



THE INTERACTION BETWEEN TRAIT AND STATE WORRY ON THE ERN DURING A WORRY INDUCTION TASK

Laura Zambrano-Vazquez¹, Philipp Ziebell², Amy E. Bowles¹, Danielle A. McGarrh¹, & John J.B. Allen¹

University of Arizona¹, University of Wuerzburg²



Background and Methods

Background

- Diverse hypotheses to explain the relationship between enhanced ERN and high levels of trait anxiety, and specifically worry.
- Role of **motivation and emotion**: enhanced results from a tendency to have a stronger response given the aversiveness of an error (Proudfit et al, 2013).
- **Compensatory Error Monitoring Hypothesis (CEMH)**: enhanced ERN is a result of a compensatory transient control designed to maintain good performance under situations in which worrying produces a high cognitive load (Moser et al., 2012).
- Although both theories recognize the **possible role for state anxiety** to potentiate the ERN, there is limited literature that allows a comparison of these competing hypotheses.

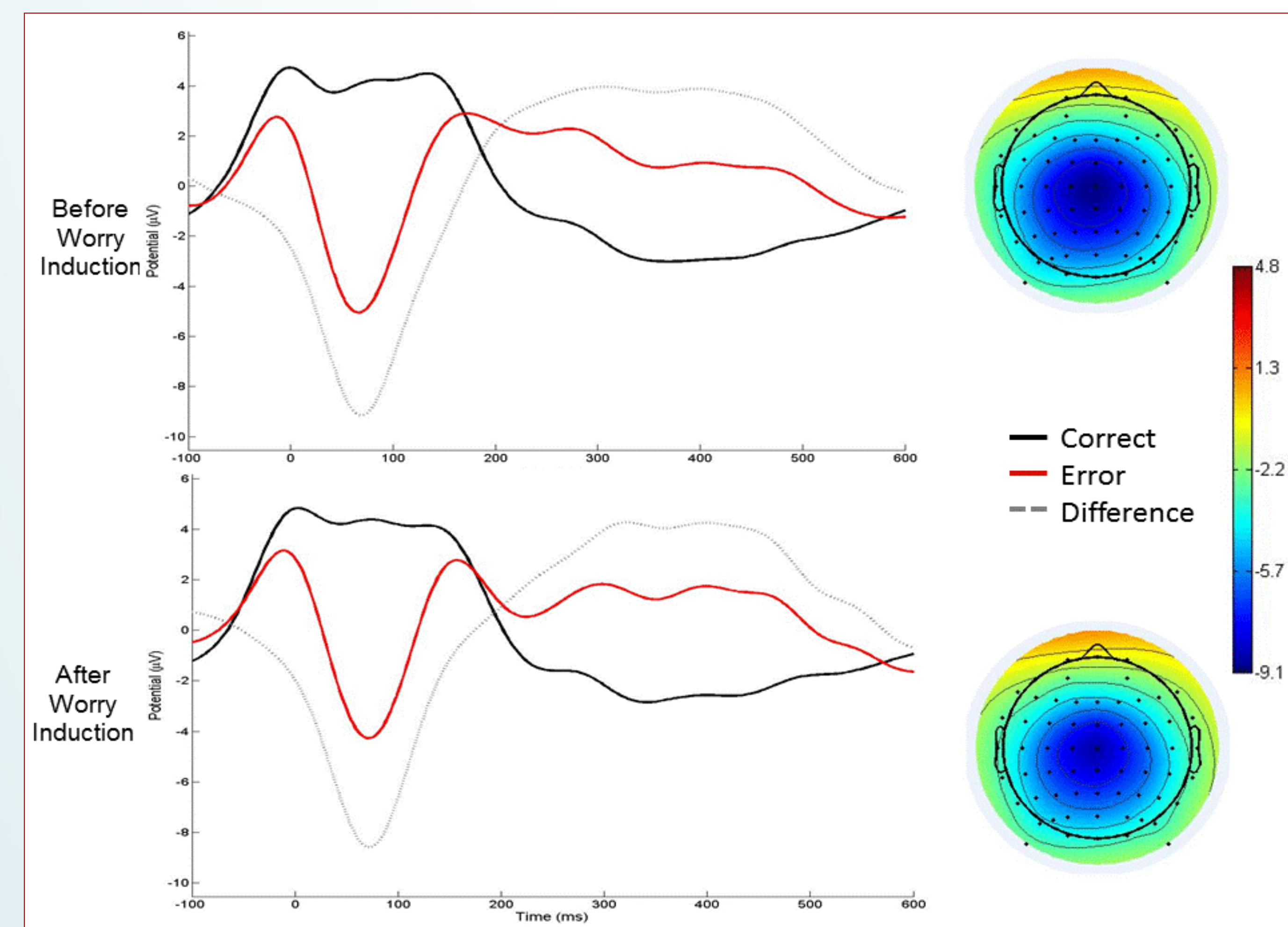
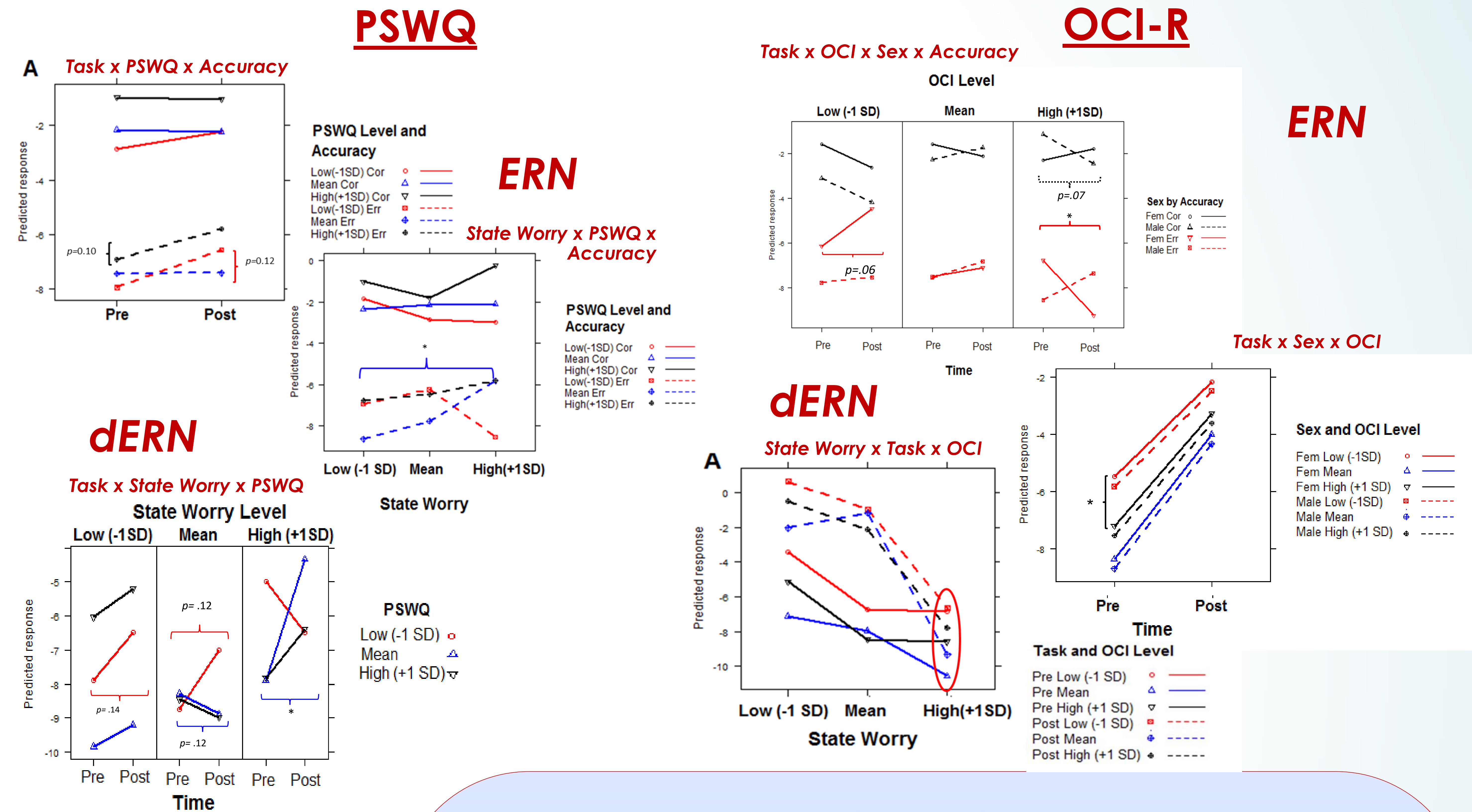
Purpose

- To test **state influences of worry** on the ERN and its **interaction with trait** worry and obsessive compulsive symptoms.

