FUNCTIONAL SIGNIFICANCE OF EARLY MULTISENSORY RESPONSES IN MODALITY SPECIFIC CORTEX

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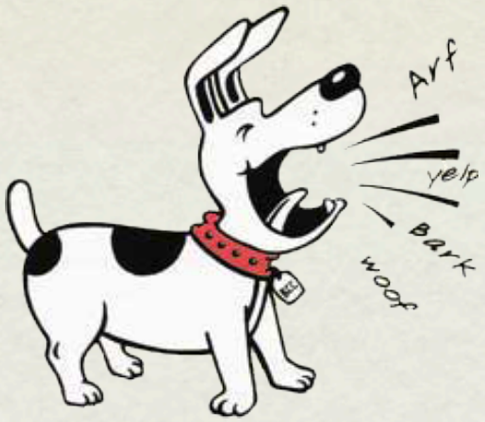
2013 Spring Retreat: INC Cognitive Neuroscience Fellow Blitz Talk
Advisor: Prof. Steven Hillyard
ERP LAB

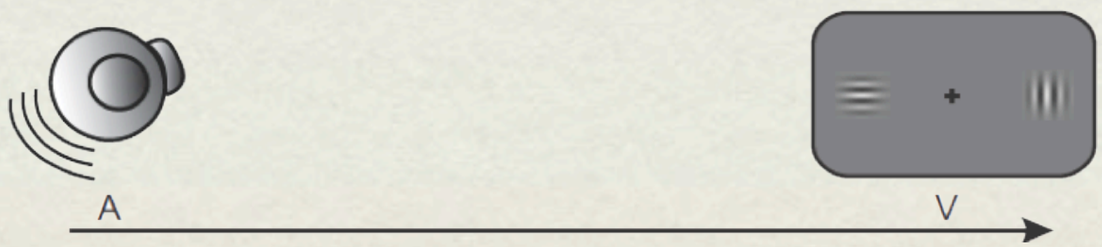
- Information in one sensory modality often alerts us to information in another sensory modality



- Preceding auditory cue makes the appearance of subsequent visual stimuli at that location :
  - faster and more accurate (McDonald et al. 2000,2003,2005)
  - brighter (Stoermer et al. 2009)

- ***What neural mechanism mediates this enhancement of visual perception by an auditory cue?***

Experimental Paradigm



time interval (450 ms) between auditory cue and visual target

EFFECT OF AUDITORY CUES ON VISUAL PERCEPTION : RESPONSES TO VISUAL TARGETS

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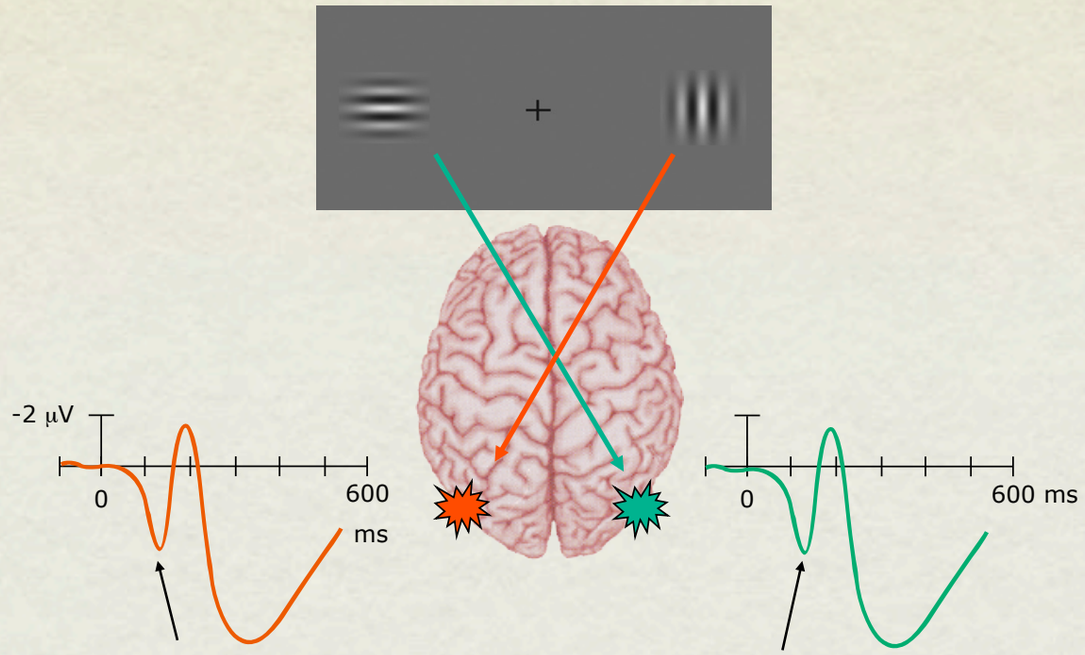

