

Increased Vagal Tone During Cognitive Stress Partially Mediates the Relationship Between Adverse Childhood Experiences and Psychopathy

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INTRODUCTION

Past research indicates there is a relationship between Adverse Childhood Experiences (ACEs) and psychopathy, but the mechanisms by which this occurs are unclear. One theory is that adversity may affect the development and functioning of the autonomic nervous system, but very little research has been conducted on this relationship. Specifically, research on the relationship between vagal tone, a measurement of the parasympathetic nervous system, and antisocial behavior is mixed. This study aims to investigate 3 main questions:

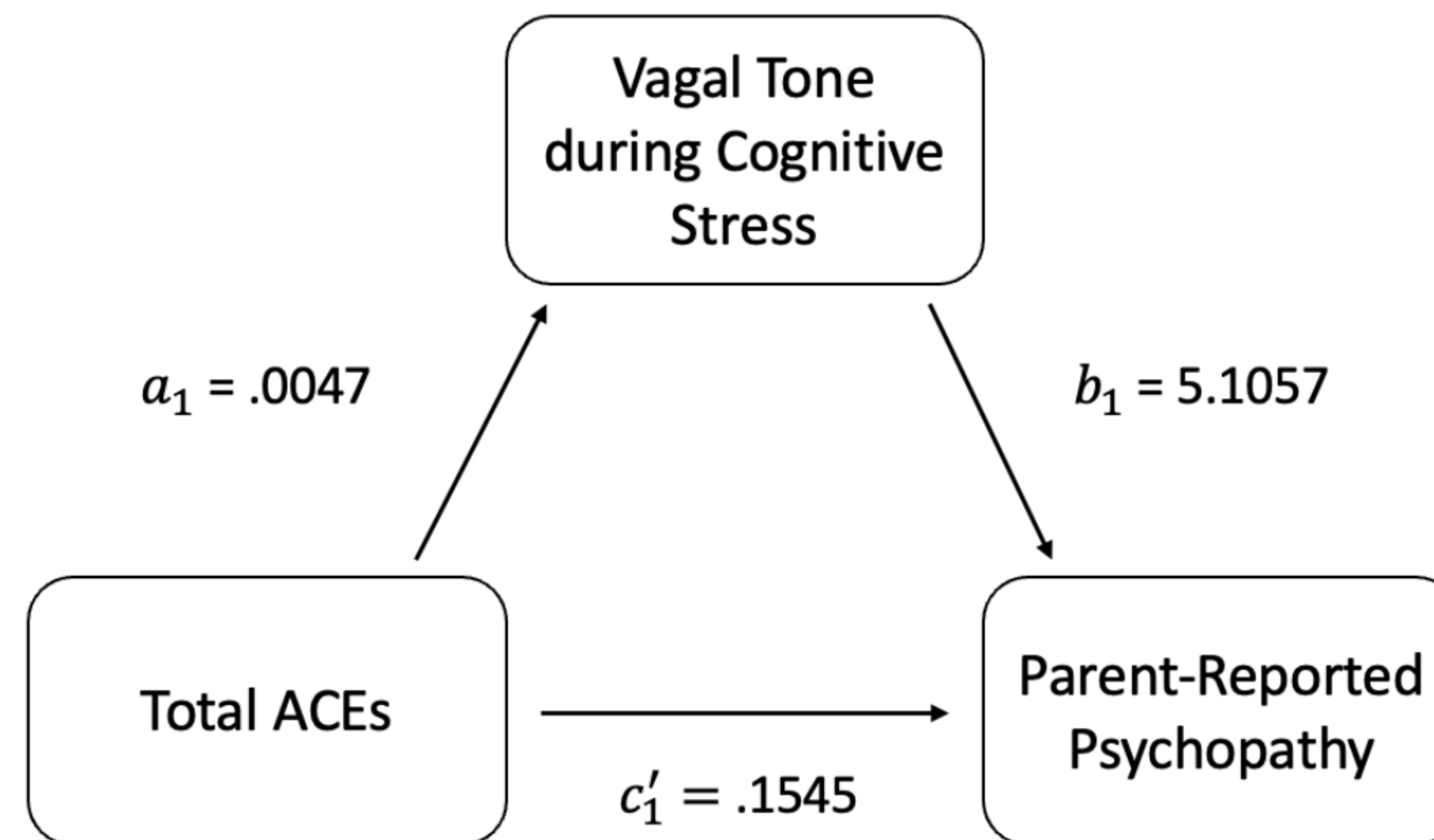
- (1) Is psychopathy related to increased or decreased vagal tone?
- (2) How is childhood adversity related to vagal tone?
- (3) If vagal tone is related to psychopathy and adversity, does it mediate the relationship between ACEs and psychopathy?

Hypotheses: Psychopathy and childhood adversity are related to increased vagal tone. The relationship between ACEs and psychopathy will be at least partially mediated by vagal tone during a cognitive task.

