

INTRODUCTION

Background: Current literature has associated early childhood adversity to long-term dysregulation of the physiological stress-response systems within the body. Research has shown that altered baseline levels & reactivity to stress subsequently increases the risk for poor health outcomes¹. Within the field, there have been calls to further explore the true predictive value of sympathetic & parasympathetic response alterations for negative health outcomes.

Purpose: Examining how healthy adults relive an upsetting personal memory (i.e., emotional stressor) will permit me to explore the question of whether individuals who have a history of early life adversity have differences in their sympathetic and parasympathetic stress responses when recounting an adverse life experience. Doing this work will advance our understanding about the mechanisms that drive the physiological consequences of early life stress in adulthood.

Specific Aim: Analyze heart rate variability (HRV) and skin conductance, measures of parasympathetic & sympathetic responses respectively, in participants to determine autonomic nervous system baseline levels & reactivity. An additional exploratory aim included examining the relationship between emotional intensity of the disclosure, HRV, and skin conductance as a function of early life adversity.

Hypotheses: (1) Individuals who have a history of childhood adversity will have higher baseline skin conductance & decreased HRV measurements. (2) Individuals who have a more extensive history of childhood adversity will have an increase in skin conductance & decrease in HRV while under acute stress. (3) Stronger emotional intensity will be associated with higher skin conductance & lower HRV measurements in participants with a history of childhood trauma.