P1 Component is typically bilaterally symmetrical

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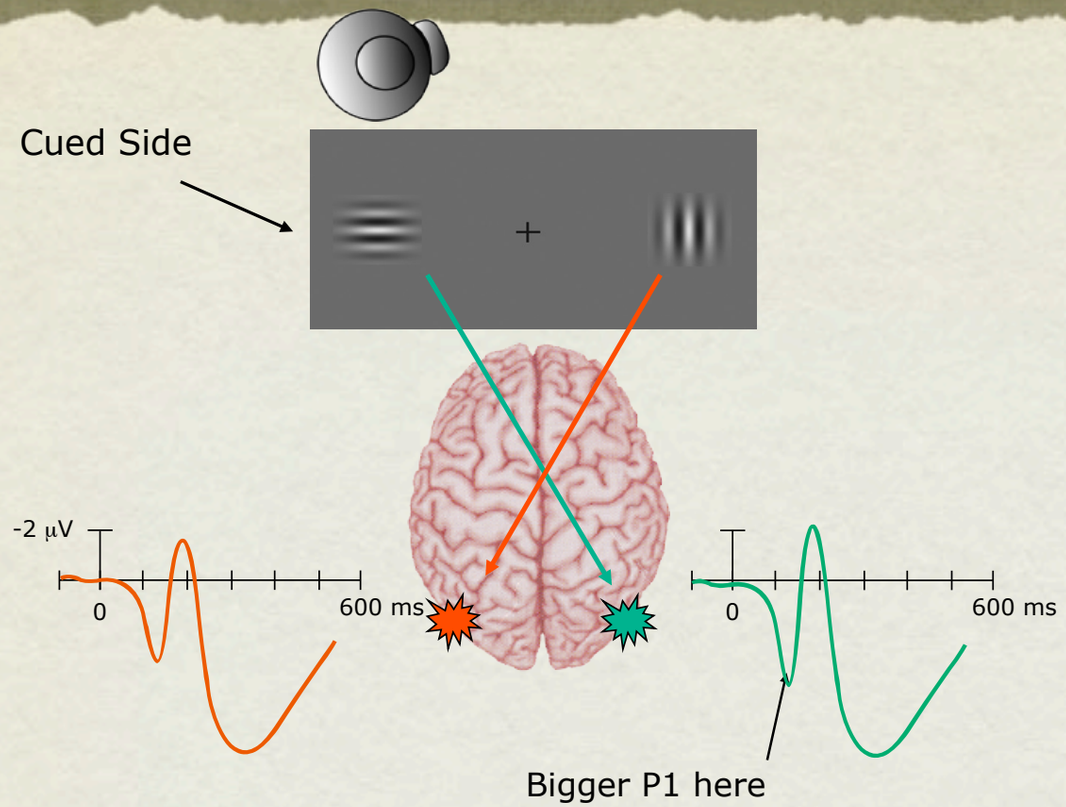
Cued Side

