



# Acute Social Stress Influences Cardiovascular and Emotional Reactivity among College Students



Kelly Cole, Hannah Gordon, Sophia Koné, Aerial Lin, Catherine Pham, & Laurel M. Peterson, Ph.D.  
Bryn Mawr College

## INTRODUCTION

- Stress, with acute symptoms affecting emotional distress and cardiovascular changes, has significant implications for well-being (Lehman et al., 2009).
- The Trier Social Stress Test (TSST) induces elevated self-reported stress, heart rate, and blood pressure (Allen et al., 2014).
- Field research extends TSST findings, demonstrating increased negative emotions and cardiovascular reactivity during student class presentations (Elfering & Grebner, 2012).



- Our goal is to explore if a modified TSST will similarly affect undergraduates' cardiovascular reactivity and emotional stress; resulting in higher cardiovascular indicators and self-report stress compared to pre-stressor measures.

## METHOD

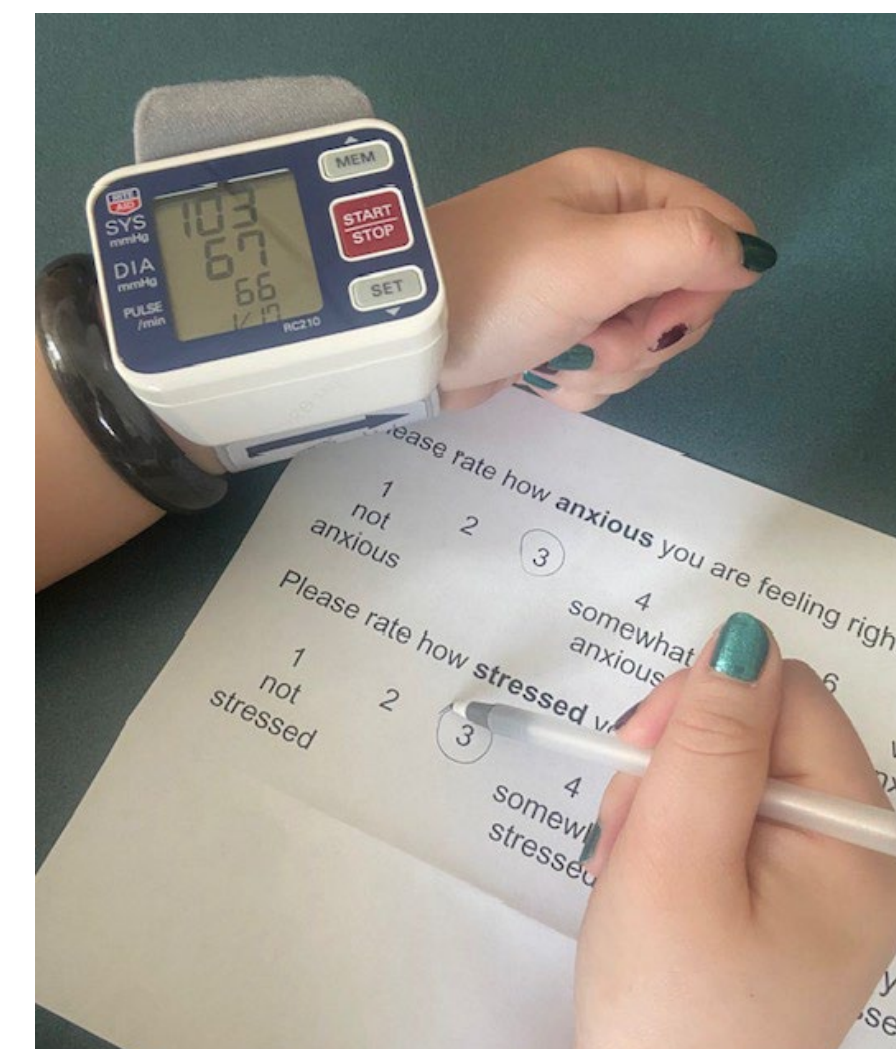
### PARTICIPANTS:

A convenience sample of 51 undergraduate students enrolled in laboratory courses at a historically women's college volunteered; no demographic information was collected to ensure anonymity.