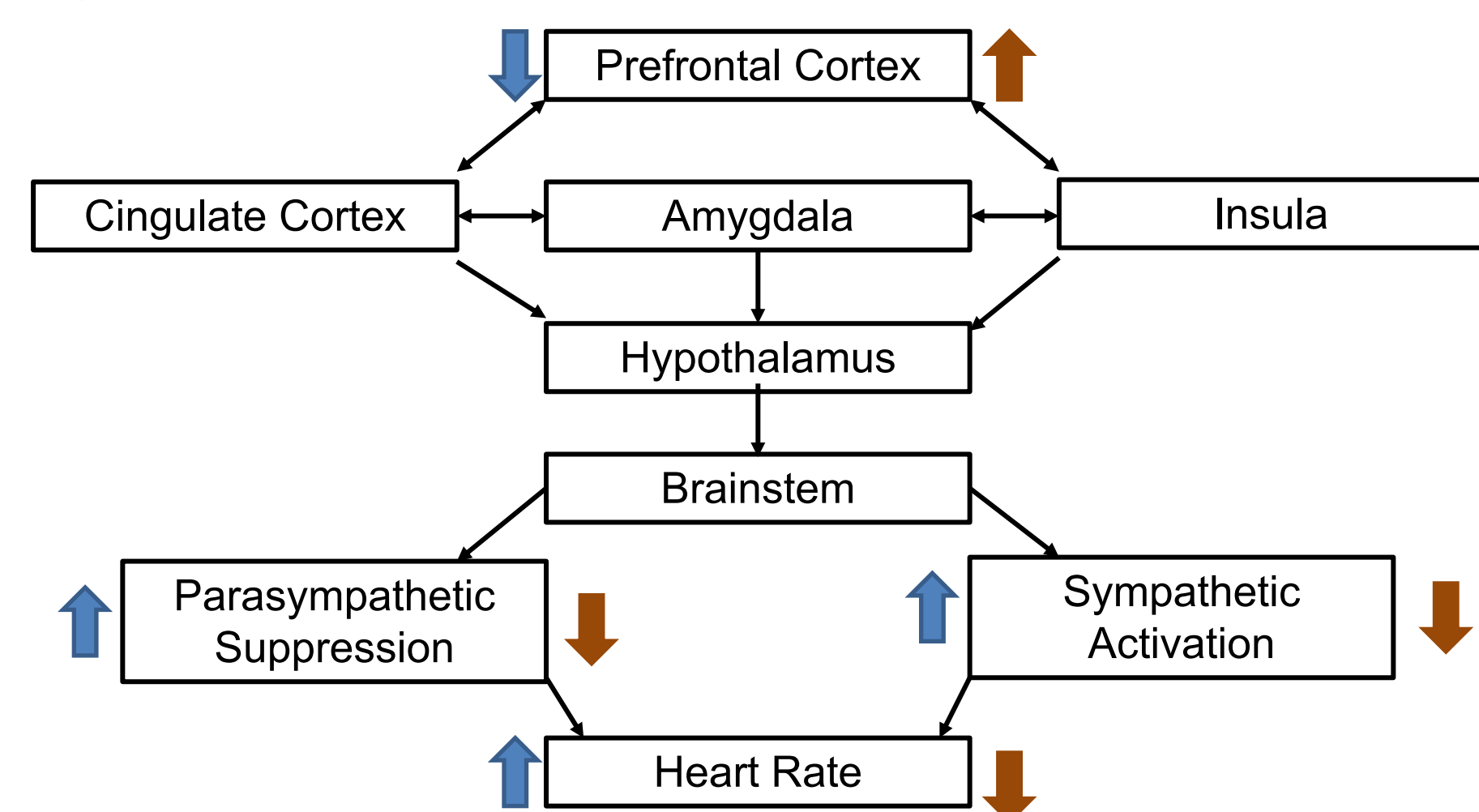


Figure 1: Neurovisceral Integration Theory Diagram²

METHODS

Participant Protocol

This observational study recruited English-speaking couples (N=107) ages 40 and older who were married or in a marriage-like relationship for at least 2 years. Couples completed a 5-min resting period to obtain baseline measurements of high-frequency heart rate variability (HF-HRV) and skin conductance (SC), measures of parasympathetic and sympathetic activity, respectively. In the battery of questionnaires, participants reported experiences with childhood trauma using the well-established Childhood Trauma Questionnaire (CTQ)³. Both partners reported on their mood and completed a life event checklist to aid their recall of a distressing past personal life event that they still considered upsetting. The event was one that they experienced as an individual, not jointly with the partner. The partner randomly chosen to disclose their upsetting event first (balanced by sex) was given instructions from the *relived emotion* protocol⁴⁻⁵; listeners were asked to only listen, similar to other established couples disclosure protocol⁶⁻⁸. The discloser was asked to relive the event aloud to his or her partner, relaying the autobiographical narrative from beginning to end. They then elaborated on the emotional details using a series of structured follow-up prompts provided at the start of the task. The listener was asked to listen to his or her partner as closely as possible, focusing on taking in the discloser's re-experience and thus minimizing interruptions, prompts, redirects, and suggestions⁸⁻⁹. After the task, the listener rated his or her engaged listening, and both partners again rated their mood. Then, the partners switched roles and completed the exercise again. HF-HRV, HR, and SC were recorded continuously to provide measures of reactivity and recovery.

Disclosure Video Analysis

Upsetting memories were coded with adequate reliability ($\kappa = 1.0$) by independent raters for whether there was a focus on traumatic childhood events. Emotional intensity of the disclosure was coded reliably (Finn's $r = .85$) on a scale of 0 (not emotionally engaged) to 3 (highly intense emotional engagement), taking into account verbal expressions, facial expressions, verbal cues, and physical gestures.

We fit multilevel models in PROC MIXED (SAS v9.4) to account for nesting of participants within couples. Covariates included disclosure order (randomized between husbands and wives), gender, education, comorbidities, whether the event they disclosed occurred in childhood, and baseline levels of physiology.