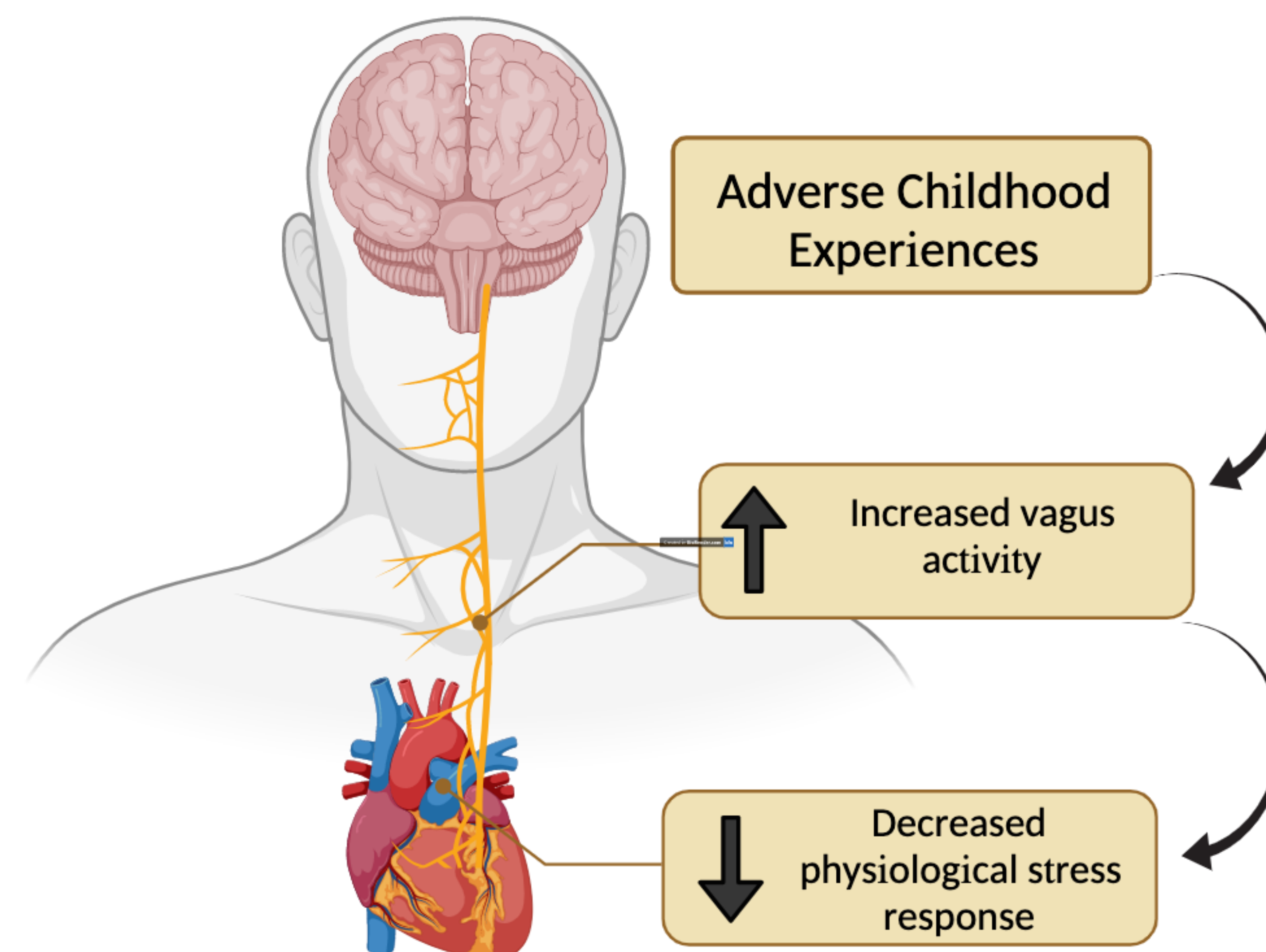
METHODS

- 335 boys participated in the Pittsburgh Youth Study from ages 7-17.
- Adverse Childhood Experiences (ACEs) were continuously collected from age 7 to 17.
- Heart rate and respiration were measured during rest, a social challenge, and a cognitive challenge (CPT).
- Respiratory Sinus Arrhythmia (RSA) was calculated from heart rate variance to represent vagal tone.
- Parent-report psychopathy scores were collected at age 17.

Mediation Model for the Effect of ACEs on Psychopathy through Vagal Tone during a Cognitive Stressor



The pathway between adversity in childhood and later psychopathy can be partially explained by an **increased parasympathetic response**, not a decreased sympathetic response, during cognitive stress.



RESULTS

Vagal tone scores during the cognitive stressor partially mediated the relationship between total ACEs and parent-reported psychopathy ($p = .024$).

15.43% of the relationship between ACEs and psychopathy can be explained by vagal tone during cognitive stress.

Heart rate during the cognitive stressor did not mediate the relationship between ACEs and psychopathy.

CONCLUSIONS

- (1) Higher parent-reported psychopathy is related to increased vagal tone.
- (2) Increased adversity in childhood is related to increased vagal tone.
- (3) Increased vagal tone during cognitive stress partially mediates the relationship between increased ACEs and higher psychopathy.

The hypotheses were supported.

To our knowledge, these findings are the first to document the mediating role of parasympathetic activity on the relationship between ACEs and psychopathy.

These findings challenge the perspective that antisocial behavior is consistently associated with decreased vagal tone.

These results support a parasympathetic dominance theory of psychopathy.

Repeated exposure to ACEs may alter an individual's physiological response to stress, causing their parasympathetic nervous system to over-activate in response to cognitive stress.