



THE UNIVERSITY  
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at CHAPEL HILL

# Fear Learning Predicts PTSD Symptoms in Children After Hurricane Florence

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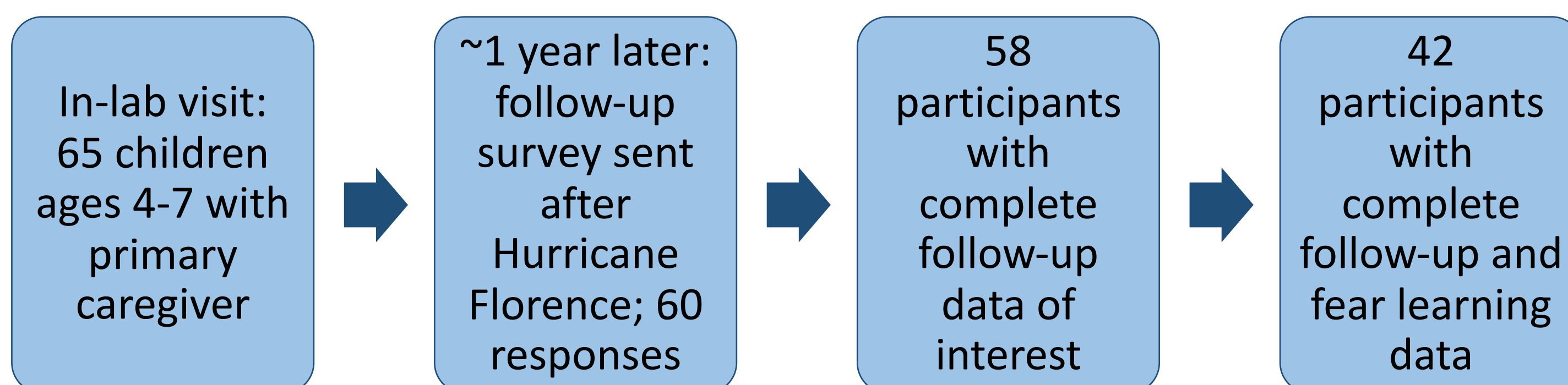
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## INTRODUCTION

- Posttraumatic stress disorder (PTSD) is a type of anxiety disorder that some individuals develop following a traumatic event that results in negative outcomes.
- Young children are highly susceptible to developing PTSD, especially following natural disasters (Javidi & Yadollahie, 2012).
- Physiological responses during fear learning are linked to PTSD (Gamwell et al., 2015; McLaughlin et al., 2016).
- Young children with a history of abuse can differentiate between threat and safety cues during fear learning (Machlin et al., 2019).
- At low physiological reactivity, adolescents with high media exposure to the Boston Marathon Bombings (BMB) had higher levels of PTSD symptoms following the BMB than those with low media exposure (Busso et al., 2014).
- There has been no prospective research to show whether and how fear learning can predict PTSD in young children.

**We hypothesized that children's physiological responses during fear learning would predict PTSD symptoms following Hurricane Florence and that their exposure to the hurricane's destruction would moderate this relationship.**