EFFECT OF AUDITORY CUES ON VISUAL PERCEPTION : RESPONSES TO VISUAL TARGETS



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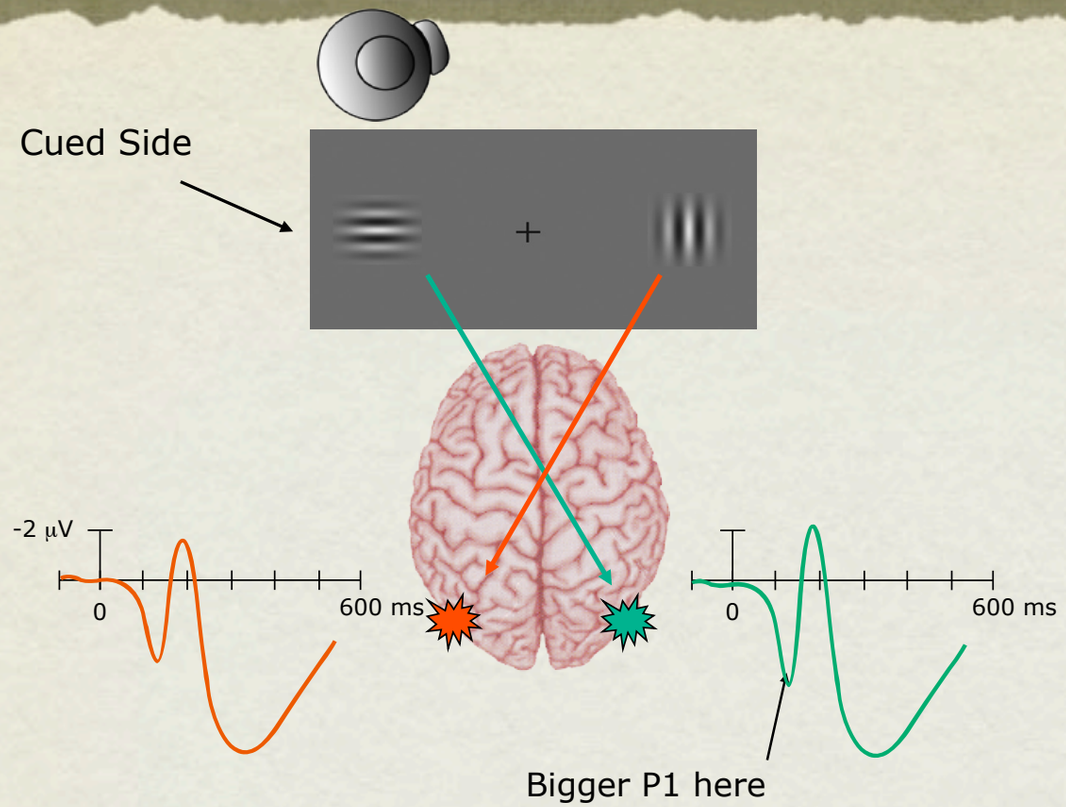

Enhanced processing on Cued side

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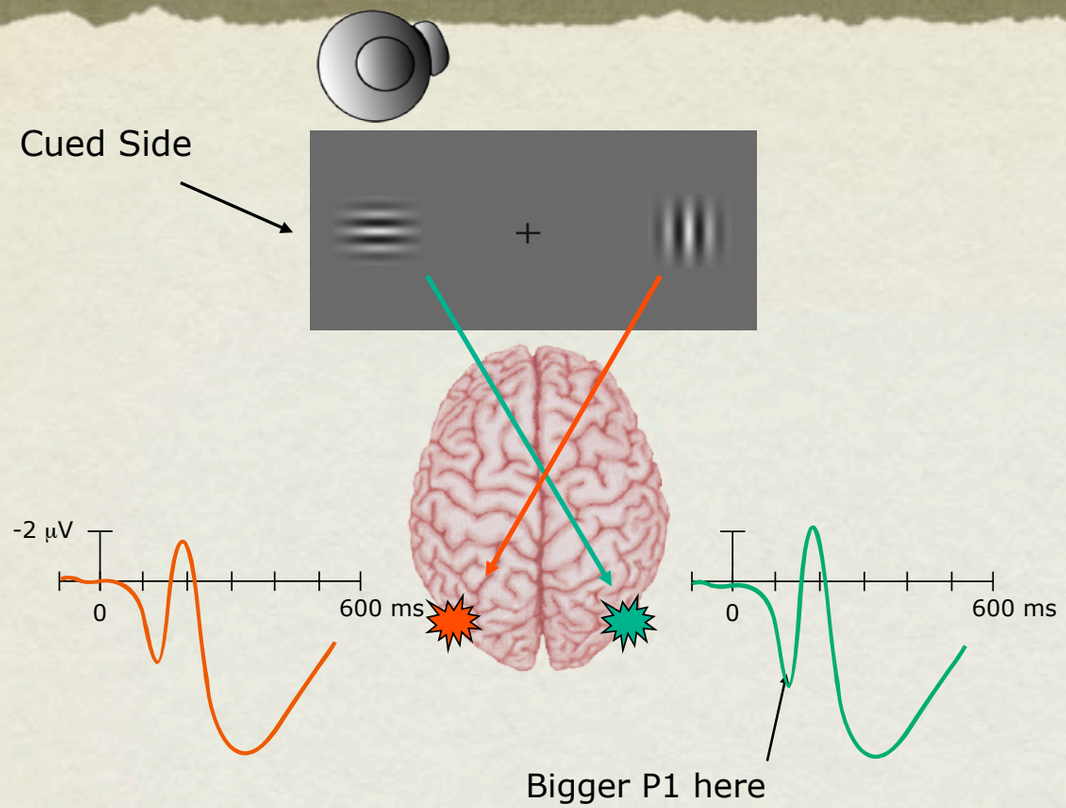

