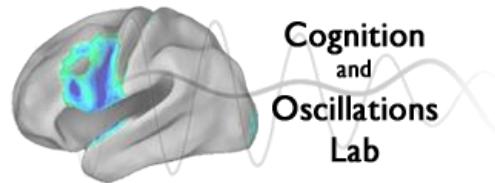


Alpha and Beta Entrainment Affects Simple and Complex Perception



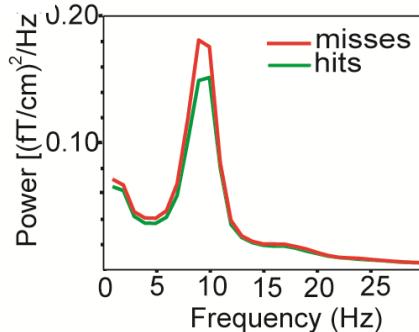
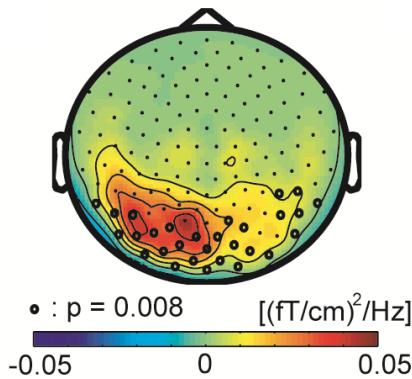
Dr. Simon Hanslmayr

University of Birmingham, School of Psychology
www.uni-konstanz.de/oscillations-and-cognition/

Alpha states that predict perception

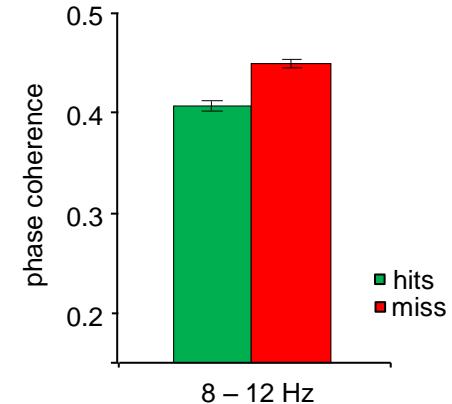
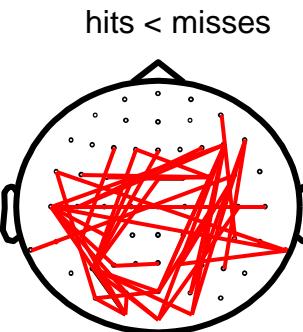
Power

VanDijk et al (2008) *J Neurosci*

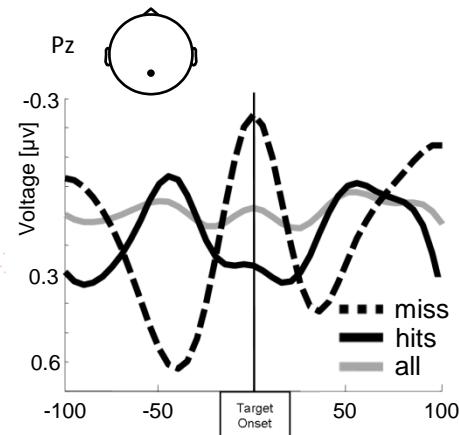
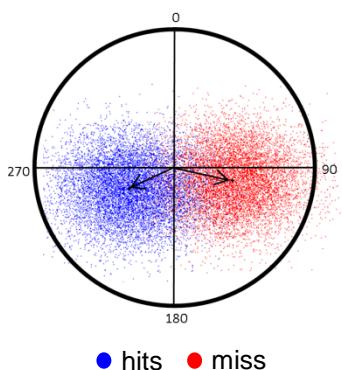


