BACKGROUND AND SIGNIFICANCE

- Baseline startle is defined here as resting eyeblink startle response elicited before any intentional manipulation of affect.
- Baseline Startle manifests with large individual differences. This leads researchers to standardize startle outcome measures to remove variability between participants in their baseline under the assumption that it is task-irrelevant “noise”.
- The current study examined whether baseline startle may indeed index meaningful affect related individual differences.
- Recent research has suggested that uncertain vs. certain threat elicit distinct stress response components referred to as “anxiety” vs. “fear”, respectively. Furthermore, preclinical research suggests that the neurobiological substrates of these components may be dissociable.
- We reanalyzed baseline startle response and startle potentiation collapsed across 3 tasks in our laboratory. Each task manipulated threat (electric shock) predictability, probability, or temporal uncertainty to examine anxiety and fear response.

MEASURE

- The startle reflex is often used to assess affective response to threat (e.g., electric shock).
- EMG eyeblink startle response to noise probes was measured during cue presentation in all tasks.
- Startle potentiation is defined as the increase in startle response (to an acoustic “probe”) during threat vs. no-threat. Analyses of startle potentiation to each threat block, relative to matched cue (vs. no shock blocks) was conducted across all tasks.

RESULTS

- The final sample consisted of 350 participants (162 female) from 6 separate experiments collapsed across 3 tasks (2 experiments per task). Participants reported no axis I or II disorder.
- Potentiated startle was analyzed in a General Linear Model with Baseline Startle and Task as interactive between subject factors and Threat (Certain vs. Uncertain) as a within subject factor.
- The effect of baseline startle on overall startle potentiation was significant (t(344) = 6.34, p < .001). For every 1µV increase in baseline startle, startle potentiation increased by .16µV.
- A significant interaction between baseline startle and threat type confirmed that baseline startle was differentially related to certain vs. uncertain threat (F(1,344) = 16.85, p < .0001). For every 1µV increase in baseline startle, startle potentiation increased .10 µV’s more in the uncertain condition than the certain condition.

SELF REPORT ANXIETY MEASURES

- Individual difference measures relevant to trait anxiety were administered at each experiment. No significant correlations were found with baseline startle or potentiated startle despite large sample sizes.

BASELINE STARTLE AS A MODERATOR OF DRUG EFFECTS

- Baseline startle significantly predicted potentiated startle during threat. However, the relationship between baseline startle and startle potentiation was significantly stronger during uncertain than certain threat. This differential relationship was comparable across all tasks.
- As uncertain threat is thought to elicit anxiety in humans, the current findings provide empirical support that baseline startle may index state anxiety in healthy individuals.
- These data underscore the importance of including baseline startle as a regressor in linear models that examine potentiation during affective tasks. In fact, data from our laboratory show that baseline startle is a moderator of intoxication and withdrawal effects of various drugs.

REFERENCES AND SUPPORT