

Neural signatures of conscious face perception: The N170 is absent during inattention blindness

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Background

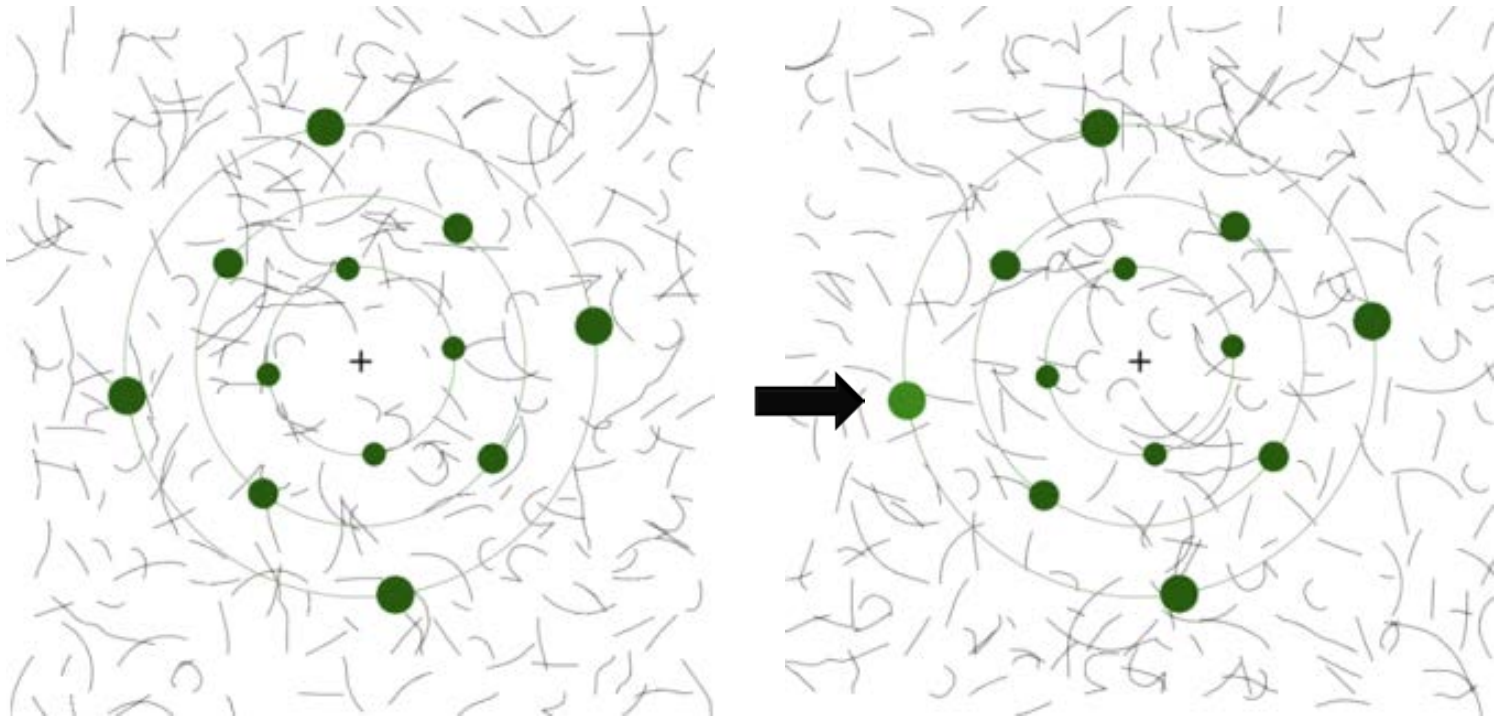
- ▣ Neural correlates of conscious visual perception
 - ▣ Idea: compare brain activity in response to perceived stimuli to the same stimuli when they are not consciously perceived
- ▣ Inattention blindness
 - ▣ The failure to detect an unexpected, but otherwise salient stimulus because one's attention is engaged elsewhere.
- ▣ Face perception
 - ▣ N170 – the earliest face-sensitive ERP component

Research Question

- ▣ What are the neural correlates of conscious perception of faces?
 - ▣ What is the role of the N170 in visual awareness?
 - ▣ How might the correlates of awareness for faces compare to proposed correlates of general visual awareness?

