

ELECTROPHYSIOLOGICAL EVIDENCE
OF AN EMOTIONAL BLINK:

NEGATIVE EMOTIONAL CONTENT
IMPAIRS LANGUAGE PROCESSING

The Attentional Blink (AB)

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- First observed during Rapid Serial Visual Presentation (RSVP)
- Momentary inattention similar to the effect of a physical eyeblink
- “Target” visual is missed due to presence of previous “distractor” image
- Initially linked only to attentional focus

Links to Emotion & Motivation

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- Attentional blink strengthened by emotional salience
 - ▣ Gory murder scene or nude photo
 - ▣ Increasingly referred to as the “Emotional Blink”
- Also strengthened by motivational state
 - ▣ Hunger increases blink following food images

Auditory Attentional Blink

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- The Attentional Blink is present for audio stimuli too
 - ▣ Anderson & Phelps (2001) presented subjects with a rapid stream of words and a blink was still present
 - ▣ Smith et al. (2006) also found a blink for audio stimuli
 - ▣ Vachon & Tremblay (2008) explored connection between auditory & visual blinks
- Auditory blink is also modulated by emotion and motivation

Stage of Processing?

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- At what stage of processing does the AB occur?
- Perceptual or Post-Perceptual?
 - ▣ Does the blink block/delay perception itself?
 - ▣ Or does it simply clog the working memory and slow behavioral responses?
- This question is still being debated
- Evidence exists for both sides
- Wide variation in testing paradigms

Shapiro Study

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- Lewis Shapiro study at SDSU tested if emotional content of speech created an emotional blink
 - ▣ “distractor” stimuli were emotionally laden verbs
 - ▣ “target” stimuli were pitch-changed object nouns
- Found a significant difference in response time
- Reaction time is not precise enough to differentiate pre- and post-perceptual processes
 - ▣ Issues with the calculations of pitch-change latency in the audio files

Our Study

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- Replicated the Shapiro study with some alterations
 - ▣ Added an EEG component
 - More precisely identify response time
 - Explore brain processes responsible for emotional blink
 - ▣ Corrected latency calculations in audio files
- Voice recordings of sentences where one word differs dramatically in pitch from the others
 - ▣ Digitally manipulated pitch using a low pass filter
 - ▣ Alternated syntactic position of the pitch change to avoid predictability

Examples of Filler Sentences

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- Filler sentences had pitch change on variable parts of the sentence
-  □ The DEFENSE lawyer questioned the boring witness after the bar room brawl.
-  □ It was the waiter who was foolishly locked in the BASEMENT.
- The emotional content of filler sentences also varied
-  □ The girl was SLAPPED by the bully at school.

Examples of Test Sentences

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- The test sentences always had the pitch change on the direct object.
-  □ The monster is scaring the BABY in the bedroom.
-  □ The father is feeding the BABY after returning from the zoo.
- There were two versions of each test sentence, which had the same direct object.
 - One was preceded by an emotionally neutral verb
 - One was preceded by a negatively charged verb

