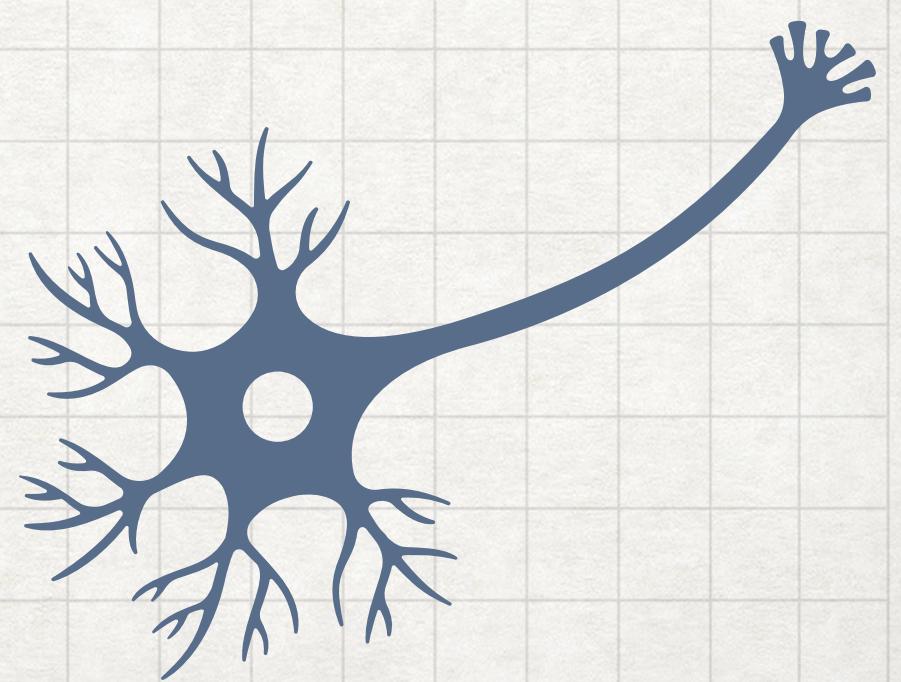


# BCS207

# CONFIRMATION BIAS

Leslie Li  
Team Haefner  
5/1/2019



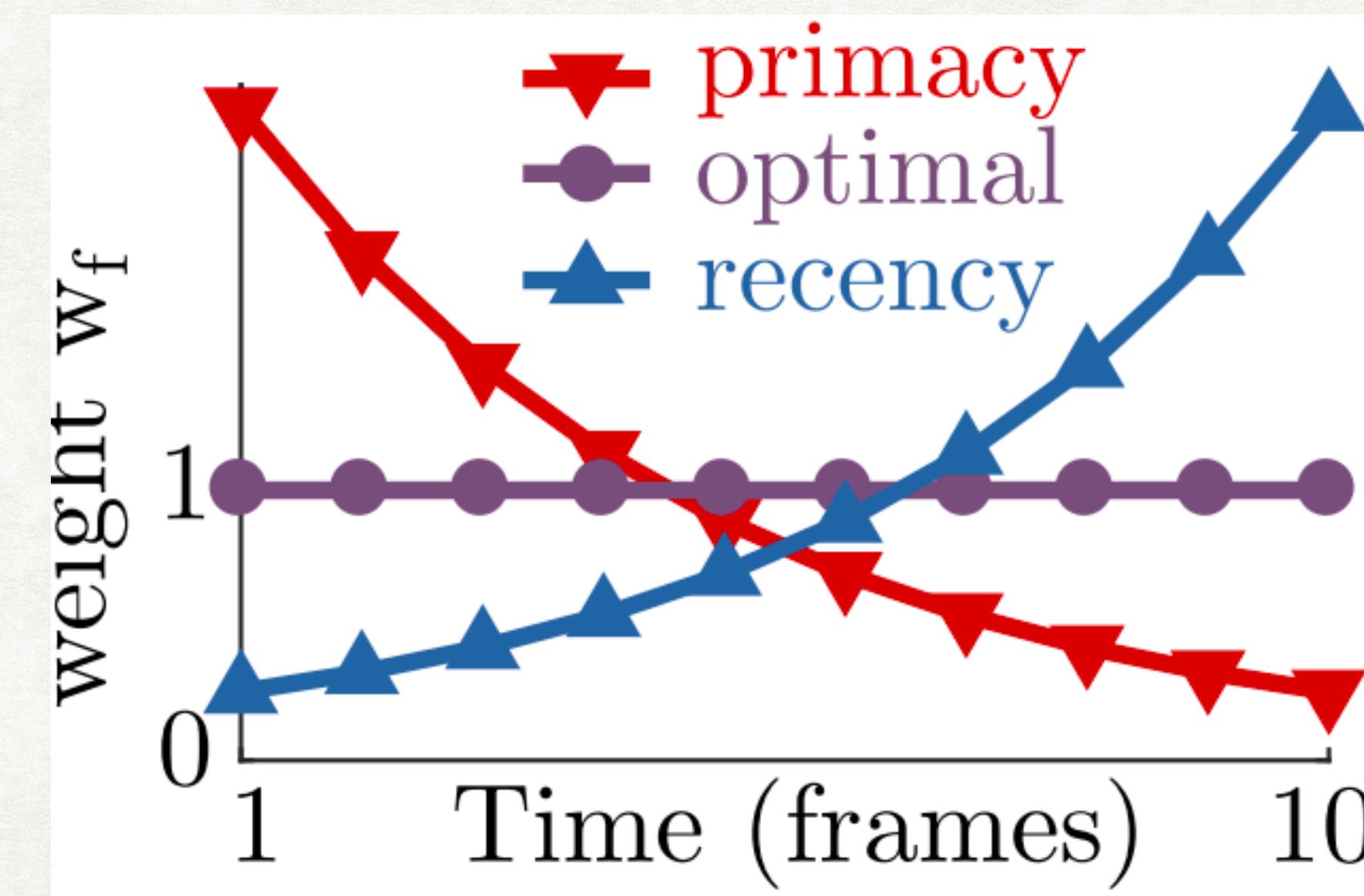
# INTRODUCTION

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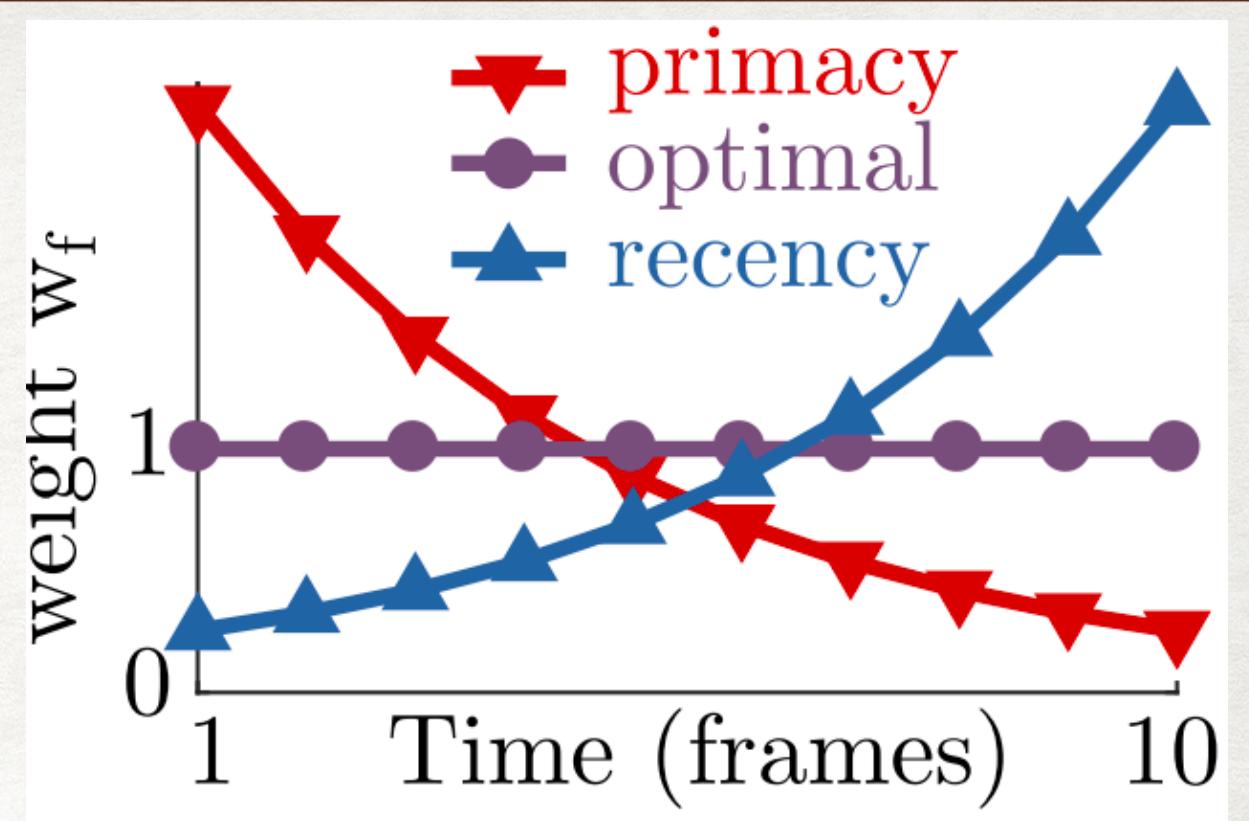
1. Confirmation bias: the seeking or interpreting of evidence in ways that are partial to existing beliefs, etc.

# INTRODUCTION

1. Confirmation bias: the seeking or interpreting of evidence in ways that are partial to existing beliefs, etc.
2. Perceptual decision making: weight along time.



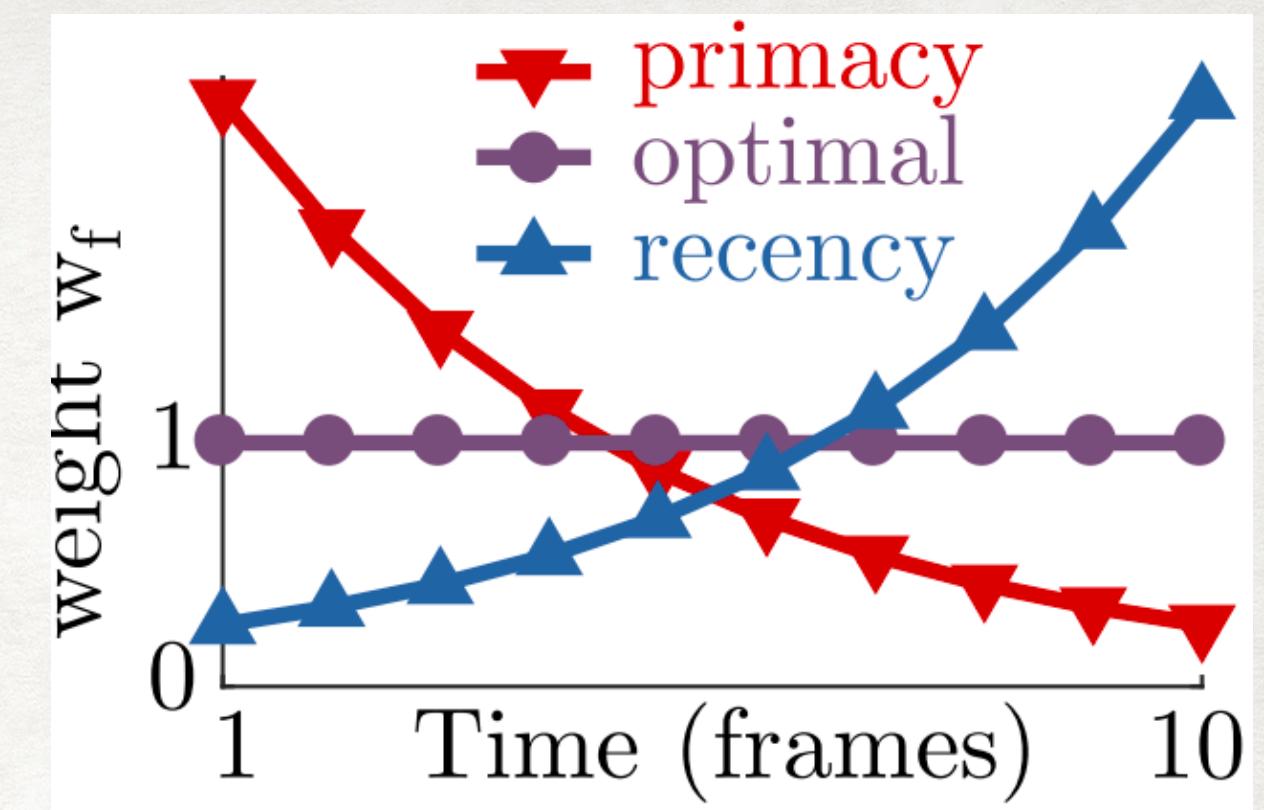
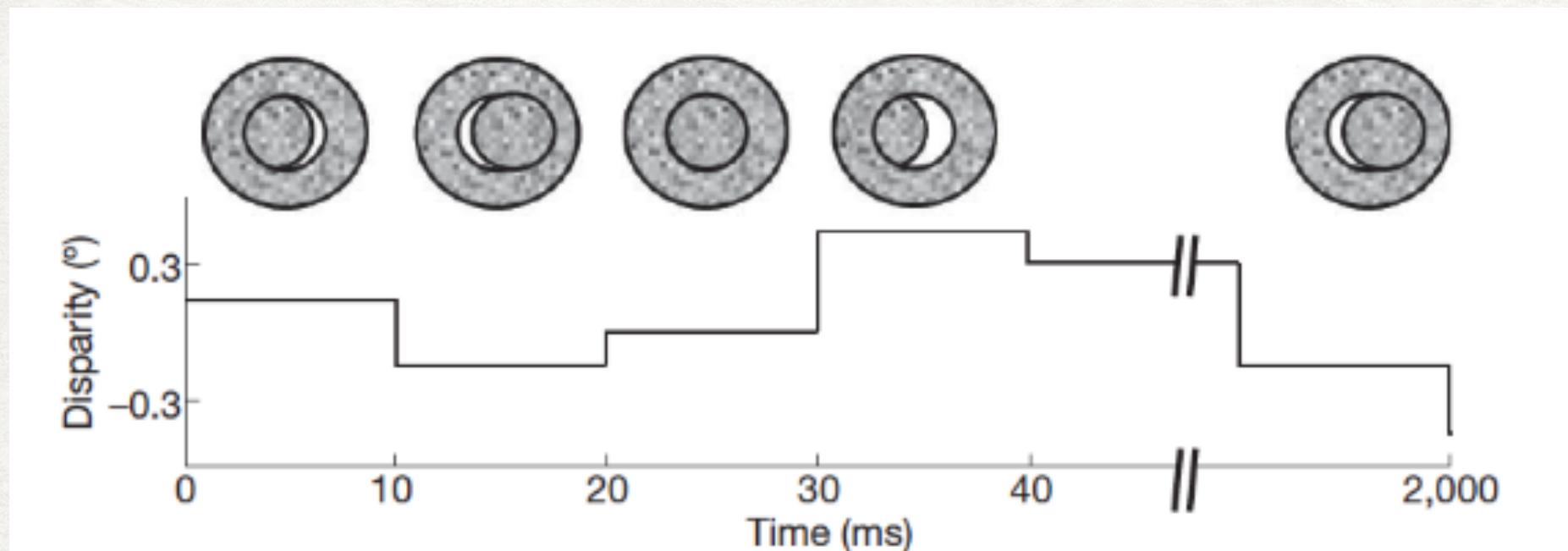
# INTRODUCTION



# INTRODUCTION

Nienborg & Cumming, 2009:

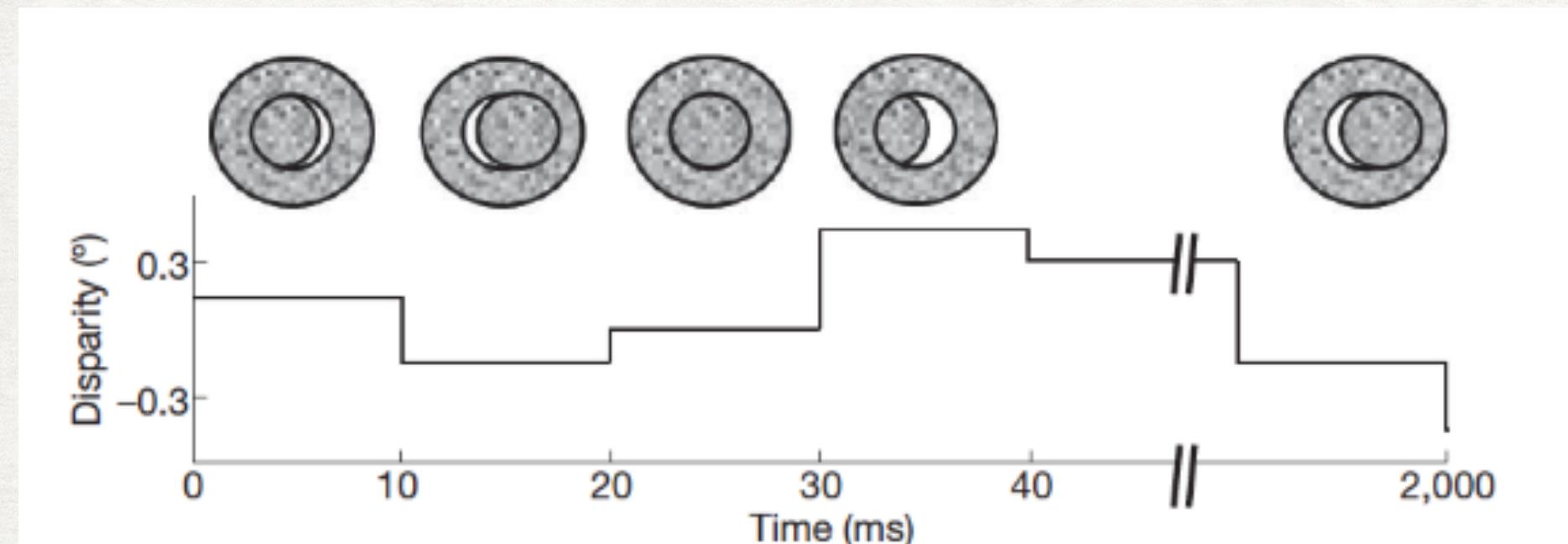
- disparity-discrimination task
- **primacy effect**



# INTRODUCTION

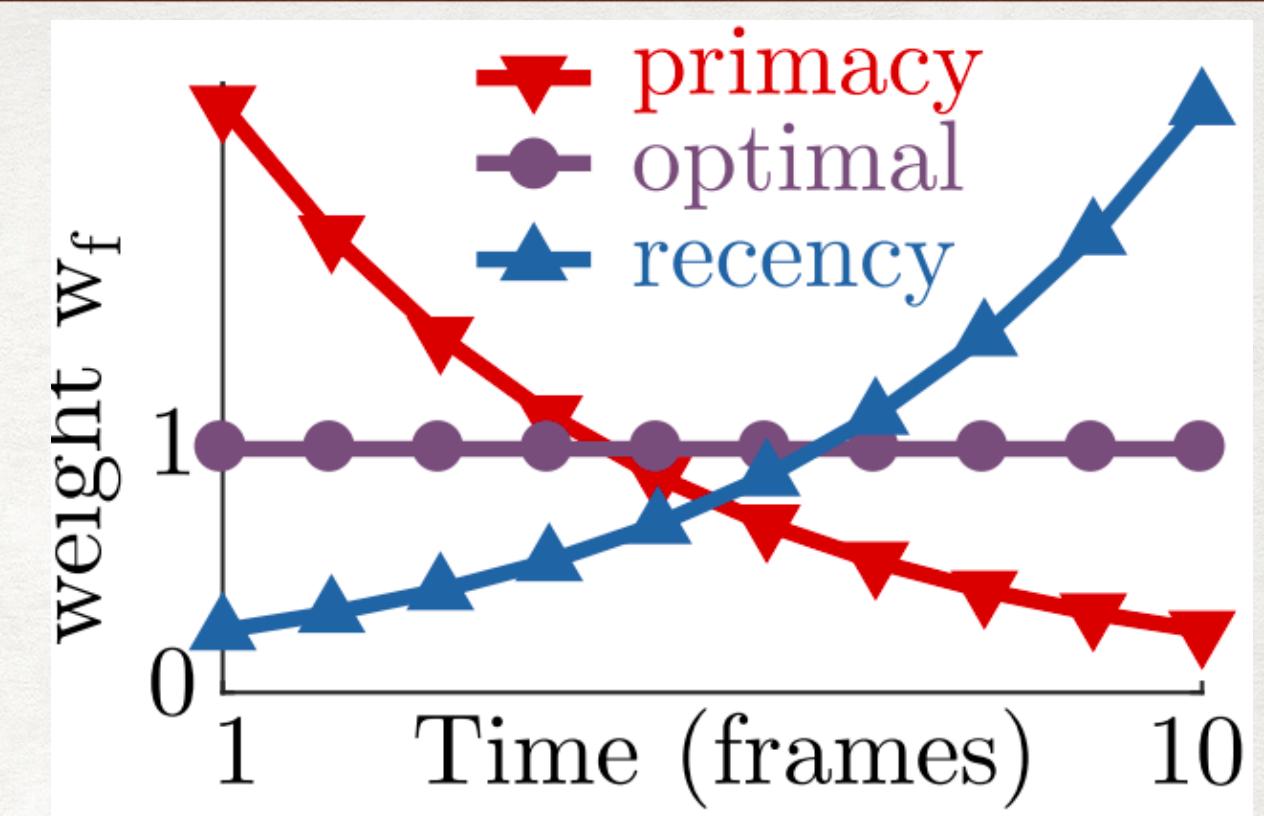
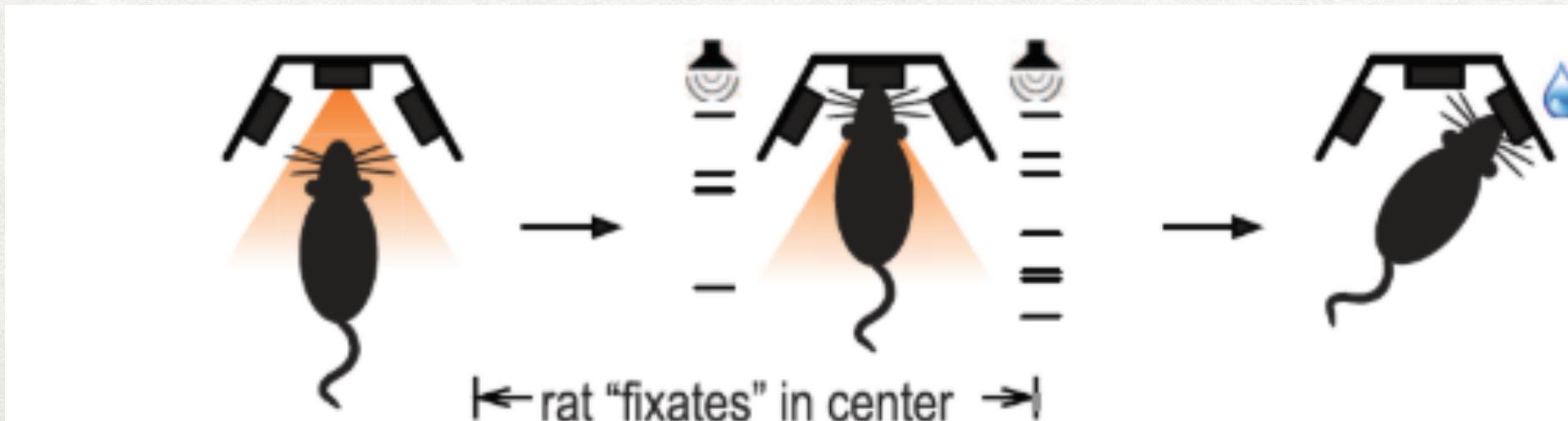
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Brunton et al., 2013:

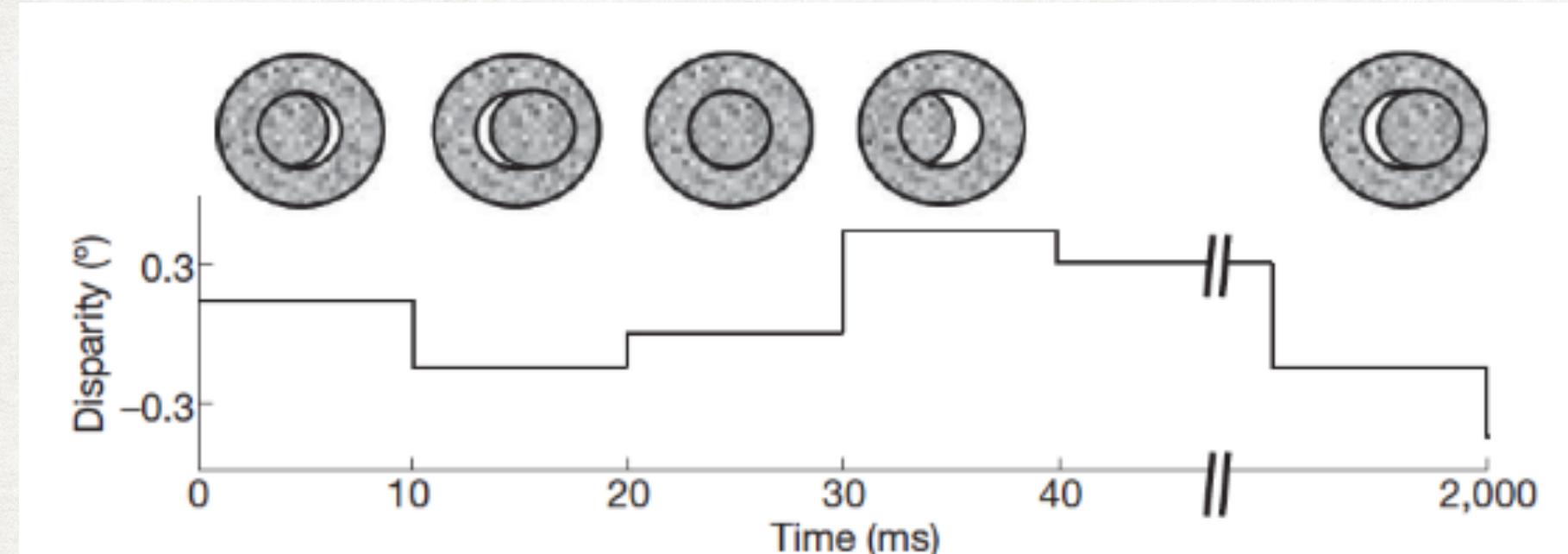
- Poisson click task
- **optimal integration**