Methods

▣ Distractor task:



Methods

- ▣ Video example of stimuli:

<http://www.youtube.com/watch?v=aWsfO2FNlp0>

Methods

▣ Example background patterns:



Scrambled pattern



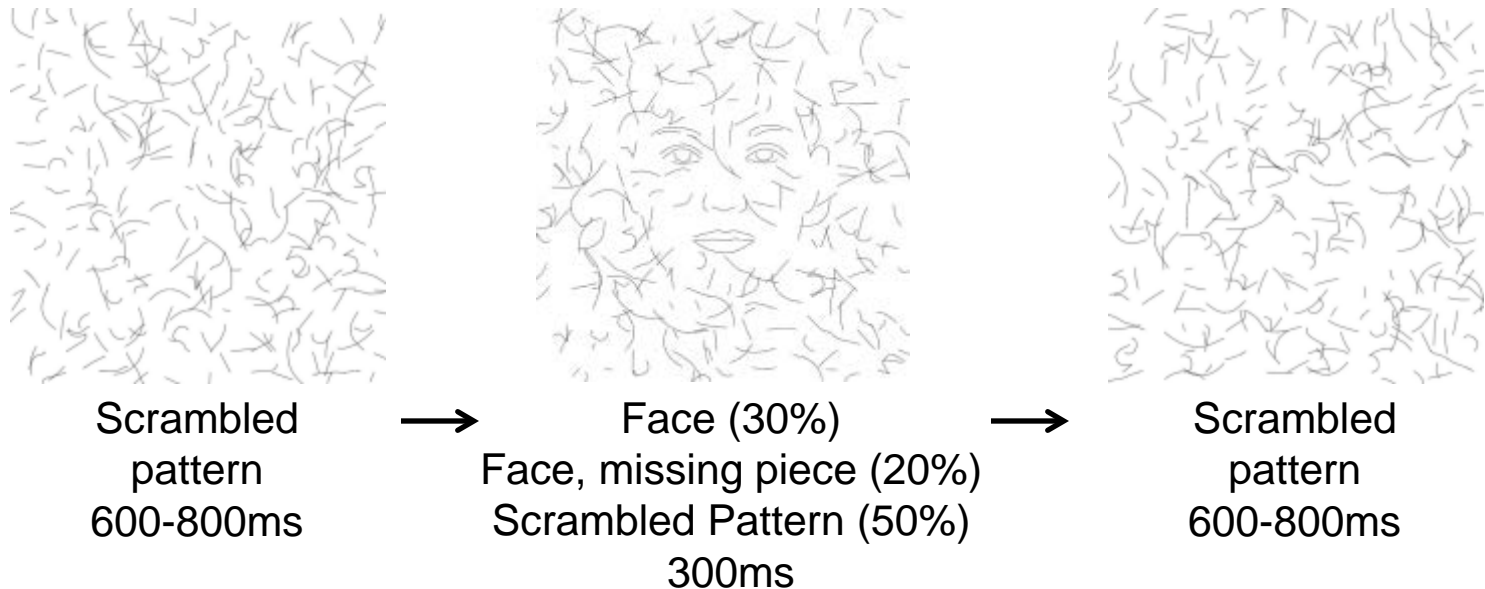
Face



Face, missing piece

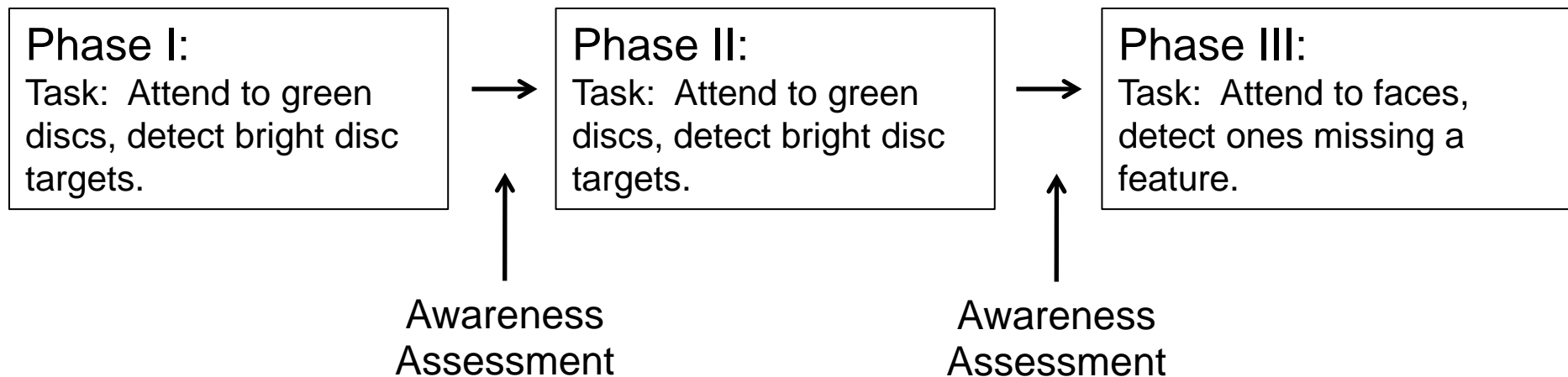
Methods

■ Stimulus sequence:



Methods

■ Experiment sequence:



Methods

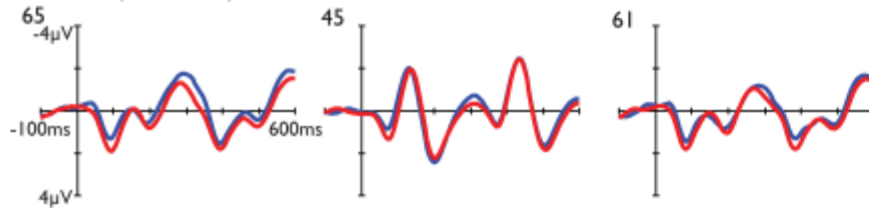
▣ Awareness assessment foils



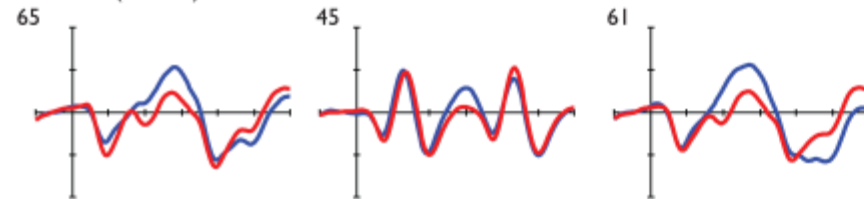
Results

Inattentionally Blind

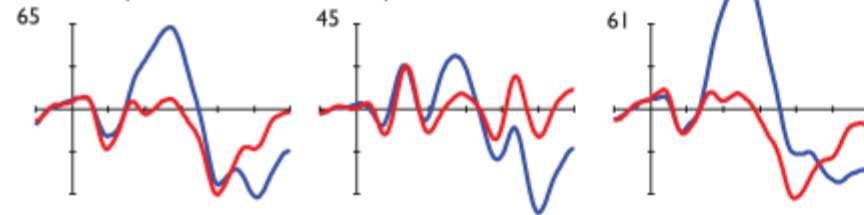
Phase I (unaware)



Phase II (aware)

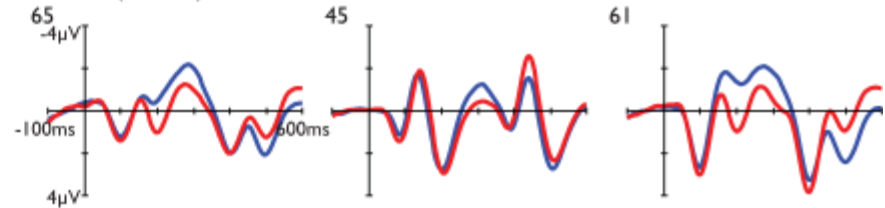


Phase III (aware + task relevant)

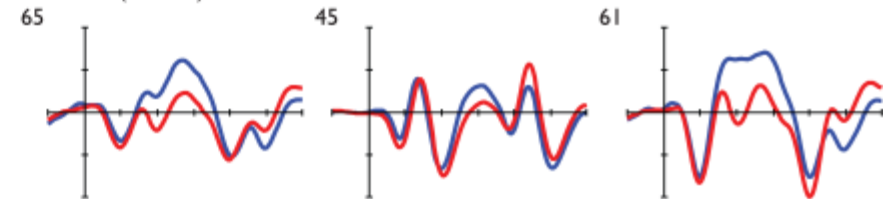


Noticers

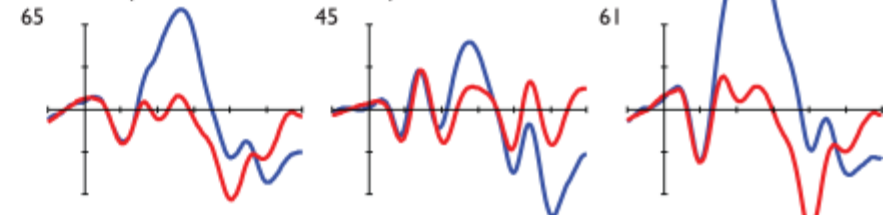
Phase I (aware)



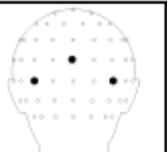
Phase II (aware)



Phase III (aware + task relevant)