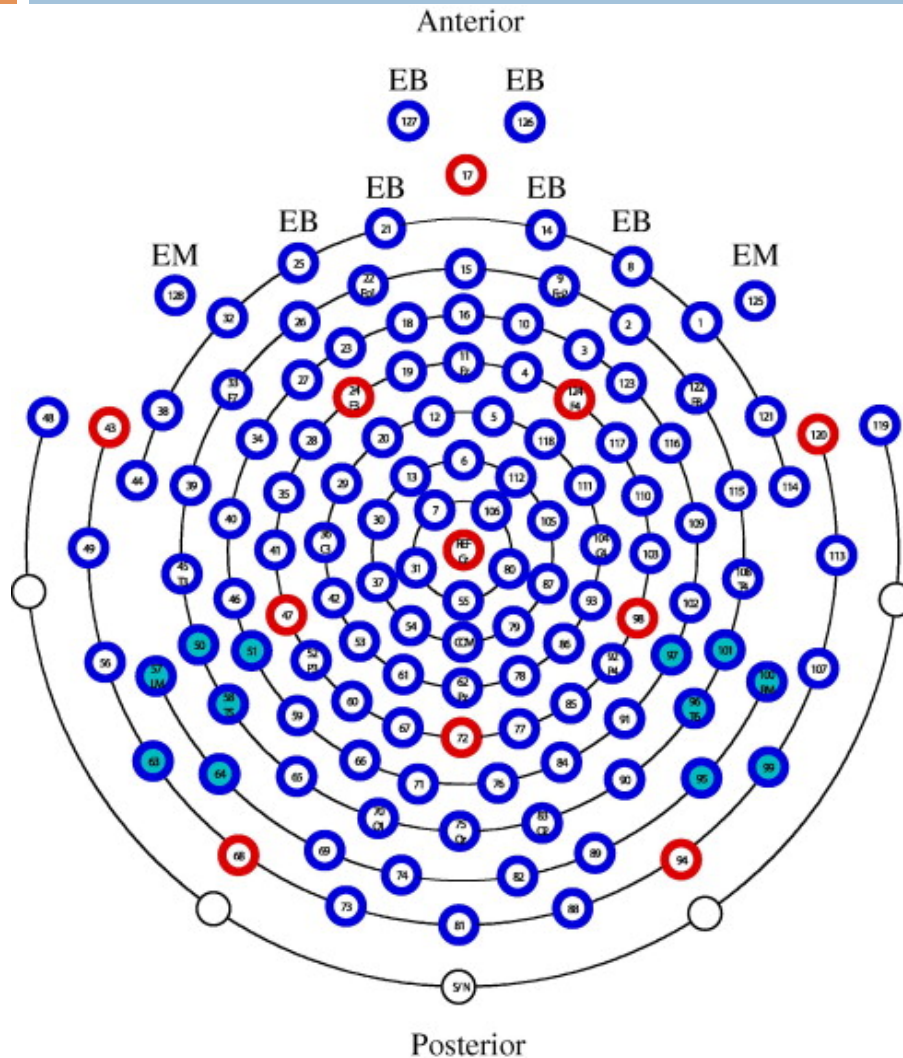
Participants

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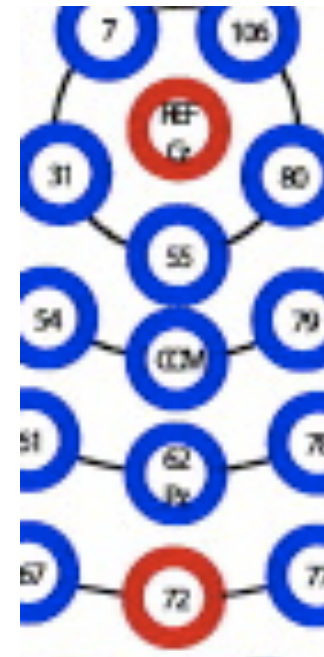
- 27 native speakers of English participated in the study in exchange for extra credit
- Jamie Tebaldi, Rachel Bristol, Jamie Williams, Lynsey Keator, and Mercedes Murphy ran the subjects in the Experimental Psycholinguistics Lab at the University of Delaware

Our Equipment

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Centro-Parietal Electrodes
55, 62 & 72