# INTRODUCTION

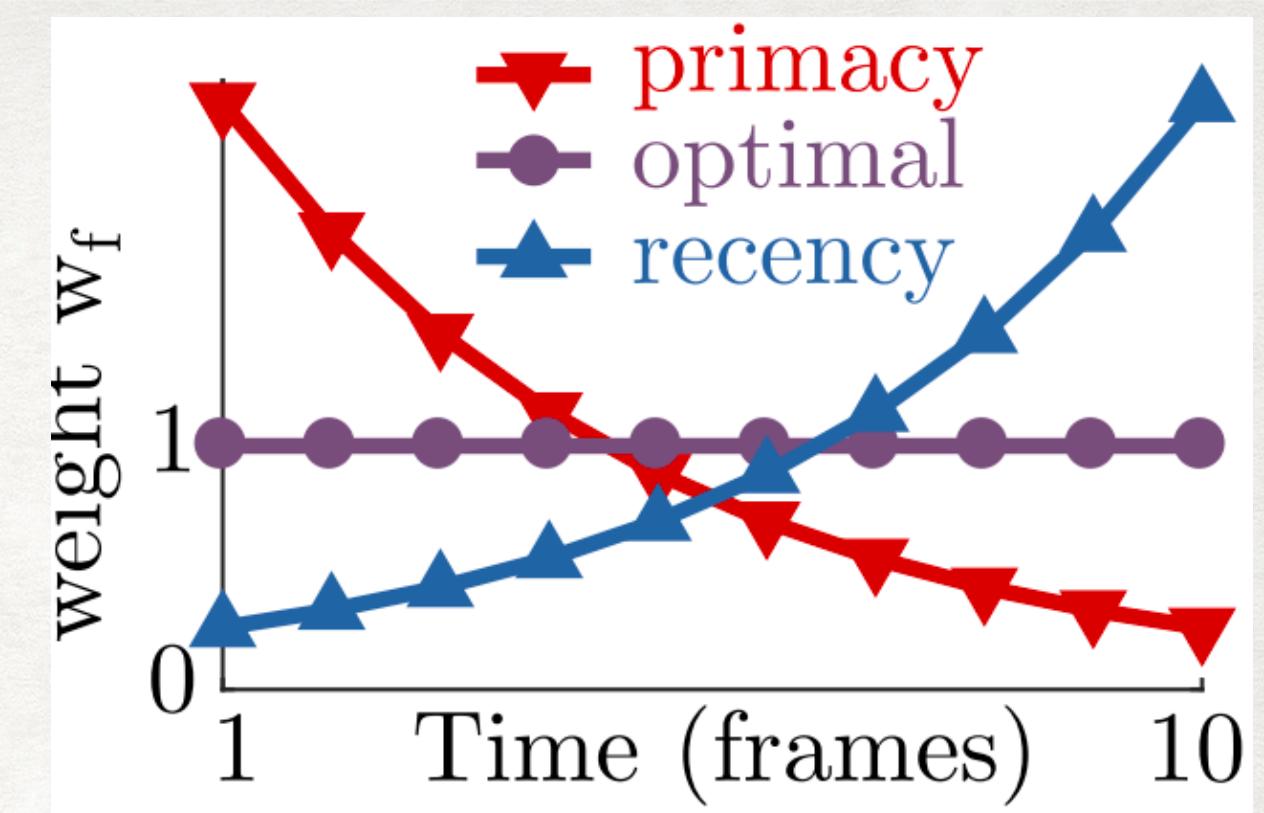
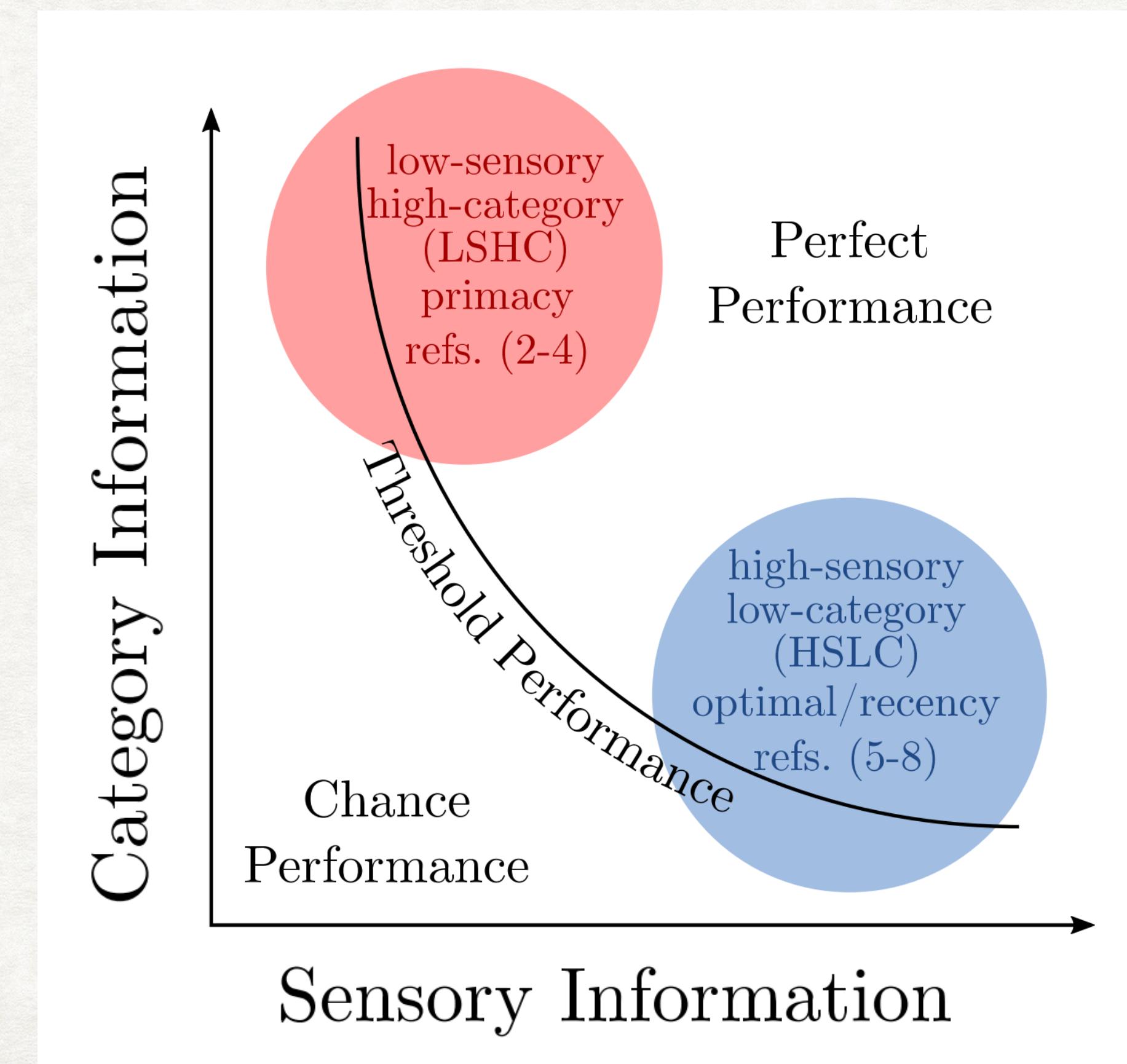
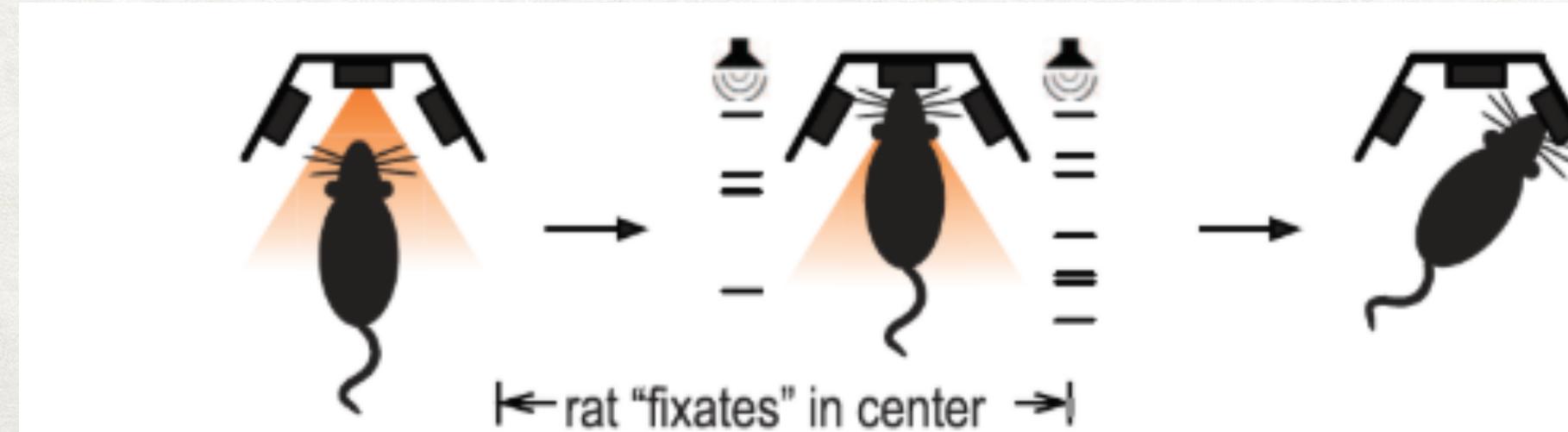
Nienborg & Cumming, 2009:

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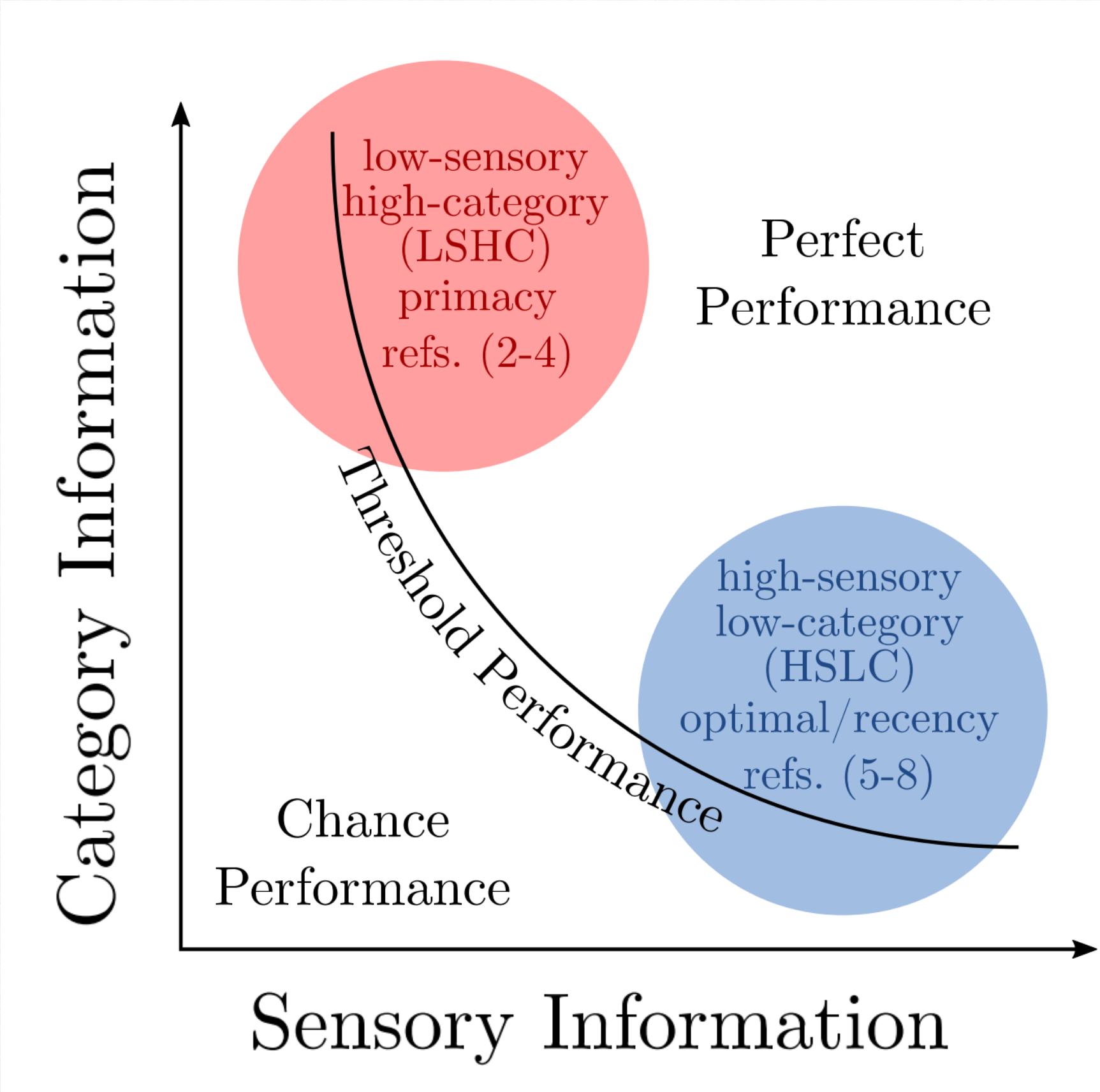
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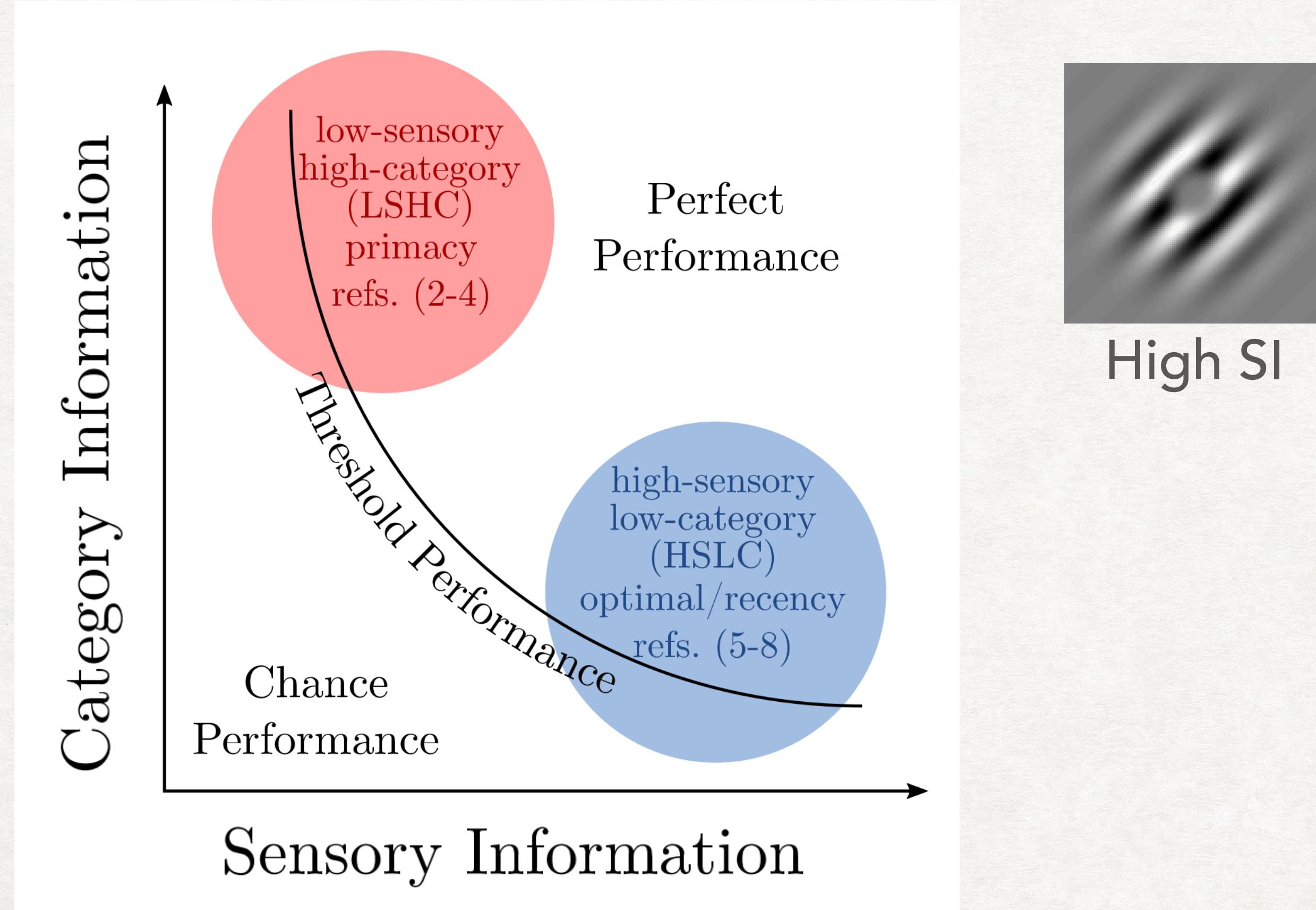
# INTRODUCTION

Lange et al. (2018):



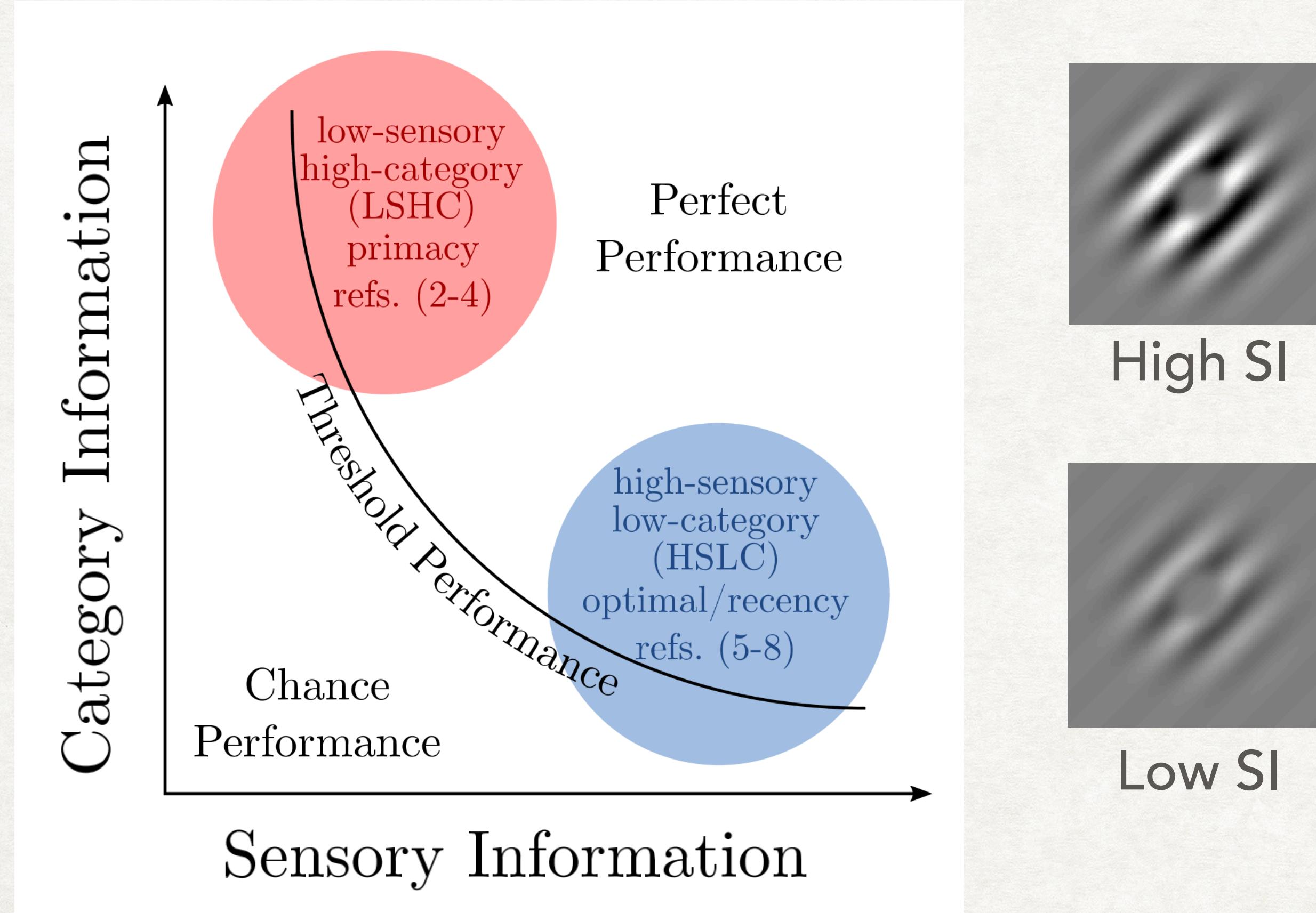
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Lange et al. (2018):



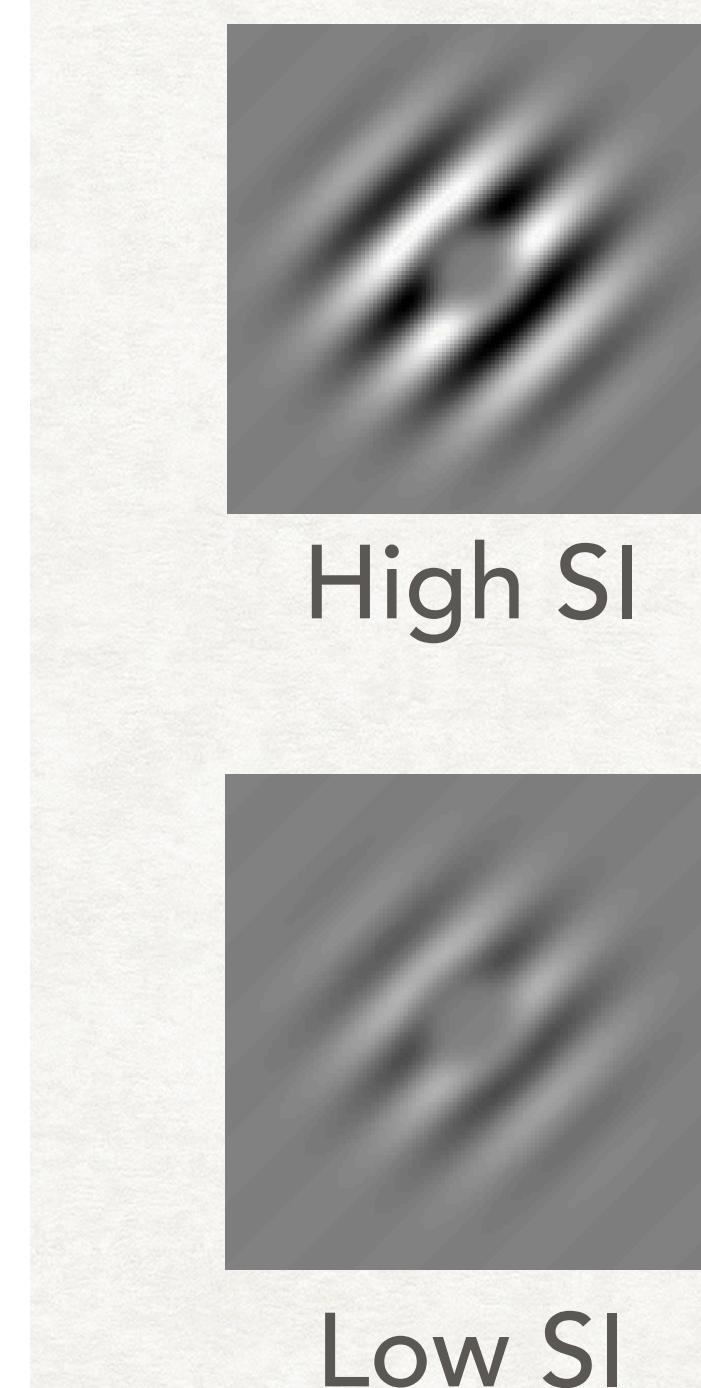
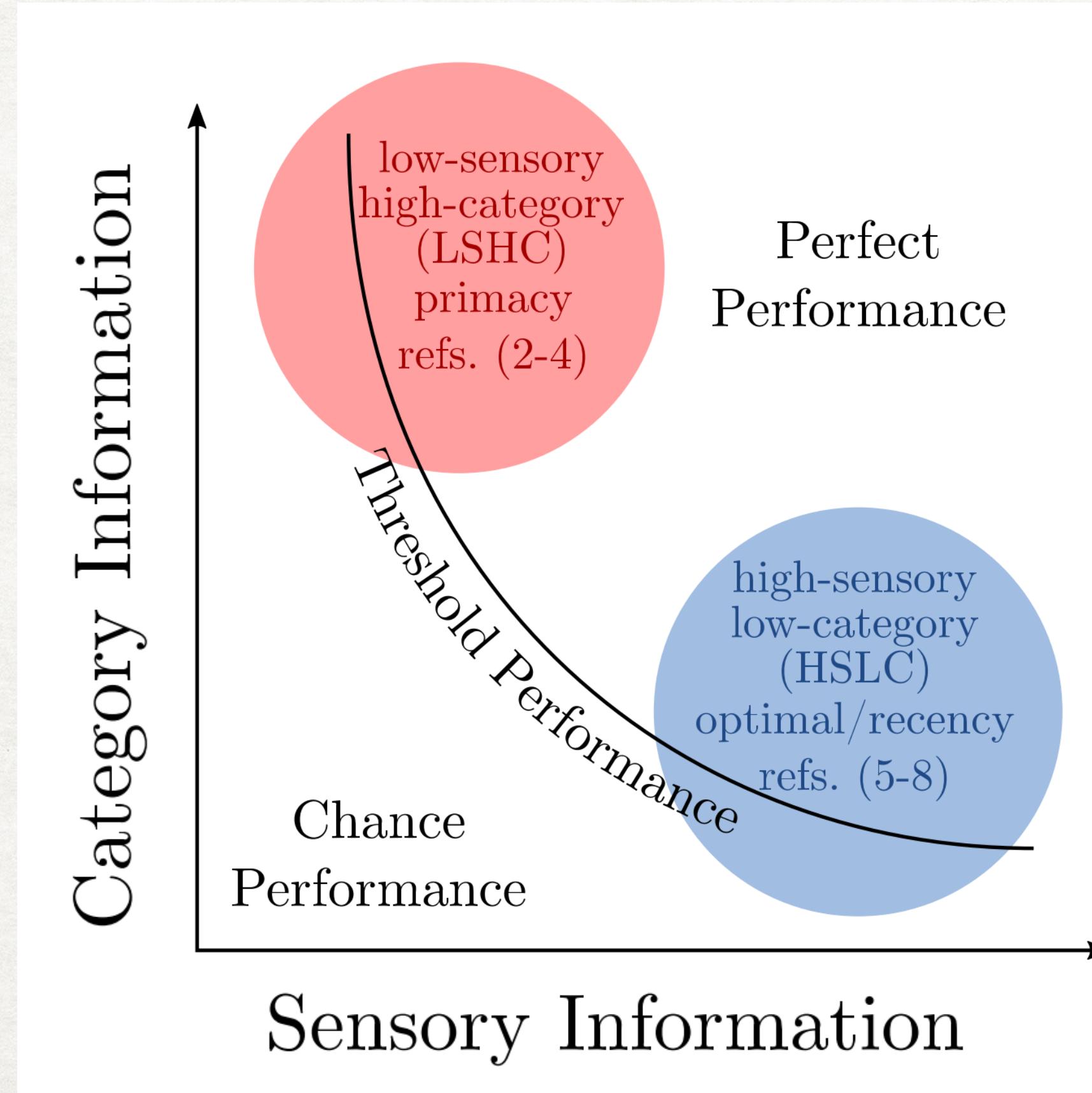
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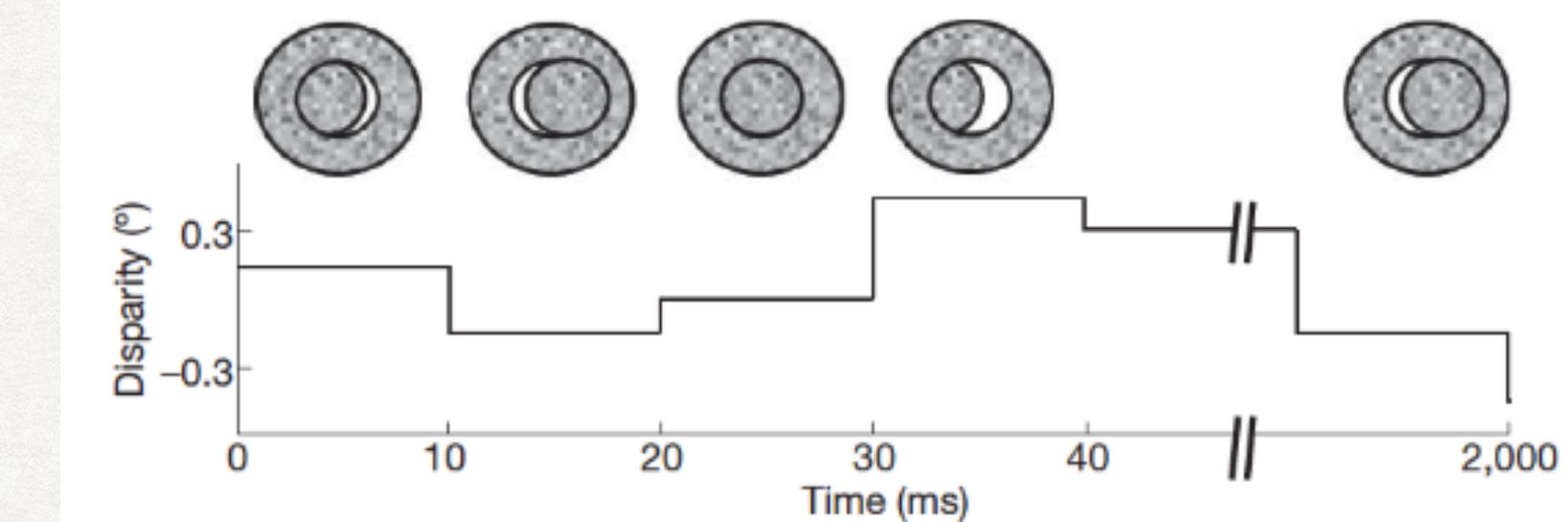
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Lange et al. (2018):