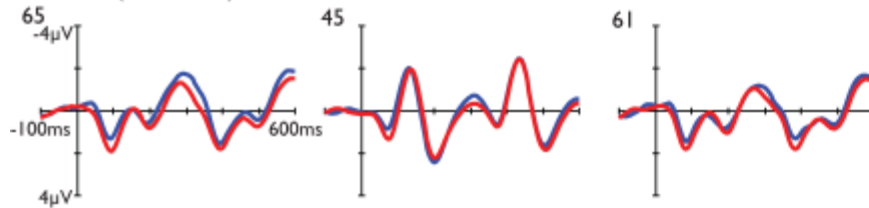
Key:
— Face
— Scrambled



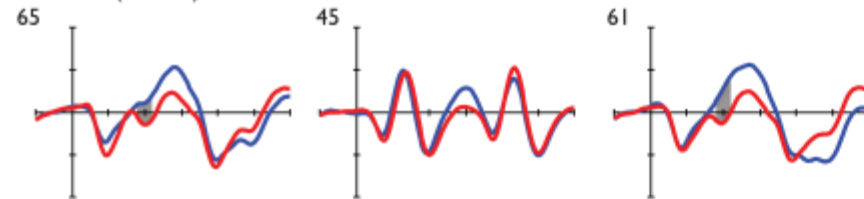
Results

Inattentionally Blind

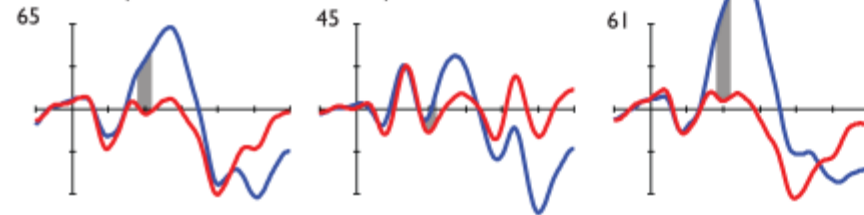
Phase I (unaware)



Phase II (aware)

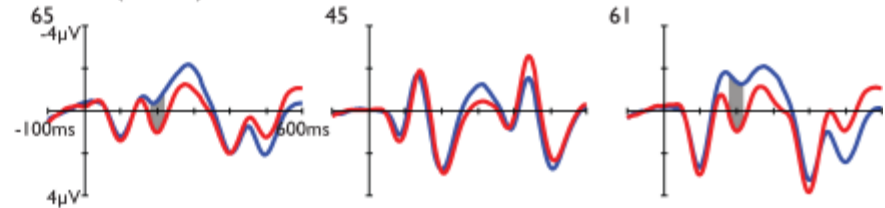


Phase III (aware + task relevant)

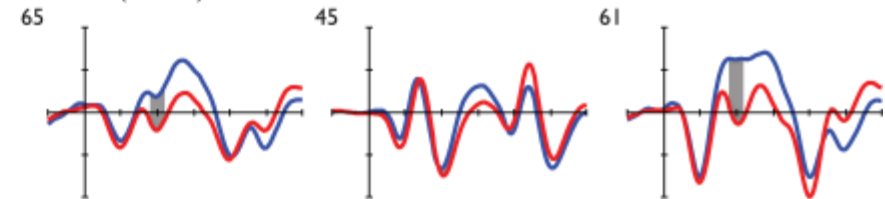


Noticers

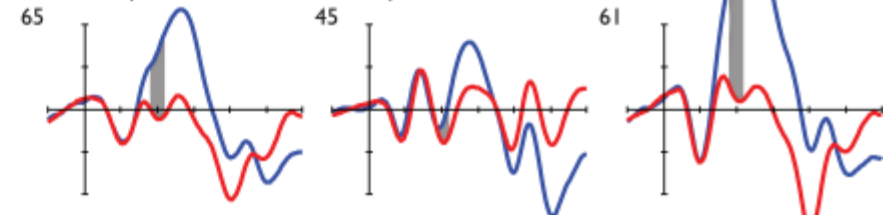
Phase I (aware)



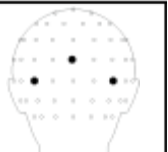
Phase II (aware)



Phase III (aware + task relevant)



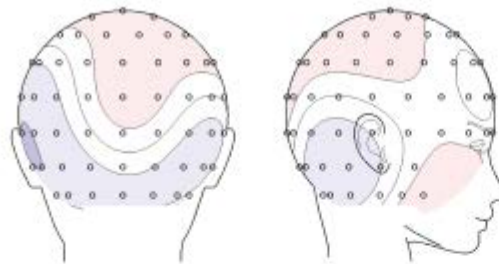
Key:
— Face
— Scrambled



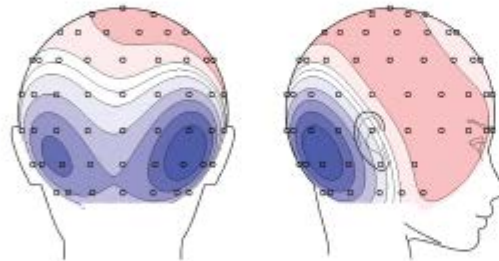
Results (N170)