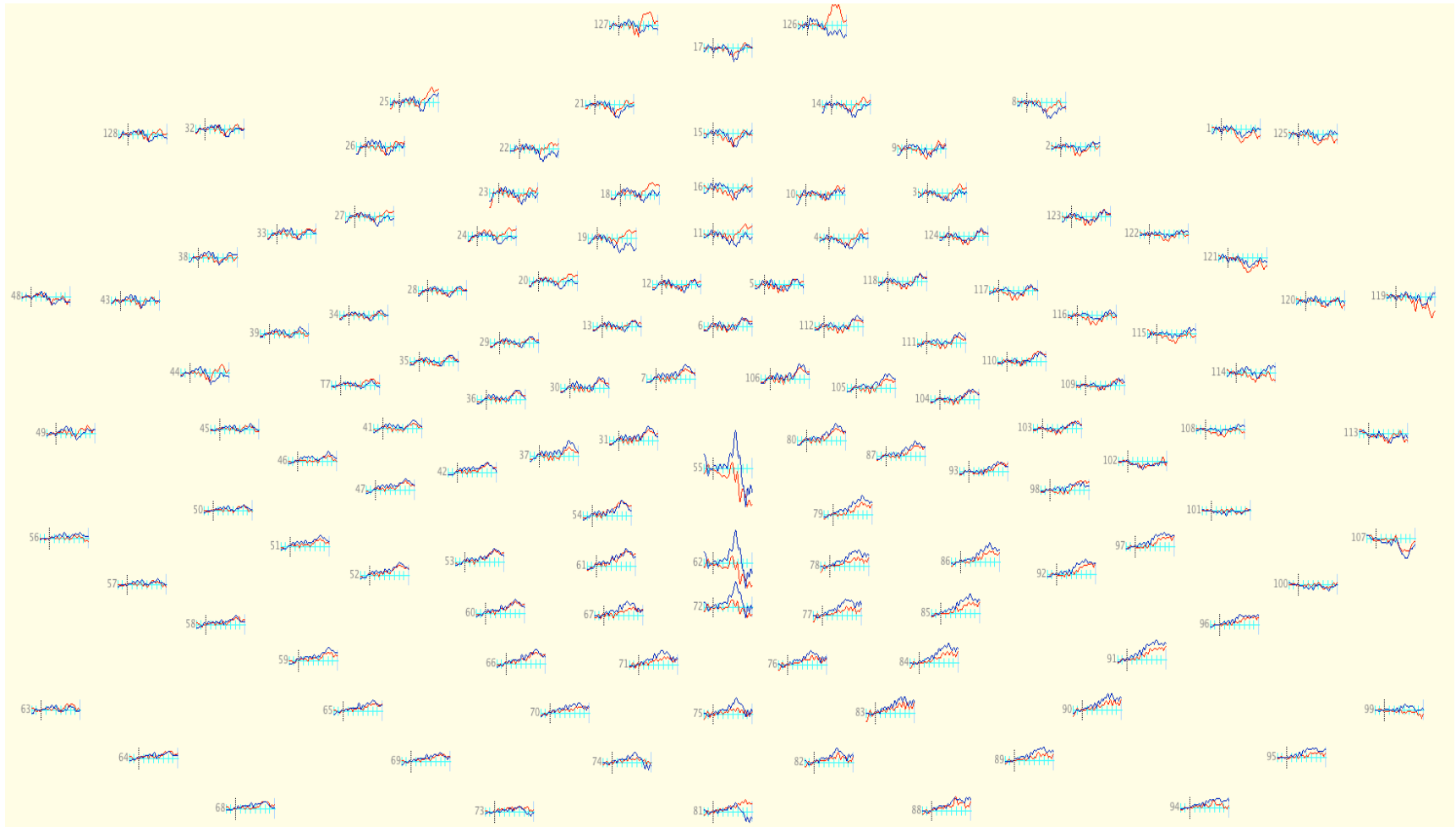
Findings: The P3 Response

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- In all sentences, subjects displayed a P3 Response to pitch change
 - ▣ Positively charged voltage fluctuation in the centro-parietal region about 300ms after the stimuli
 - ▣ Occurs post-perceptually during stimulus evaluation
 - ▣ Associated with updating working memory
 - ▣ Also associated with preparation of a behavioral response (pushing a button)