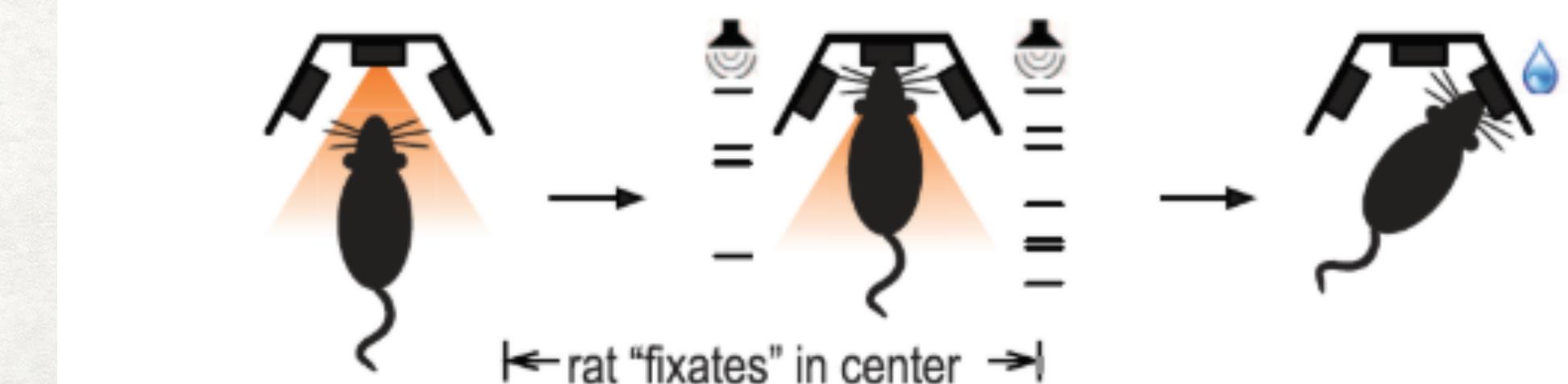
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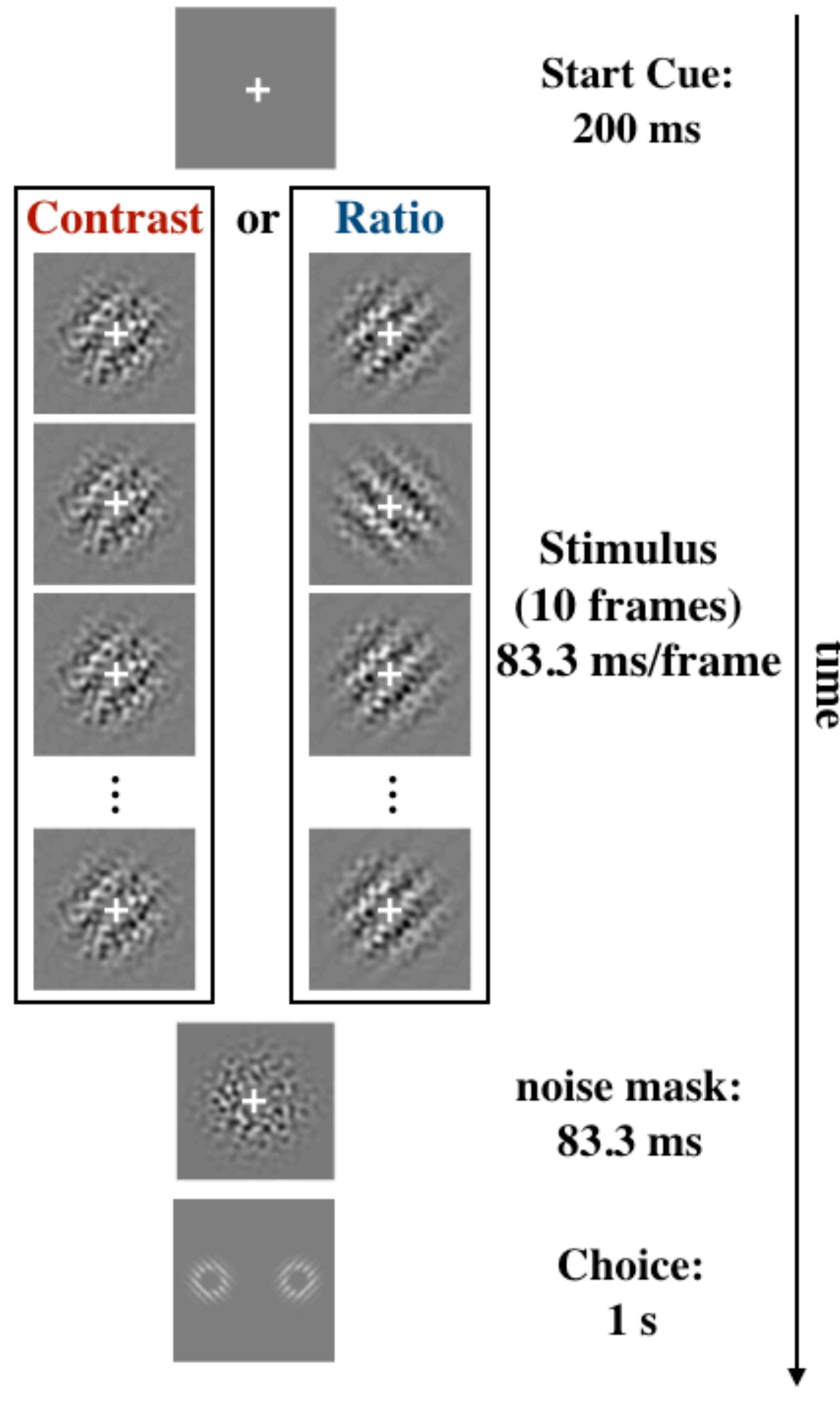
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# EXPERIMENT 1

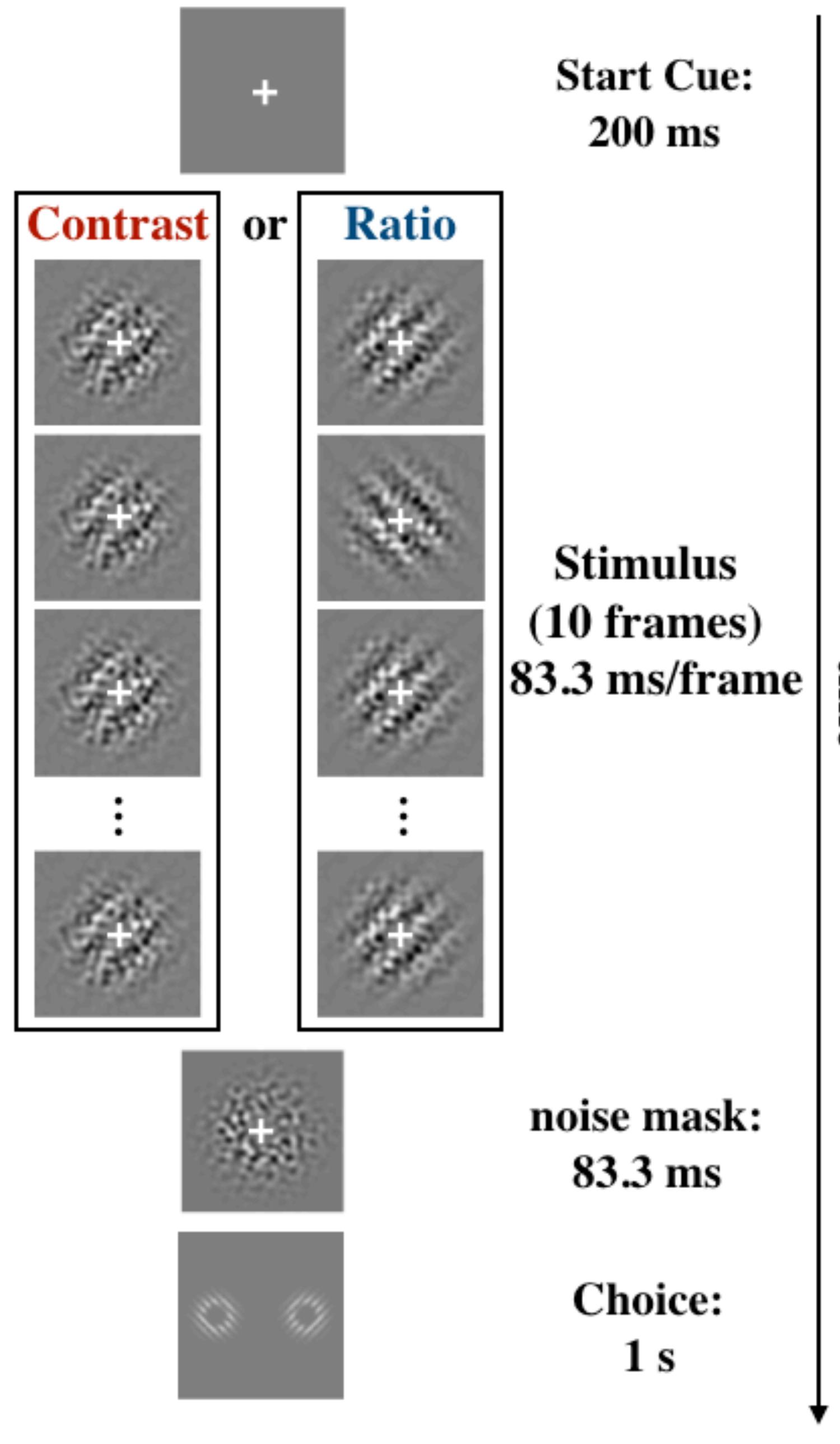
# METHOD

- 2AFC ( $-45^\circ$  vs.  $+45^\circ$ )
- within-subject design:
  - **contrast** vs. **ratio** conditions
- 2:1 staircase method



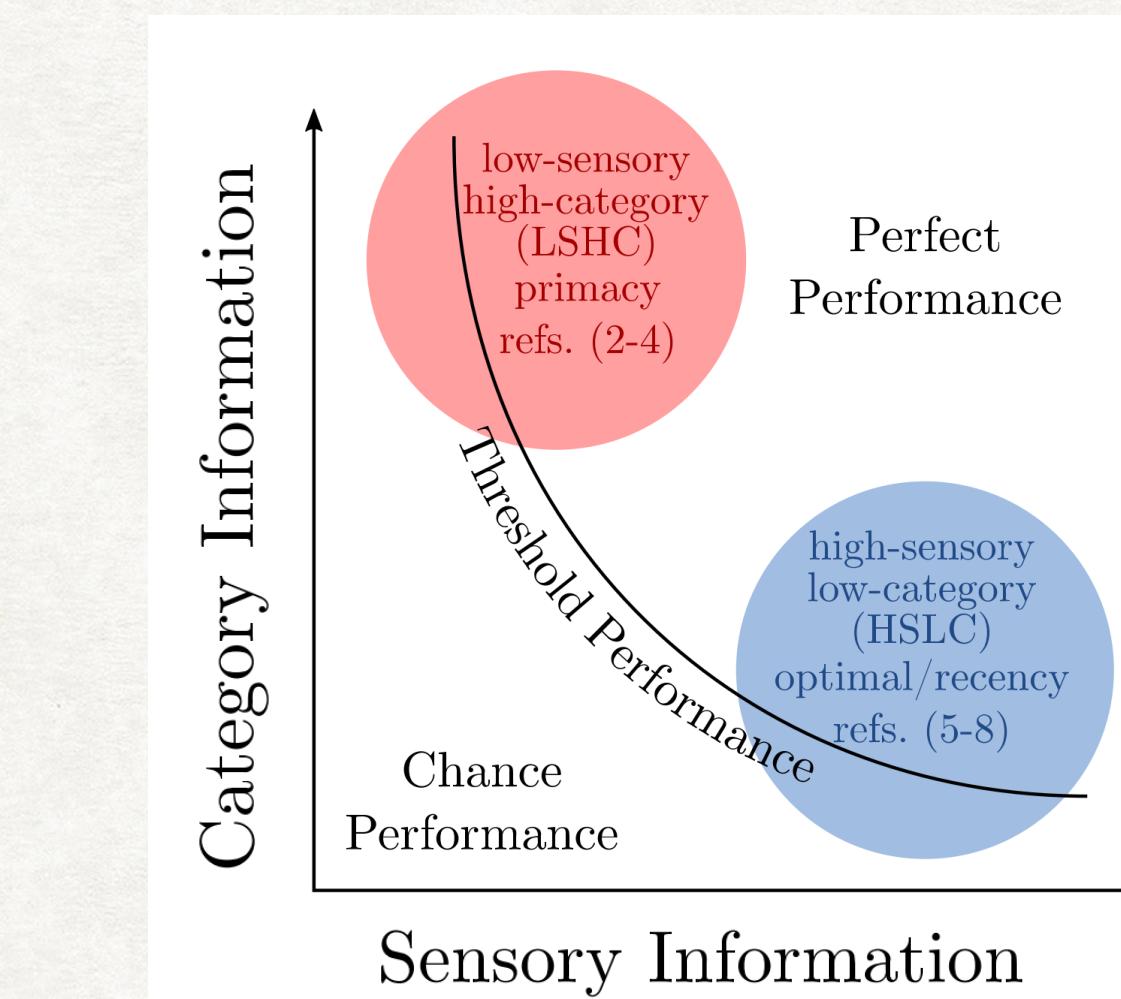
## METHOD

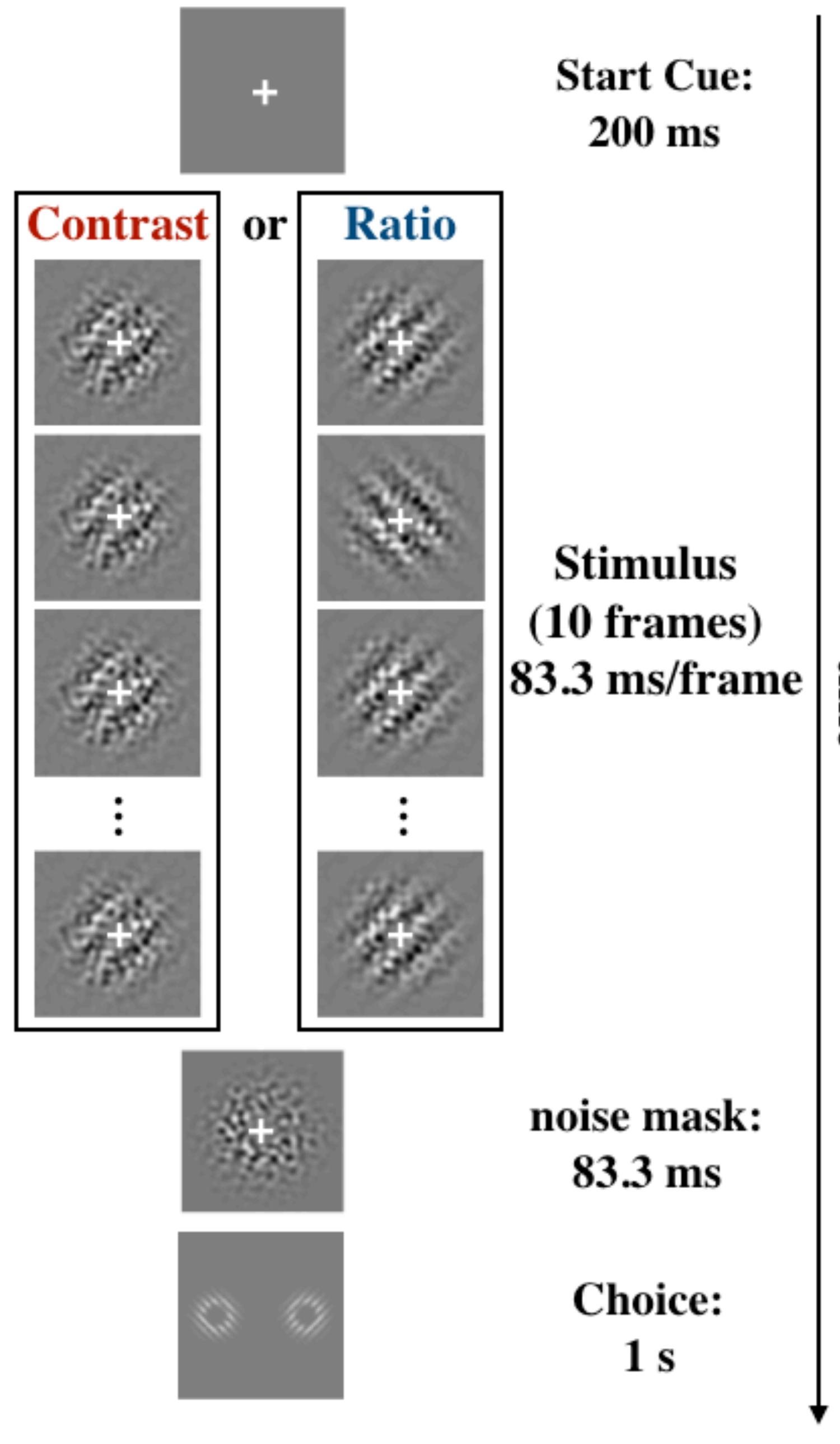
- 2AFC ( $-45^\circ$  vs.  $+45^\circ$ )
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## METHOD

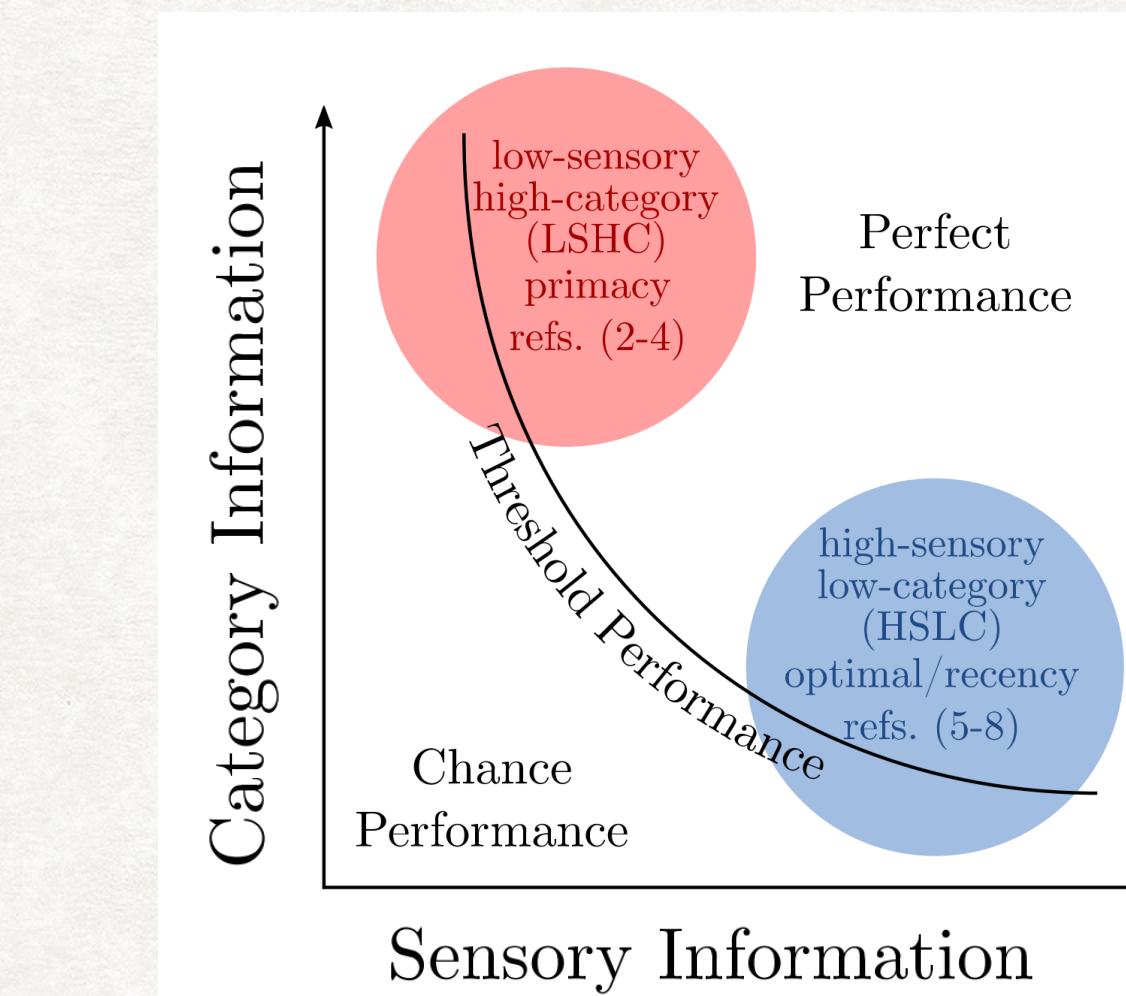
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## METHOD

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- within-subject design:
  - **contrast** vs. **ratio** conditions
- 2:1 staircase method