Inattentionally Blind

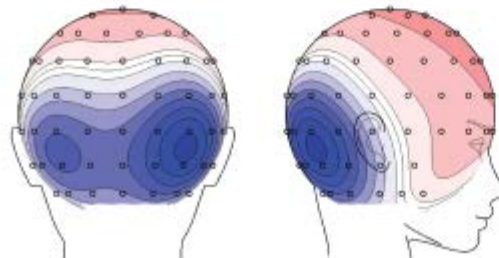
Phase I
180-220 ms
-3 μ V 0 μ V 3 μ V



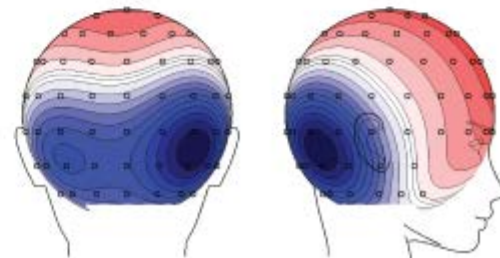
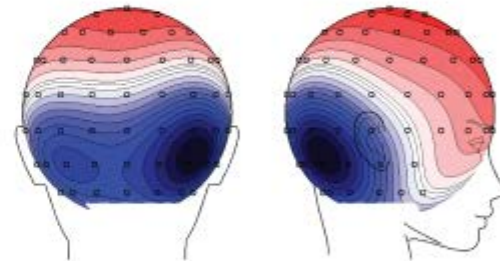
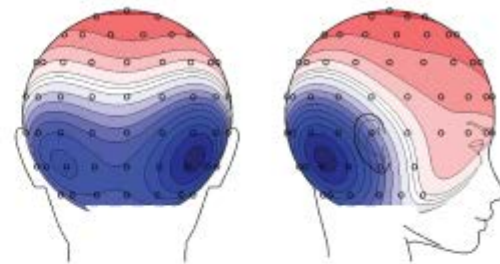
Phase II
180-220 ms
-3 μ V 0 μ V 3 μ V



Phase III
180-220 ms
-6 μ V 0 μ V 6 μ V

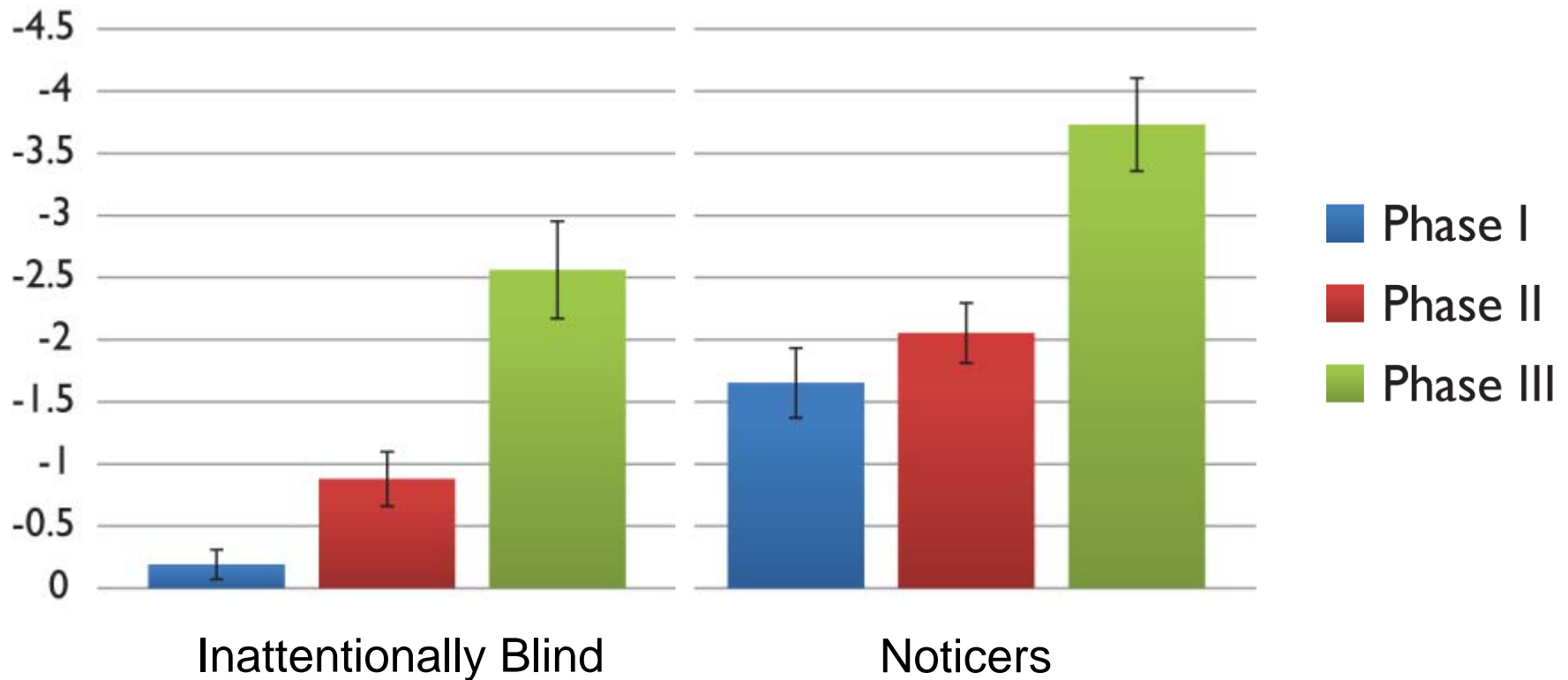


Noticers



Results (N170)