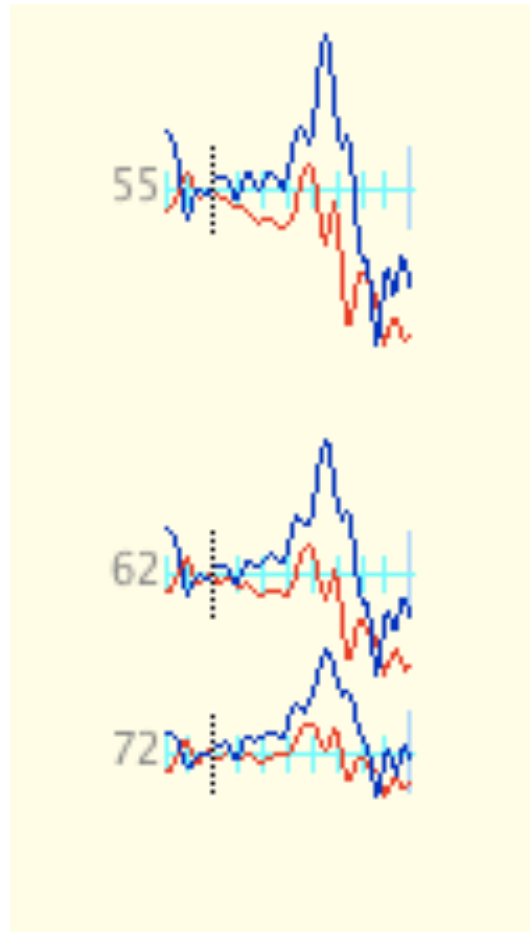
Findings: Modulation of the P3

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Close-Up of P3 Response

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Findings: Modulation of the P3

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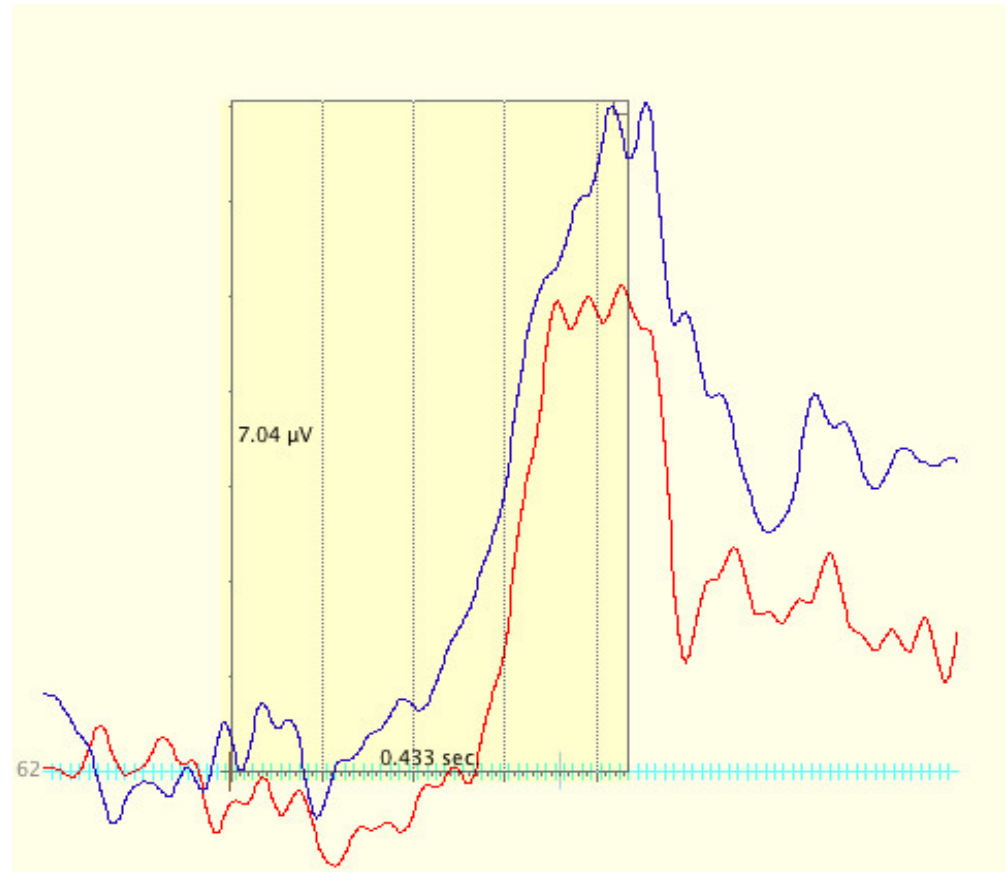
- Attenuated P3 in emotionally negative sentences
 - ▣ Reduced Amplitude
 - ▣ Delayed Latency



Positive



Negative



Conclusions

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- Emotional content of speech creates an emotional blink that interferes with the processing of the pitch change
- The blink weakens the P3 response
- Since the P3 is known to be post perceptual, this indicates that the blink is also post-perceptual
- Emotional blink doesn't block *perception* of stimuli, it merely slows *processing* of stimuli

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