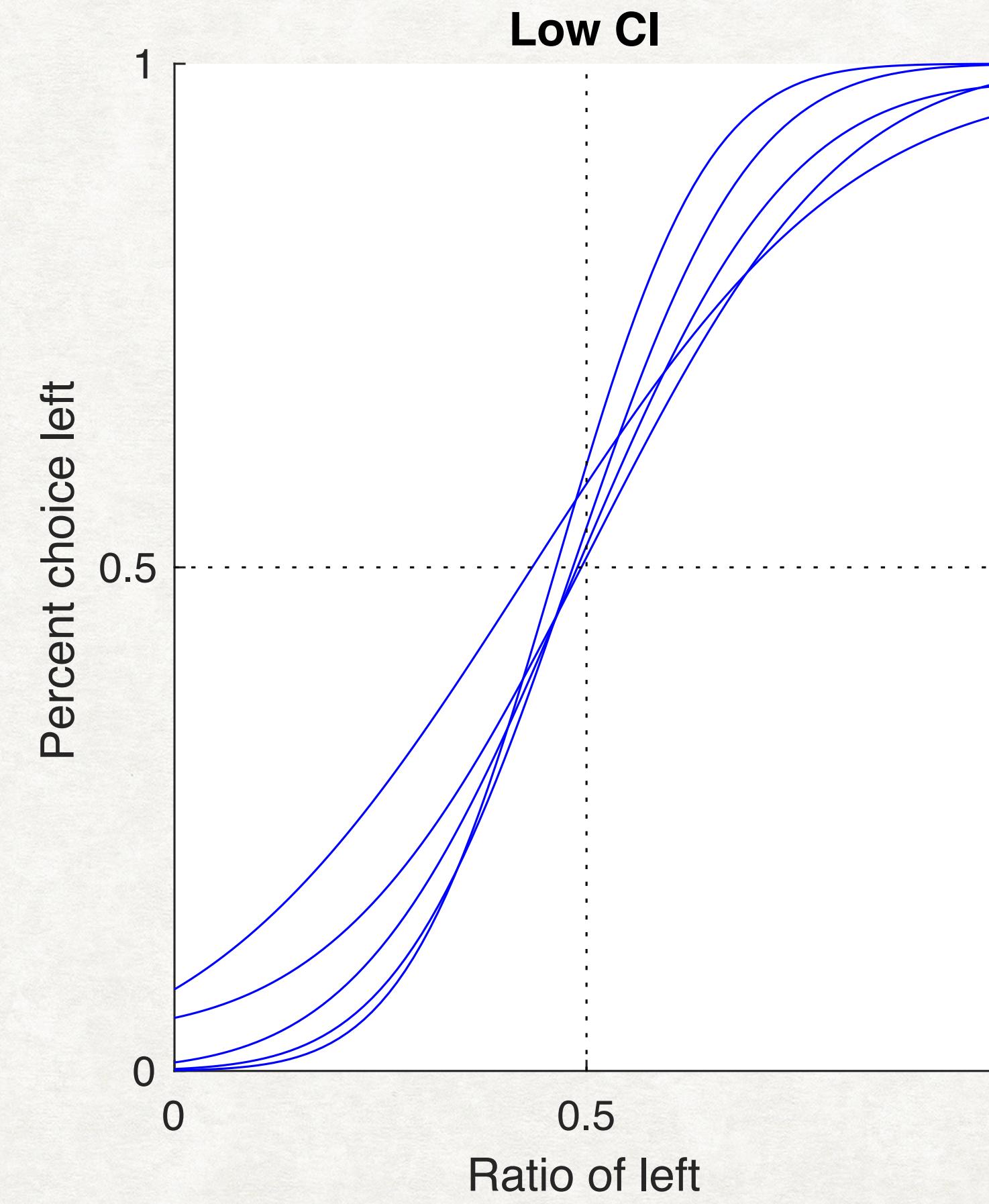
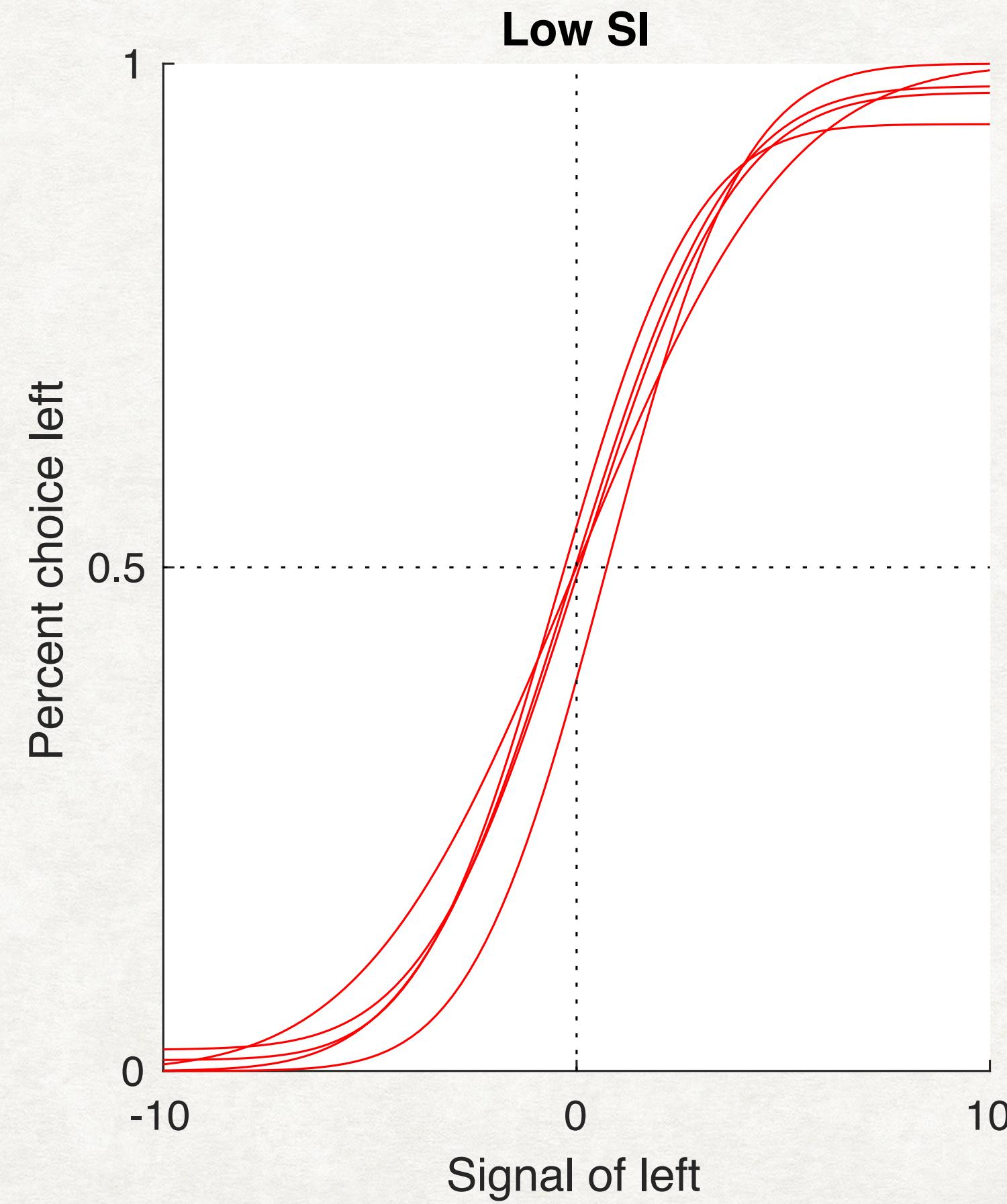


Logistic regression:

$$p(\text{choice} \mid \vec{x}) = \frac{\alpha}{2} + \frac{1-\alpha}{1+e^{-b-\sum_{k=1}^{10} s_k x_k}}$$