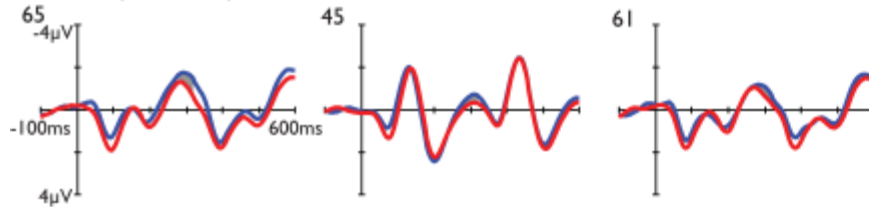
N170 Amplitude



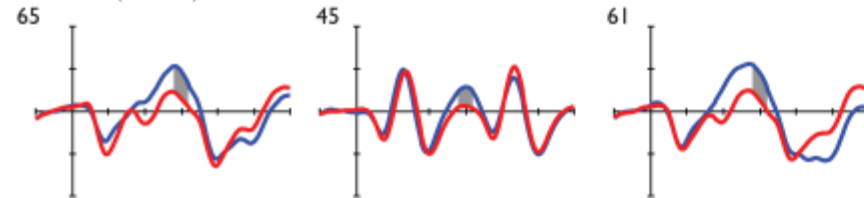
Results

Inattentionally Blind

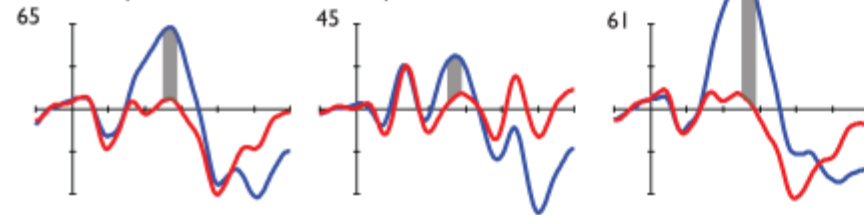
Phase I (unaware)



Phase II (aware)

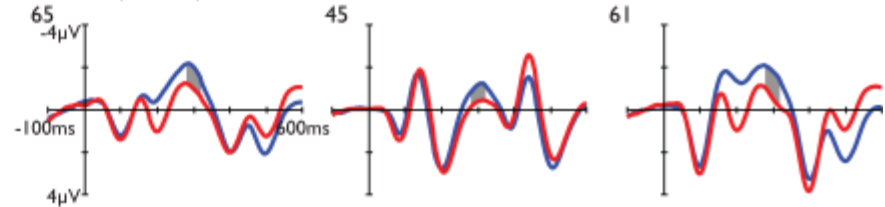


Phase III (aware + task relevant)

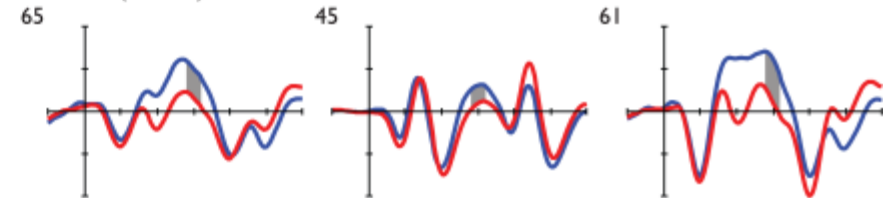


Noticers

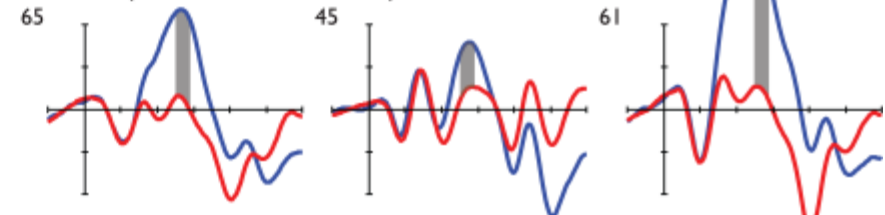
Phase I (aware)



Phase II (aware)



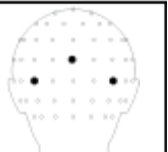
Phase III (aware + task relevant)



Key:

— Face

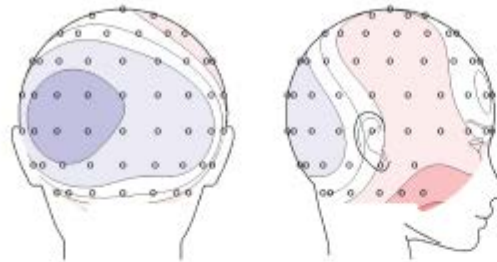
— Scrambled



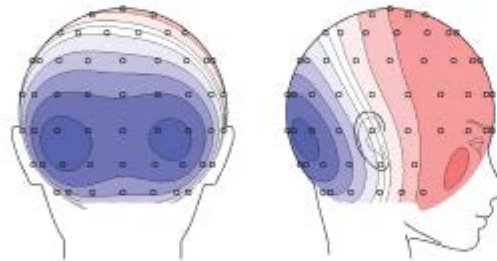
Results (Nd2)

Inattentionally Blind

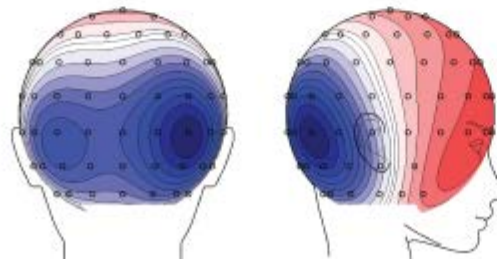
Phase I
280-320 ms
-3 μ V 0 μ V 3 μ V



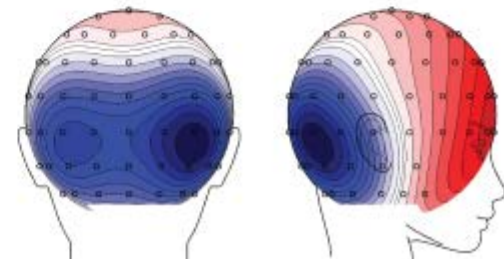
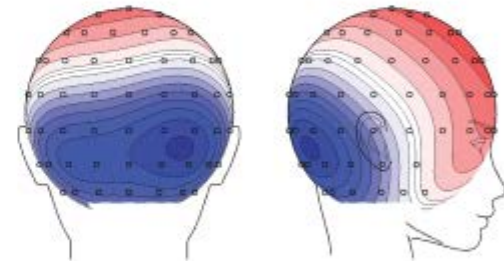
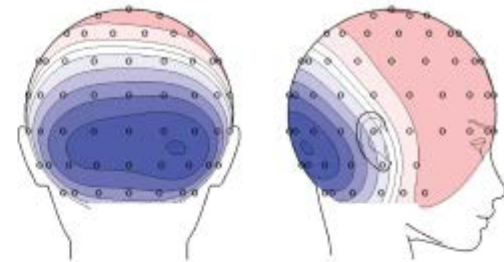
Phase II
280-320 ms
-3 μ V 0 μ V 3 μ V