Methods

- EEG data recorded while participants (62 females, 61 males) completed a baseline flankers task, followed by a 5 min **worry induction** period and a second flankers which included a paradoxical thought suppression instruction as well as a 2nd worry induction.
- State worry measure after each task and worry checks after each block during the 2nd flankers task were collected.
- Trough-peak measure: most negative value in from 0-120 msec following the response, and preceding positive peak within 100 msec during error trials (ERN) and correct trials. Difference ERN(dERN) were created.
- Separate models were tested for ERN and dERN, as well as PSWQ and OCI.
- MLM: Task (Pre vs. Post Worry), Accuracy, Centered Trait measure (PSWQ OR OCI), Centered State worry (Worry checks during 2nd flankers), Site, and Sex

Results



Response-locked grand average waveforms for correct, erroneous trials and difference wave at Cz for Flankers task before and after worry induction. Scalp maps display the voltage distribution of the difference wave (70 ms) and are scaled from 4.8 to -9.1 μV .

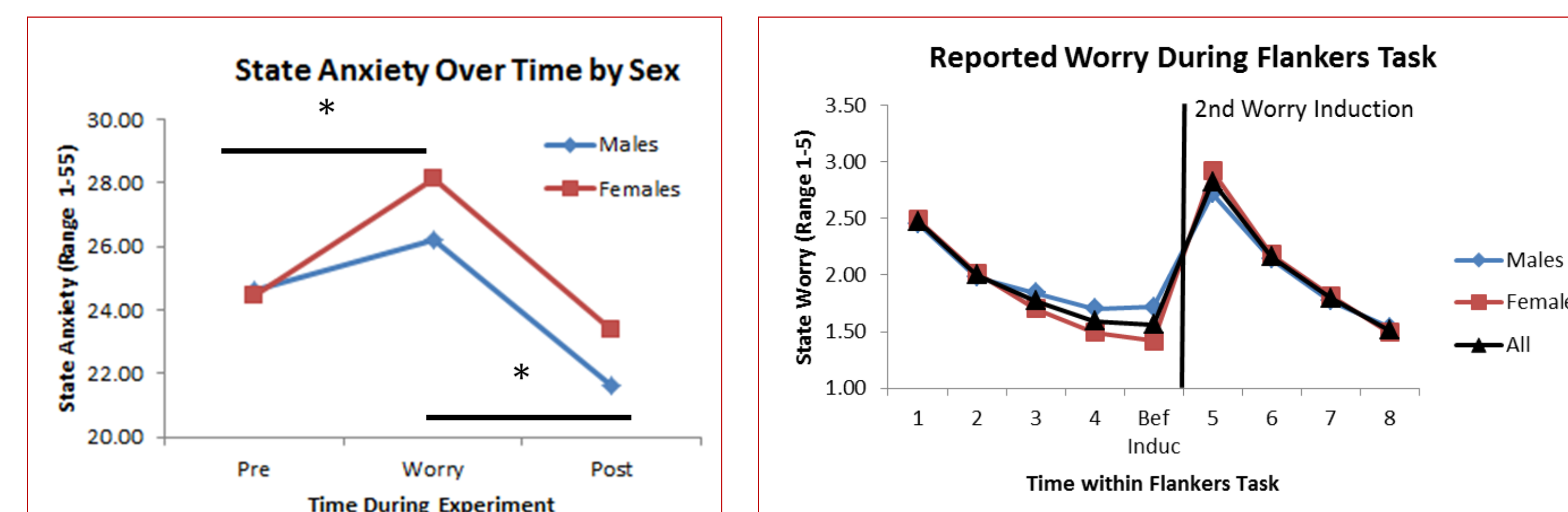
Acknowledgments: This work was supported in part by a National Science Foundation Graduate Research Fellowship (2011097808).

Handouts available at: www.psychofizz.org

Contact: Laura Zambrano-Vazquez at lzambran@email.arizona.edu



Manipulation Check of Worry Induction



Summary of Findings

- Worry Induction
 - Partially successful
 - Overall decrease in ERN/dERN over time
- PSWQ
 - High trait worry trend towards smaller ERN
 - Moderate trait and state, increase in dERN
- OCI-R
 - Increase in ERN post-worry for high OC females
 - Marginal ERN decrease for low OCI scores females and males with Mean OCI
- Pre Worry Flankers
 - Neither PSWQ nor OCI-R predicted ERN/dERN prior to worry induction

Discussion

Current Theories

□ CEMH

- No reliably enhanced ERN despite increase in cognitive load (worry induction AND thought suppression)
- Consistent results under specific conditions (high OC females, mean PSWQ and state)
- A new level of consideration: Interaction of State and Trait

□ Motivation

- No enhanced ERN due to no increase in threat value of errors
 - Worries not related to errors
 - Worries so great that errors in flankers task lost threat value

Limitations

- Sample not representative of literature and population
- Worry Induction not sustained
- Gender Ratio
- Practice Effect

Conclusions and Future Directions

- No unequivocal support to either of current theories
- Assessing impact of change in threat value to errors as related to state worry
- Compare worry-related manipulations to increased cognitive load alone