Phase-coherence

Hanslmayr et al. (2007) *NeuroImage*

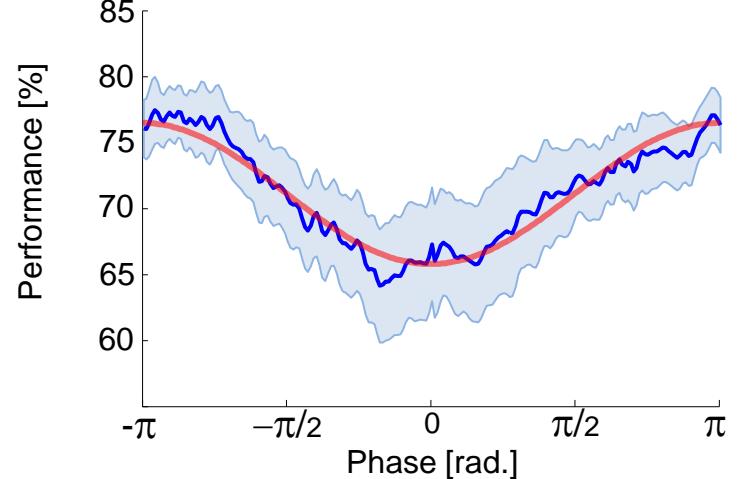


Mathewson et al (2009) *J Neurosci*

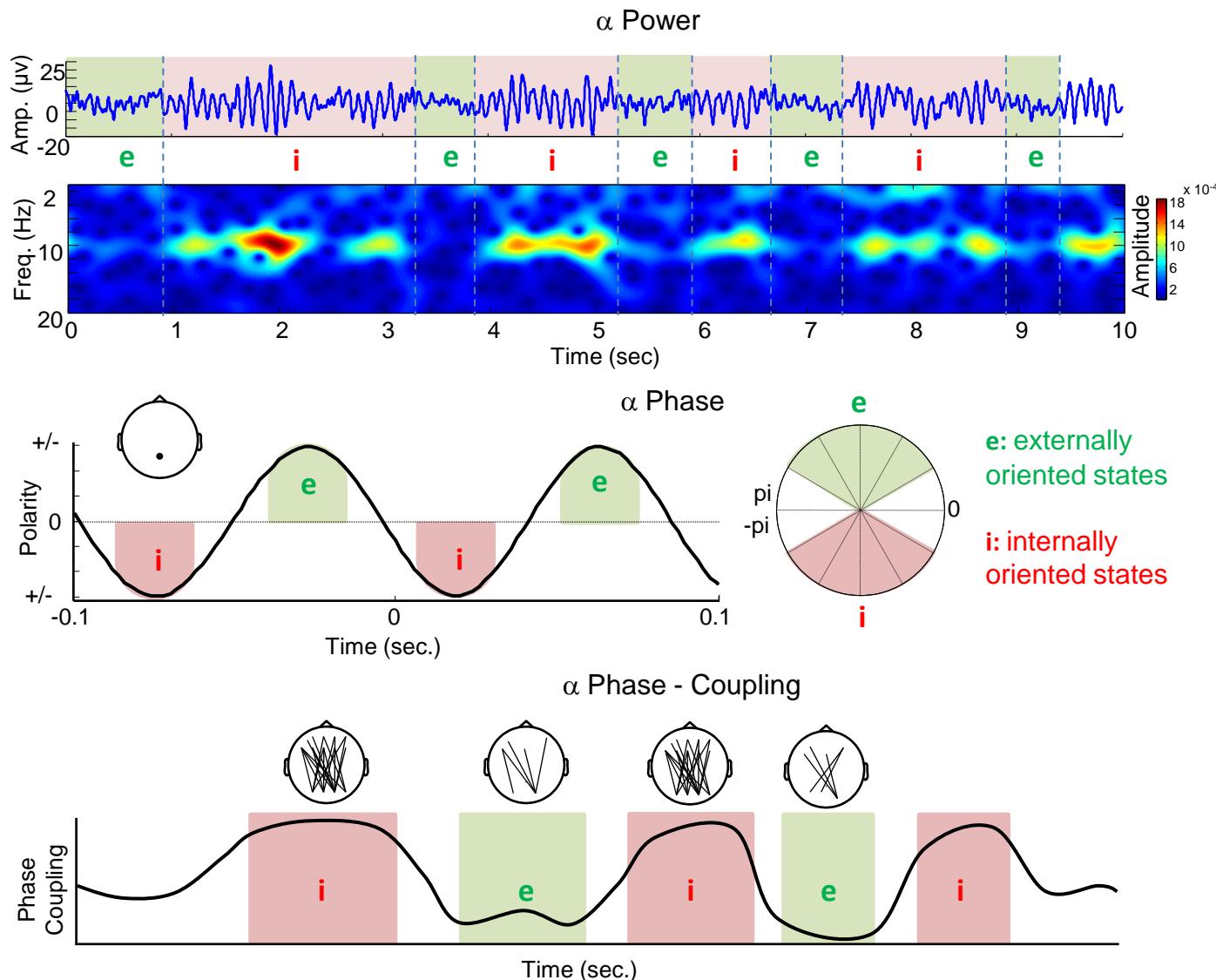


Phase

Hanslmayr et al (2013) *Curr Biol*

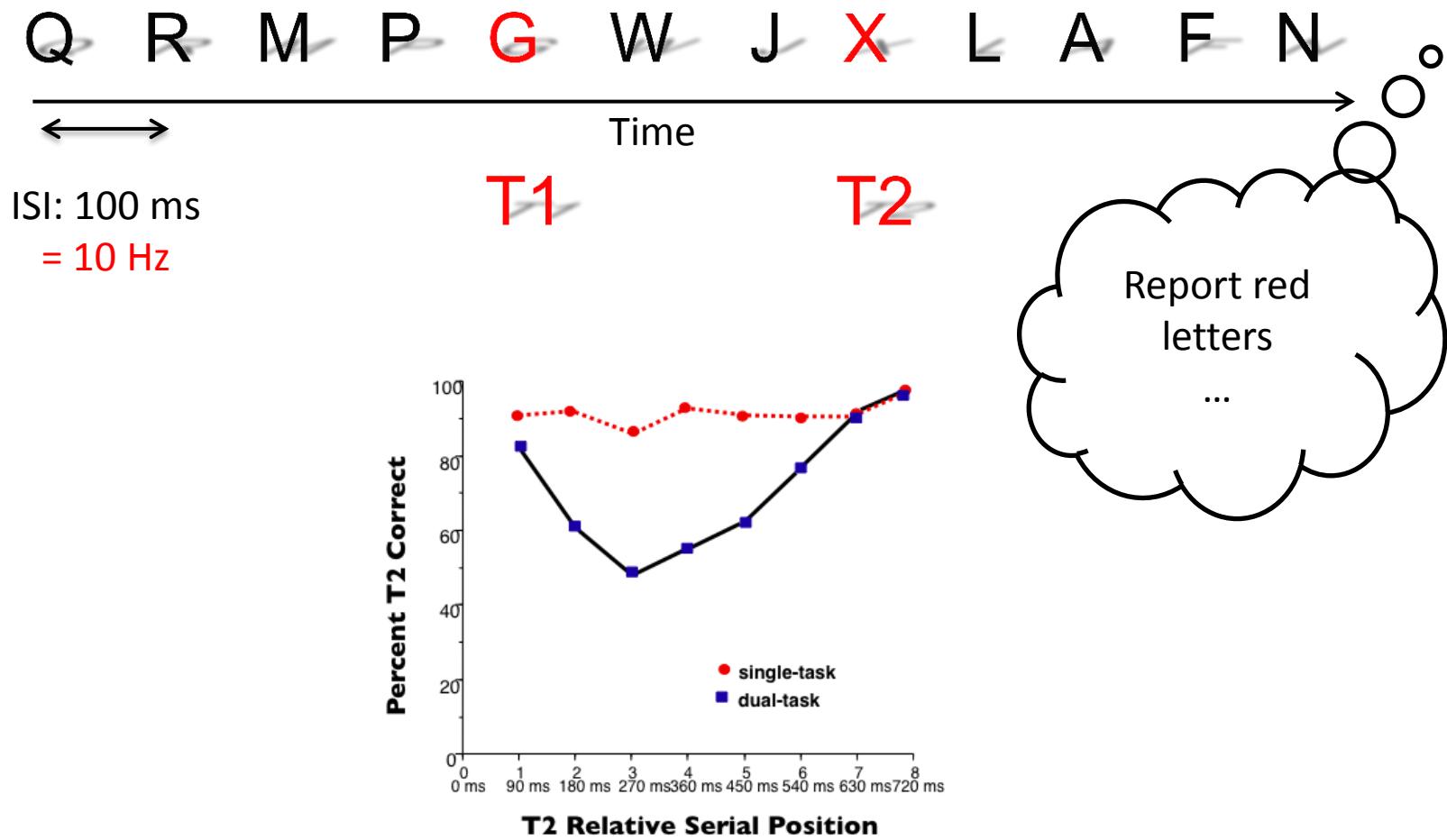


