

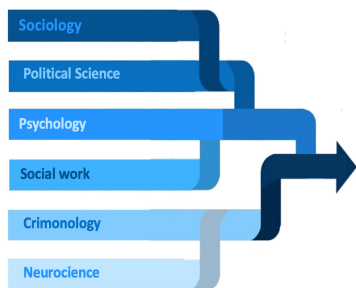
# Adverse Childhood Experiences and Outcomes on Adults Living in Rural Areas

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We acknowledge and thank the OU Office of the Vice President for Research and Partnerships for funding this study.

## INTRODUCTION

- Oklahoma is among the worst in the nation in measurements of health and well-being, and people living in rural areas have some of the poorest outcomes.
- Risk factors for these outcomes are adverse childhood experiences (ACEs) and rejection, which are both linked to feelings of loneliness, disordered substance use, and suicidality.
- We measured the intersection of adverse childhood experiences and feelings of rejection in Oklahomans living in rural areas. We visited five rural towns in Oklahoma (shown on the map below) and recruited participants from disadvantaged backgrounds.
- Studying the complex dynamics among these risk factors and outcomes may benefit from a multidisciplinary approach. Our tri-campus team received a Big Idea Challenge: Convergence Research grant for this study. Departments of researchers involved in developing and executing this study are shown on the diagram below.



Study sites: McAlester, Anadarko, Poteau, Elk City, and Vinita

Departments in Research Team

## METHODS

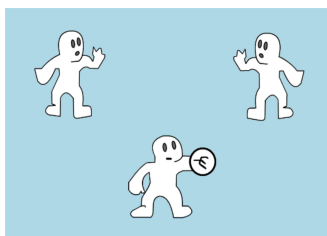
- In this study, we used a computer game to simulate feelings of rejection in the participants, which is further described in the procedure. We hypothesized that stronger feelings of rejection in the game would correlate with how many ACEs participants had.

## DEMOGRAPHICS

- Forty-two people participated in this study, with a mean age of 40.9 (SD=18.3). Gender included 14 men, 28 women, and no one of another gender. The sample included 80.0% heterosexual people and 20.0% LGBTQ+ people. Racial demographics were as follows (and participants could multi-select racial identities): 2.4% Asian (n=1), 4.8% Black (n=2), 4.8% Hispanic (n=2), 31.7% Indigenous (n=13), and 51.2% White (n=21).

## PROCEDURE

### Cyberball Rejection Simulation

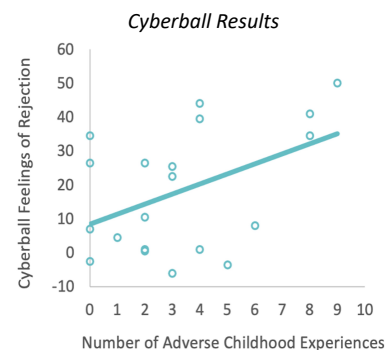


Cyberball game image

- Participants played Cyberball, a three-minute computer game of catch that has been used for 15 years to successfully induce feelings of social rejection in a laboratory setting.<sup>1</sup>
- In the game, two players are computer-programmed avatars that the participants are told are real people, and the third is the participant.
- Participants completed two conditions while attached to EEG electrodes. In the acceptance condition, participants receive the ball ⅓ of the time. In the rejection condition, participants receive the ball only twice.
- Following Cyberball, participants completed the Need Threat Scale about experiences in each condition. This scale asks about feelings of belonging, self-esteem, control, and meaningful existence during the game.
- The participants also completed the ten-item adverse childhood experiences scale.<sup>2</sup>

## RESULTS

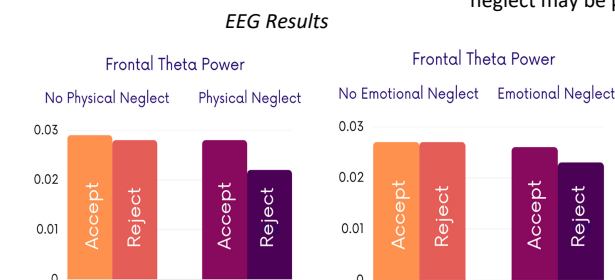
- The mean ACEs score was 3.33 with a standard deviation of 2.74. The range was 1 to 9 ACEs.
- People with more ACEs experienced greater feelings of rejection during the rejection condition than the acceptance condition as measured by change scores on the Need Threat Scale. The size of this effect was large,  $r=0.45$ ,  $p=0.048$ .
- The largest two ACEs correlations with Cyberball changes in feelings of rejection were related to emotional and physical neglect (emotional neglect  $r=0.39$ ,  $p=0.079$ ; physical neglect  $r=0.46$ ,  $p=0.016$ ).
- Resiliency and social support were also measured in study questionnaires, and neither related to feelings of rejection on Cyberball or moderated these results.



- With regard to EEG results, theta waves, which indicate feelings of wellbeing, decreased during the rejection condition of Cyberball.
- As in Cyberball, emotional and physical neglect were the strongest drivers of this effect.

## DISCUSSION

- Our study found that ACEs, especially physical and emotional neglect, correlated with an elevated rejection response in the rural populations studied.
- Individuals who experience physical and emotional neglect may be particularly at risk for negative



The decreased theta power was driven by emotional and/or physical neglect. People without these ACEs were more resilient to rejection effects on the EEG

outcomes associated with rejection sensitivity compared to people who experience other ACEs.

- These findings support the development of resources in rural areas that focus on care for people who have experienced neglect during childhood.
- Preventative programs related to childhood neglect may also be key in reducing rejection sensitivity in adulthood.

## REFERENCES

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