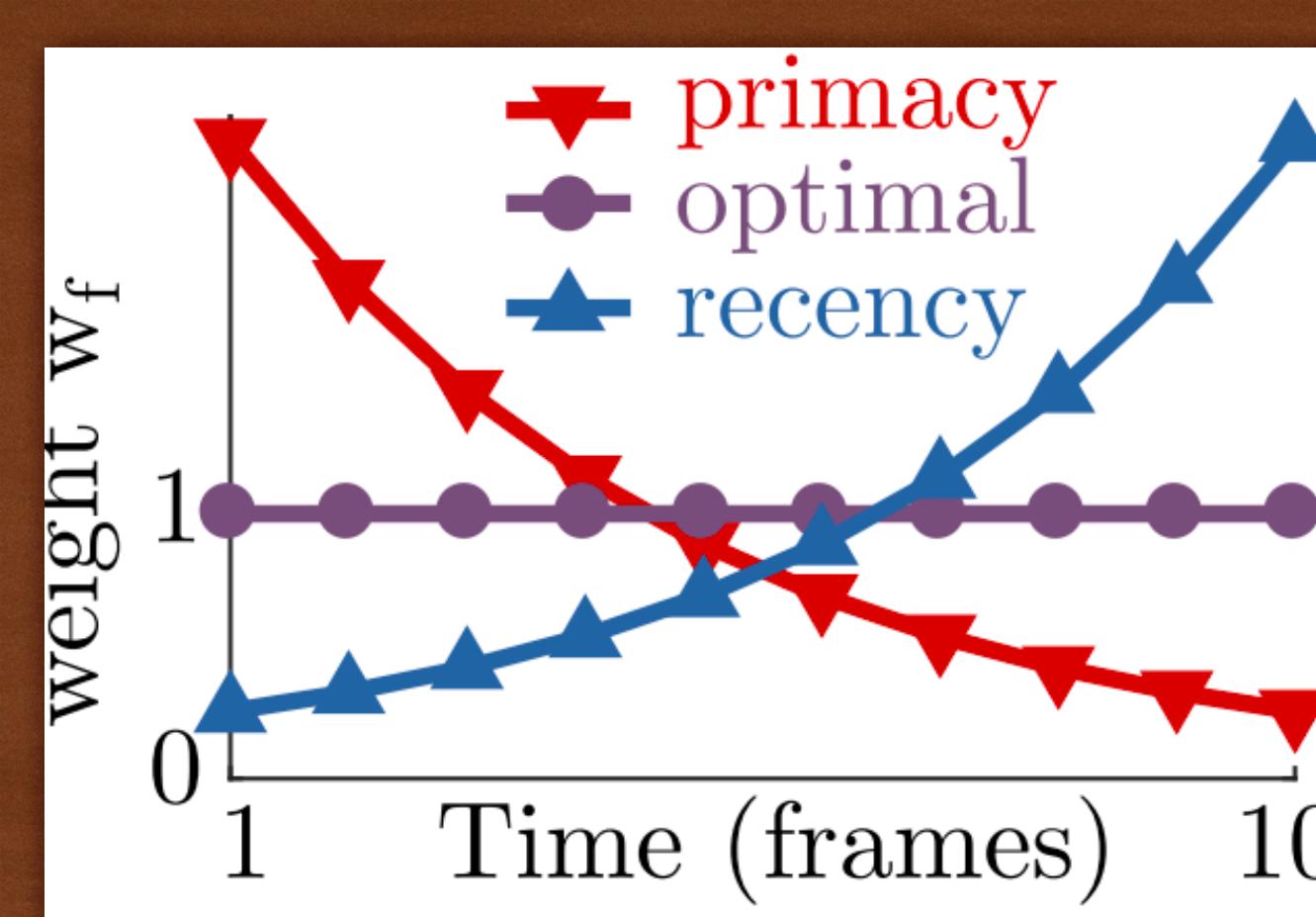
# EXPERIMENT 1 - RESULTS

## Psychometric function



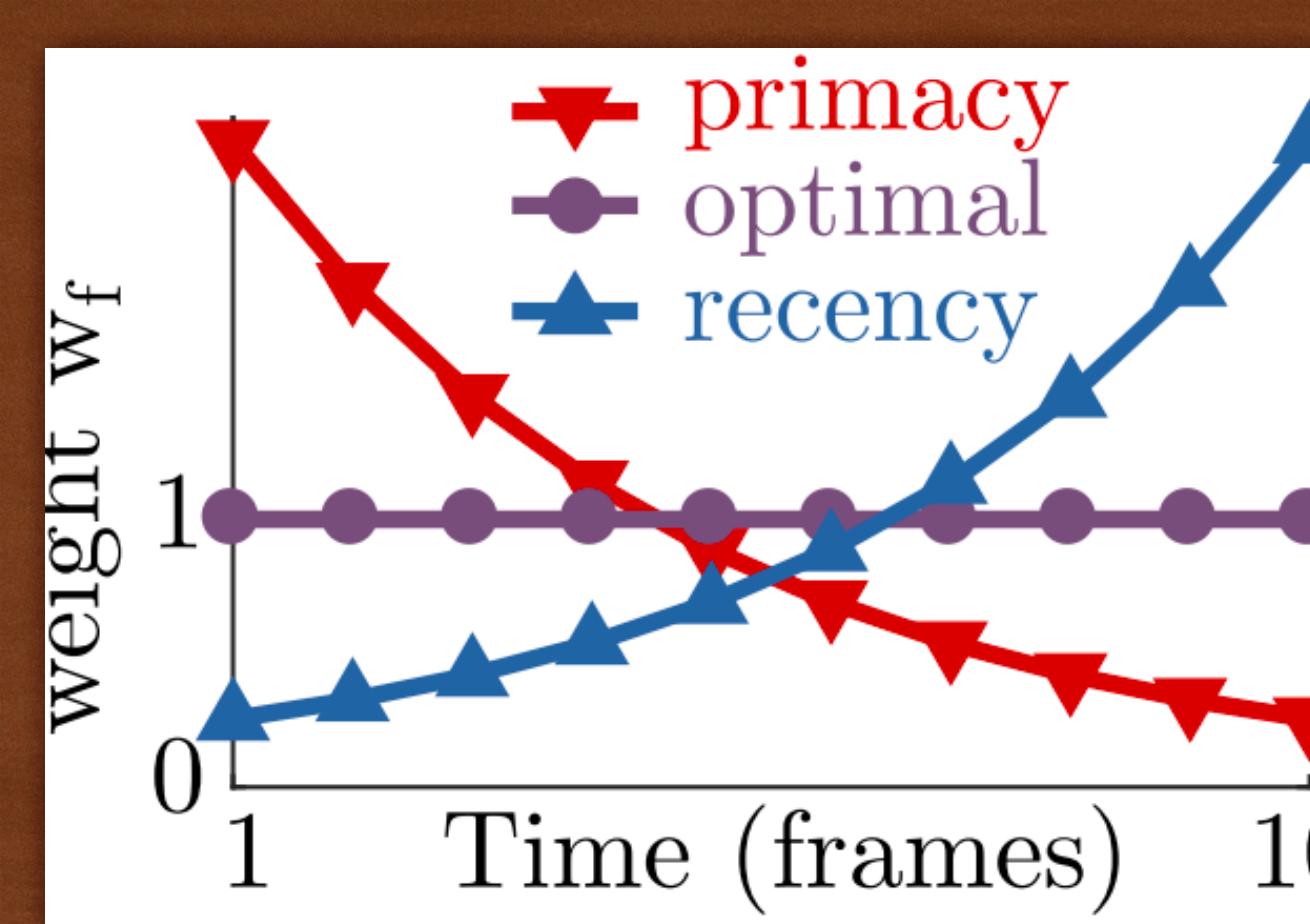
# EXPERIMENT 1 - RESULTS

Temporal Kernel



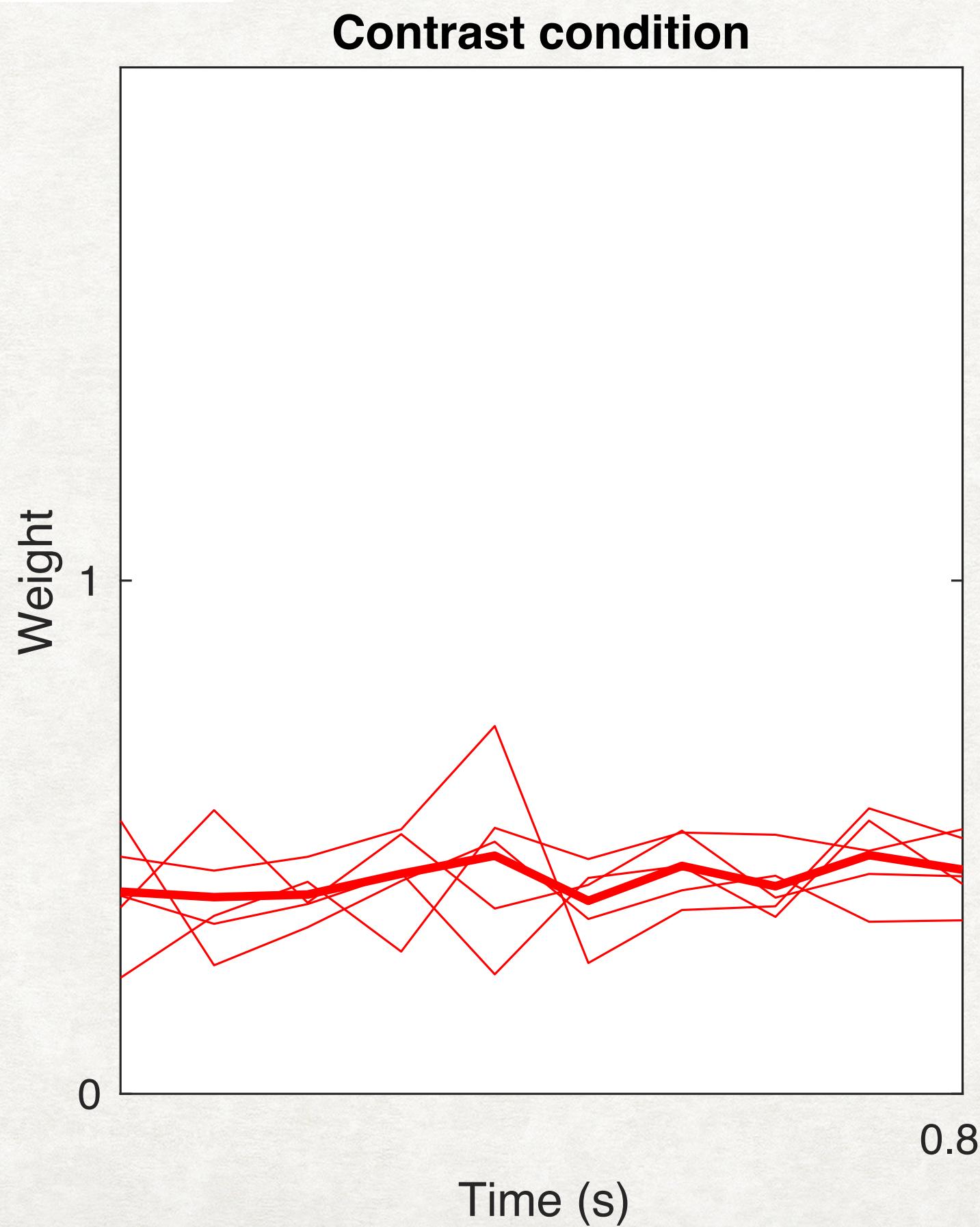
# EXPERIMENT 1 - RESULTS

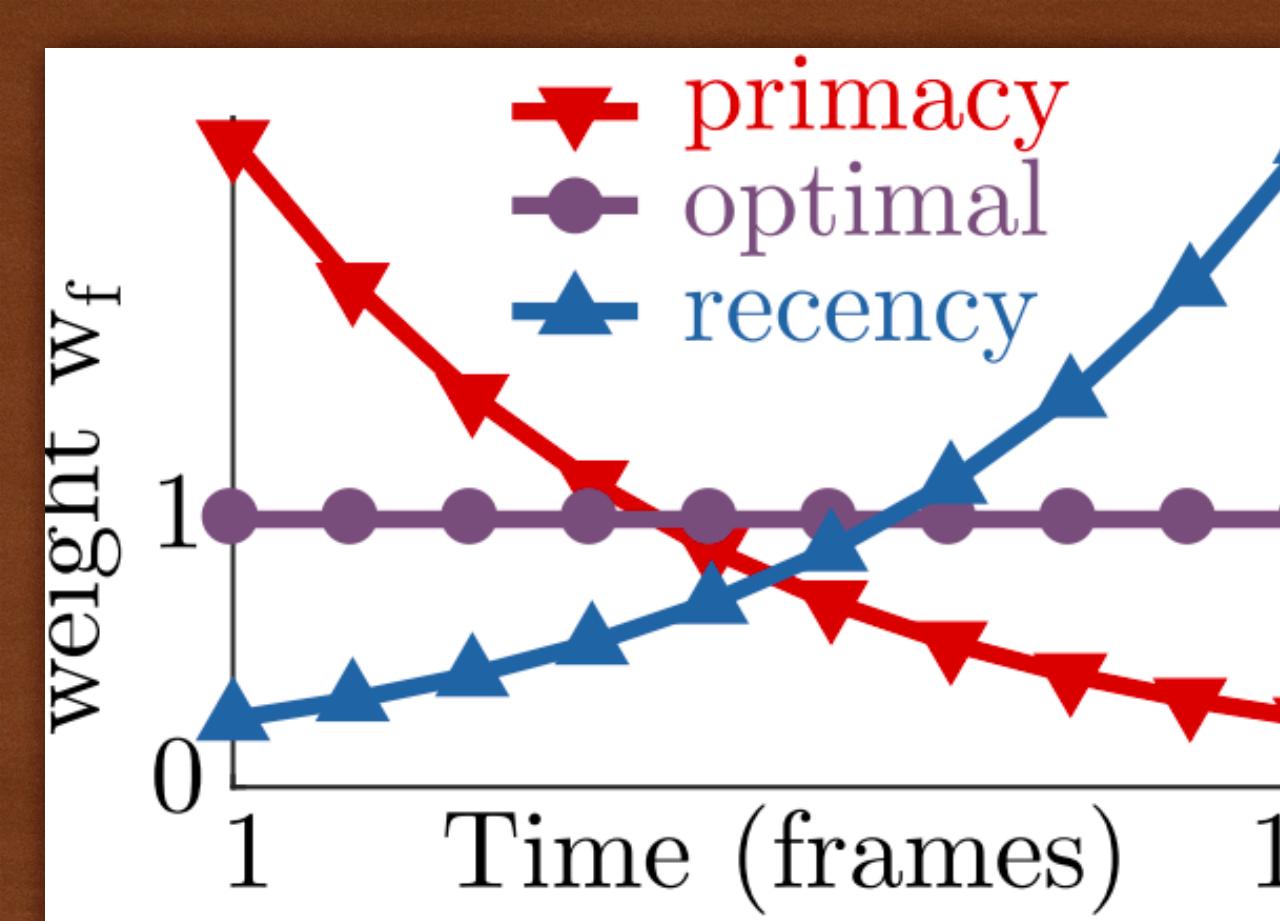
## Temporal Kernel



# EXPERIMENT 1 - RESULTS

## Temporal Kernel

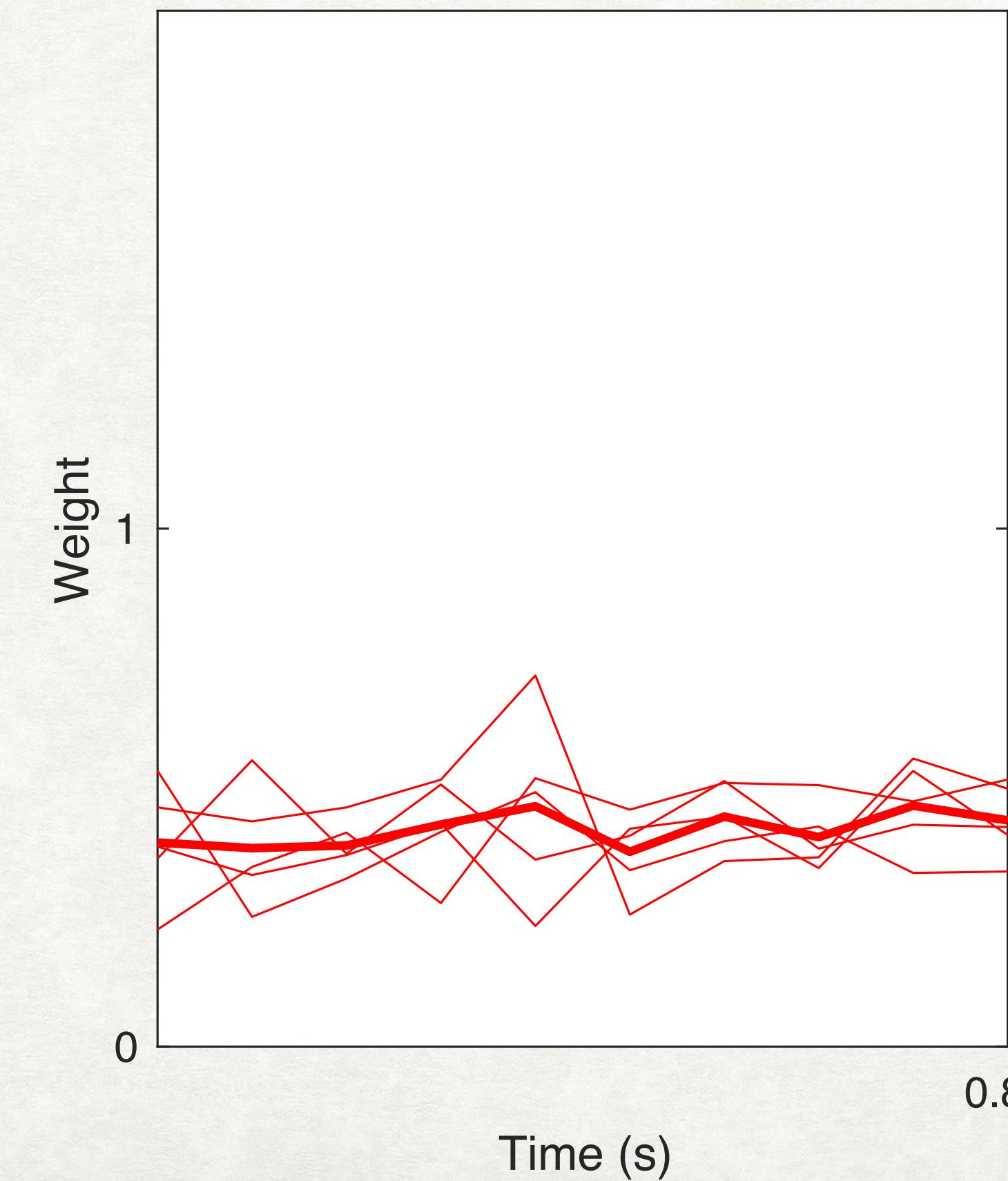




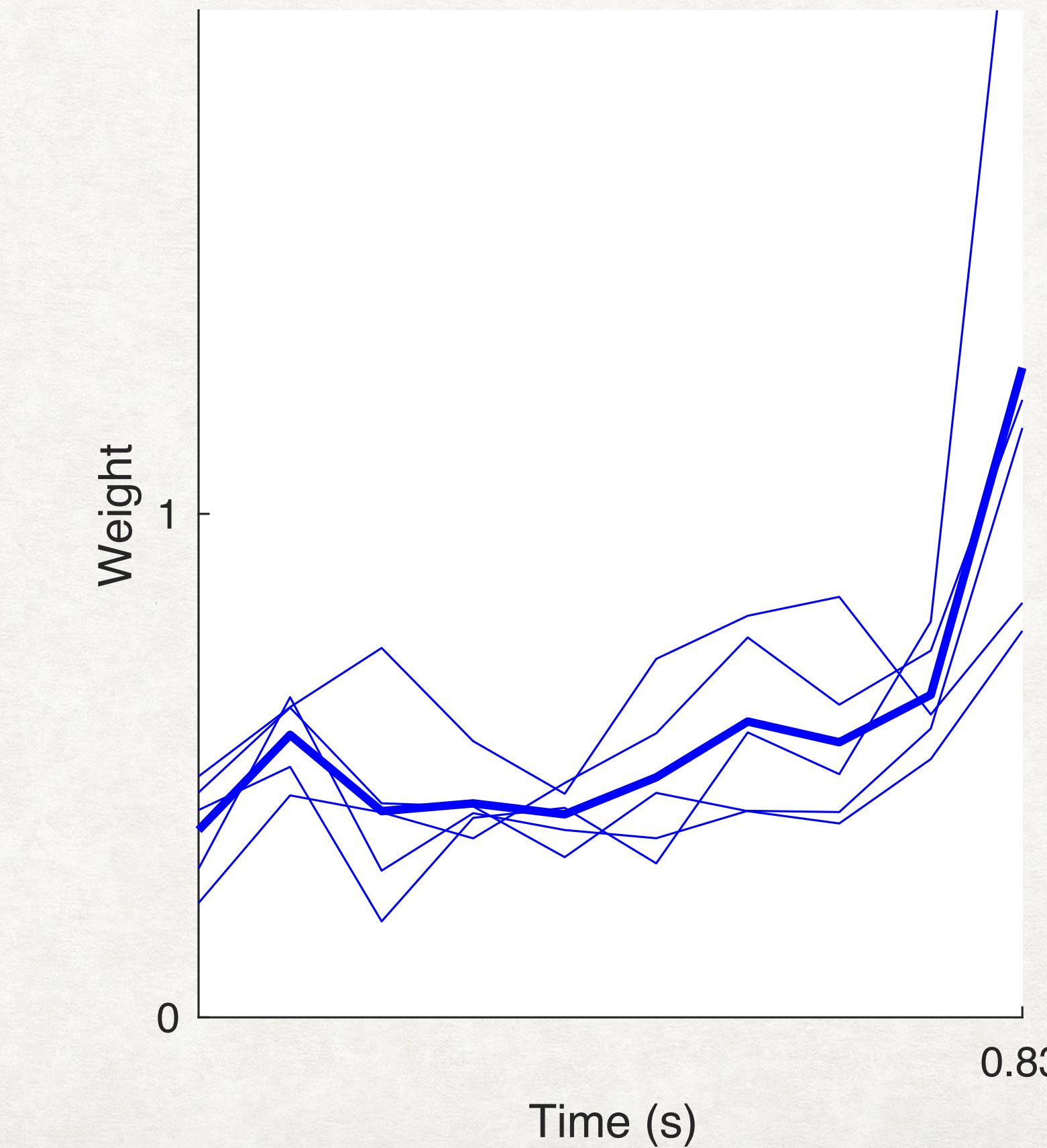
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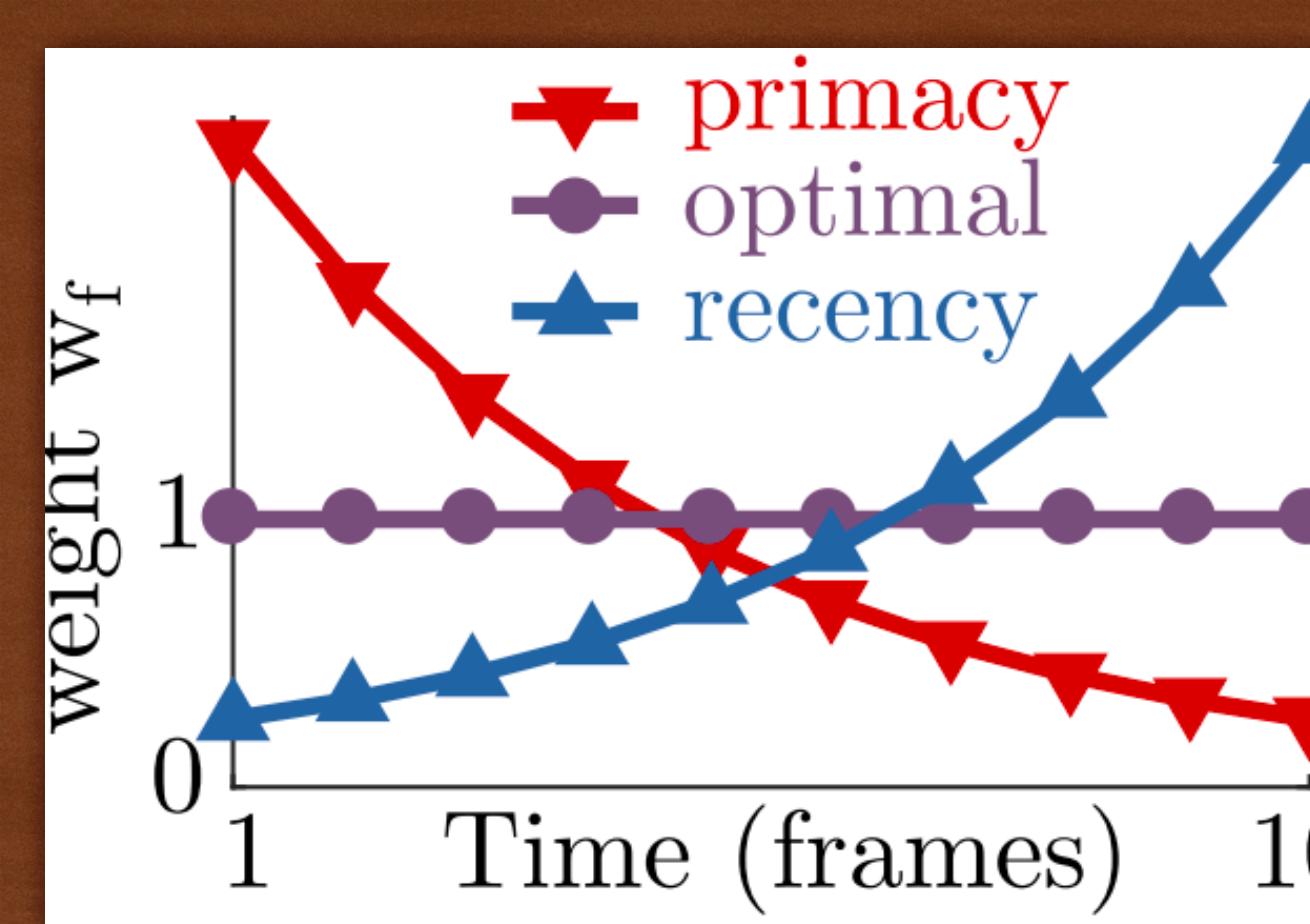
## Temporal Kernel

Contrast condition



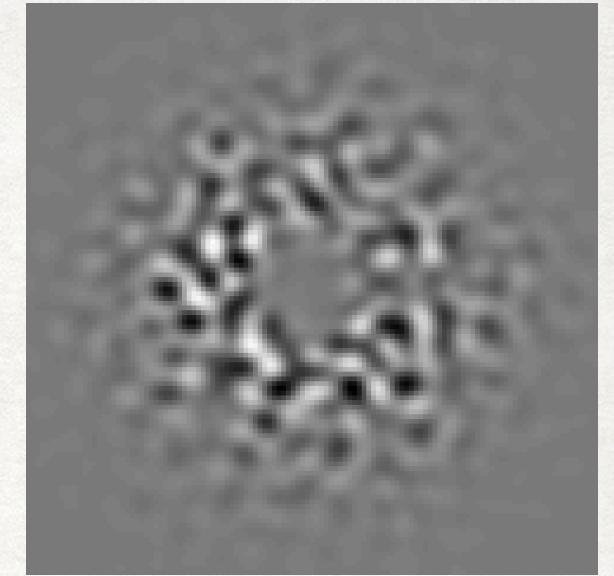
Ratio condition





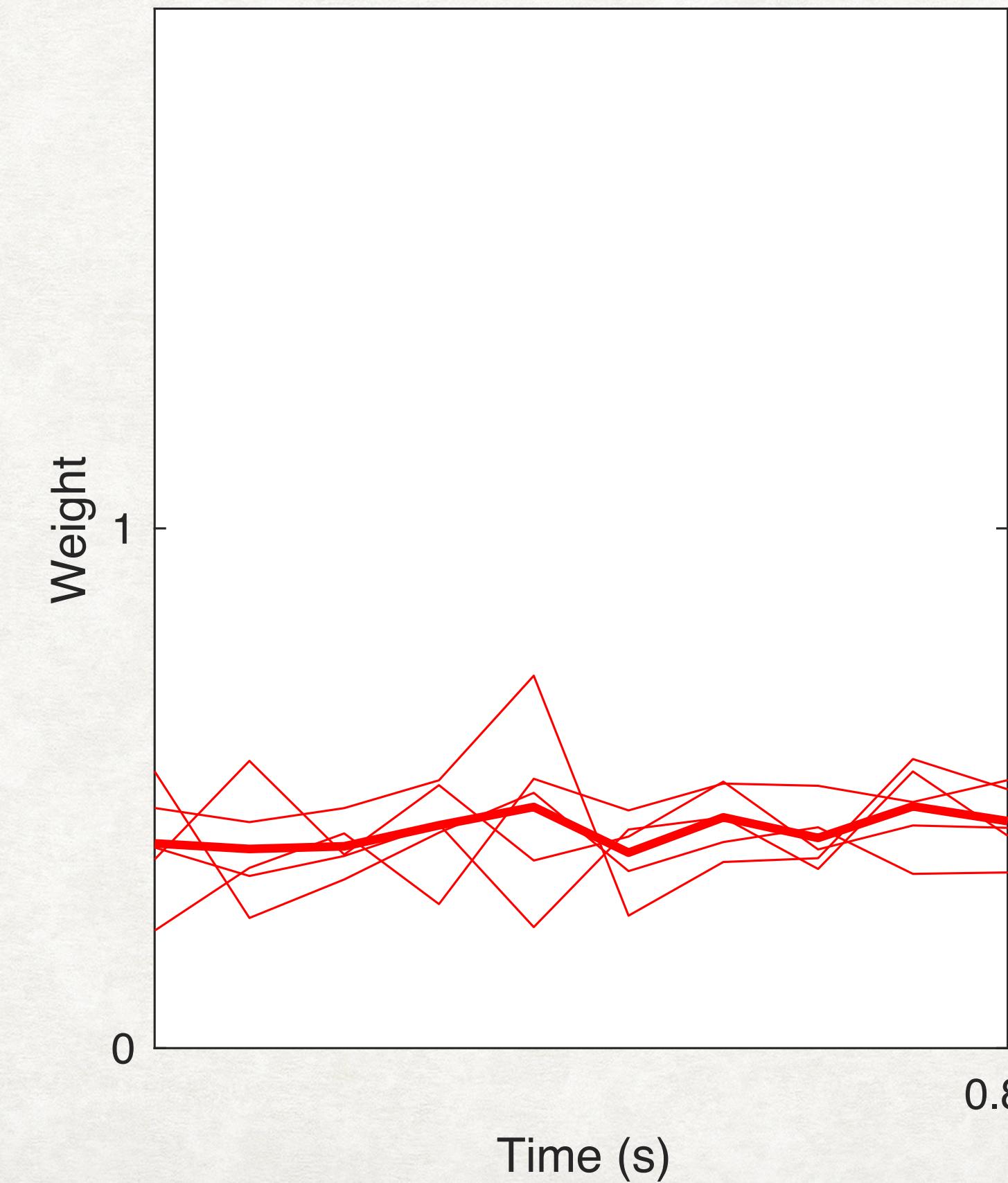
# EXPERIMENT 1 - RESULTS

## Temporal Kernel

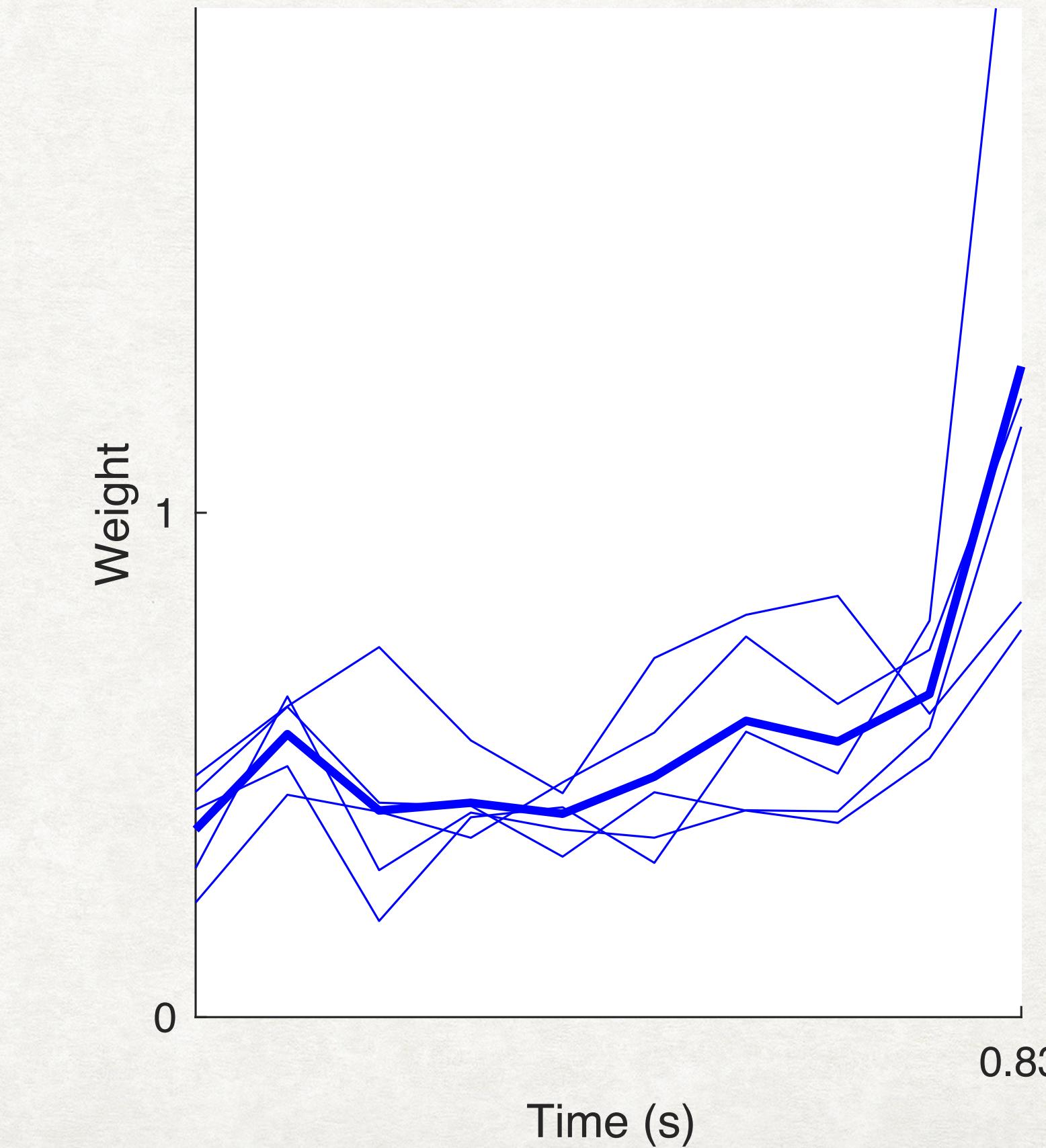


Noise mask

Contrast condition

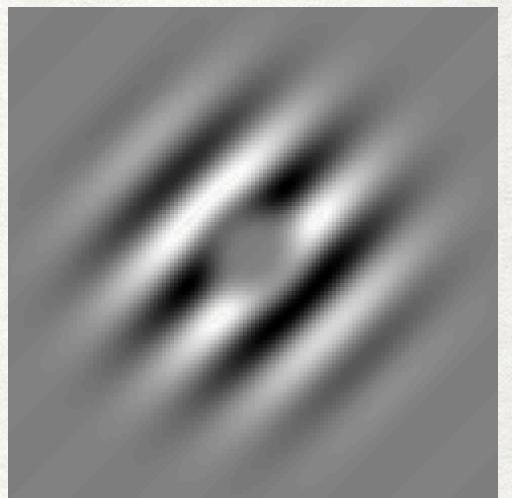


Ratio condition



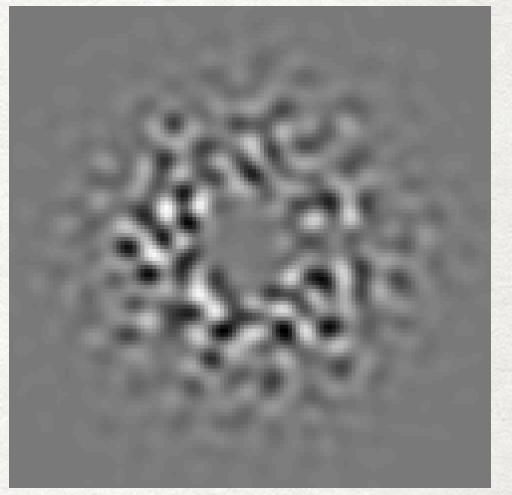
# EXPERIMENT 1 - RESULTS

Signal



+

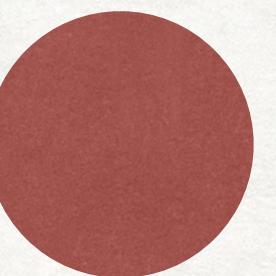
Noise



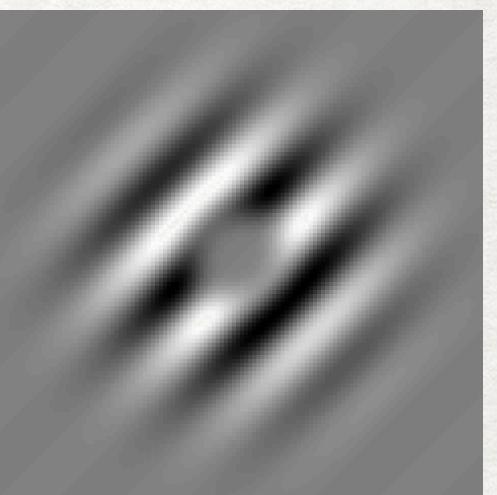
# EXPERIMENT 1 - RESULTS

Lange et al. (2018)

weak signal

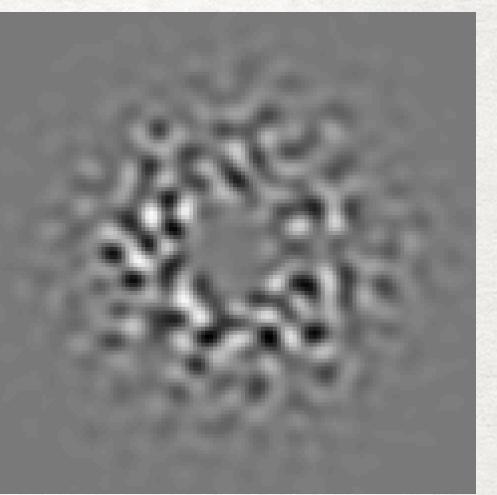


Signal



+

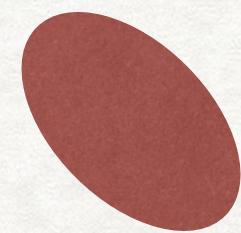
Noise



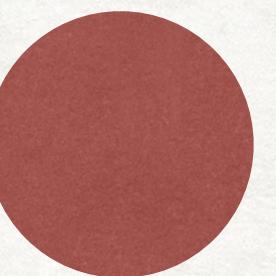
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Lange et al. (2018)