Alpha states that predict perception



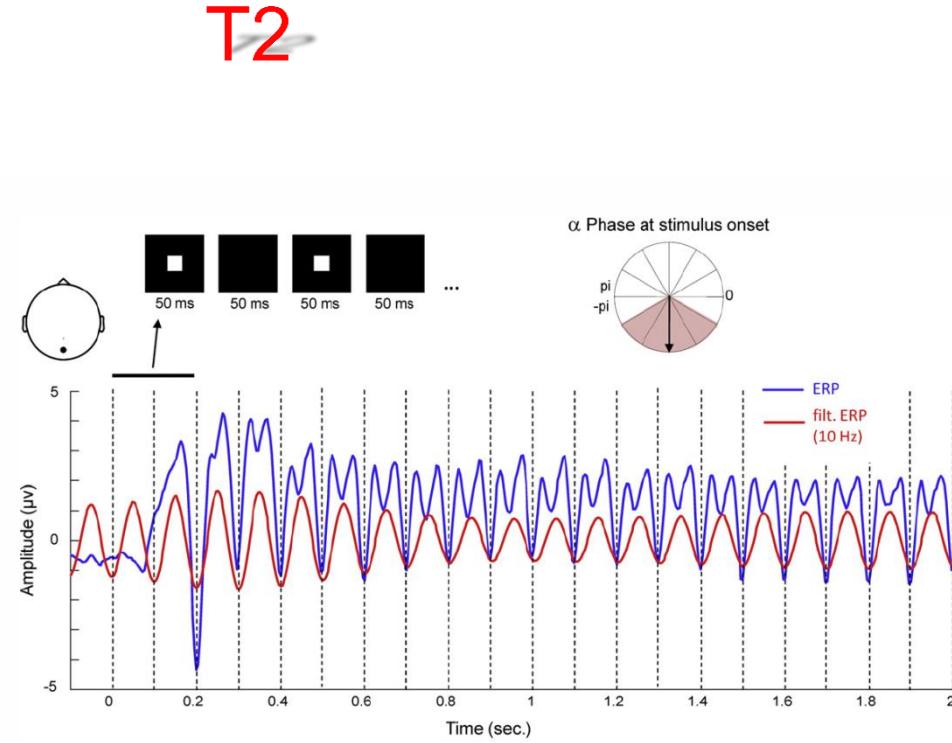
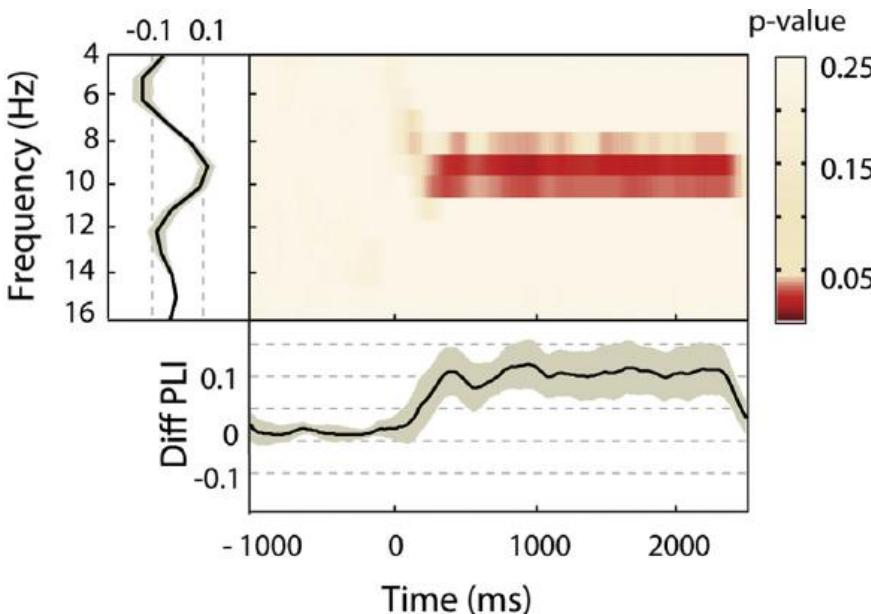
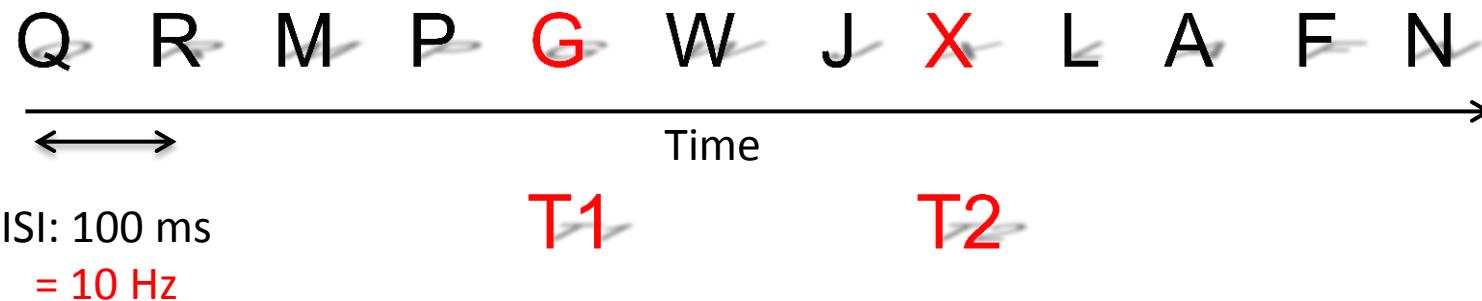
Alpha and the AB

A typical Attentional Blink Paradigm:



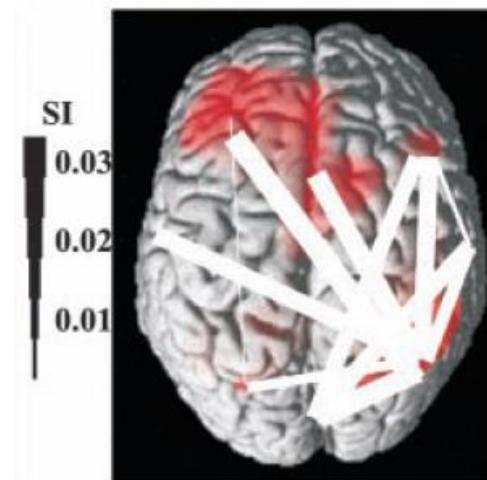
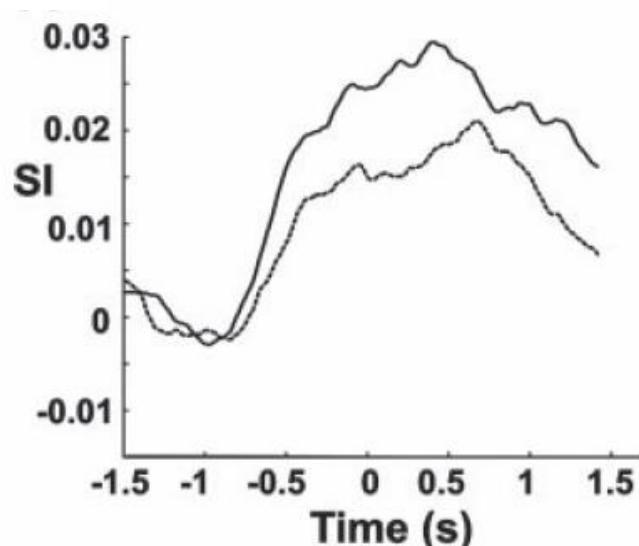
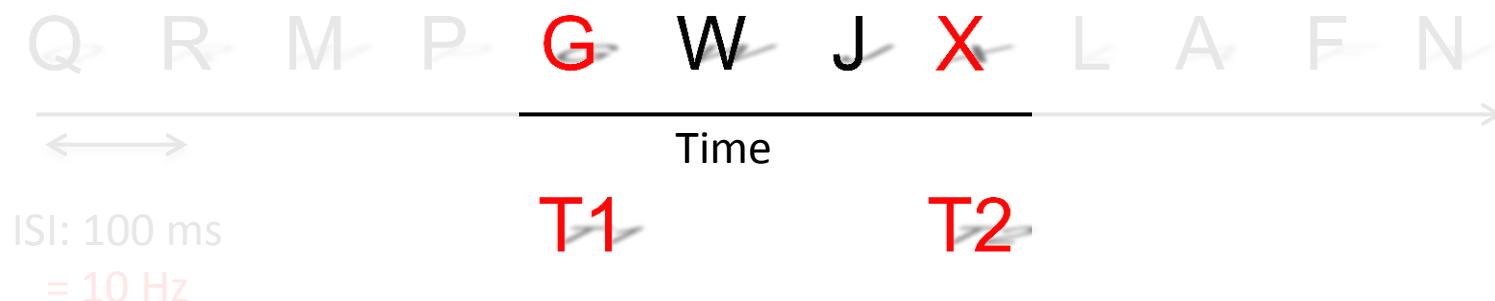
Alpha and the AB

A typical Attentional Blink Paradigm:



Alpha and the AB

A typical Attentional Blink Paradigm:



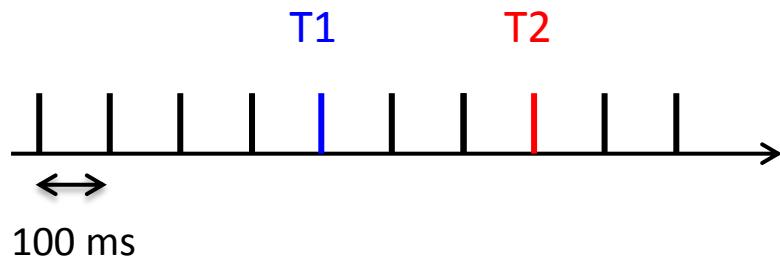
Alpha and the AB

- The problem of T2:
 - High Alpha Power
 - High Phase Consistency (negative Polarity)
 - High Fronto-Parietal Phase-Coherence
 - → Worst Case Scenario for Perception
- AB a frequency specific effect of alpha entrainment?

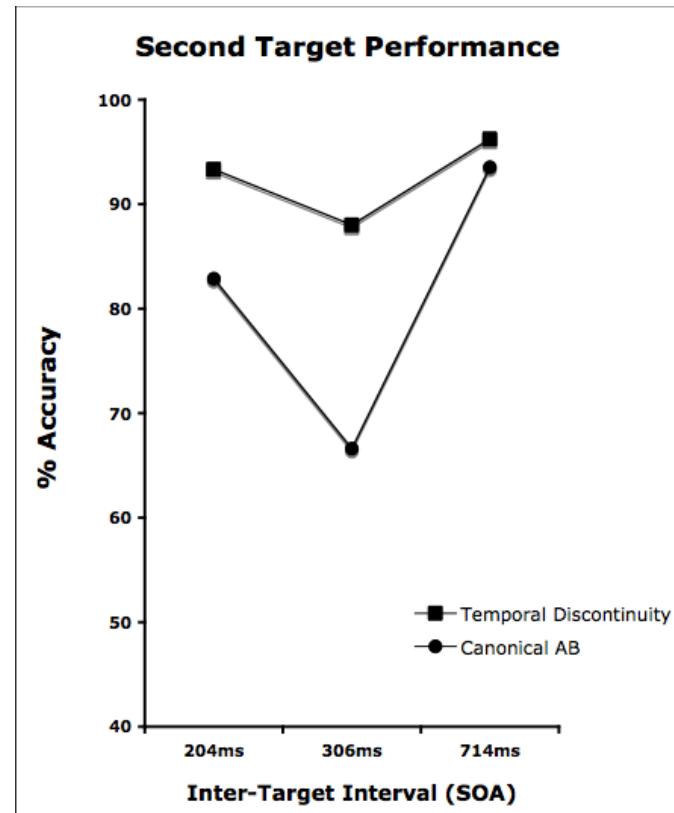
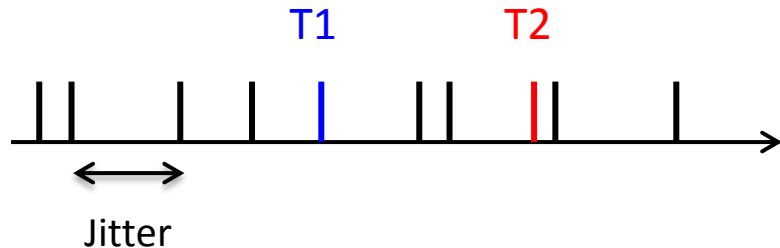
Alpha and the AB

Martin, Enns, Shapiro (2011) *Psychon Bull Rev*

Canonical AB:



Temp. Discontinuity:



Does the AB occur only when stimuli are presented at specific frequency (alpha/beta)?



