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 Stress and Mental Health

History of Childhood Maltreatment is Associated with Blunted Anticipatory Startle

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Aim

Aim: Compare adults with or without a history of childhood maltreatment on measures of aversive anticipation across three time points

Background

- Experiences of childhood maltreatment, including physical, sexual, or emotional abuse, as well as physical or emotional neglect, have been found to be associated with the emergence and persistence of anxiety and depressive disorders^{1,2}
- The literature is mixed regarding whether childhood maltreatment is associated with heightened or blunted anticipatory responding in adulthood³
- Neurobiological evidence indicates that a history of childhood maltreatment alters neurobiological systems associated with stress and disrupts normal brain development of neural circuits associated with threat detection and anticipatory anxiety⁴

Methods

Participants

- A total of **2,592** active duty Marines participated in the study prior to deployment. All active duty members of these operational units were eligible. There were no exclusion criteria. Women were not included because female Marines were not part of infantry battalions at the time of testing. All procedures were approved by the VA San Diego Healthcare, the University of California San Diego, and the Naval Health Research Center IRBs. All participants provided voluntary written informed consent

Self Report Measures

- Subjects completed a 34-item modified version⁵ of the original childhood trauma questionnaire (CTQ)⁶; at the pre-deployment visit. The CTQ assesses the frequency of childhood trauma events (i.e. emotional, physical and emotional abuse & physical and emotional neglect). Cut off scores For group assignment were as follows: emotional abuse: ≥ 13 ; physical abuse: ≥ 10 ; sexual abuse: ≥ 8 ; emotional neglect: ≥ 15 ; physical neglect: ≥ 10 ^{7,8}

Participant Demographics

Variable	No Childhood Maltreatment	Childhood Maltreatment
Age	22.84 (3.56)	22.66 (3.31)
Race		
African American	4.1%	5.2%
American Indian/Alaskan Native	0.9%	2.1%
Asian	2.2%	3.4%
Native Hawaiian/Pacific Islander	1.4%	1.6%
White	85.4%	81.3%
Other	6%	6.4%
Ethnicity		
Not Hispanic or Latino	79.3%	72.3%
Cuban	0.4%	0.3%
Mexican	11.9%	14.8%
Puerto Rican	1.8%	2.5%
South/Central American	2.4%	4.4%
Other	4.2%	5.7%
CTQ	31.42 (4.93)	50.34 (13.67)
PTSD severity		
Pre-deployment	11.65 (13.12)	18.40 (16.83)
3-month post-deployment	12.26 (15.39)	19.26 (18.94)
6-month post-deployment	13.62 (15.81)	21.92 (19.48)
BAI		
Pre-deployment	5.81 (6.93)	7.94 (8.73)
3-month post-deployment	3.62 (6.18)	6.24 (8.52)
6-month post-deployment	3.32 (6.18)	5.42 (8.48)
BDI-II		
Pre-deployment	5.23 (6.38)	8.02 (8.47)
3-month post-deployment	5.21 (6.37)	8.00 (8.48)
6-month post-deployment	3.83 (6.04)	6.04 (7.67)
DCON	32.88 (10.38)	36.23 (10.64)

Note. CTQ=Childhood Trauma Questionnaire; BAI=Beck Anxiety Inventory; BDI-II=Beck Depression Inventory II; DCON=Deployment-related combat stress scale.

Startle Task

- Anticipation period:** Color of circle cues would signal the presentation of a pleasant image (red) or unpleasant image (green)
- Image Viewing:** Following the circle cue, a positive or negative image was presented
- Electromyography (EMG) of acoustic startle: white-noise bursts (105 dB 40-ms broad-band pulses) were presented between 2 and 6 seconds following the circle cue onset to assess anticipatory-potentiated startle
- Startle pulses were also presented 1.5 seconds following image onset to assess fear potentiated startle.