RESULTS

Figures 1-3 . Sample Descriptive

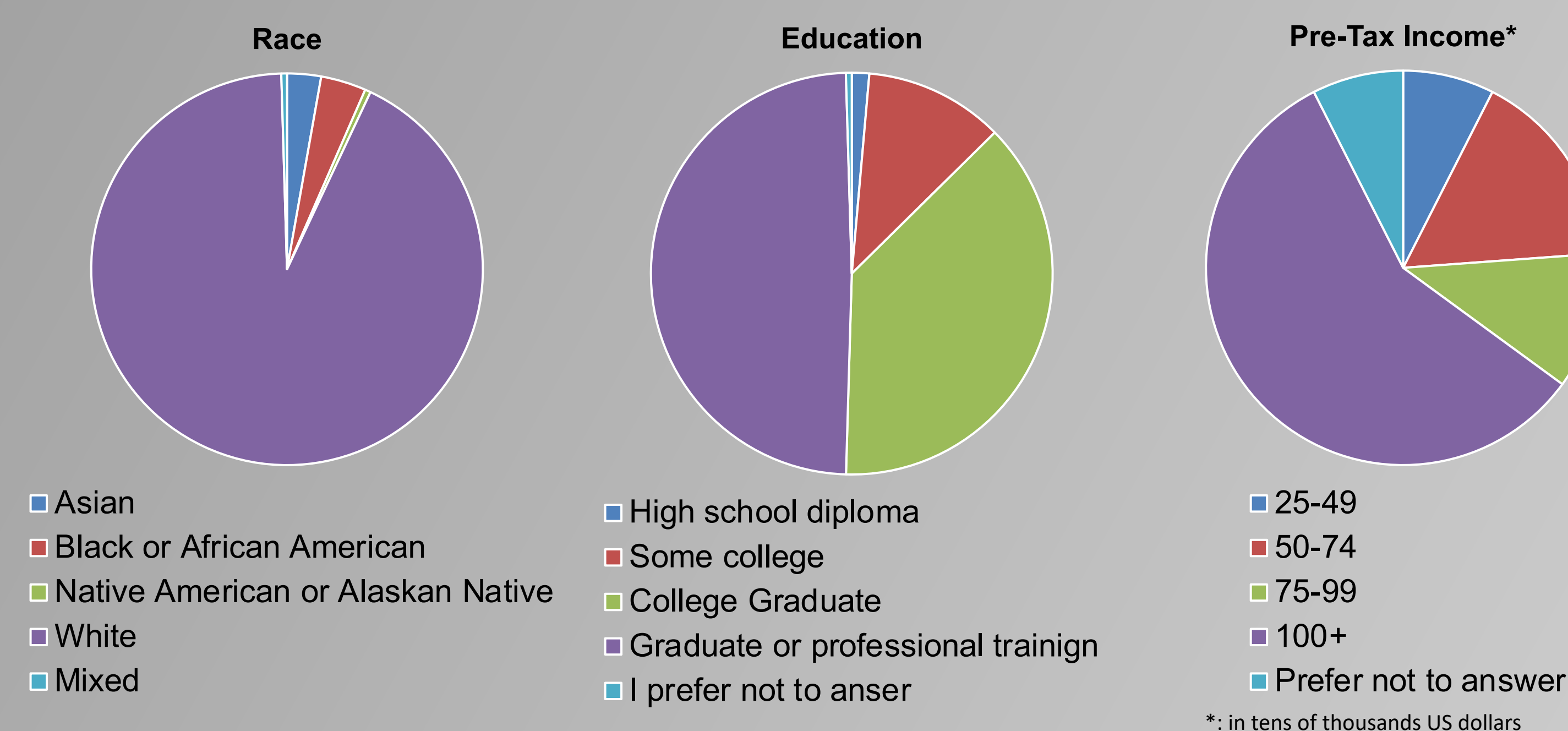
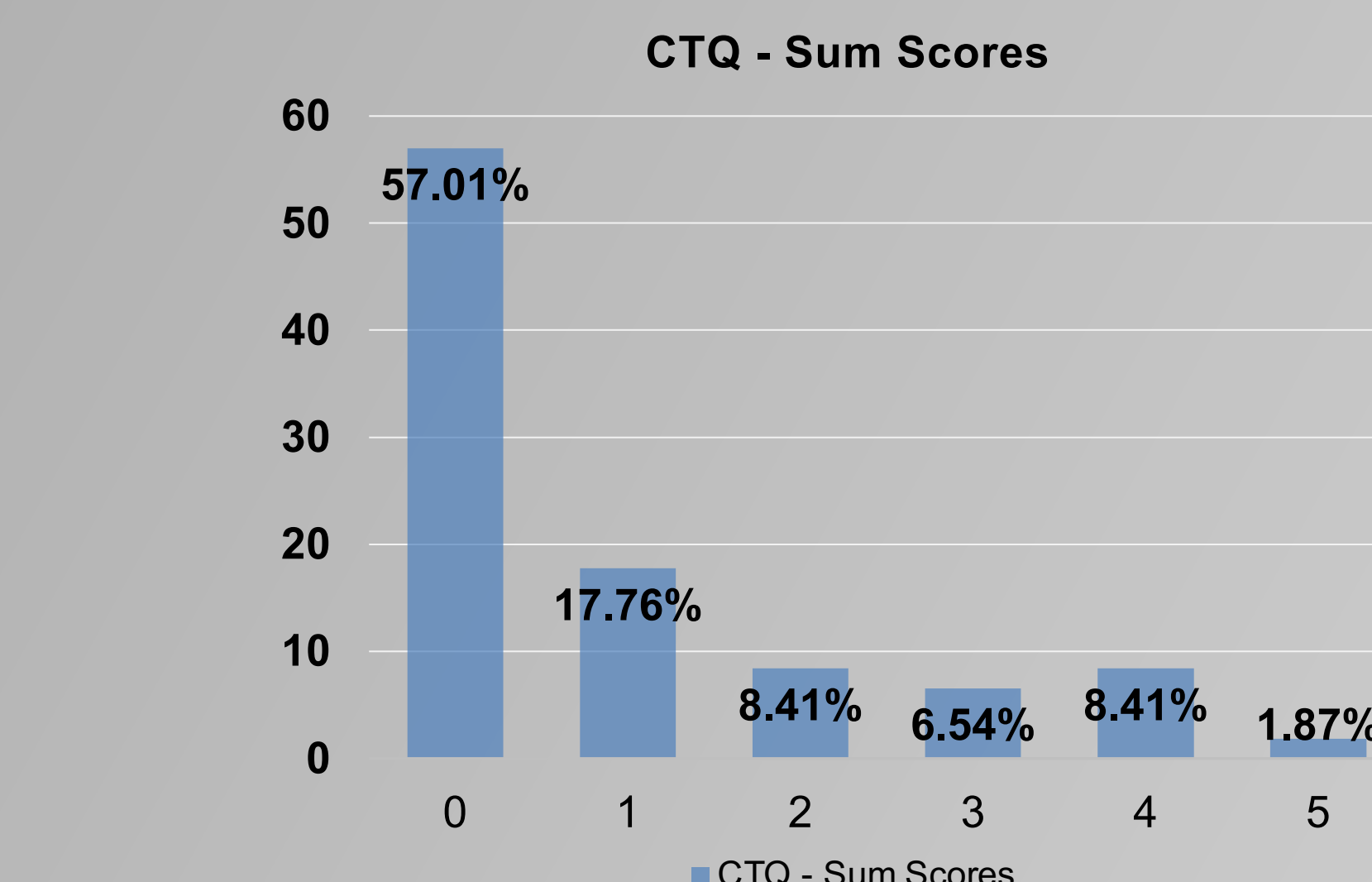