Alpha and the AB



Shapiro, Kerlin, Martin, Hanslmayr, Enns, Lleras (submitted)

Design

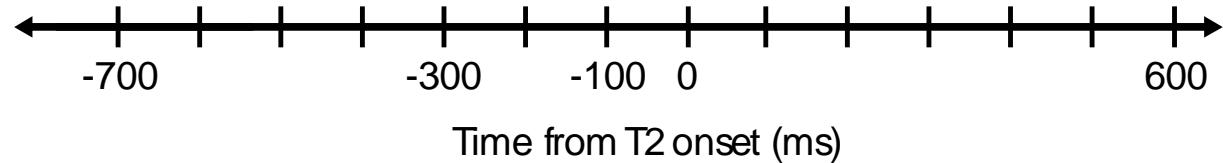
Kimron Shapiro
(Univ. Birmingham)

Jess Kerlin
(Univ. Birmingham)

| = PossibleT1Locations | = T2 Locations | = Distractors * = Report Targets



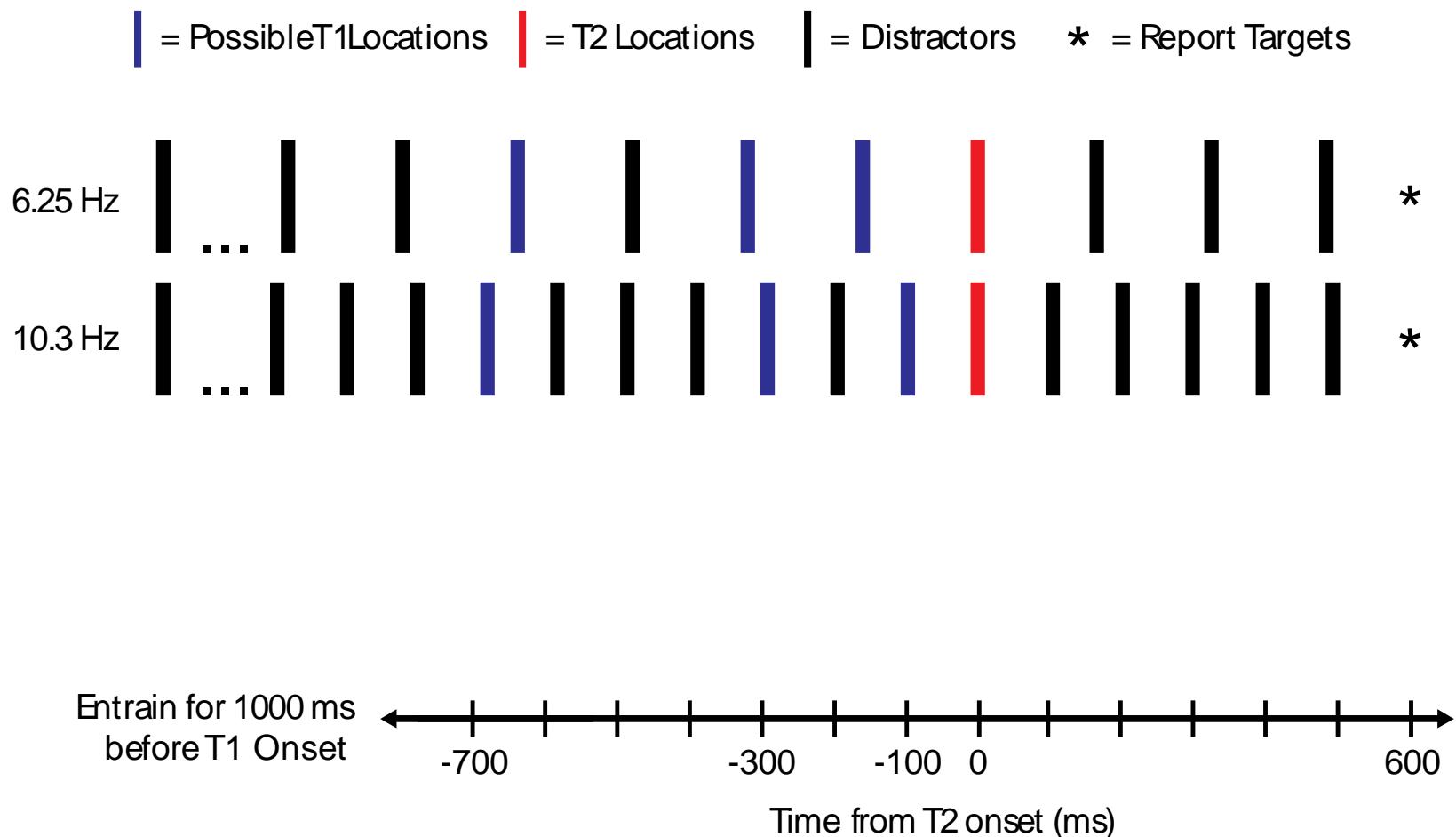
Entrain for 1000 ms
before T1 Onset



Alpha and the AB

Shapiro, Kerlin, Martin, Hanslmayr, Enns, Lleras (submitted)

