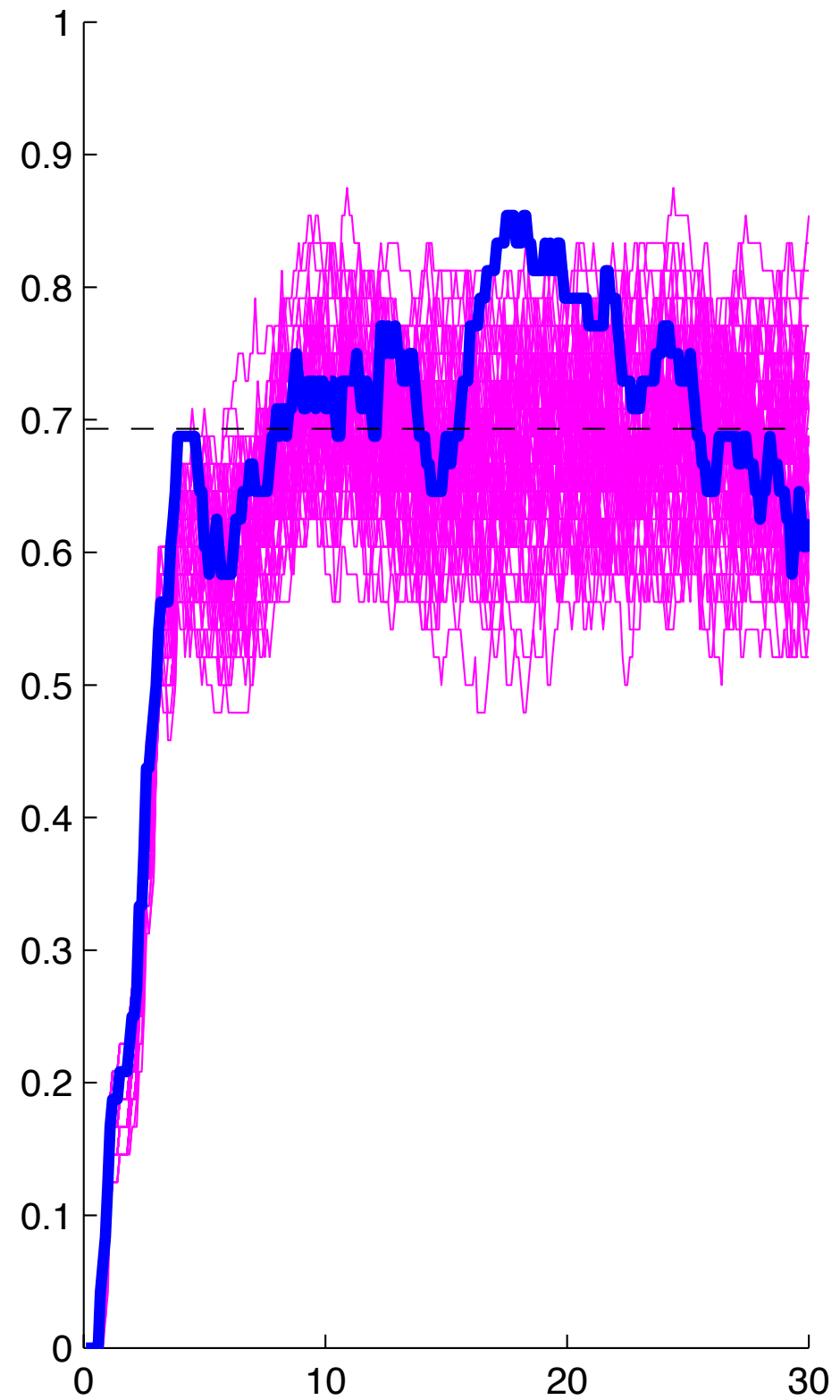


scrambled

100 simulated BUFs 48windows



100 scrambled BUFs



# Why does buildup occur?

- competition between neural populations
- neuromorphic function- set a threshold for differential activation by the two tones, one at BF neuron and another at BF +/- dF
- Adaptation based models should predict dependencies?

# Future work

- Mutual inhibition model simulations- test distributions of dominance durations and check for correlations
- Incorporate first duration into our model

- Auditory bistable percepts have been used to investigate stream segregation (van Noorden 1975). The characteristic dynamics of the perceptual time course leading to increased segregation over time is called buildup, and is typically observed over many trials.