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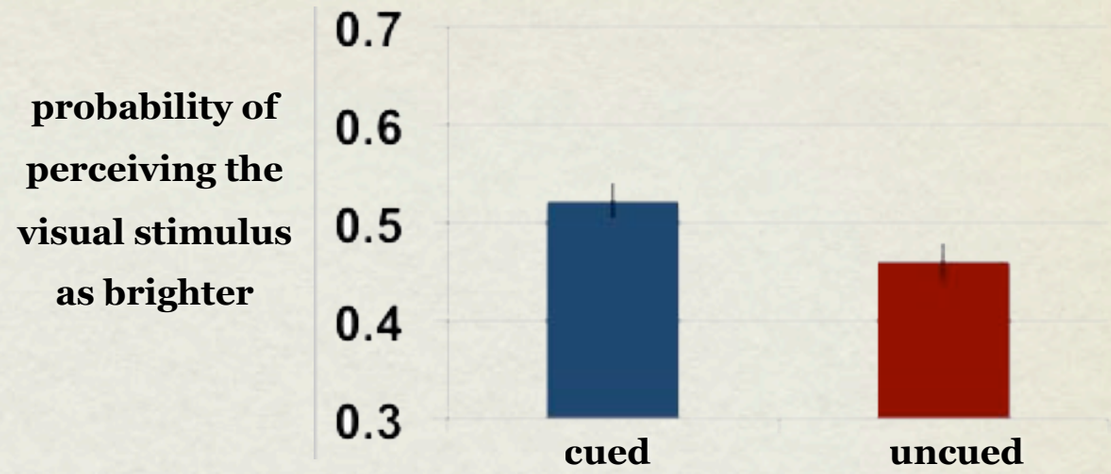

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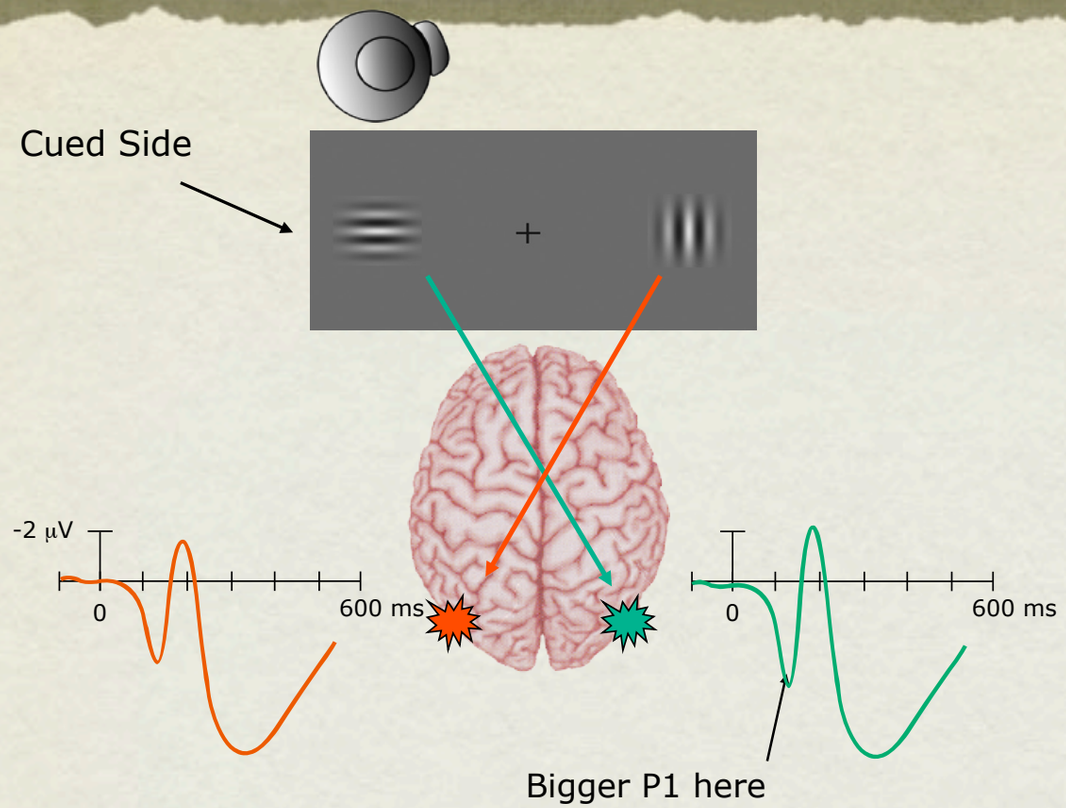