Design

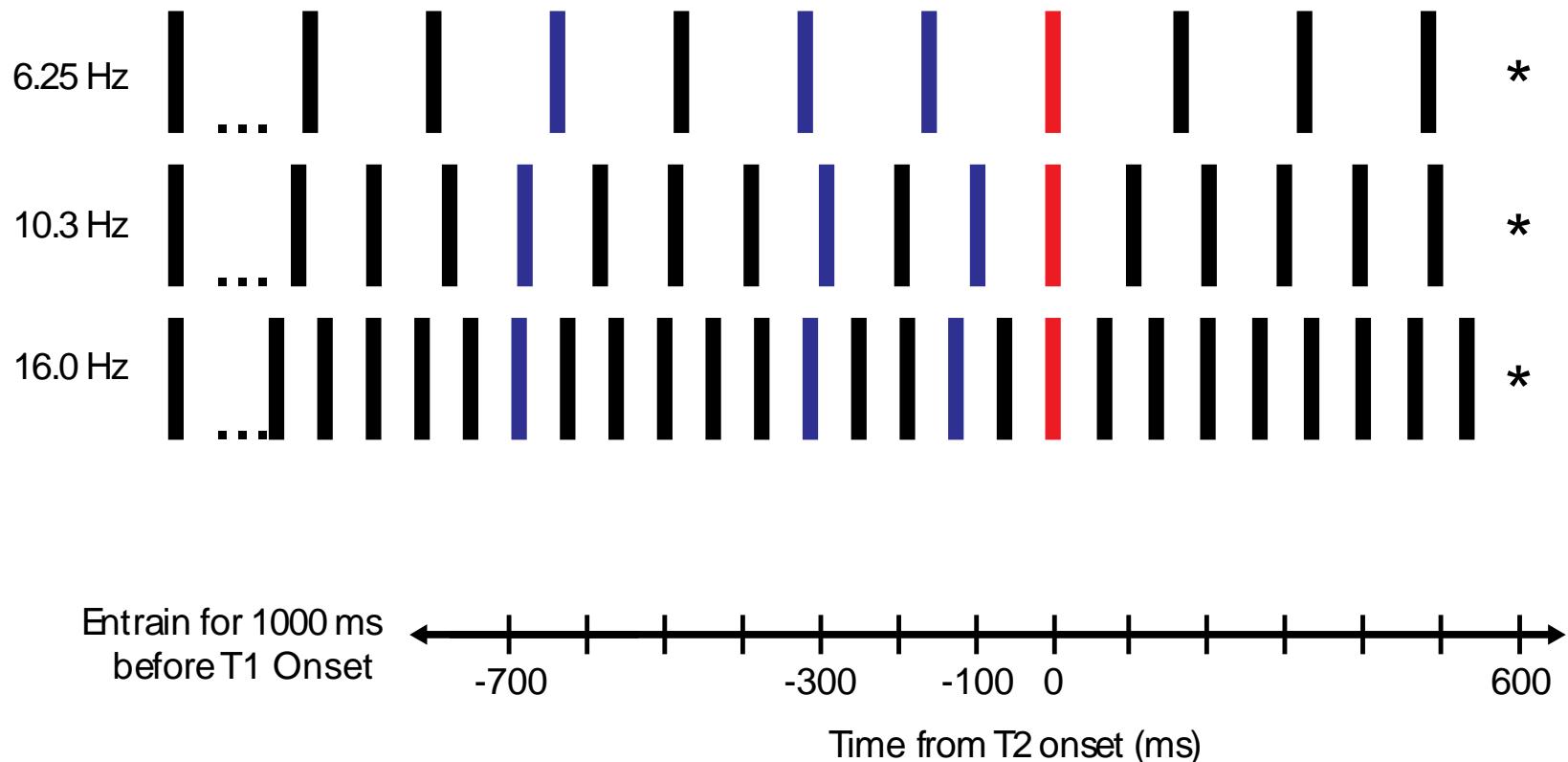


Alpha and the AB

Shapiro, Kerlin, Martin, Hanslmayr, Enns, Lleras (submitted)

Design

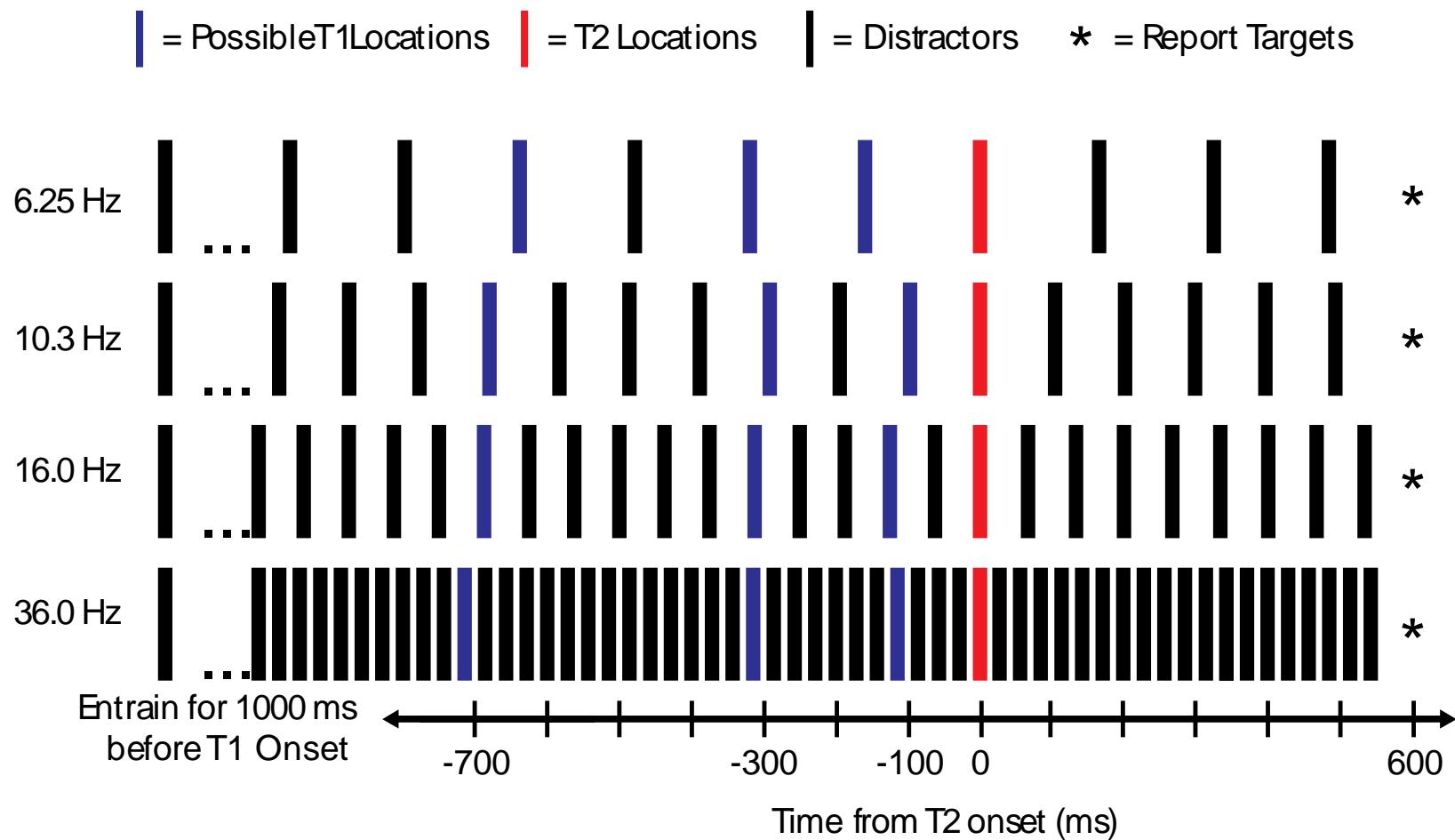
| = PossibleT1Locations | = T2 Locations | = Distractors * = Report Targets