Phase III
250-290 ms
-6 μ V 0 μ V 6 μ V

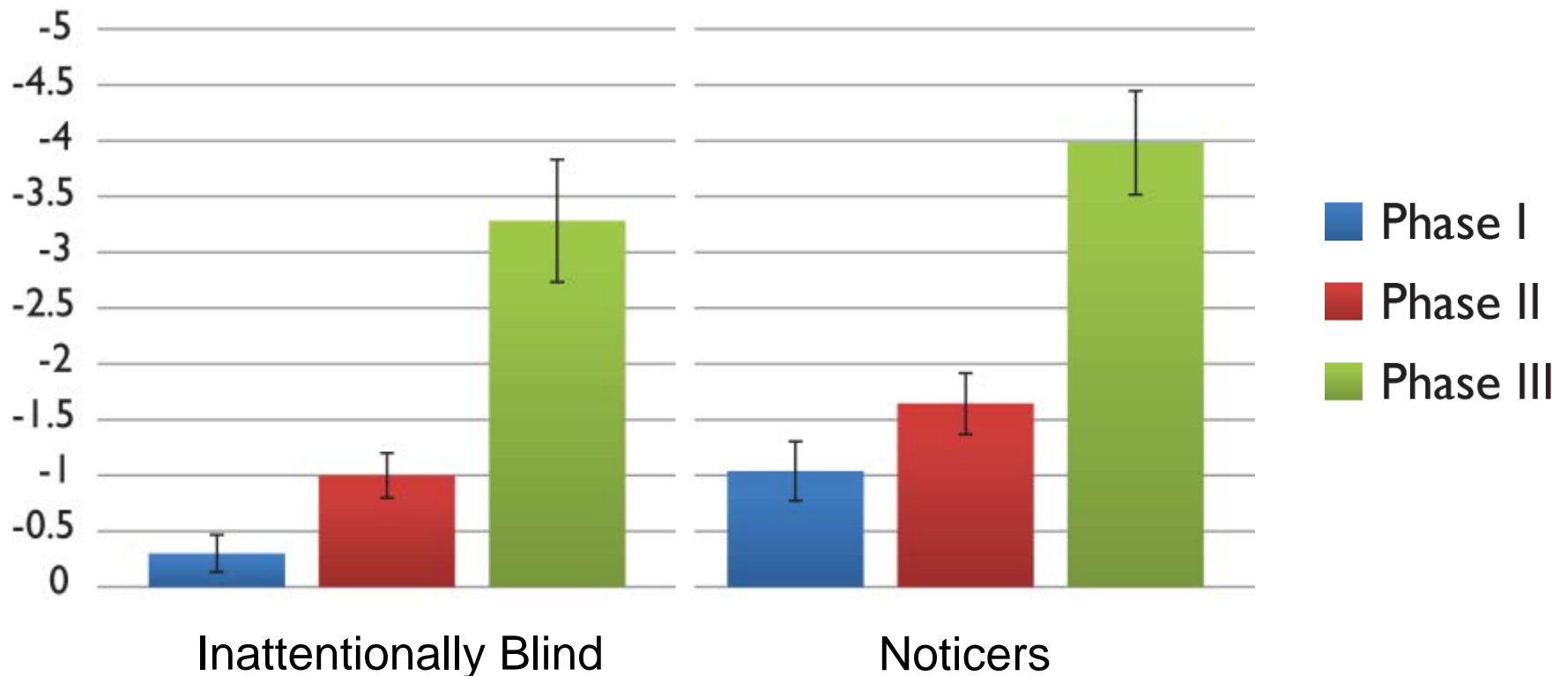


Noticers



Results (Nd2)

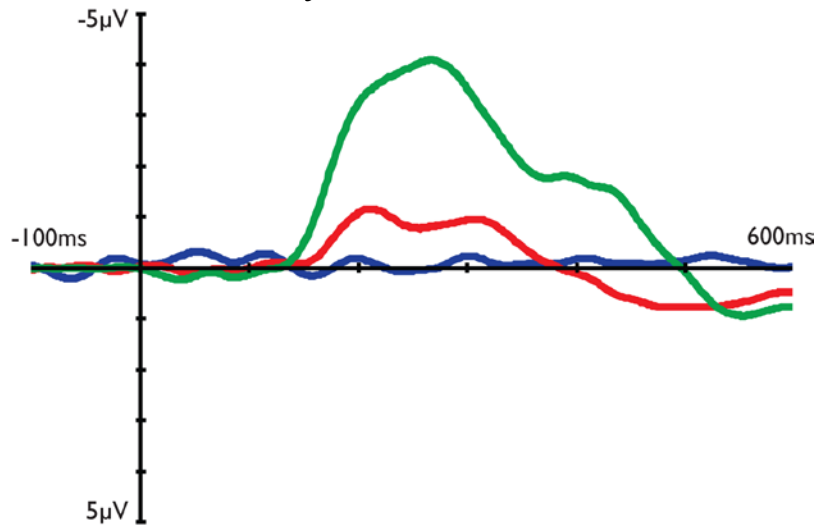
Nd2 Amplitude



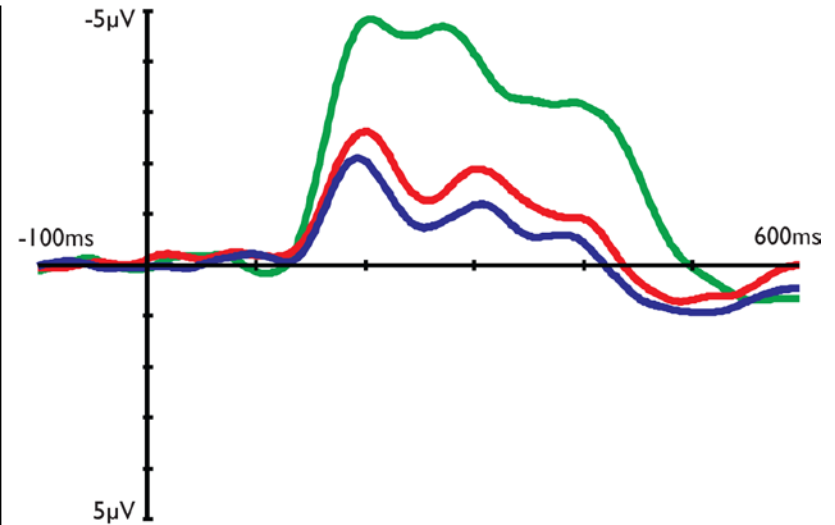
Results

▣ Difference waves

Inattentionally blind



Noticers



Key:

- Phase I
- Phase II
- Phase III



Conclusions

- The N170 & Nd2 were present for all subjects, but only during awareness:
 - Subjects who spontaneously noticed faces
 - Subjects who had previously been unaware.
- Task-related attention significantly enhanced N170 and Nd2 amplitude.
- Possible Interpretations:
 - N170 & Nd2 both correlates of awareness
 - N170 correlated with attention; Nd2 correlated with awareness
 - N170 & Nd2 both correlates of attention