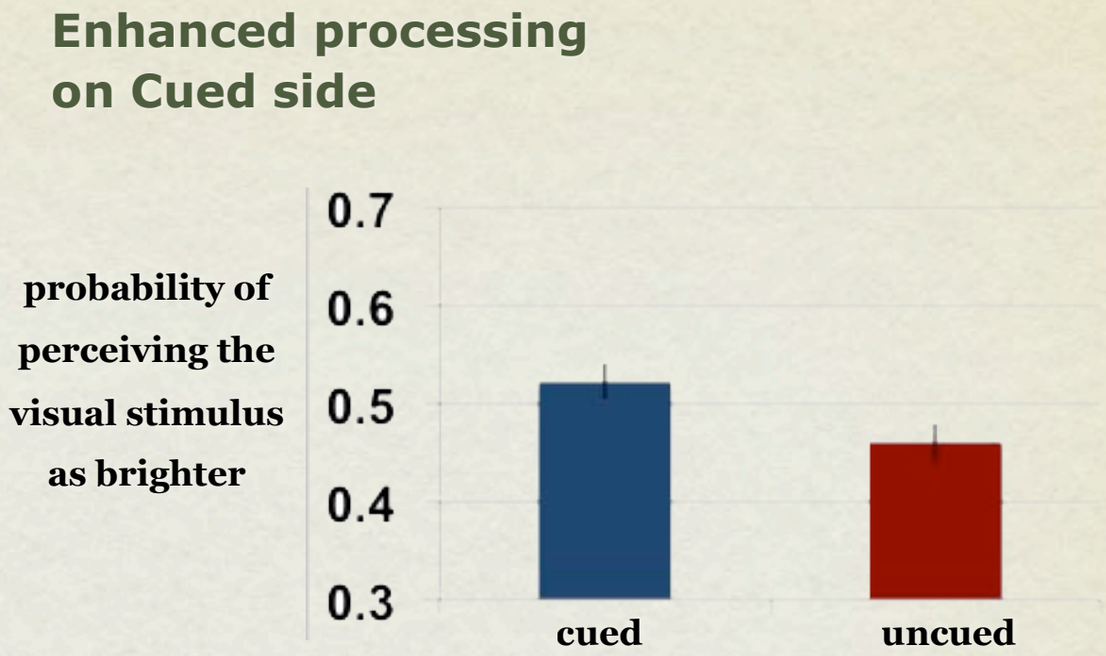

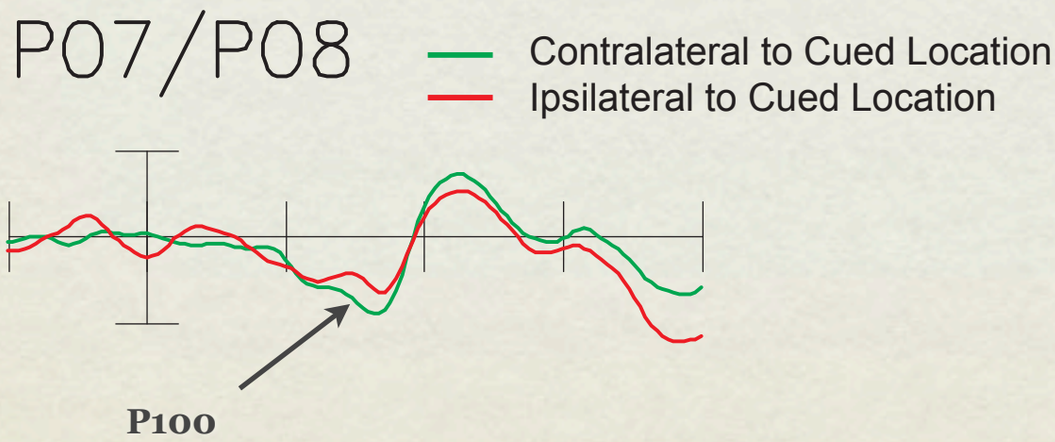

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