Alpha and the AB

Shapiro, Kerlin, Martin, Hanslmayr, Enns, Lleras (submitted)

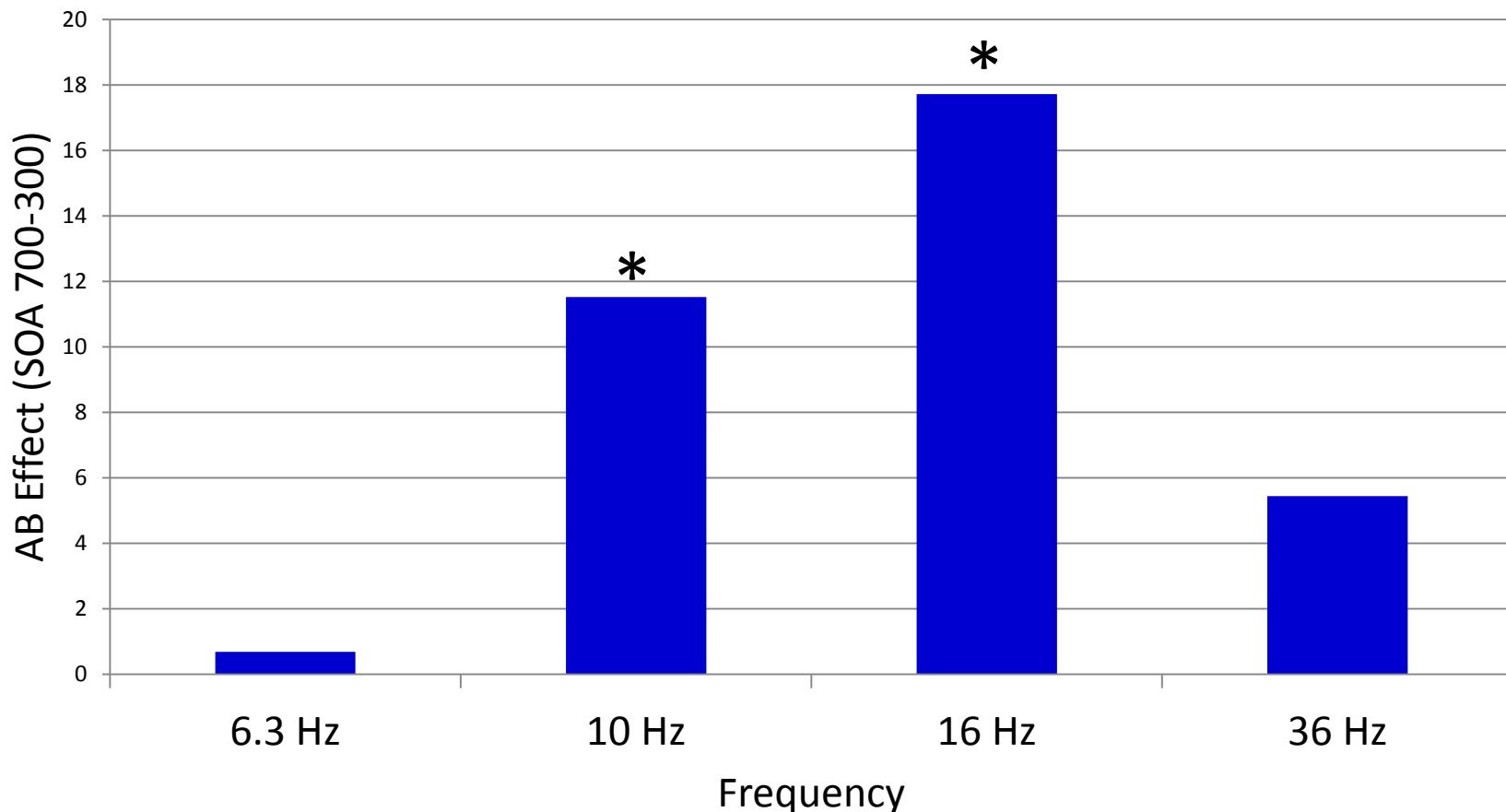
Design



Alpha and the AB

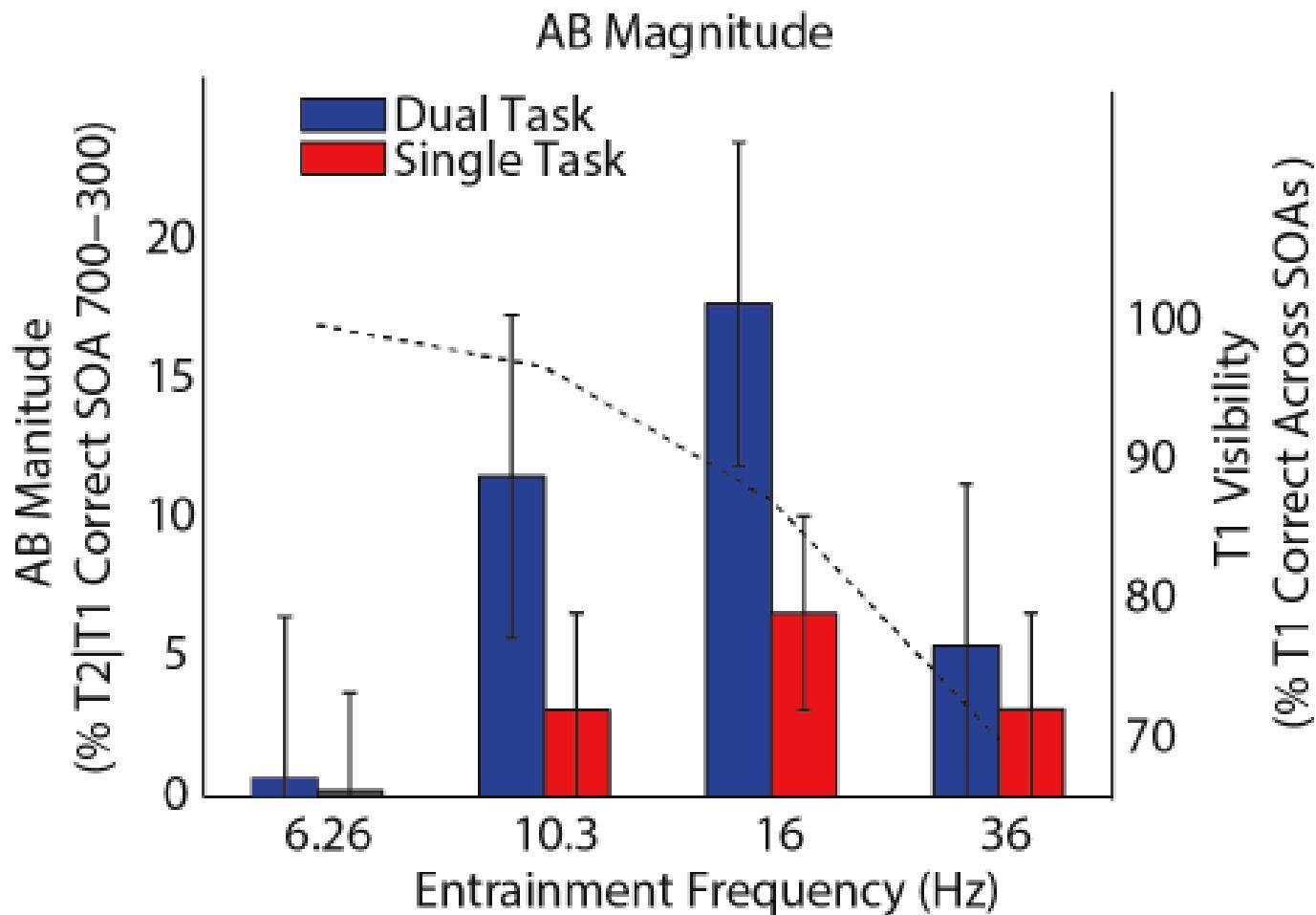
Shapiro, Kerlin, Martin, Hanslmayr, Enns, Lleras (submitted)

AB occurs only at 10 Hz (alpha) and 16 Hz (beta)



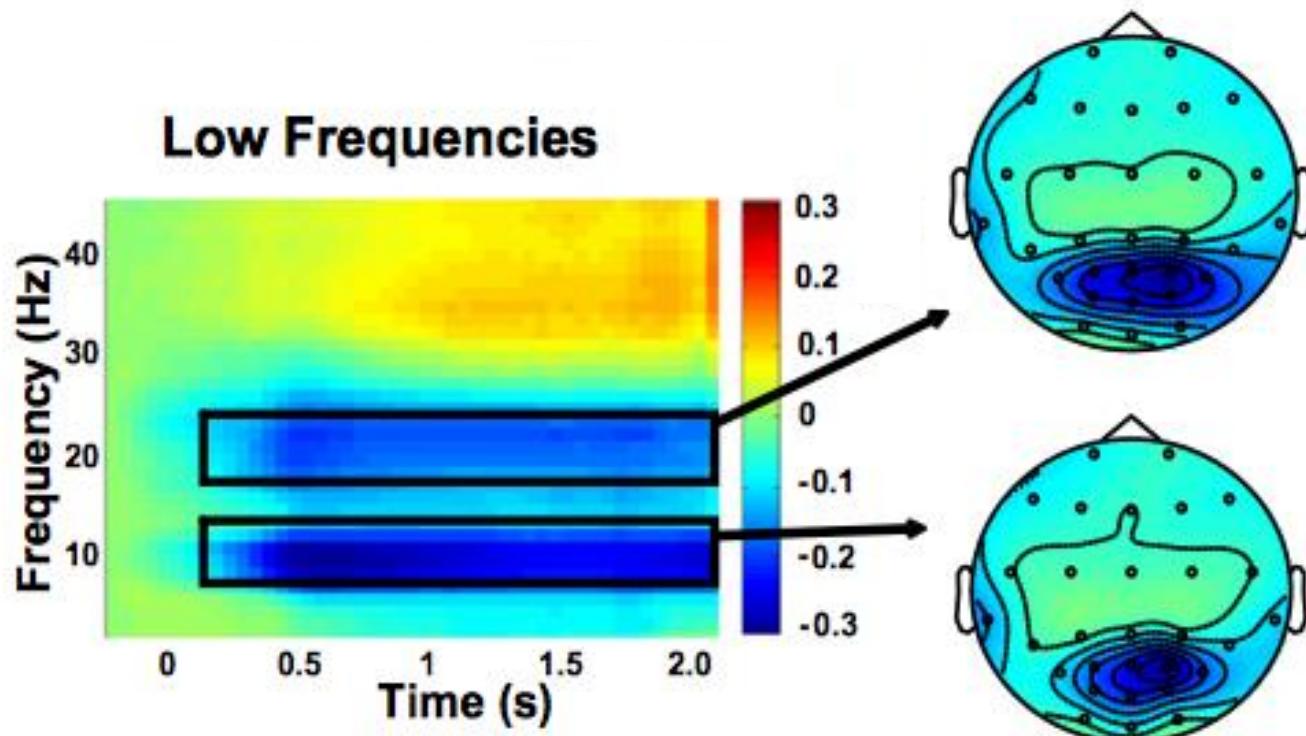
Alpha and the AB

Shapiro, Kerlin, Martin, Hanslmayr, Enns, Lleras (submitted)



Open Question

- Why Alpha *and* Beta?



Conclusions

- The Attentional Blink could be a brain oscillatory phenomenon.
- The AB arises because the brain is driven in the alpha/beta frequency range, thus setting up a worst case scenario (internal processing mode) for the perception of a visual stimulus.

Collaboration Partners:



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(Univ. Birmingham)



Jim Enns
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