## SAMPLE



## MEASURES

### IN-LAB VISIT

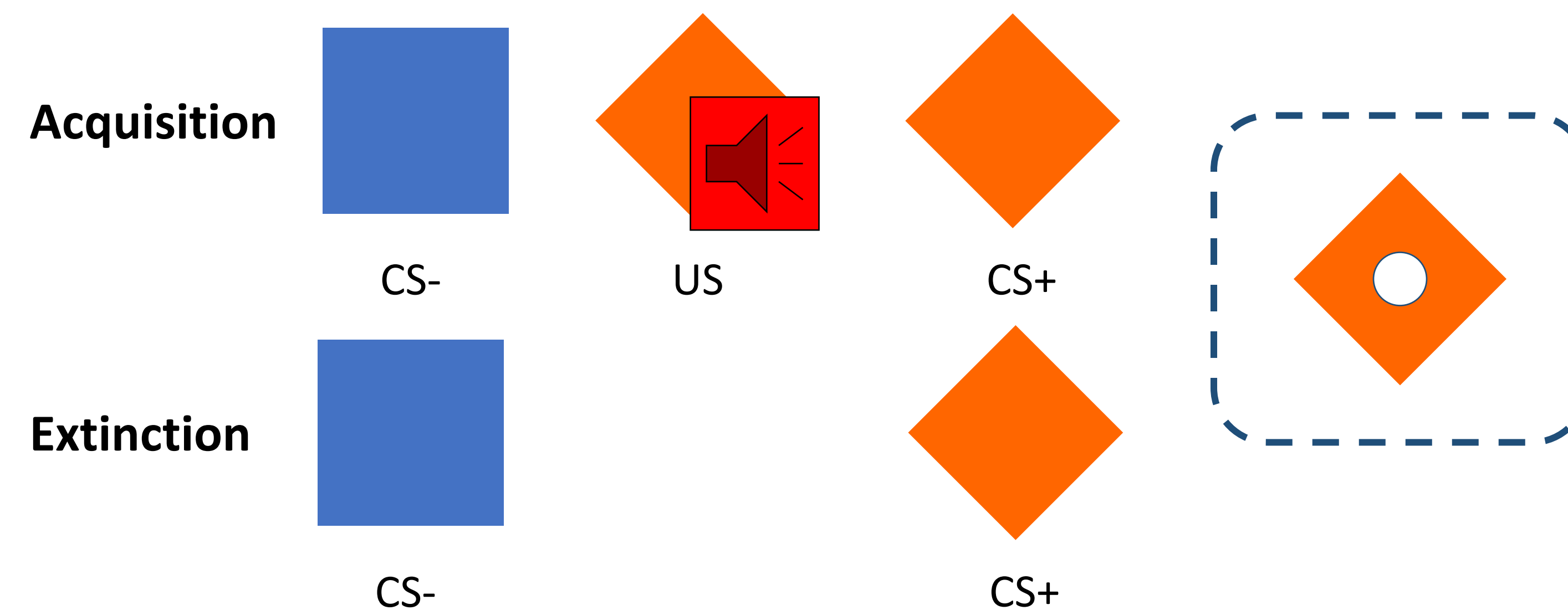
- Parents: Diagnostic Interview Schedule for Children - Young Child
  - Baseline anxiety control
- Children: Fear learning paradigm with physiological measures
  - Skin conductance response (SCR)

### FOLLOW-UP SURVEY

- Hurricane exposure questions: "On a scale of 1 (no damage at all) to 5 (severe damage), did Hurricane Florence damage your home (e.g. flooding, broken windows, roof damage)?"
- UCLA PTSD Index (symptoms only)
  - Overall PTSD symptom score and subscores for each symptom cluster

## FEAR LEARNING PARADIGM

**In fear learning, one stimulus is conditioned to generate a fear response and one is conditioned to be a safety cue.**



- Blue square and orange diamond randomized to be threat (CS+) and safety (CS-) cues.
- Threat cue reinforced 80% time with aversive sound (US) during acquisition.
- Attention check: 20% time children pressed to dot on shape.
- SCR collected throughout paradigm; amplitude used to determine physiological response to each stimulus.

## RESULTS

### MEASURES FREQUENCIES

Measure:	DISC anxiety	Hurricane exposure	Overall PTSD	Increased arousal
<i>n</i> endorsed: ( <i>N</i> = 42)	33	7	32	9

### REGRESSIONS PREDICTING PTSD SYMPTOMS

- Child hurricane exposure → overall PTSD symptoms
  - $p = .013$ ,  $B = 4.41$
- Fear learning → overall PTSD symptoms
  - $p = .056$ ,  $B = 6.99$
- Fear learning → increased arousal PTSD symptoms
  - $p = .036$ ,  $B = 5.84$