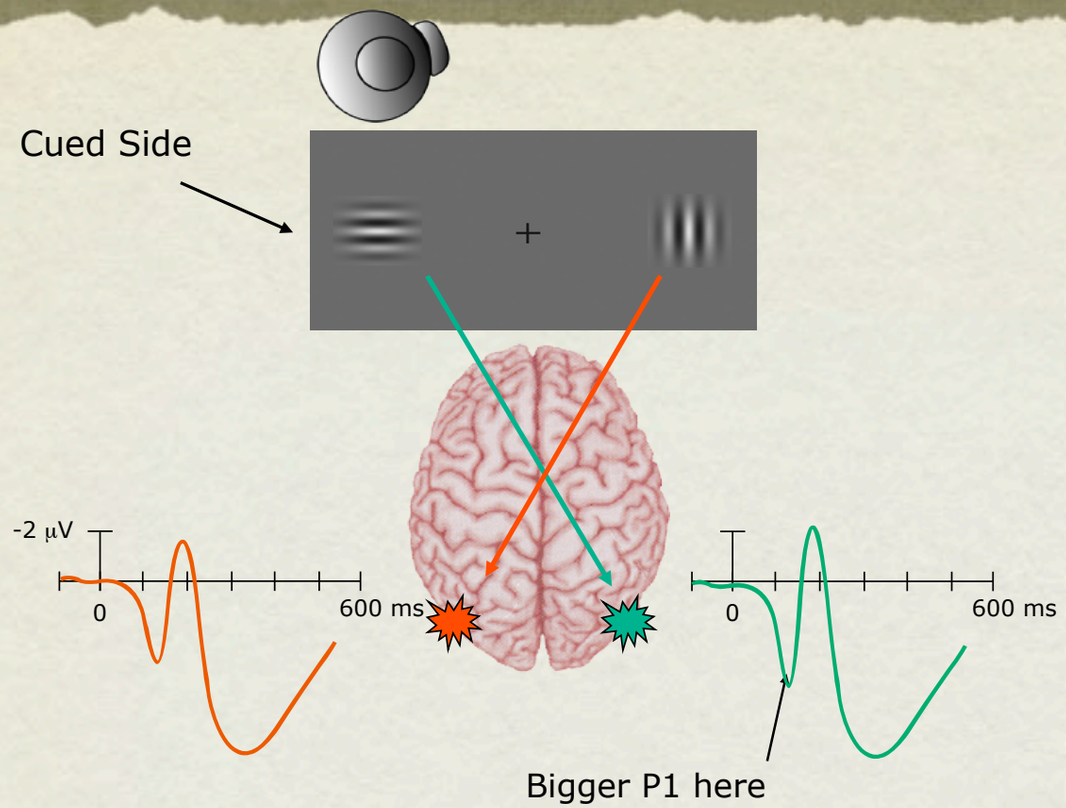

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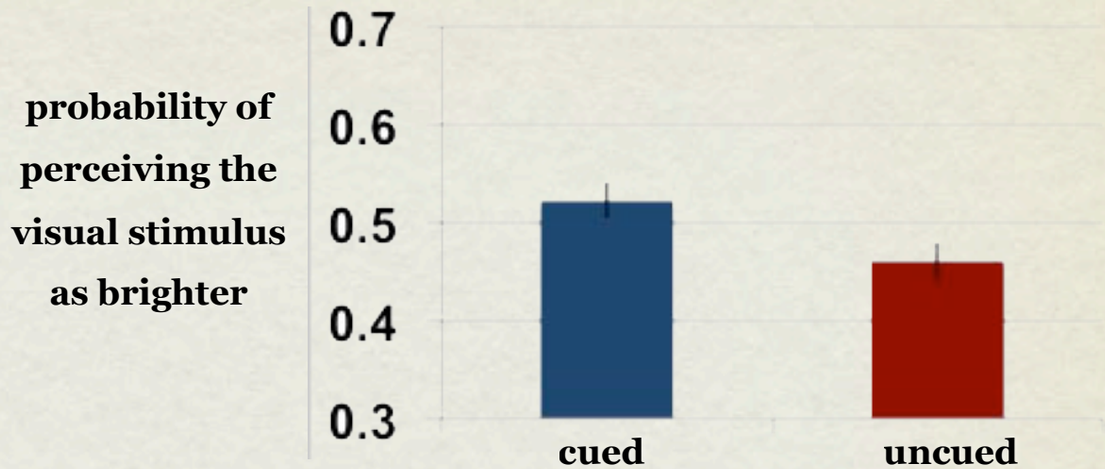

