Participants (N=128, 64 female) completed three tasks at two study visits separated by one week. Participants first completed the Resting State Task. Participants were randomized to groups on Task Order (1st visit: NPU Task or Affective Picture Viewing Task). Participants completed the same Task Order at both study visits. Participants were excluded for health conditions that contraindicate exposure to stress or current use of psychiatric medications. This task involves a period of time characterized by the absence of other explicit task manipulations or potent experimental stimuli, often during threat or stress exposure to stress or current use of psychiatric medications.

Startle Response Measurement

The startle response is a measure of defensive reactivity that can be modulated by emotional stimuli (e.g. potentiated by threat).

Acoustic startle probes (50ms, 102dB) were presented at 4.5s post picture onset in the NPU Task (8-12 per condition) and 3-5s post-picture onset in the Affective Picture Viewing Task (8 per condition).

The eyeblink startle response was measured with Ag/AgCl EMG sensors over the orbicularis oculi muscle. Startle response was quantified as the peak magnitude 20-100ms post-probe onset.

Raw score: Mean startle amplitude for each condition during cues or pictures in the NPU and Affective Picture Viewing tasks, respectively.

Standardized t-score: We used trial level raw startle responses (i) to calculate participant’s (i) raw startle response mean (M) and standard deviation (SD) across their trials in the task. T-Startle = RawStartle – (M/SD) * 10 + 50

Study Procedures Overview

Resting State

NPU

Affective Picture Viewing

- Participants (N=128, 64 female) completed three tasks at two study visits separated by one week.
- Participants first completed the Resting State Task.
- Participants were randomized to groups on Task Order (1st visit: NPU Task or Affective Picture Viewing Task).
- Participants completed the same Task Order at both study visits.
- Participants were excluded for health conditions that contraindicate exposure to stress or current use of psychiatric medications.

Startle Potentiation

No Shock, Predictable Shock, Unpredictable Shock Task

During this task has been suggested to index individual differences in defensive reactivity within the Negative Valence System domain of the RDoC.

Participants viewed 36 different pictures (set) at each study visit comprising 12 pleasant, 12 unpleasant pictures in the NPU and Affective Picture Viewing tasks, respectively.

Pleasant Picture condition order was counterbalanced within subjects (8 per condition).

Unpleasant startle modulation was quantified as shock magnitude to unpredictable (vs. neutral, no-shock) pictures.

- To control for individual differences in shock sensitivity, participant’s maximum tolerated shock at 1st study visit is used during the NPU Task at both visits.
- Startle potentiation = shock cues minus no shock cues (not displayed)

Temporal Stability

Visit 1 to Visit 2

- Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

Final Startle Potentiation

Final Startle Potentiation

Final Startle Potentiation

Final Startle Potentiation

Final Startle Potentiation

Effect Size Robustness & Stability

Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

Visit 1 to Visit 2

NPU Task raw startle potentiation displayed moderate to high temporal stability and internal consistency, as well as large effect size across study visits.

Psychometric properties were generally superior for raw scores than t-scores.

Study Objectives

Psychophysiology tasks are poised to become a major contributor to the National Institute of Mental Health Research Domains Criteria (RDoC) and related initiatives in experimental medicine. For these tasks to meaningfully contribute to the goals of RDoC, their psychometric properties must first be well understood. Are they up for the task?

We designed the current study to comprehensively evaluate key psychometric properties of startle response modulation in three commonly used psychophysiology task platforms that can be anchored within the RDoC Negative Valence System domain.

1) Temporal stability: We quantify the temporal stability of individual differences in responses over one week with Pearson correlations between study visit 1 and study visit 2.
2) Internal consistency: We quantify the internal consistency within subjects with Spearman-Brown corrected correlations between odd and even trials (split-half reliability).
3) Effect size robustness and stability: We examine the strength and stability of each focal task manipulation by quantifying its effect size and testing for interactions with task visit (vis 1 vs. 2).

Conclusions

- NPU Task results demonstrate high temporal stability of startle potentiation consistent with previous reports (Shankman, 2013) and provide novel evidence of high internal consistency and robust effect sizes of startle potentiation across study visits.
- Unpleasant picture modulation had moderate temporal stability, higher than previous reports (r’s = 2 in Larsson 2000, 2001, Manber, 2000, Lee, 2009), but poor internal consistency.
- Pleasant picture startle modulation displayed low temporal stability and internal consistency. Effect sizes were small and not stable across study visits, particularly for t-scores.
- General startle reactivity displayed excellent temporal stability and internal consistency in the Resting State Task, similar to previous reports that have evaluated the psychometric properties of overall task performance (e.g., Larsson, 2000).
- Quantification as raw scores generally yields superior psychometric properties than standardized t-scores across affective tasks.

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Poster available at http://storymap.psych.wisc.edu

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