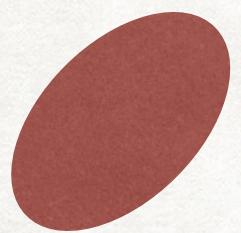
strong left signal



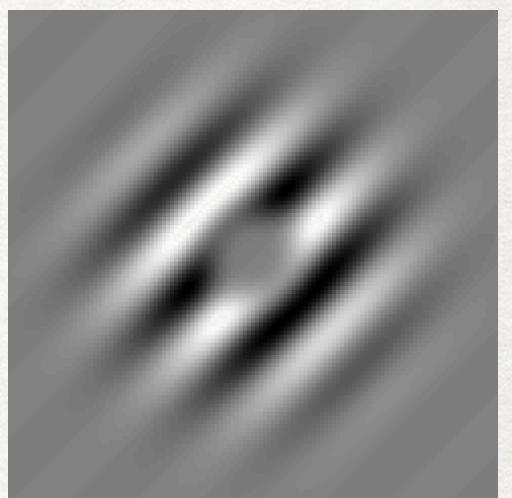
weak signal



strong right signal

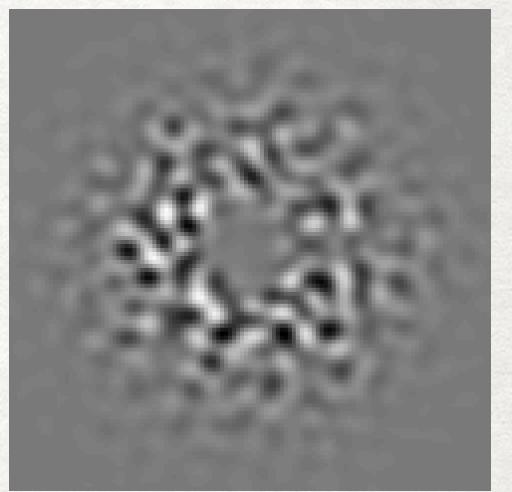


Signal

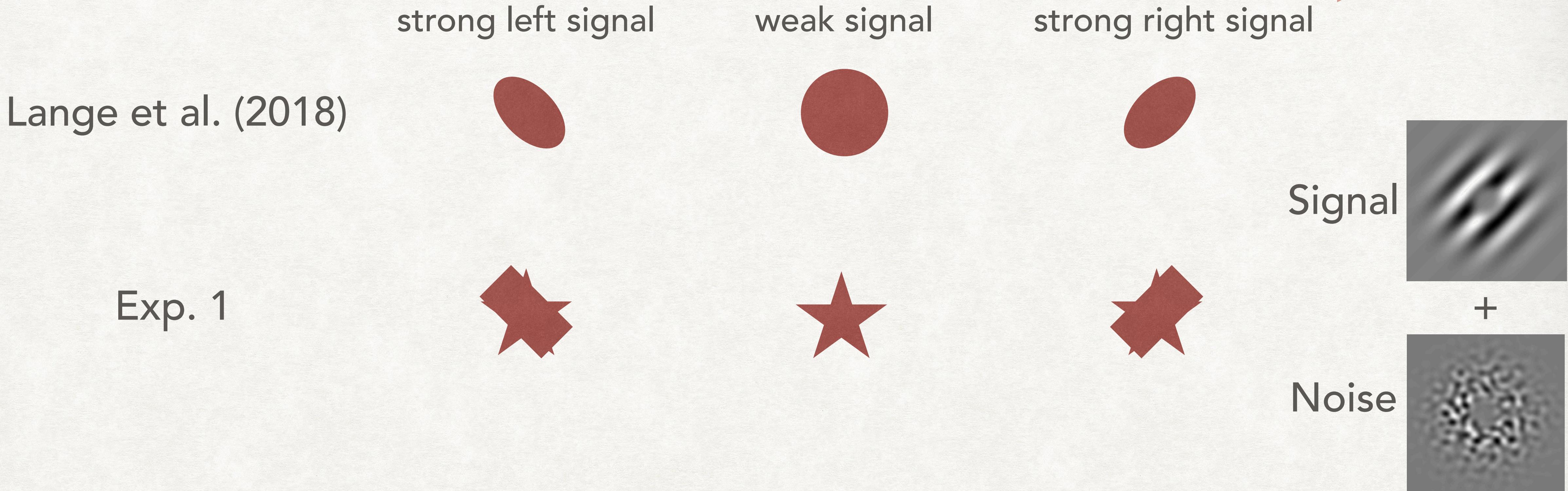


+

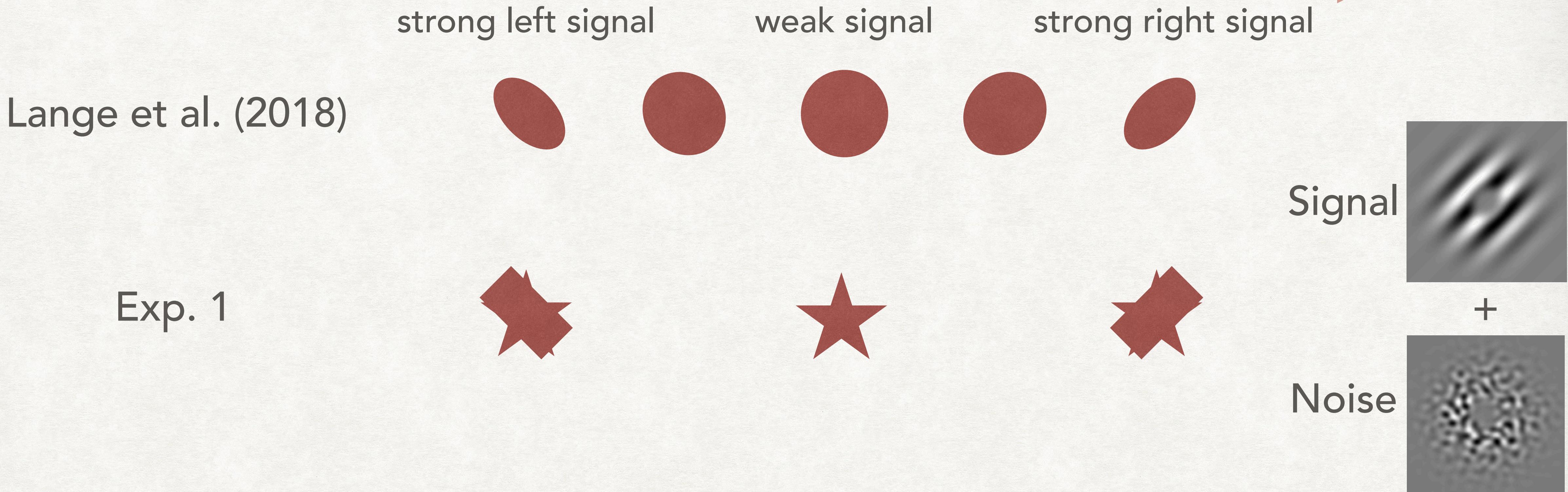
Noise



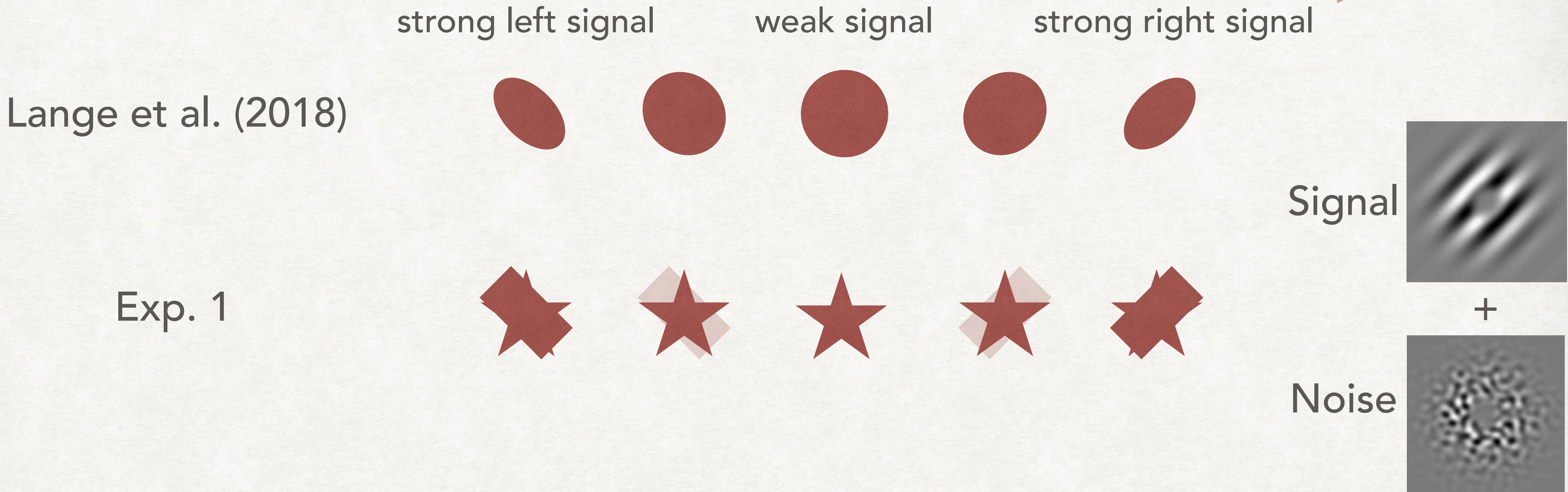
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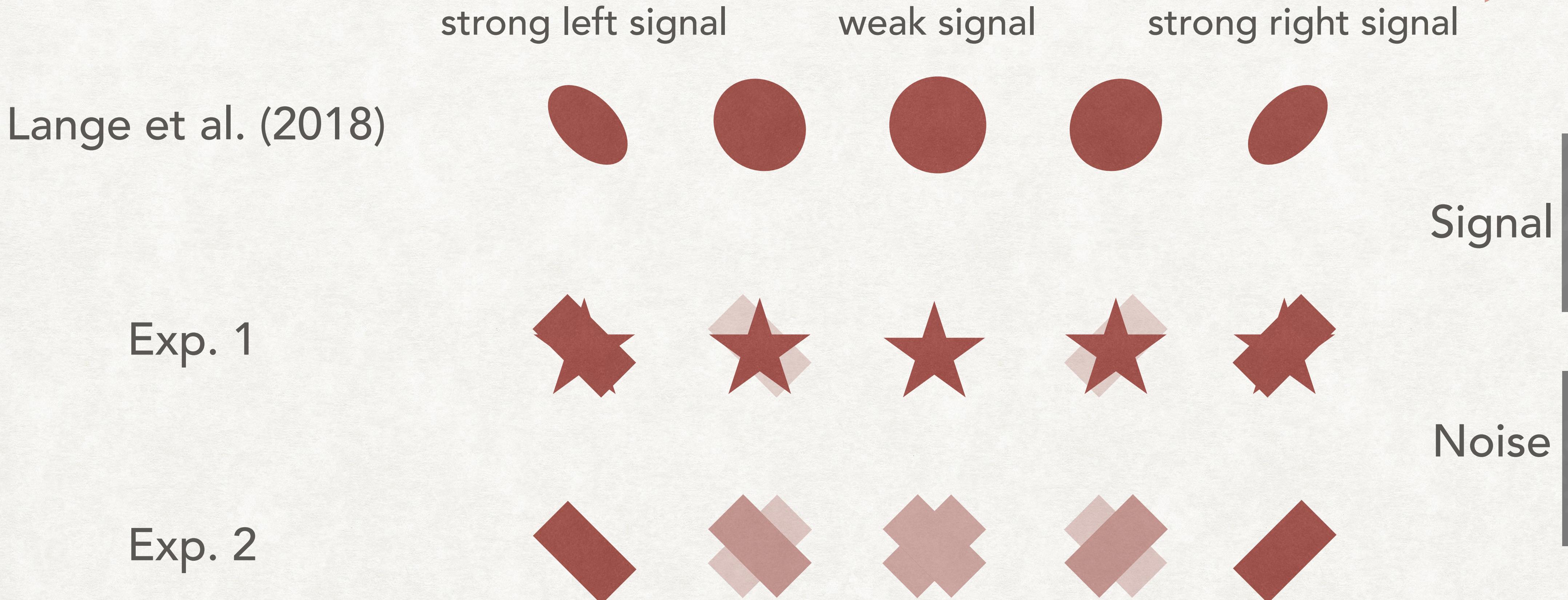
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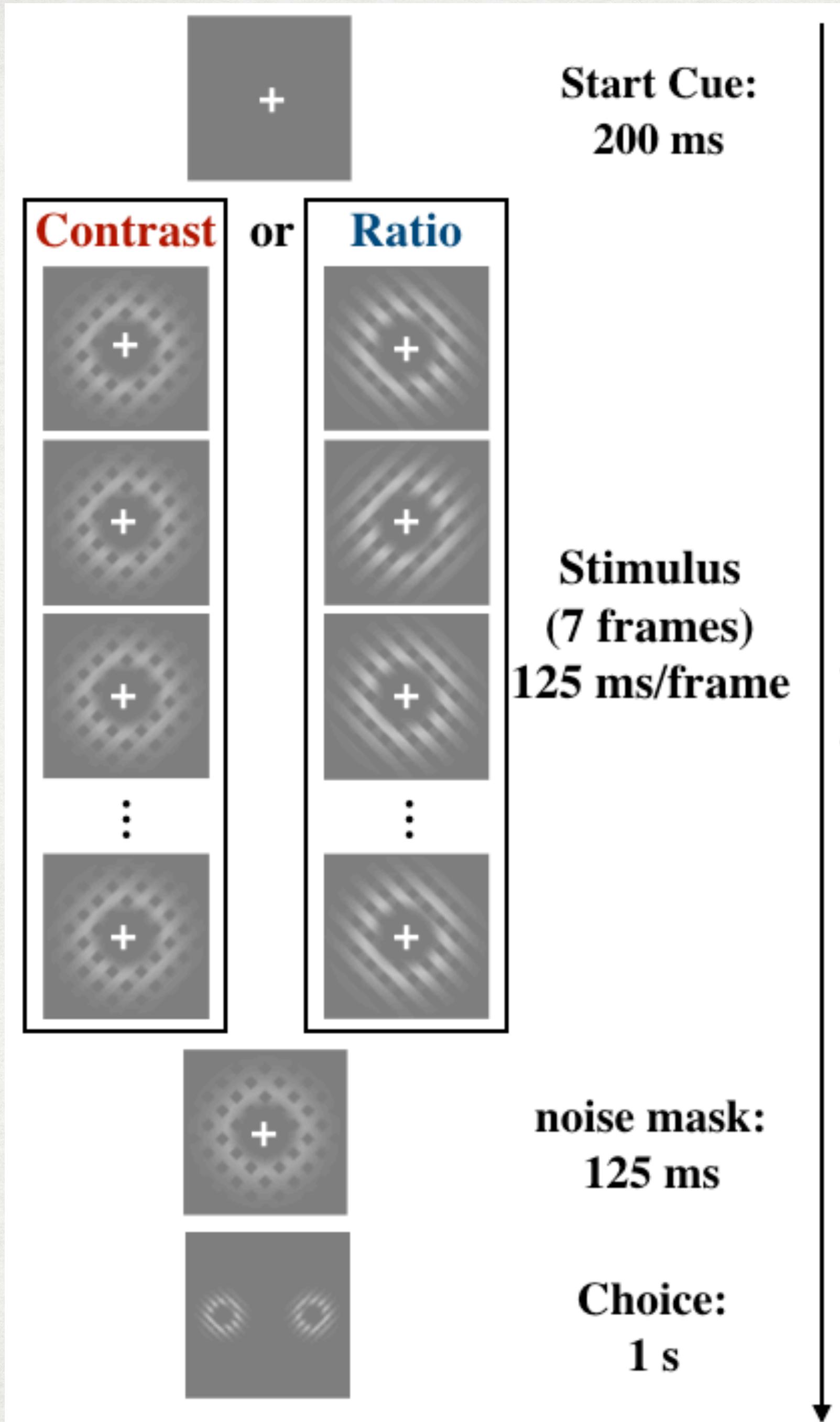
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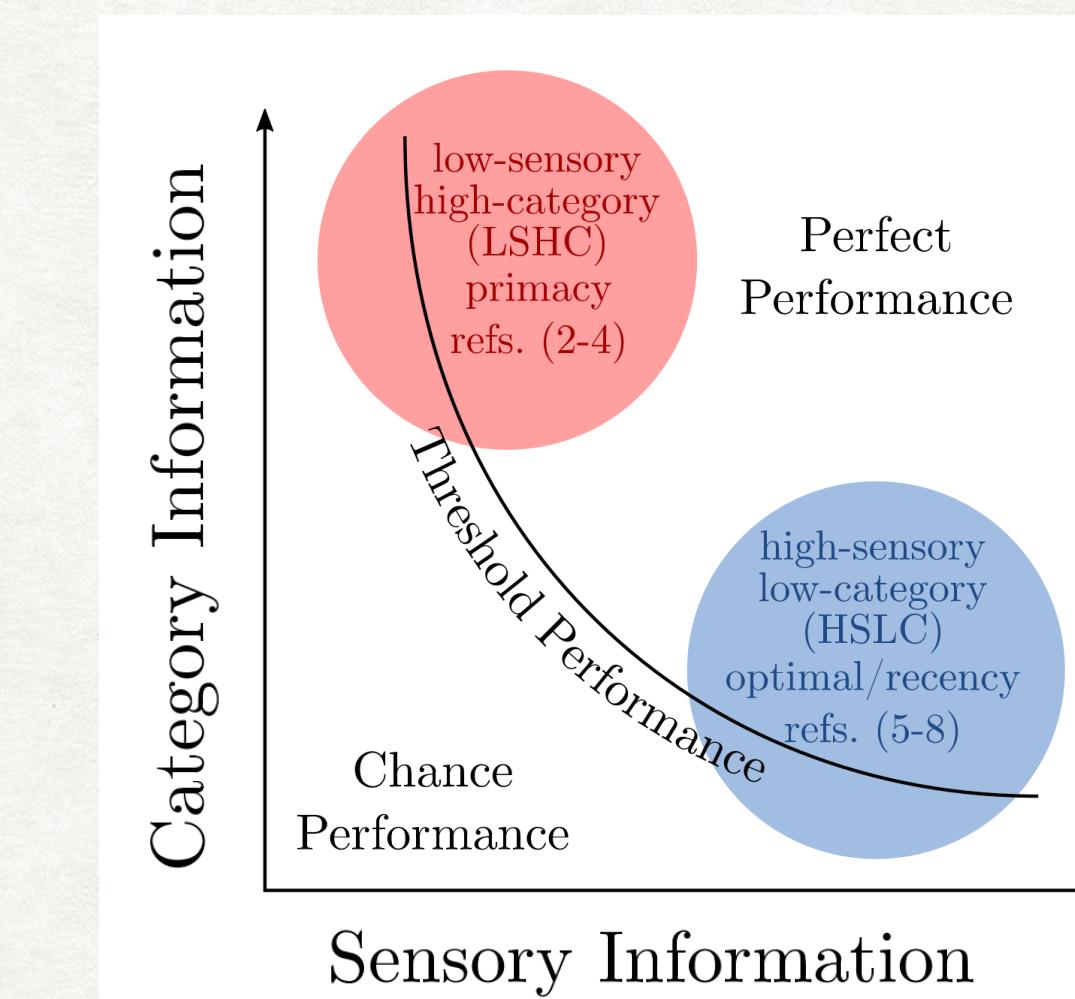


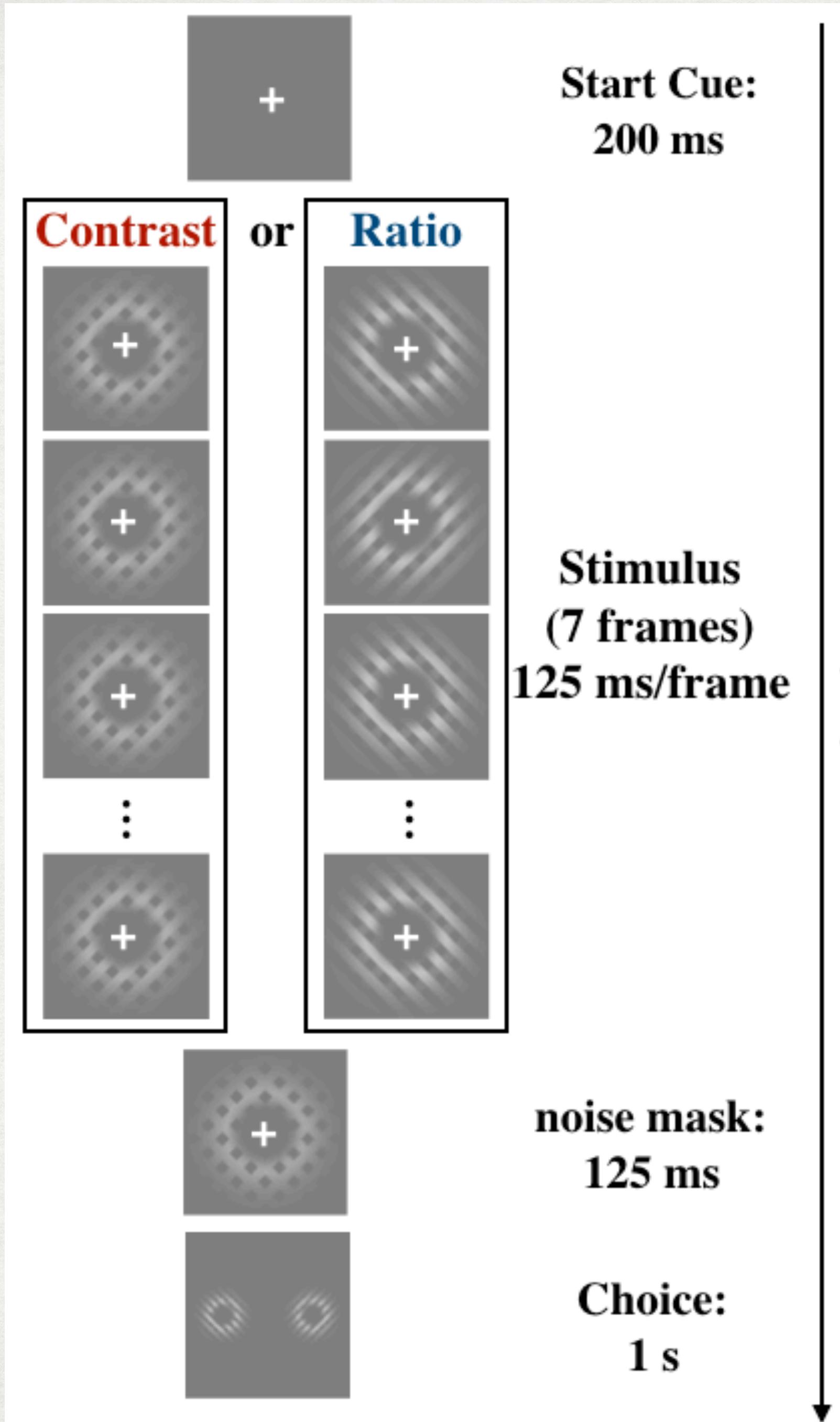
# EXPERIMENT 2



## METHOD

- 2AFC ( $-45^\circ$  vs.  $+45^\circ$ )
- within-subject design:
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- 2:1 staircase method



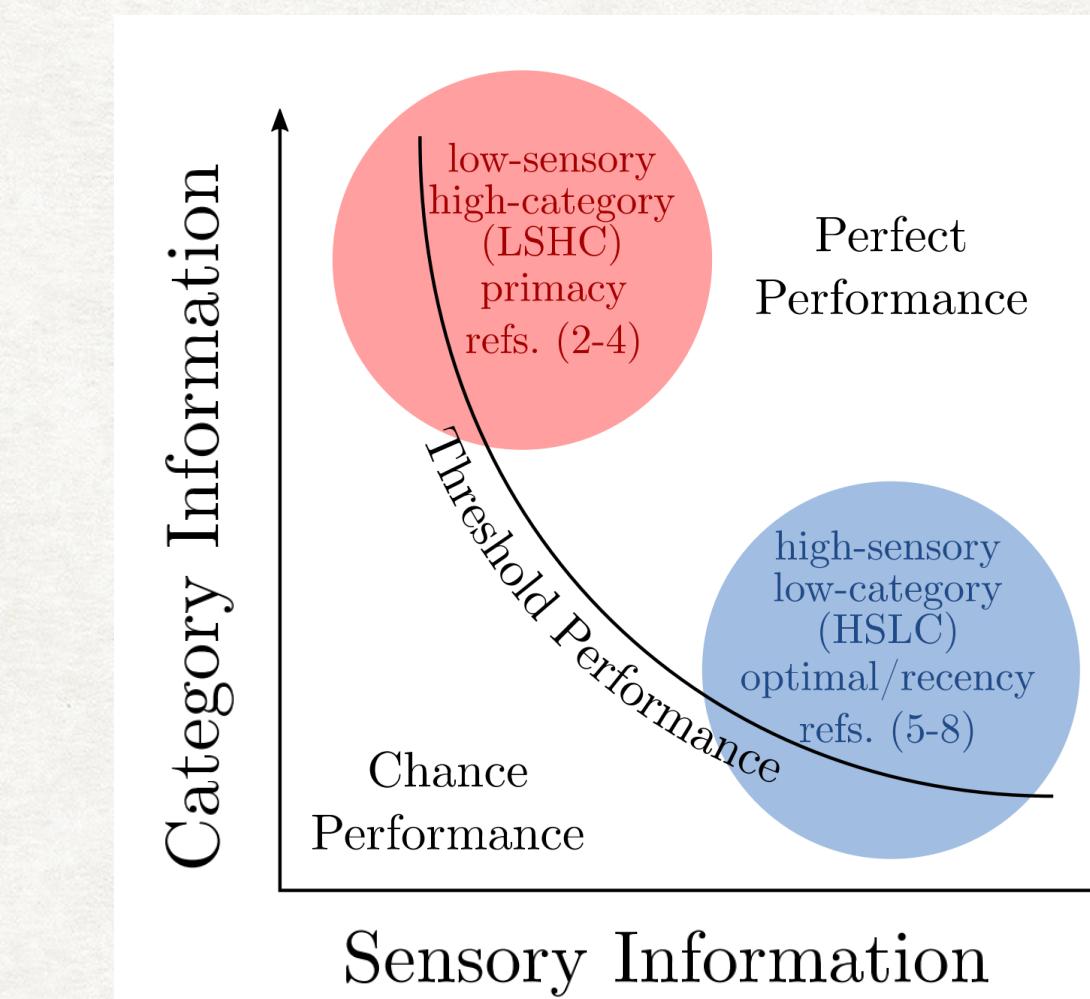


Logistic regression:

$$p(\text{choice} \mid \vec{x}) = \frac{\alpha}{2} + \frac{1-\alpha}{1+e^{-b-\sum_{k=1}^7 s_k x_k}}$$