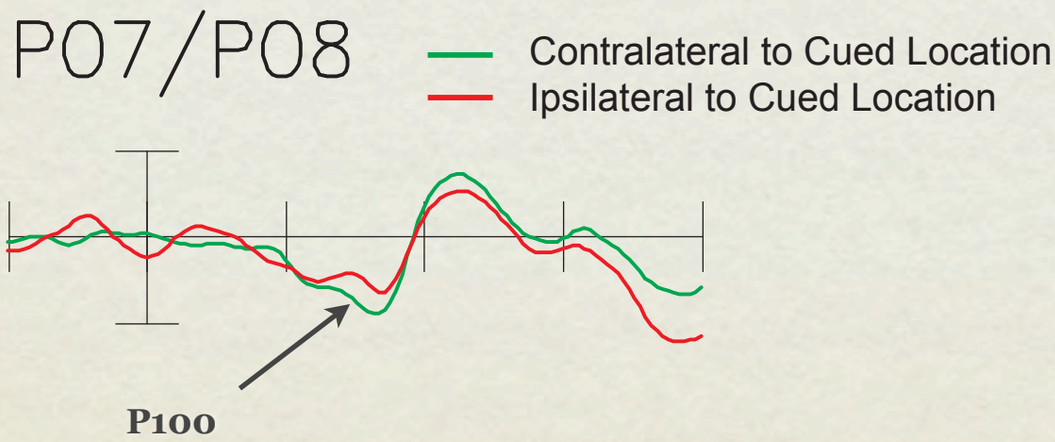

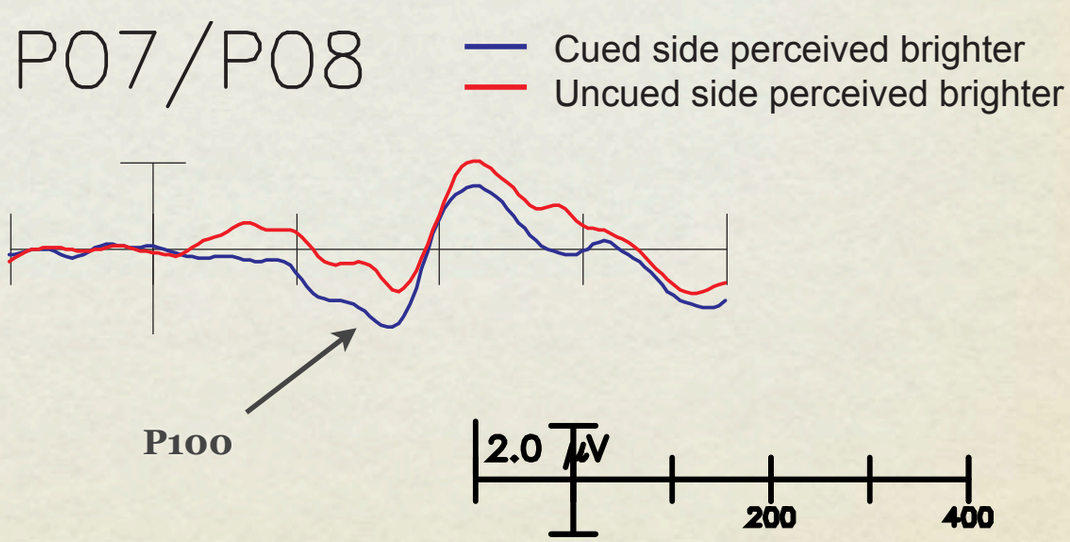

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Auditory Evoked **CO**ntralateral **P**ositivity : **ACOP**

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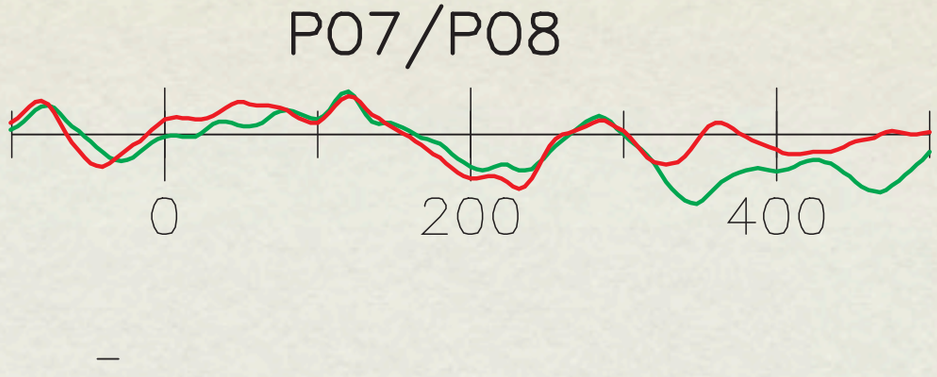
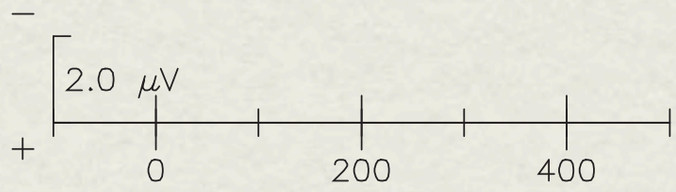
Cued side perceived as being brighter

