Enhanced Startle Modulation to Contamination Pictures in Obsessive-Compulsive Disorder: A Case Study

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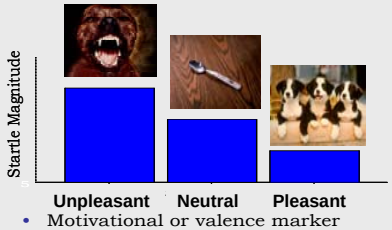
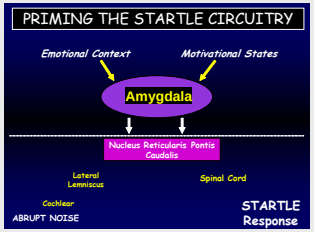
INTRODUCTION

In normal adults, the startle eyeblink response is larger during negative emotional states (e.g., fear, anxiety) compared to pleasant emotional states (Bradley, 2000; Vrana et al., 1988). This phenomenon, known as affective modulation of the startle reflex (AMSR), has become a valuable tool for measuring emotional and physiological reactivity in normal, psychiatric, and neurologically impaired individuals.

Aversion Enhancement of Startle Eyeblink



- Motivational or valence marker
- Primed under fear, anxiety, aversion
- Inhibited during pleasant state
- High arousal important



Potentiated startle responses reflect the amygydala's role in danger detection and priming of the subcortical startle circuitry.

Purpose of Present Study

- To learn whether a patient with Obsessive Compulsive Disorder (OCD) would display greatest reactivity to content specific preoccupations (i.e., blood contamination).
- We hypothesized greater startle reactivity to pictures of blood relative to other contaminants and threat pictures.

METHODS

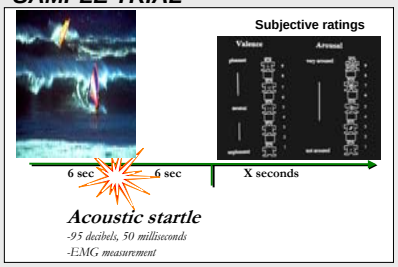
Case: 34-yr-old woman with a 10 yr history of intractable OCD

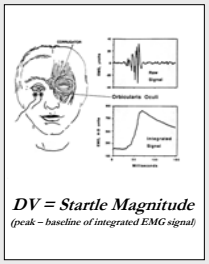
- ✓Psychiatric history described in Okun et al., 2004; normal neurologic exam; normal MRI
- ✓Fear of contamination by bodily fluids, especially blood
- ✓Avoided humans and objects perceived as contaminated
- ✓Repeatedly performed complex cleaning rituals
- ✓Unresponsive to multiple pharmaceutical agents and CBT
- ✓Hamilton Depression Scale 17-item survey score = 12, mildly elevated; Met DSM-IV criteria for major depression
- ✓Yale-Brown Obsessive Compulsive Scale = 38/40, extremely severe
- ✓Approximately 6 months prior to the evaluation, underwent Deep Brain Stimulation (DBS) surgery for treatment of her OCD
  - Leads implanted bilaterally in the anterior limbs of the internal capsule in the region of the nucleus accumbens. Stimulator turned off during startle procedure

Startle Eyeblink Task

Patient tested across 3 sessions. During each trial, a picture was shown for 6 seconds, during which time a 95 db white noise was delivered via headphones to elicit a startle eyeblink. The magnitude of the startle response was recorded for each eye via electrodes over the orbicularis oculi muscles; these signals were amplified (gain = 30,000) and integrated (200 ms time constant). All measures were obtained on a trial-by-trial basis. Subjective ratings were also obtained.

SAMPLE TRIAL





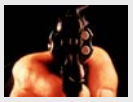
Emotion Pictures

- ✓ 3 sets of standardized emotional pictures from the IAPS
- ✓ Each set consisted of 9 Pleasant, 9 Neutral, & 9 Unpleasant Pictures (27/set)

Unpleasant Picture Types

Blood Disgust

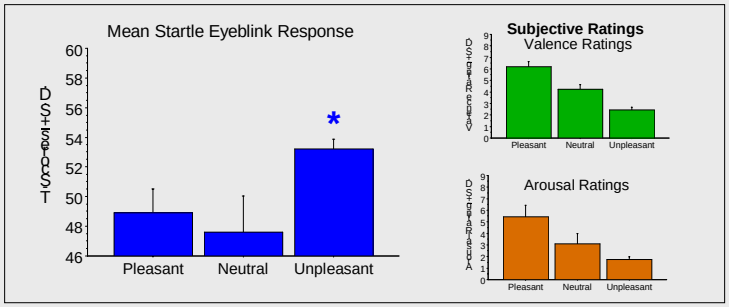
Non-Blood Disgust



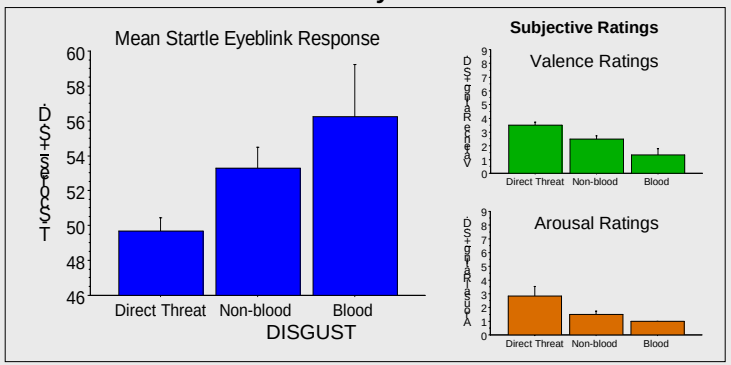
Threat

RESULTS

Typical aversion enhanced startle: Unpleasant > Pleasant



Greatest startle reactivity to blood contamination



- ❖ **Greater startle reactivity to "disgust" than "direct threat" pictures**
  - ➢ **Greatest startle reactivity with content specific to patient's most intense preoccupation (contamination by bodily fluids -blood)**
  - ➢ **No evidence of change in pattern with repeated exposure (across sessions)**

CONCLUSIONS

- ❖ **Our findings suggest that OCD patients with contamination preoccupations may show greatest startle reactivity to content specific to their contamination.**
- ❖ **These findings are consistent with a recent fMRI study showing a similar pattern of activation for threat pictures comparing controls to OCD patients with contamination preoccupations, but a different pattern of activation for disgust pictures (greater activation for disgust pictures in the right insula, inferior frontal region, and parahippocampal region in OCD; Shapira et al., 2003).**
- ❖ **The case study raises the possibility of using AMSR to evaluate treatment response.**
- ❖ **Future research should evaluate emotional reactivity in treatment naïve OCD patients (CBT, Medication, DBS) and longitudinally following treatment.**

Acknowledgements: Supported by: NS93211, MH54632, CRC RR00082, NIH:MH63545