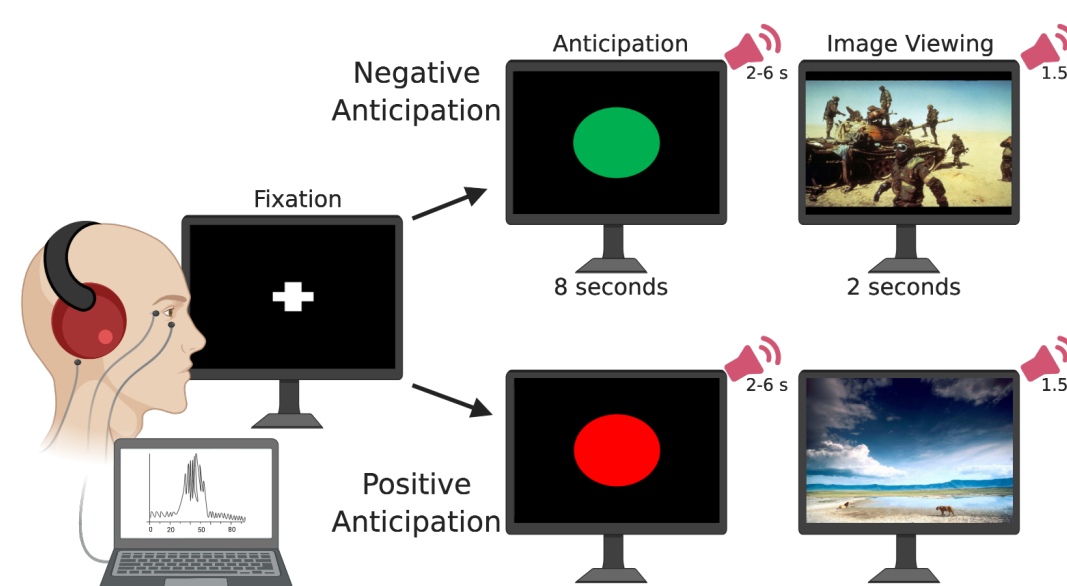


Figure 1: Participants anticipated a negative or positive stimulus depending on the color of the circle that appeared on the screen

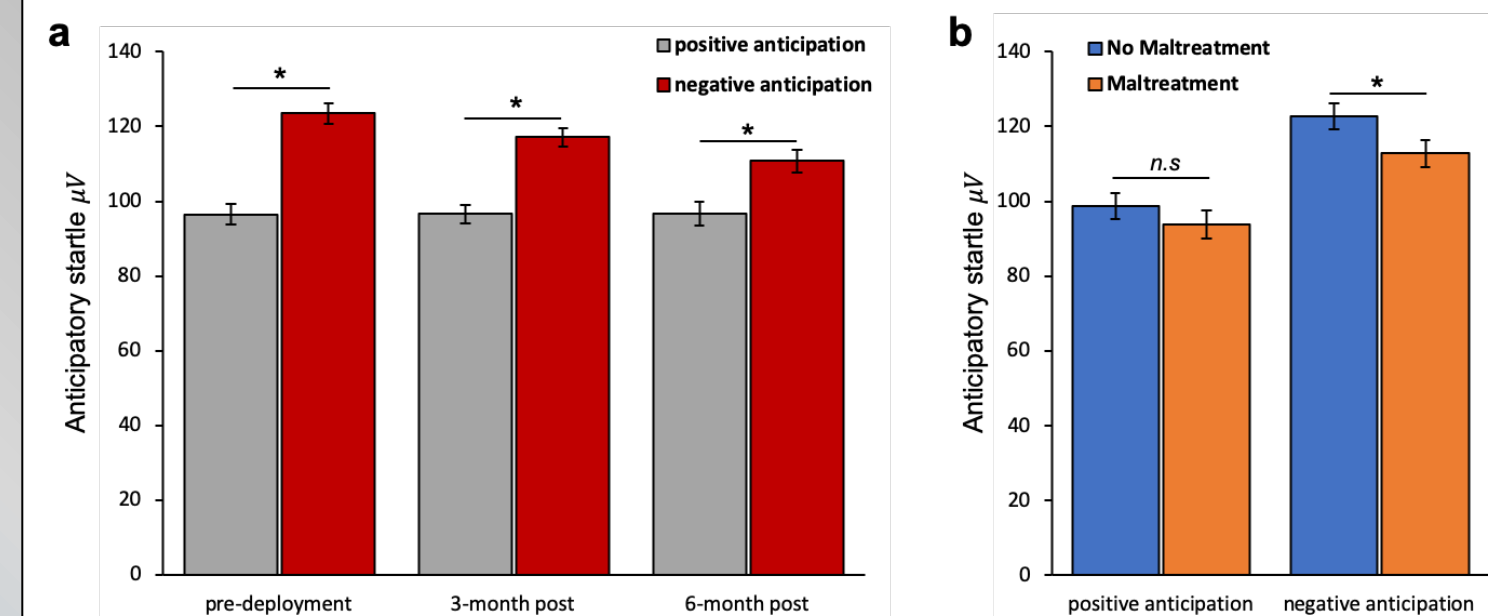
Reliability Results

Table 2. ICCs for the Aversive Anticipation Task Startle Response

Measure	ICC	95% Confidence Interval
Negative Anticipation	.67	.64 - .69
Positive Anticipation	.84	.82 - .85
Negative Image Viewing	.63	.61 - .65
Positive Image Viewing	.86	.86 - .87
Negative – Positive Anticipation	.27	.23 - .31
Negative – Positive Image Viewing	.06	-.01 - .11

Note. ICC's were calculated using the ICC(2,k) method.

Startle Results



(Left) Anticipatory startle response was significantly higher for negative than positive images at all three time points. (Right) Anticipatory startle was lower for individuals with a history of childhood maltreatment than those without for negative but not positive anticipation

Summary

- Anticipatory startle is moderately reliable, suggesting it is a trait-like psychophysiological biomarker associated with childhood maltreatment
- Anticipatory startle is greater for negative than positive anticipation across time
- Startle during negative but not positive anticipation is blunted for individuals with a history of childhood maltreatment
- These results provide evidence that a history of childhood maltreatment is associated with a reduced startle response when anticipating negative images

Limitations

- Subjects were young activity duty adult males – generalizability
- Focused on certain threat – need to test under uncertain threat contexts

References