Uncued side perceived as being brighter





Contralateral to Cued Location
Ipsilateral to Cued Location

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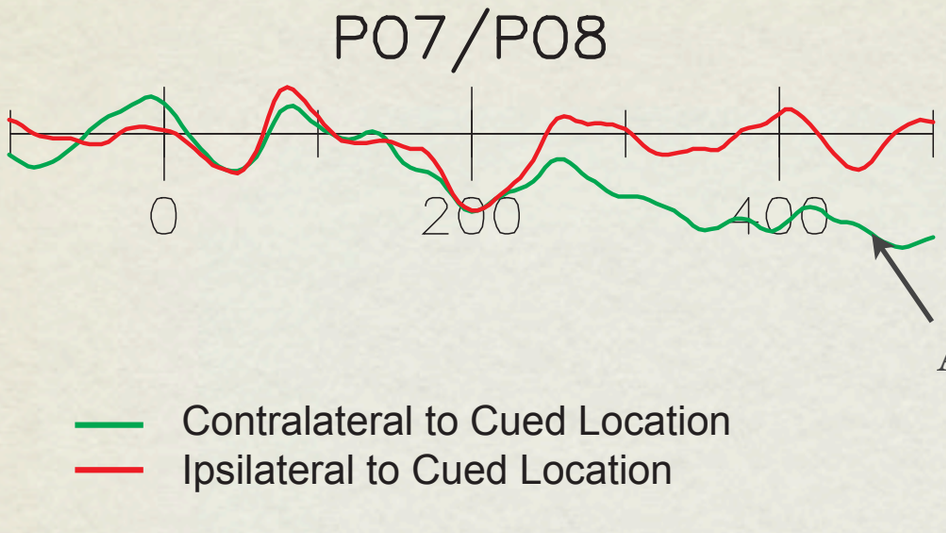
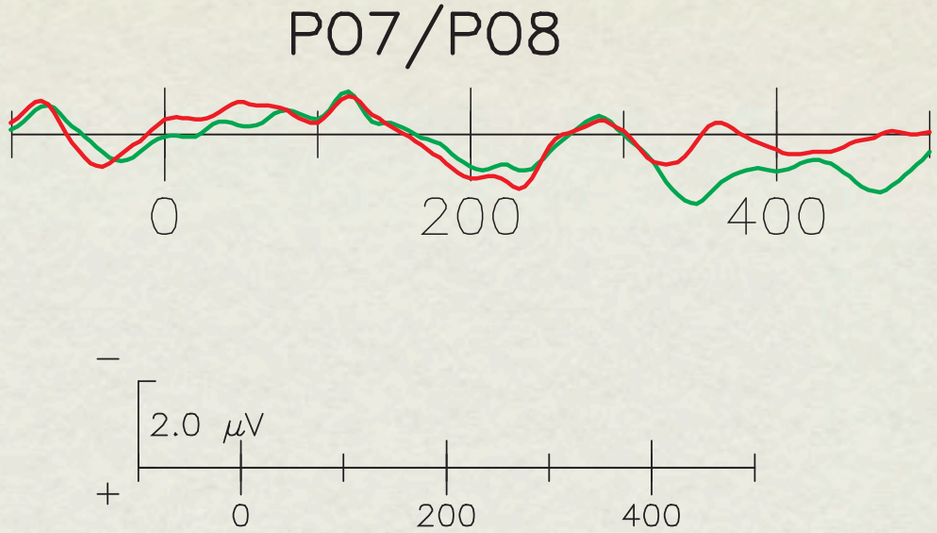


Uncued side perceived as being brighter



Contralateral to Cued Location
Ipsilateral to Cued Location

Conclusions:

1) Even with a longer cue-target interval, participants perceived the cued visual stimulus as brighter

2) This behavioral effect was accompanied by larger contralateral P100 when participants perceived the stimulus as brighter

3) Contralateral auditory positivity in visual cortex were larger when participants perceived the stimulus as brighter

Future Direction :

1) Trial by trial correlations between auditory responses and enhanced contrast perception

2) Investigating causal relationship between auditory responses and speed of visual processing

ACKNOWLEDGEMENTS

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- Thank You!