Figure 4-5 Childhood Trauma Question Score Breakdown

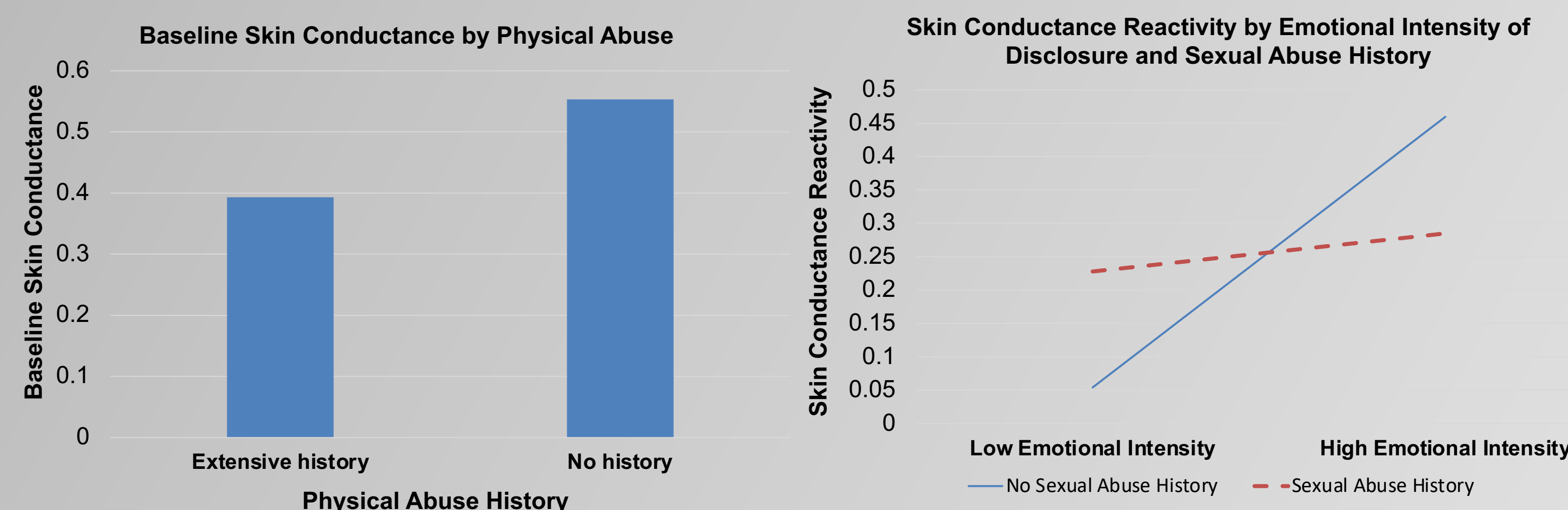


Summary: represents the distribution of CTQ scores amongst the 214 participants.
Note: Study distribution is approximate to current national averages