## ACKNOWLEDGMENTS

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## RESULTS

### MODERATING EFFECT OF CHILD HURRICANE EXPOSURE

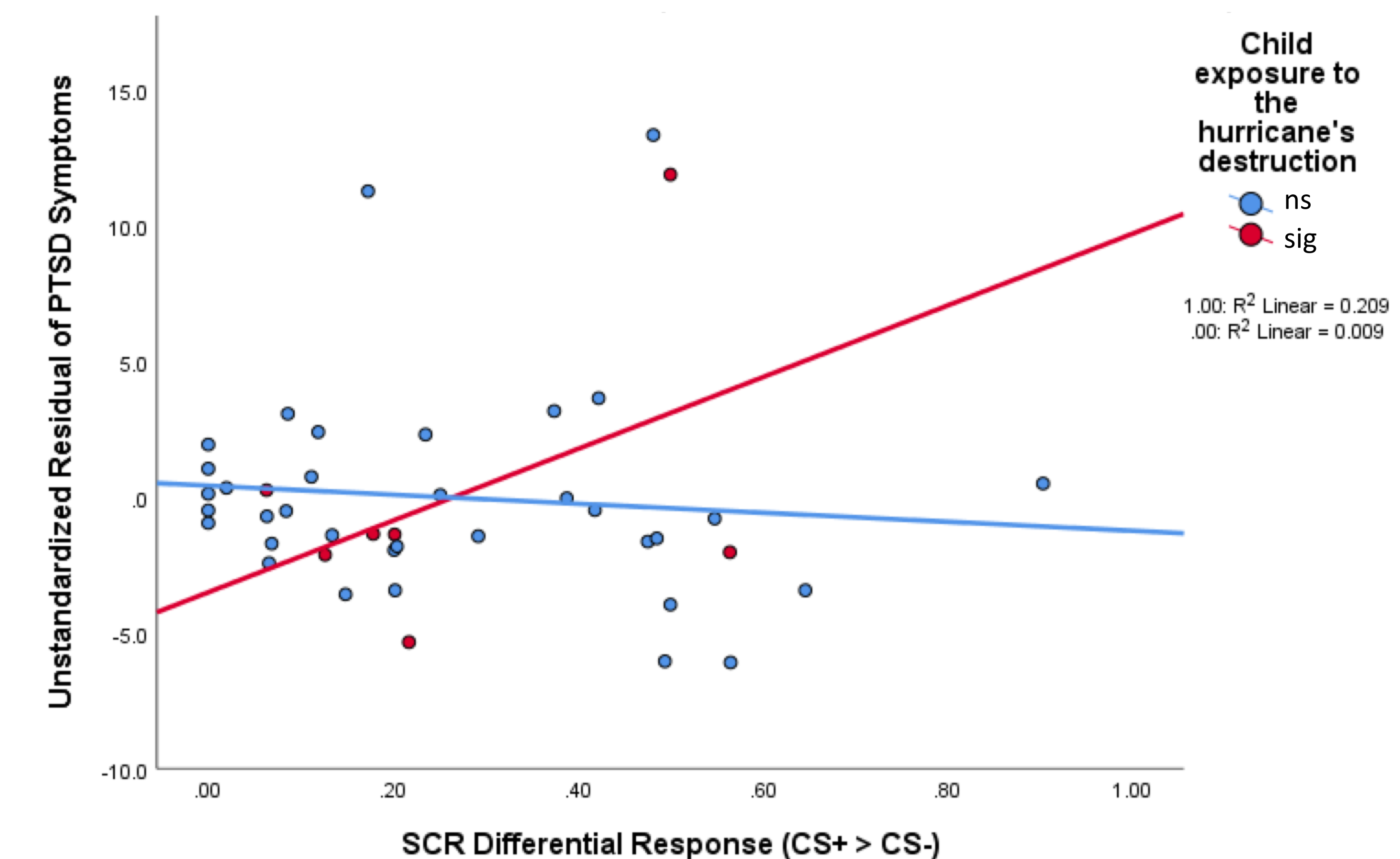


Figure 1. SCR to the CS+ during fear learning marginally predicted PTSD symptoms only in children with significant exposure to Hurricane Florence ( $p = .088$ ,  $B = 19.87$ ).

## CONCLUSIONS

- Fear learning predicted increased arousal PTSD symptoms in children which is similar to what has been found in adults; interventions used to treat PTSD in adults may also effectively treat PTSD in children.
- In contrast to the pattern found in adolescents exposed to the BMB, fear learning marginally predicted PTSD symptoms in children with *greater* differential SCR.
  - This difference lines up with fear learning research in children and adolescents with histories of abuse.
- To prevent children from developing PTSD following large-scale trauma, caregivers should limit their exposure.
- Future work should investigate a larger sample with more PTSD symptoms and trauma exposure, as the present study was limited by geographic radius.
- It would be interesting to investigate whether fear learning can predict PTSD in children after other types of large-scale trauma, such as COVID-19.

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