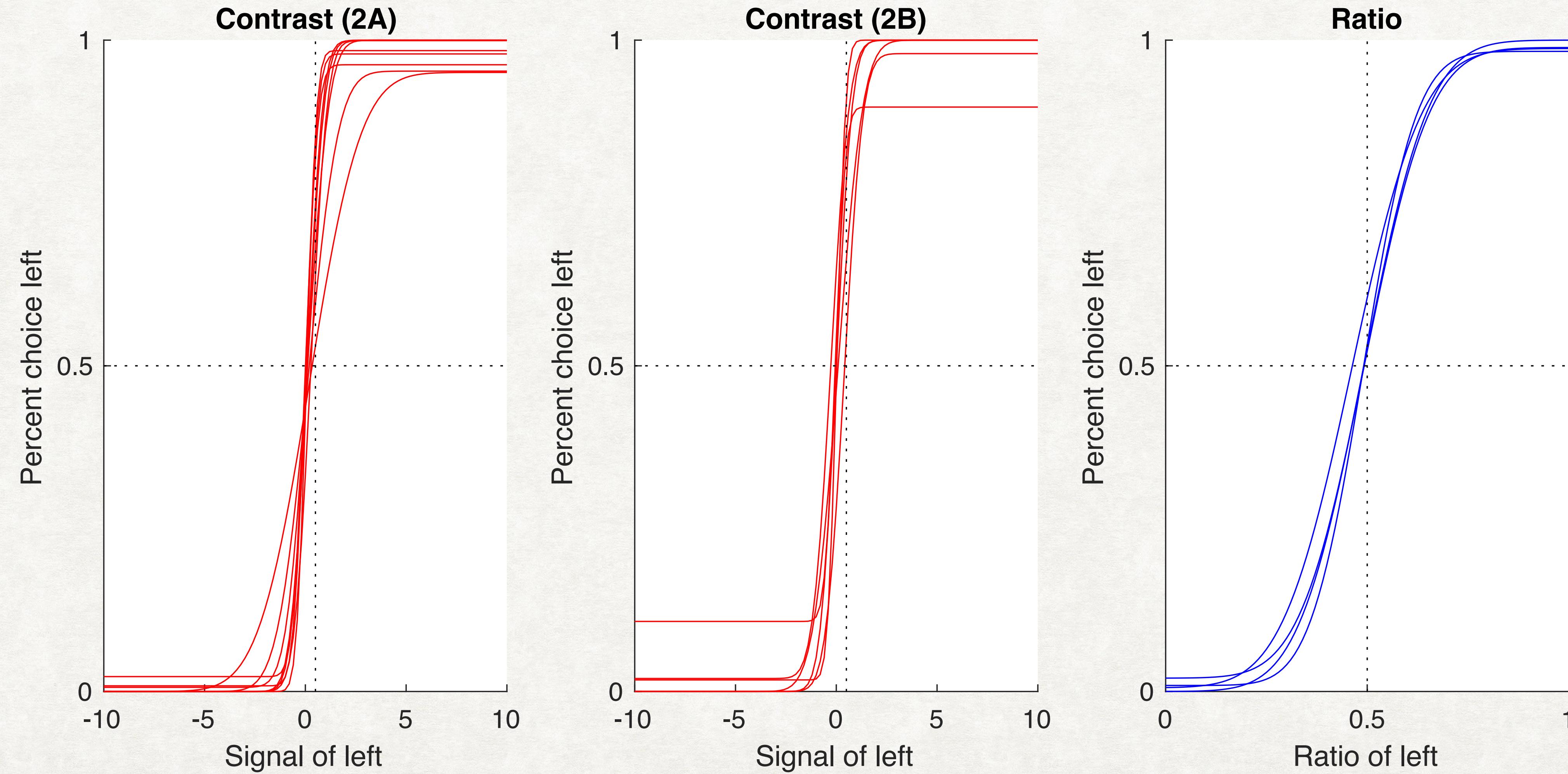
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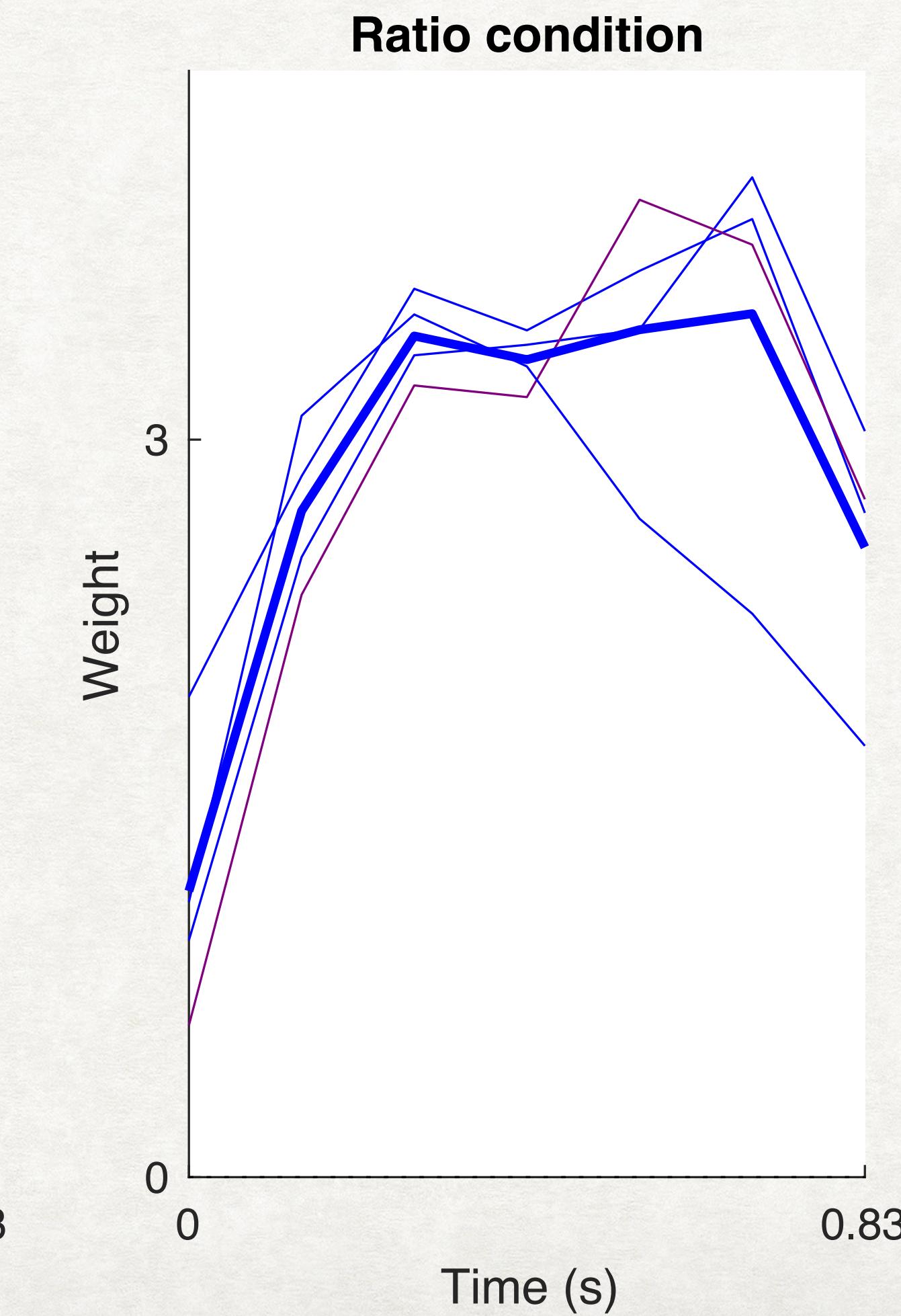
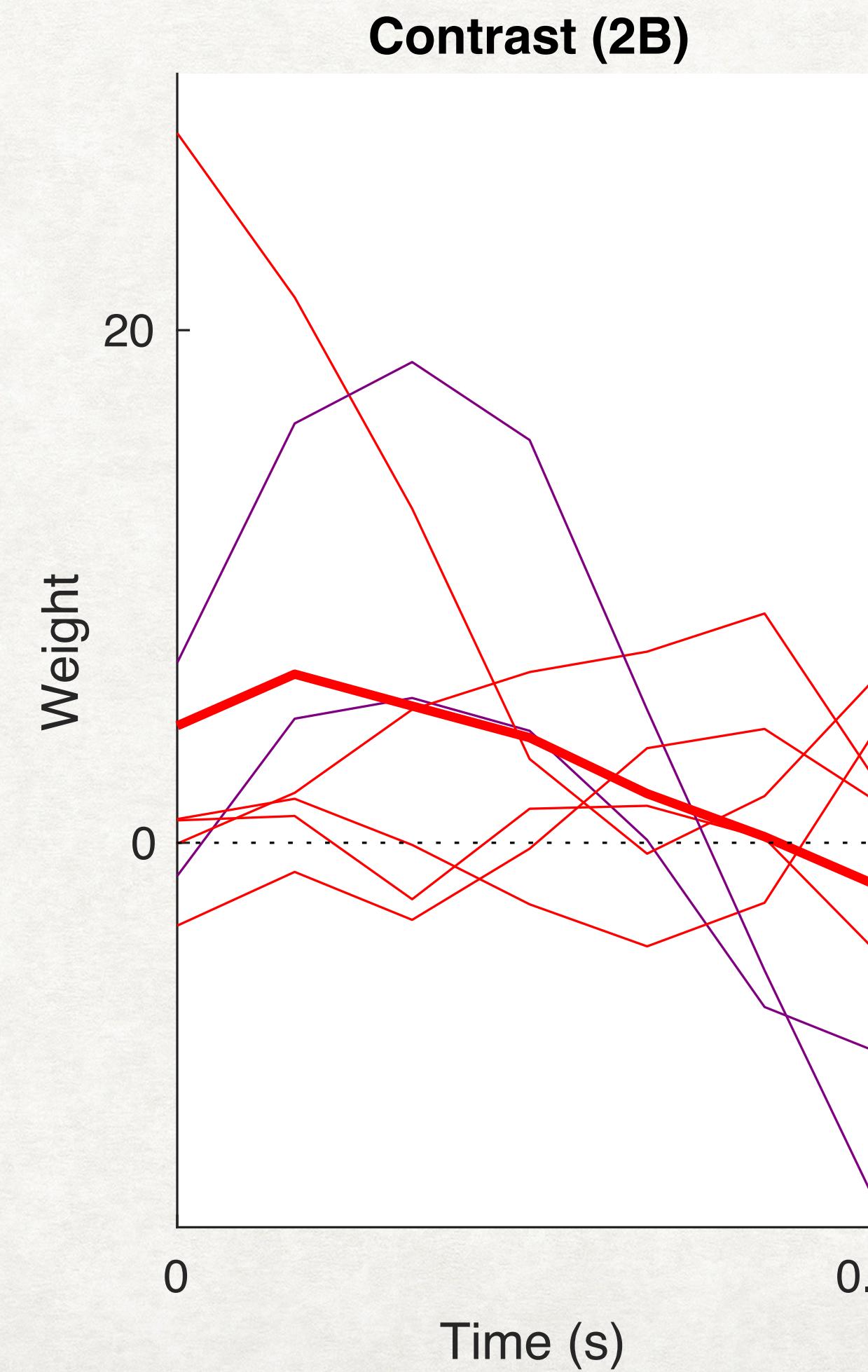
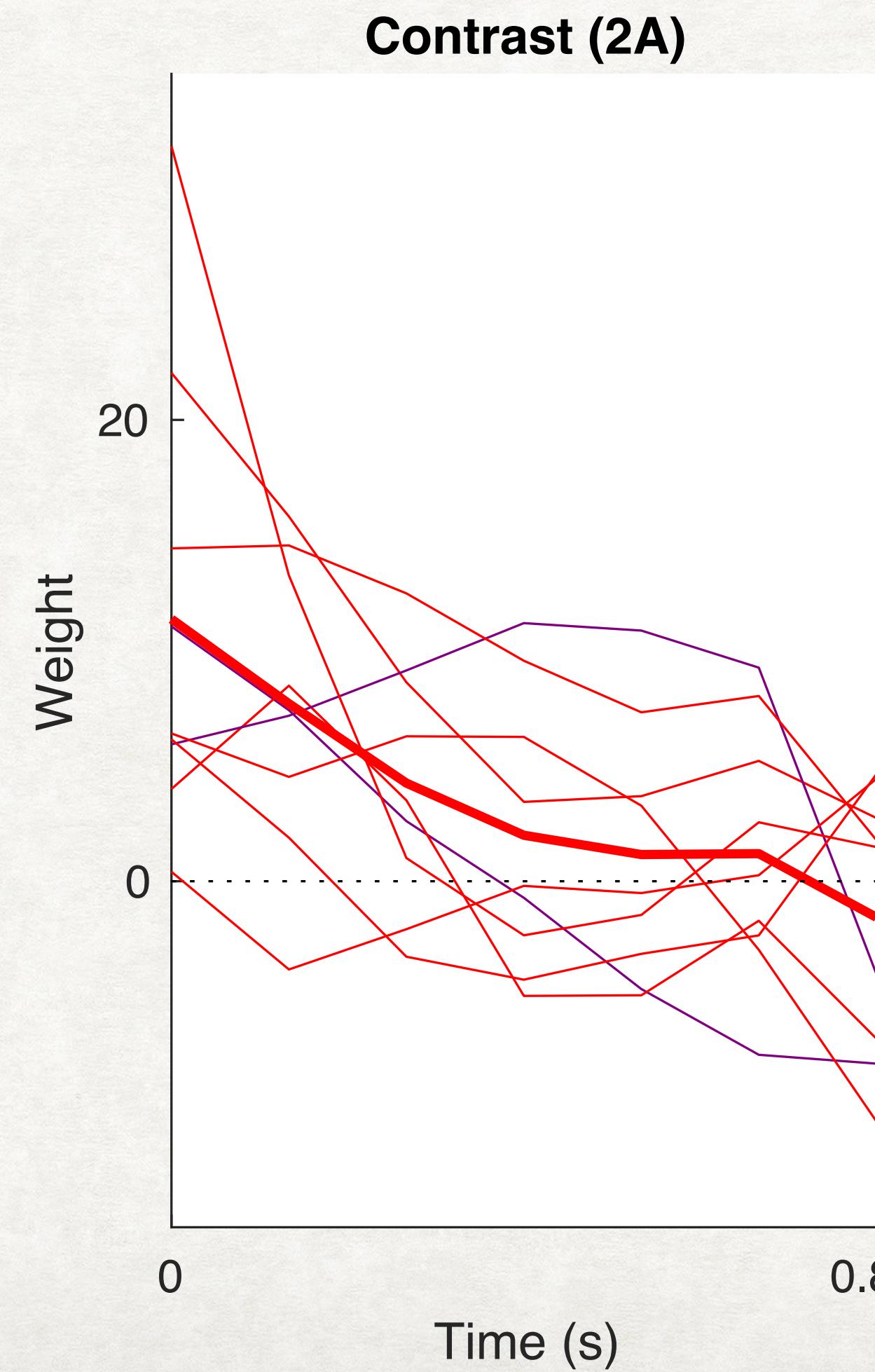
# EXPERIMENT 2 - RESULTS

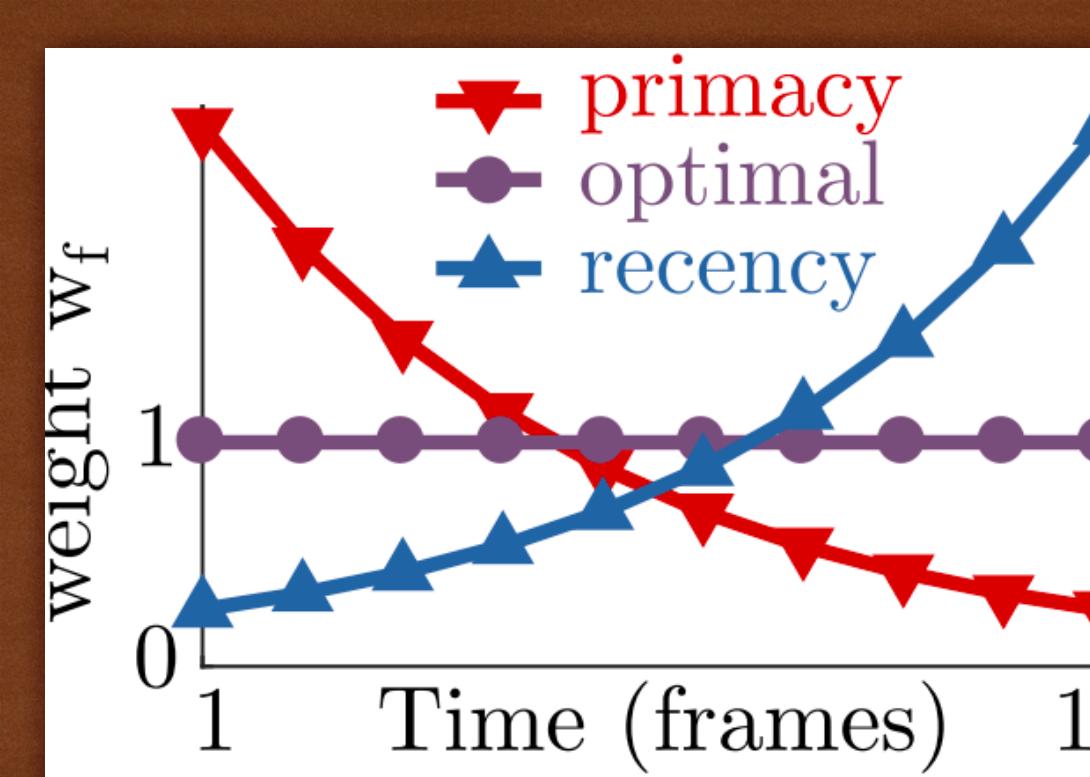
## Psychometric function



# EXPERIMENT 2 - RESULTS

## Temporal Kernel

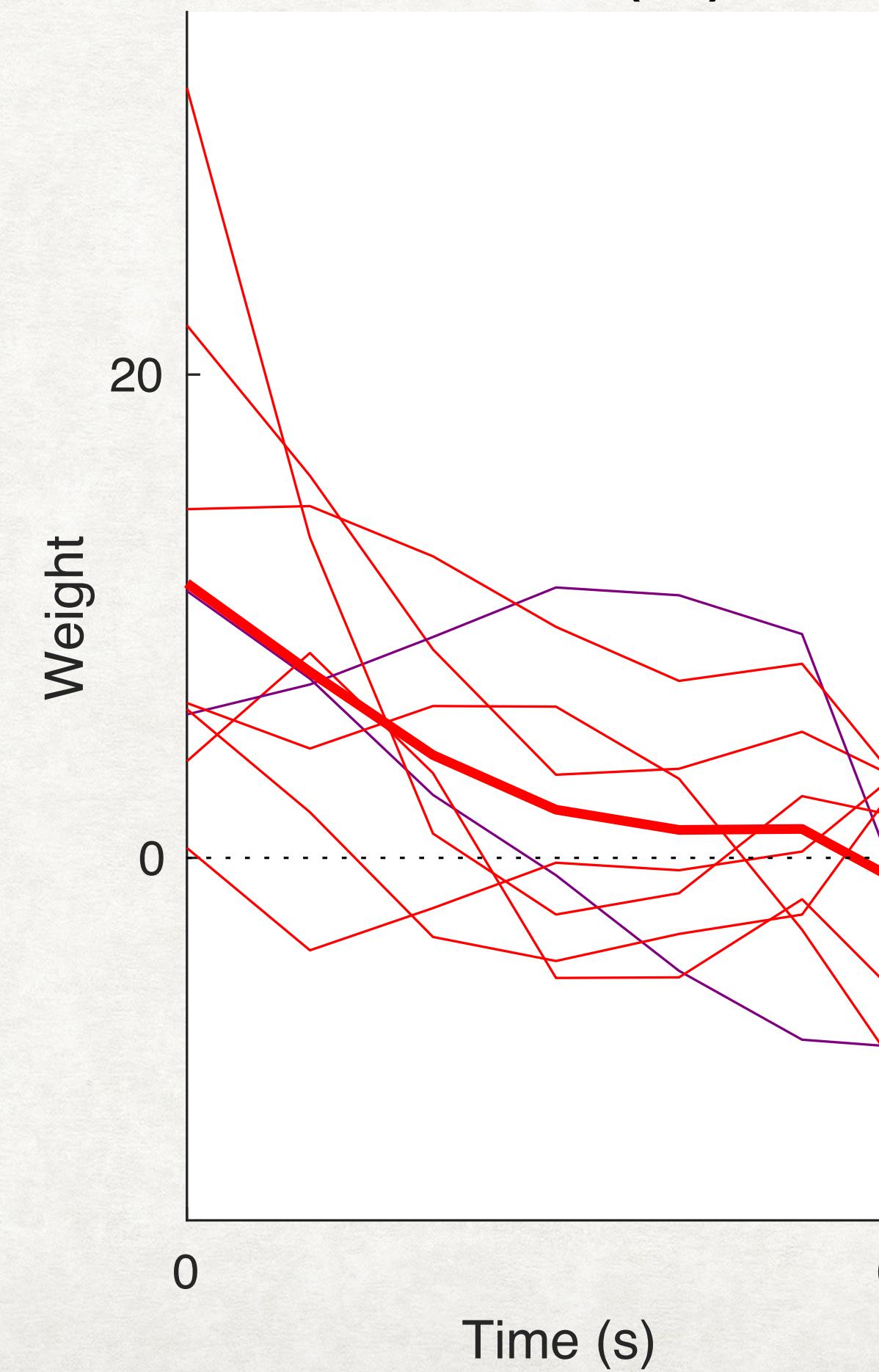




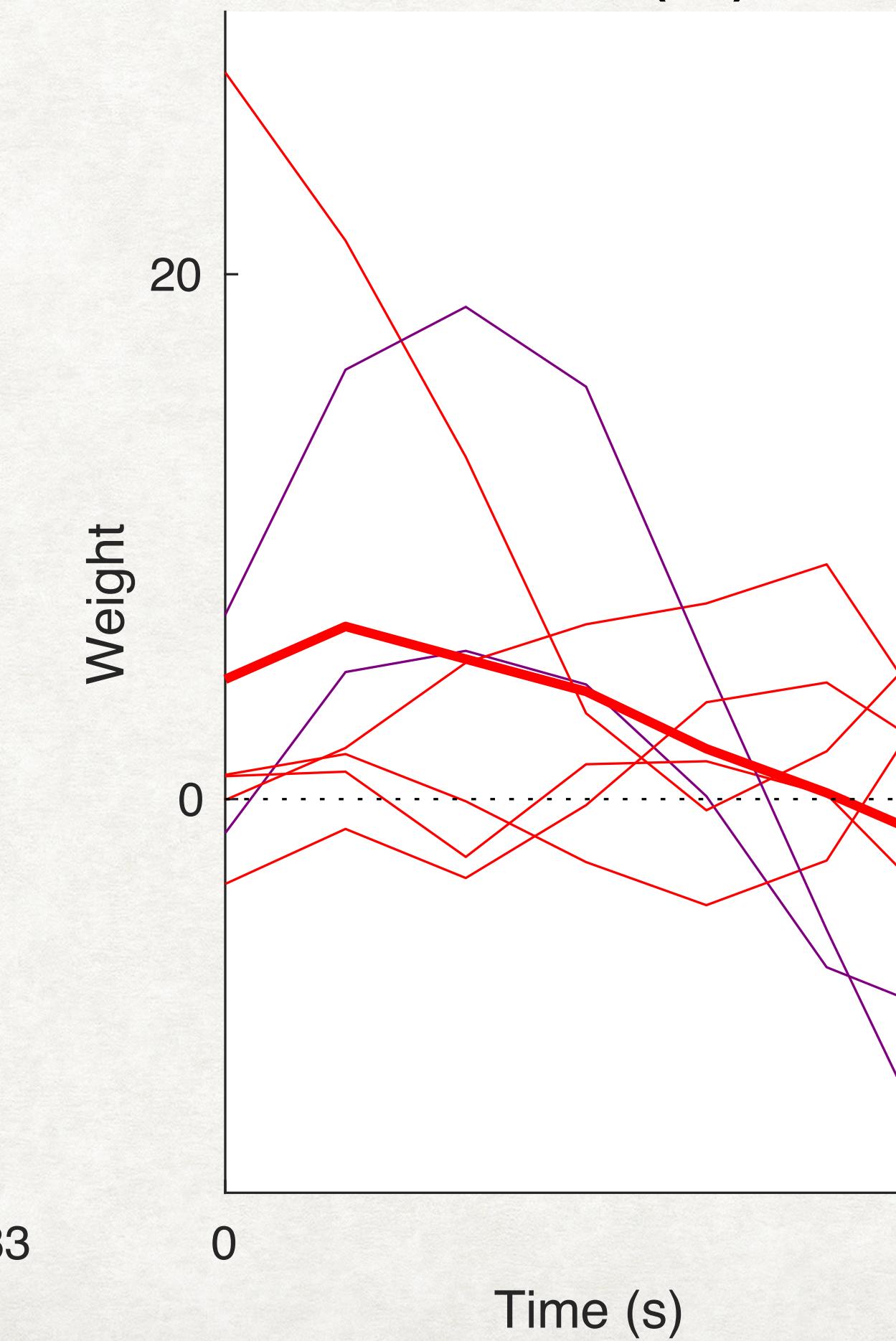
# EXPERIMENT 2 - RESULTS

# Temporal Kernels

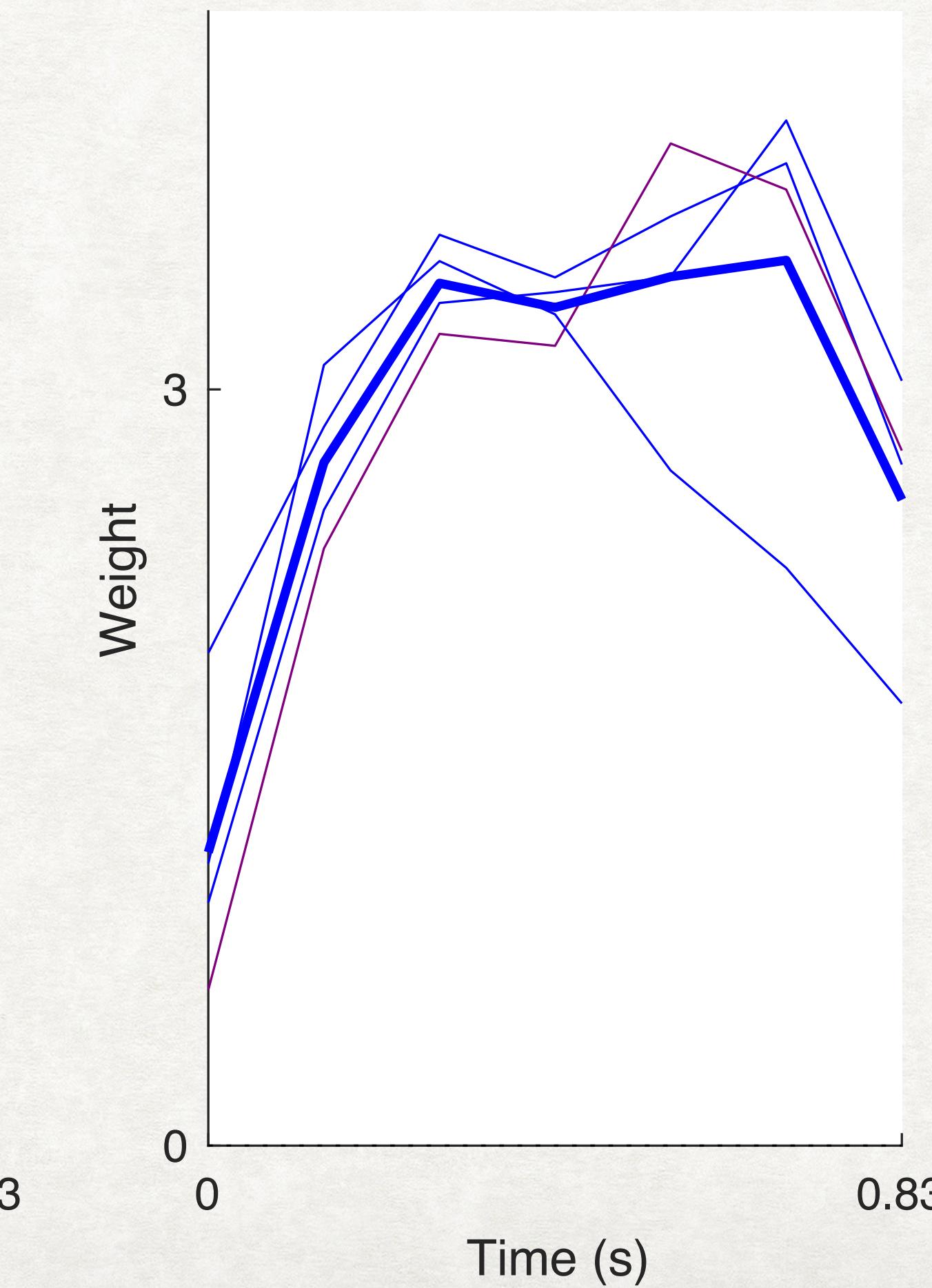
# Contrast (2)



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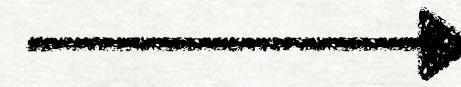
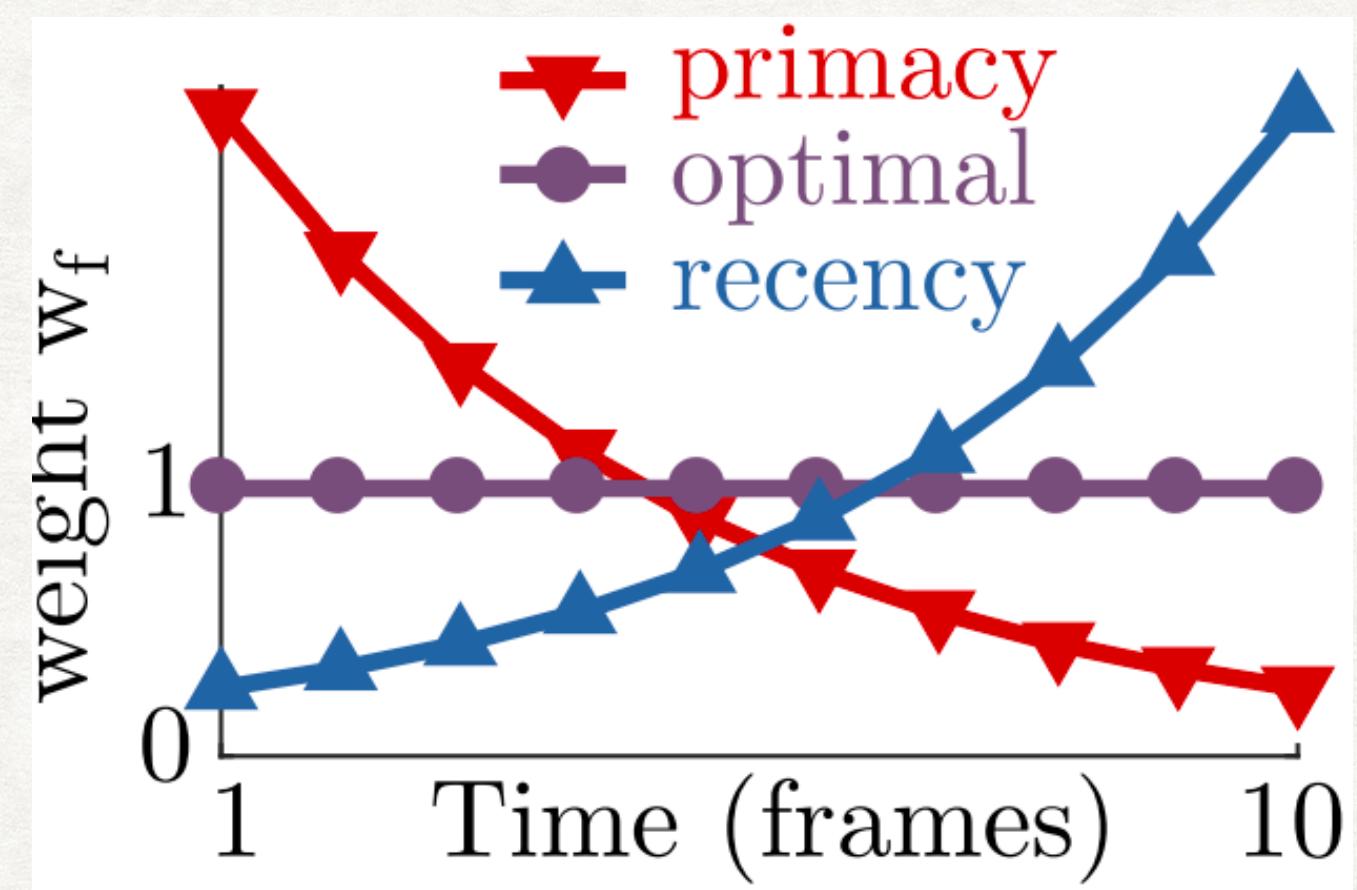