Variable	1	2	3	4	5	6	7	8	9	10	M(SD)
1. Age	--										56.52 (11.22)
2. Comorbidities	0.10	--									0.29 (0.61)
3. Emotional Intensity	-0.18*	0.02	--								1.93 (1.00)
4. CESD total	-0.09	-0.05	0.12	--							7.34 (6.38)
5. Emotional Abuse	-0.04	0.04	0.09	0.38*	--						8.39 (4.33)
6. Physical Abuse	-0.01	-0.02	0.07	0.23*	0.60*	--					6.78 (2.77)
7. Sexual Abuse	0.06	0.11	0.05	0.20*	0.39*	0.26*	--				5.93 (2.73)
8. Emotional Neglect	-0.07	0.01	0.13*	0.38*	0.73*	0.52*	0.28*	--			9.83 (4.42)
9. Physical Neglect	-0.08	-0.01	0.08	0.26*	0.63*	0.50*	0.24*	0.65*	--		6.41(2.53)
10. CTQ Sum	-0.01	0.05	0.12*	0.35*	0.81*	0.72*	0.49*	0.76*	0.71*	--	0.97 (1.41)

Note: Ns = 212-214 participants; *p < 0.05

Figures 5-6 Skin Conductance Analysis



RESULTS (continued)

Q1. Do individuals with a history of childhood adversity have higher baseline skin conductance & lower HRV measurements?

- > Healthy adults who had more extensive histories of physical abuse in childhood had higher baseline skin conductance levels as measured on the non-dominant wrist (Estimate = -0.03, SE = 0.02, p = .038)
- > No overall difference was noted in the baseline HRV data.

Q2. Did individuals who have an extensive history of childhood adversity show an increase in skin conductance and decrease in HRV while under acute stress?

- > No differences were observed in either parasympathetic or sympathetic reactivity between individuals with and without a history of childhood trauma. There were also no reactivity differences observed between the varying CTQ subscales (e.g. emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect).

Q3. Is high emotional intensity associated with higher skin conductance and lower HRV in individuals with a history of childhood adversity?

- > A non-significant trend arose for the interaction between emotional intensity of the disclosure and sexual abuse history on skin conductance reactivity (Estimate = -0.03, SE = 0.02, p = .066). Specifically, participants with no sexual abuse history in childhood who relived their upsetting memory with greater emotional intensity also demonstrated larger sympathetic responses compared to those who recounted the event with less emotional engagement (Estimate = 0.14, SE = 0.04, p = .0003). However, those with a sexual abuse history showed no effect of emotional intensity on skin conductance reactivity (p > .250).

DISCUSSION AND CONCLUSION

Current literature highlights that dysregulation of autonomic stress responses due to long-lasting adverse childhood experiences have been suggested as the cause for higher vulnerability to both physical & mental health problems.¹⁰ Heightened or prolonged responses, which include heightened activation of SNS and prolonged deactivation of PNS are associated with increased risk for a range of health morbidities.¹⁰

The present study found that individuals who experienced adverse life events before the age of 18 did not experience the expected dysregulation in their parasympathetic and sympathetic responses when under acute emotional stress. The study sample did not include individuals with pre-existing health comorbidities, which may be indicative that healthy individuals with a history of childhood adversity do not display adverse alterations of their stress axes. While current models assume that ACEs have the potential to have long-term effects on the autonomic nervous system, additional research is needed in both healthy and comorbid populations to assess for potential correlations in health status and stress response. Our study sample was predominantly white, highly educated, and upper-middle to high class; which also calls for additional research with a more diverse sample for better generalizability.

Early life adversity has been associated with life-long increased risk for chronic health conditions, which is of great public health importance. Researching the effects of childhood trauma in adulthood interactions can assist in enlightening the medical community to the lasting consequences of early exposure to adversity. Through the research, the health disparities associated with these cases can be further examined, which also serves as yet another impactful component of this field of study.

LITERATURE CITATIONS

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ETHICS APPROVAL

IRB approval received on 12-20-2017.