



## **Electrodermal Responses in Context Dependent Fear**

Ellie Diederich, Yiyu Wang, Kieran McVeigh, Ajay Satpute

Category: Physical and Life Sciences

Undergraduate

**Northeastern University**



Do different situations evoking fear experiences have the same physiological correlates?



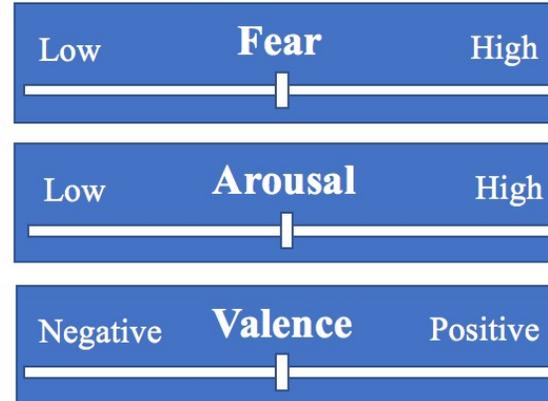
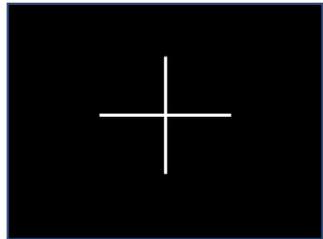


Figure 1. Participants viewed a fixation cross for a one minute baseline, then watched a 20 second point-of-view video depicting heights, social situations, or spiders. Participants then rated fear, arousal, and valence felt during each video.

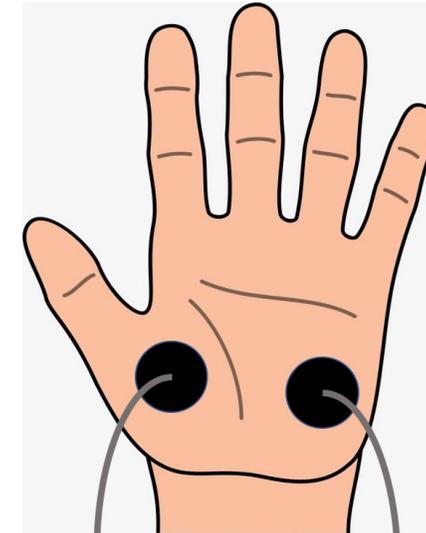
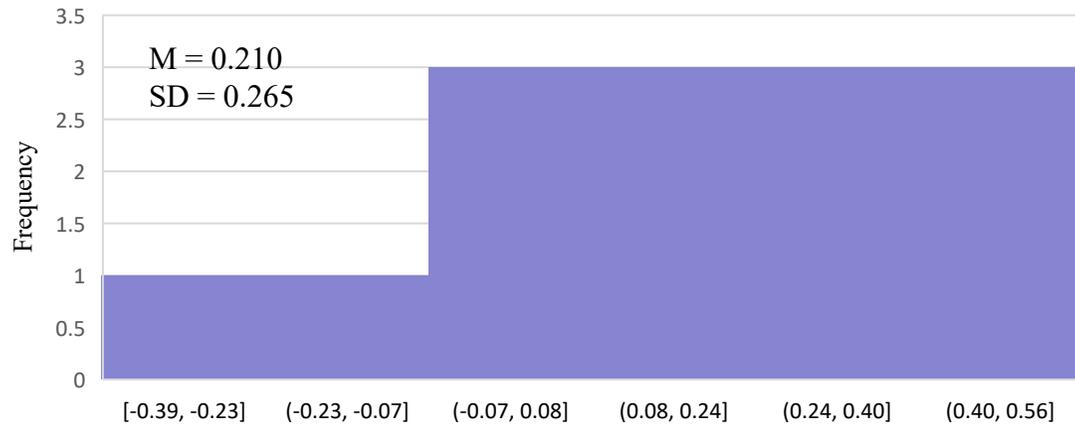


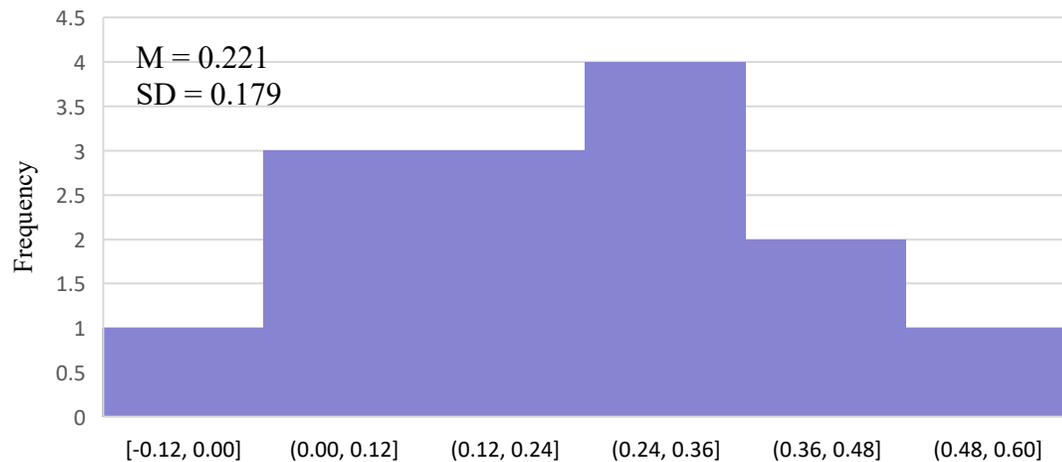
Figure 2. Electrodermal palmar electrode setup.