## Ratio condition

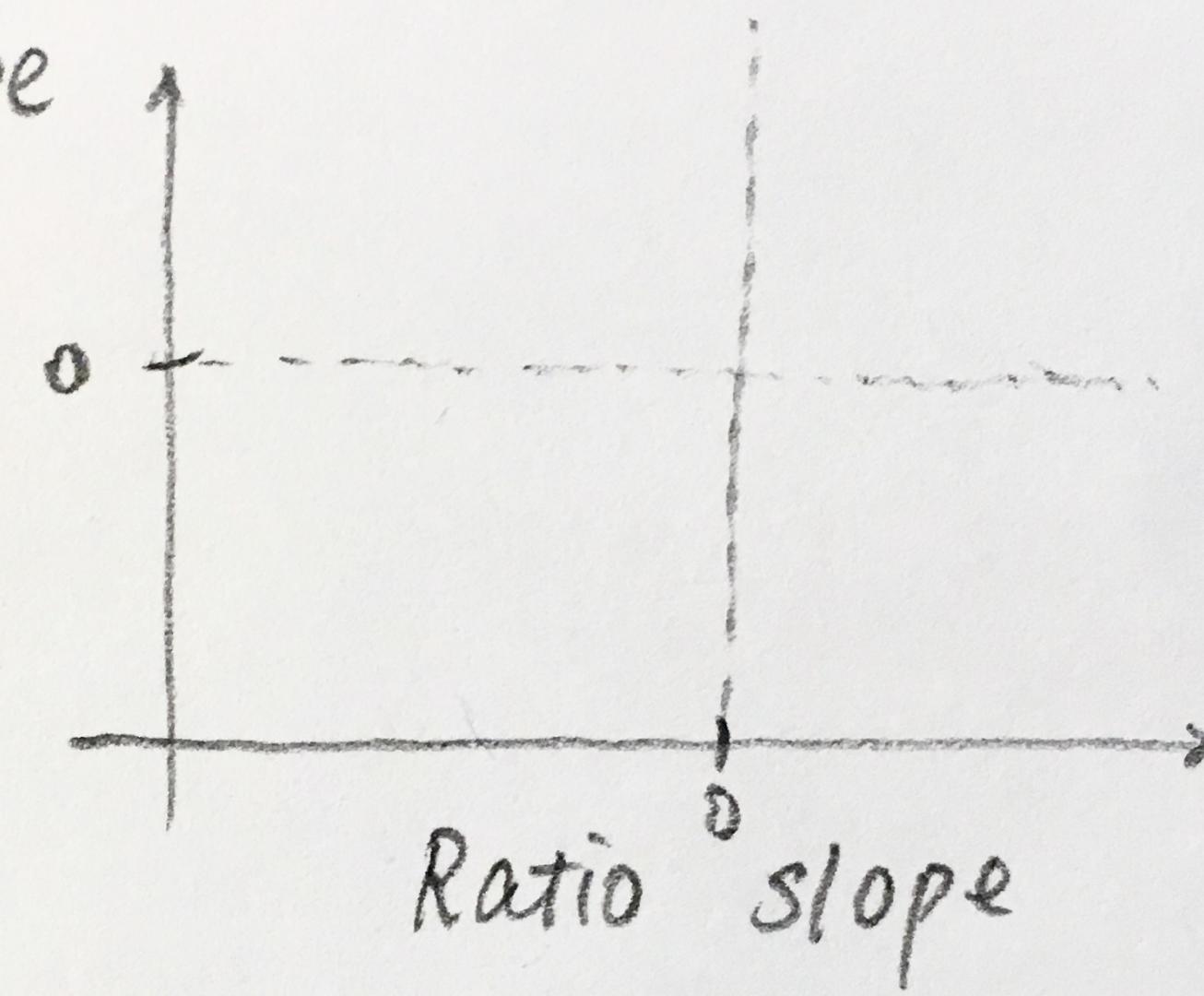


# EXPERIMENT 2 - RESULTS

## Linear regression slopes

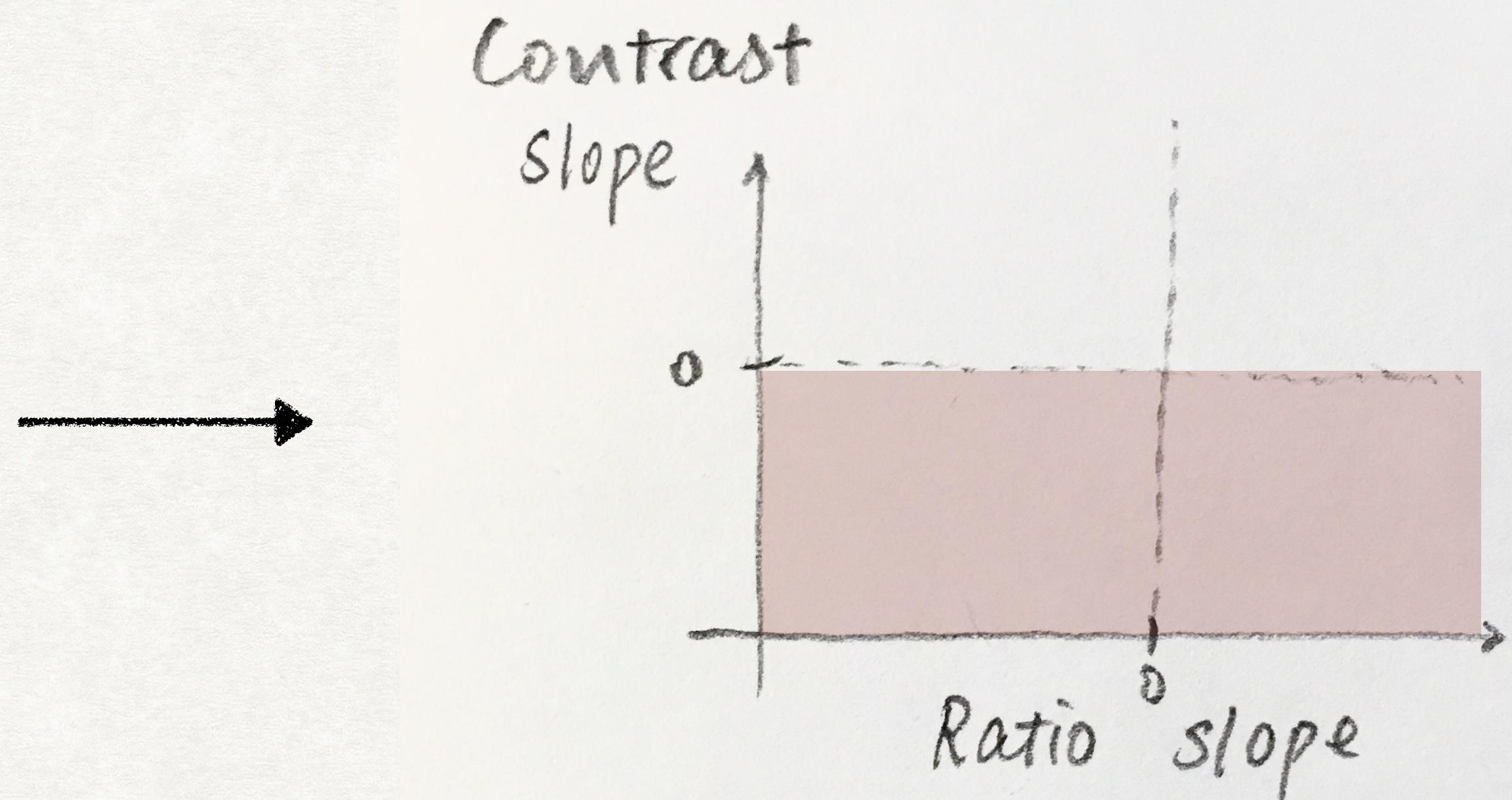
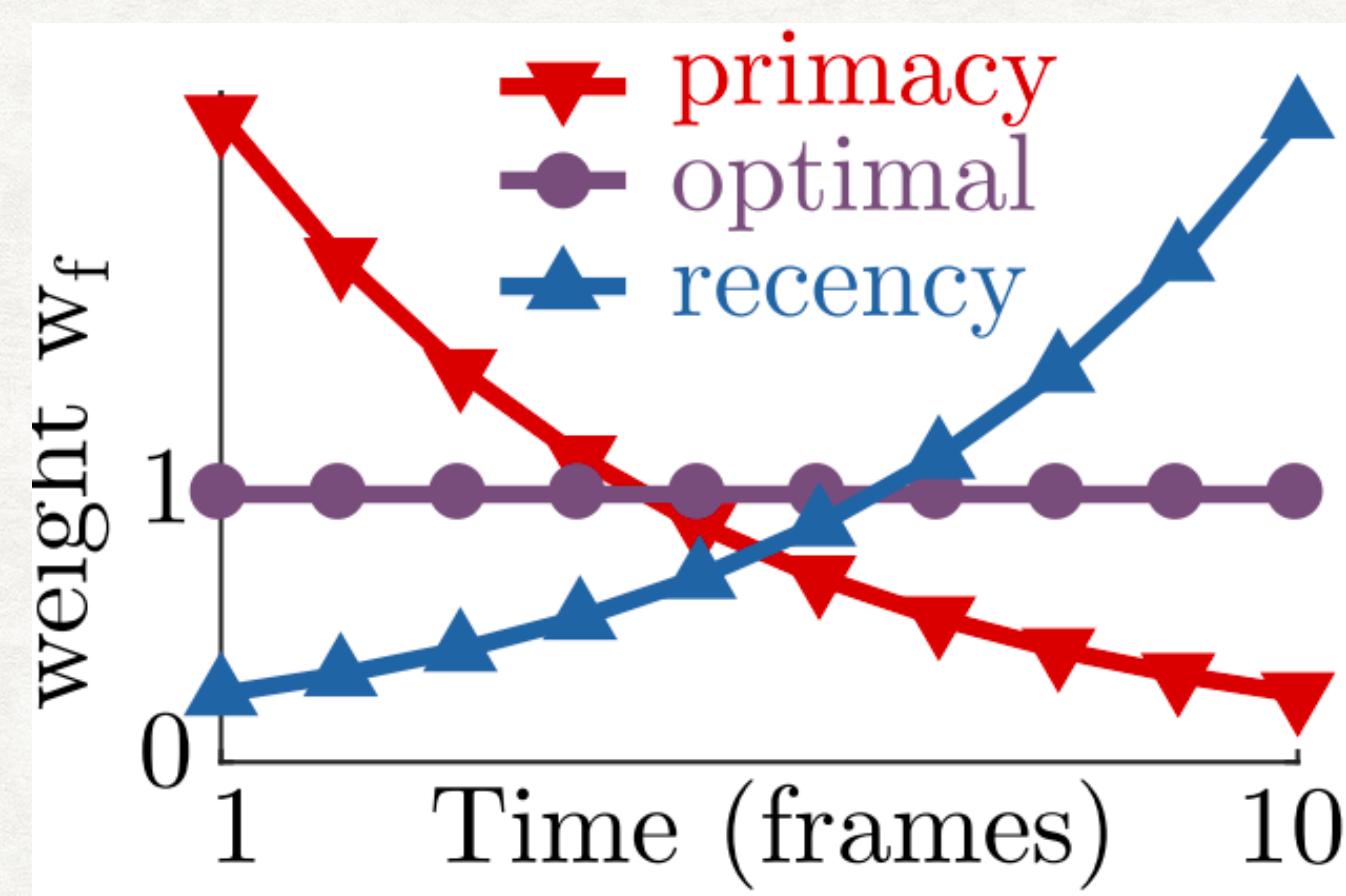


Contrast  
slope



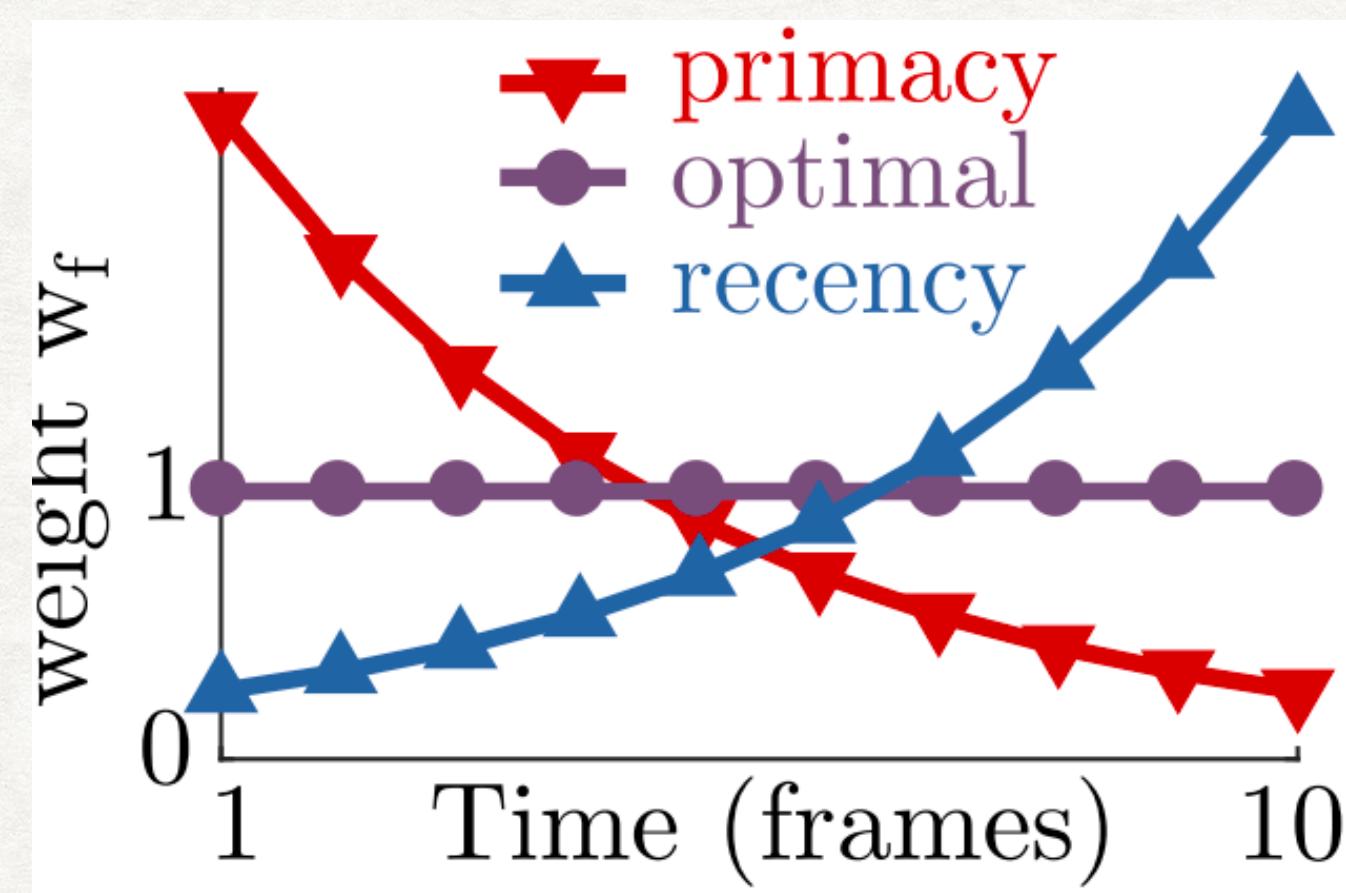
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## Linear regression slopes

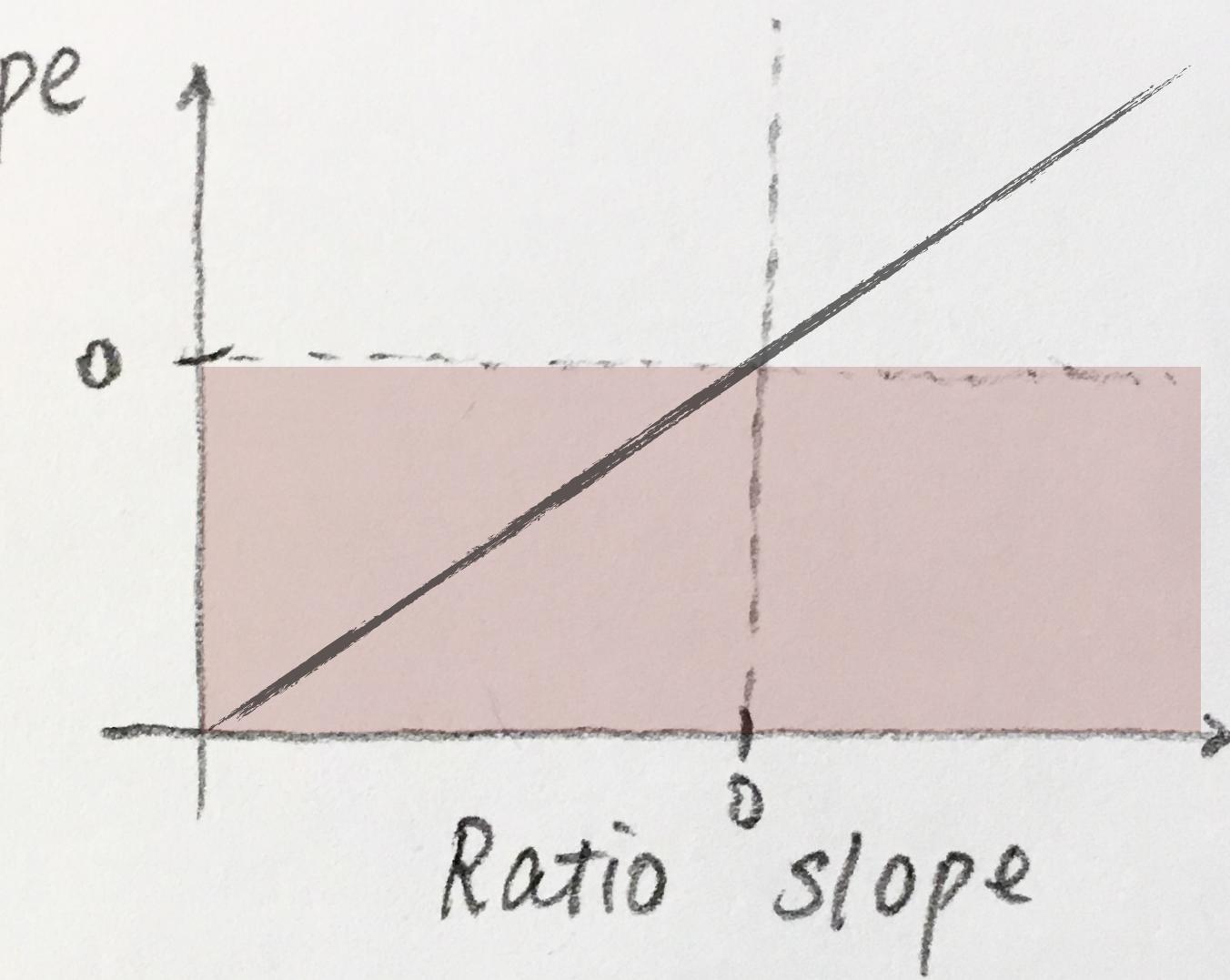


# EXPERIMENT 2 - RESULTS

## Linear regression slopes

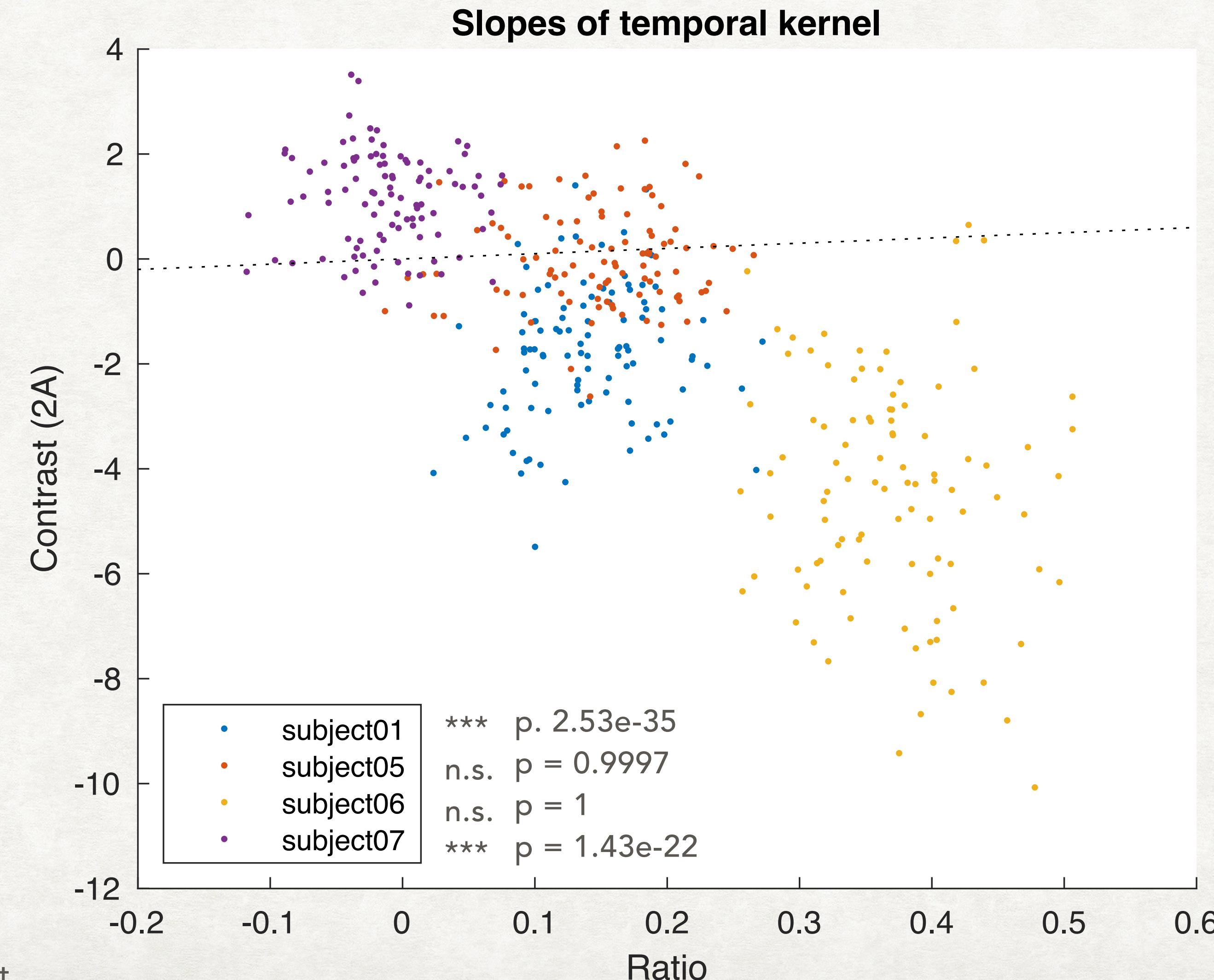


Contrast  
slope



# EXPERIMENT 2 - RESULTS

## Linear regression slopes



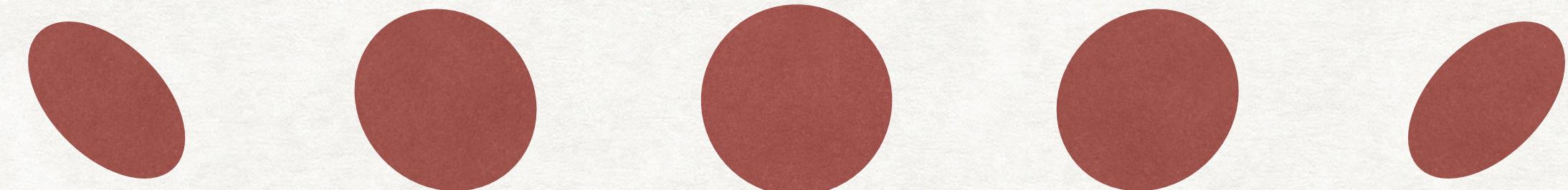
# CONCLUSION

Experiment

Design

Primacy effect?

Lange et al.



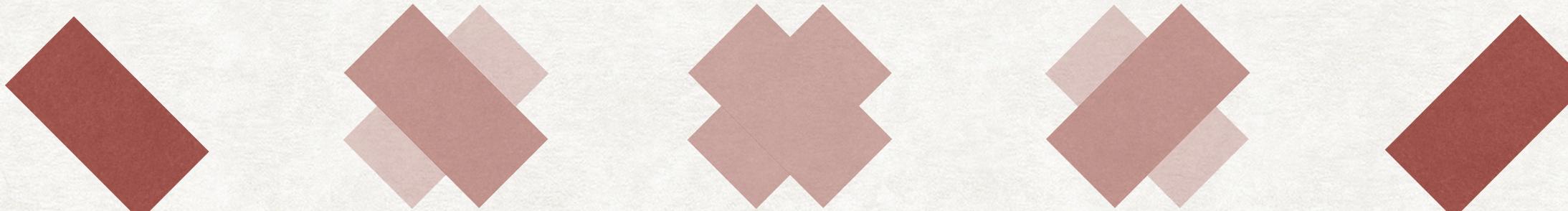
Yes

Exp. 1



No

Exp. 2



Yes

# CONCLUSION

The current project tests the theory from Lange et al. (2018) and found...

1. The theory generalizes to a foreground-background task;
2. The theory does not always generalize, depending on the nature of the stimuli