Participants watched 36 POV fear inducing videos while in the fMRI scanner. Participants were asked to rate their fear, arousal, and valence following each video. Electrodermal activity was simultaneously collected via two palmar electrodes.



**Fear Rating vs. SCR Relative Magnitude Regression Coefficients**

Figure 1a. Distribution of regression coefficients of fear ratings vs. SCR relative magnitude during all video watching periods. All data was normed prior to regression analysis. Subject-level regression demonstrated a significant ( $\alpha < 0.05$ ) positive correlation between fear ratings and SCR relative magnitude ( $t(13) = 2.99, p < 0.02$ ).



**Fear Rating vs. SCR Frequency Regression Coefficients**

Figure 1b. Distribution of regression coefficients of fear ratings vs. SCR frequency during all video watching periods. All data was normed prior to regression analysis. Subject-level regression demonstrated a significant ( $\alpha < 0.01$ ) positive correlation between fear ratings and SCR frequency ( $t(13) = 4.6, p < 0.01$ ).

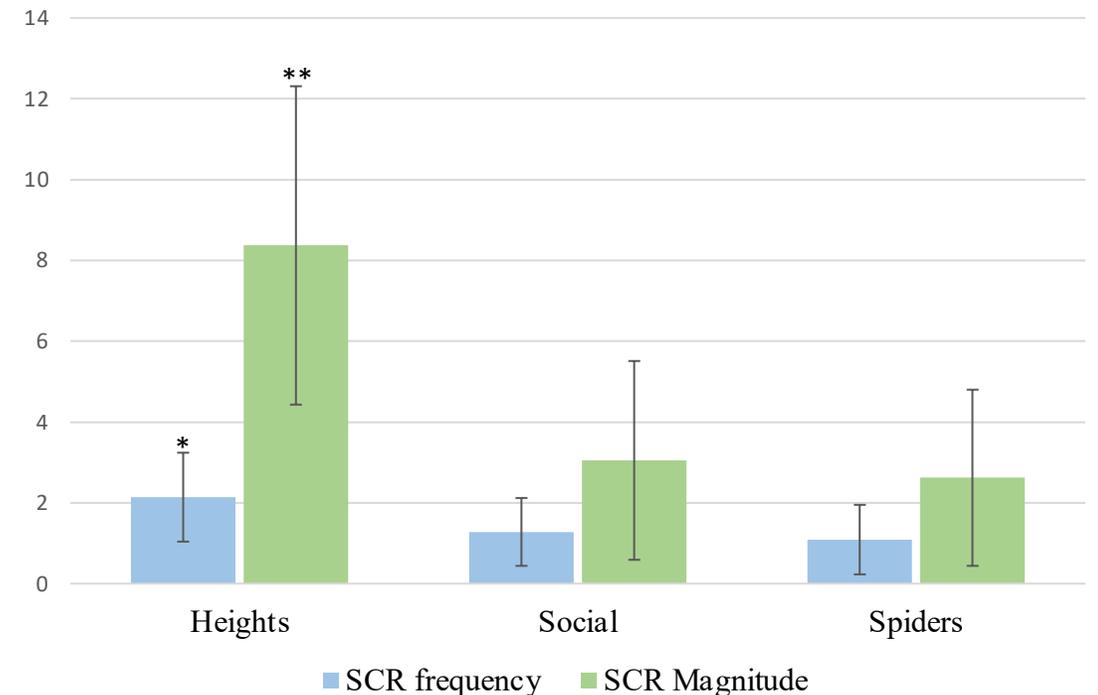


Figure 2. Comparison of mean SCR frequency and SCR relative magnitude during video watching times of each fear category. A one-way ANOVA analysis revealed a significant effect of situations for both frequency and magnitude (frequency:  $F(2,39) = 16.36, p < 0.01$ ; magnitude:  $F(2,39) = 5.63, p < 0.01$ ). Post-hoc analyses showed that the magnitude and frequency of SCRs significantly differed between heights and social situations ( $t(13) = 4.28, p < 0.01$ ;  $t(13) = 2.73, p < 0.02$ ), and heights and spiders ( $t(13) = 4.74, p < 0.01$ ;  $t(13) = 2.83, p < 0.01$ ). There was no difference between spiders and social situations ( $t(13) = 0.49, p = 0.63$ ;  $t(13) = 0.13, p = 0.90$ ).



## Conclusions

- The physiological fear response is heterogenous across contexts

## Next Steps

- Examining neural correlates of context dependent fear