### PROCEDURE AND MEASURES:

Participants underwent two measurement sessions:

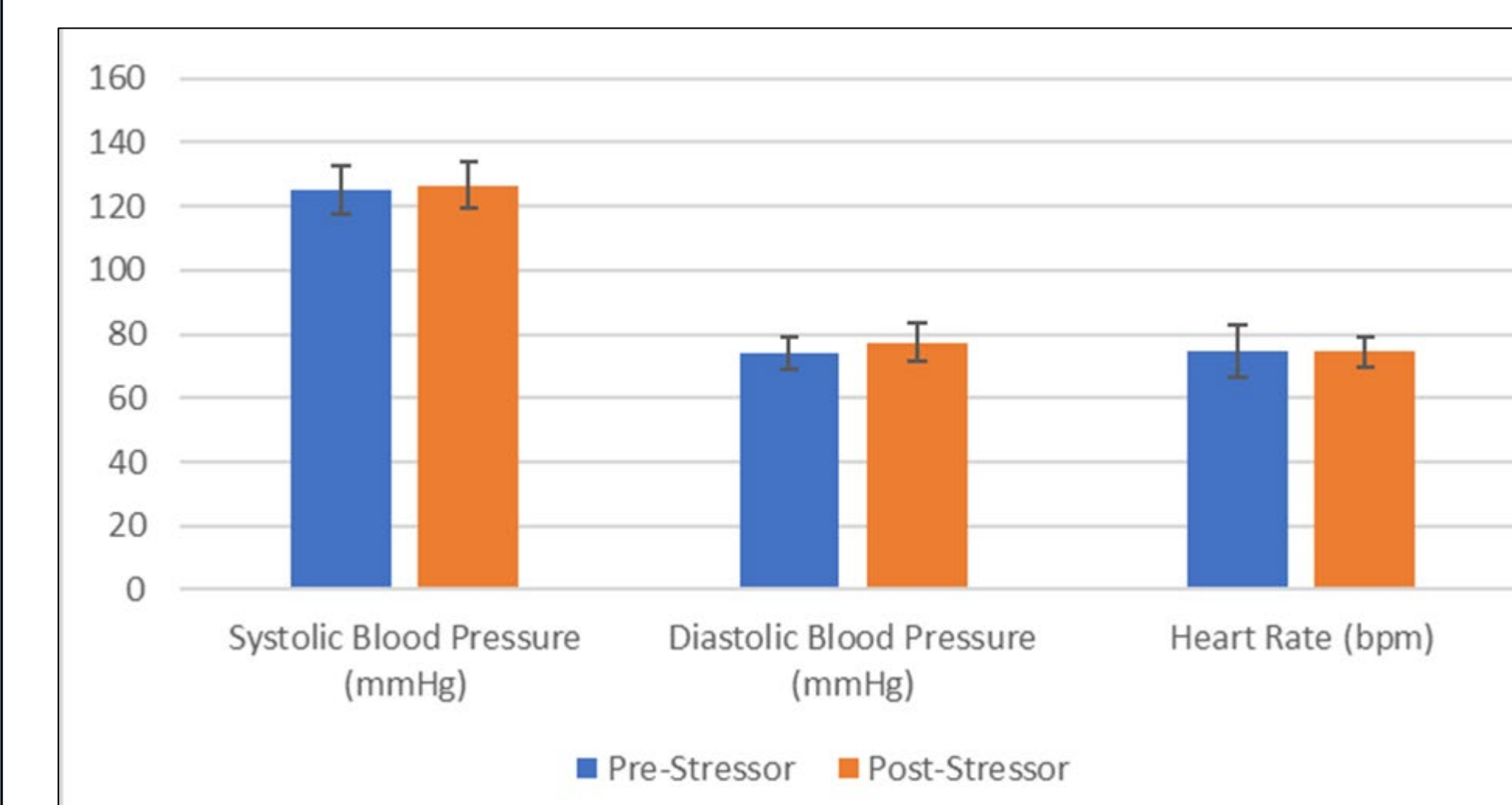
1. In the **pre-stressor** session, they self-measured baseline systolic and diastolic blood pressure, heart rate, and stress emotions, reported using an adapted version of the Positive and Negative Affect Scale (3 items,  $\alpha = .70$ ; Thompson, 2007).



2. In the **social stressor** session, participants experienced an adapted version of the Trier Social Stress Test (TSST) conducted via an audio recording only; cardiovascular and self-report stress ( $\alpha = .73$ ) were reassessed three minutes into the task.

## RESULTS

- Paired samples *t*-tests were conducted using SPSS syntax to investigate any significant differences in the pre- post-stressor sessions.
- Systolic blood pressure did not significantly differ post-stressor ( $M = 126.55$ ,  $SD = 14.40$ ) compared to pre-stressor ( $M = 124.94$ ,  $SD = 15.17$ ;  $t(50) = -.79$ ,  $p = .216$ ,  $d = -.11$ ; see figure).
- Diastolic blood pressure was higher post-stressor ( $M = 77.40$ ,  $SD = 12.18$ ) than pre-stressor ( $M = 74.06$ ,  $SD = 10.35$ ;  $t(49) = -2.92$ ,  $p = .003$ ,  $d = -.41$ ; see figure).
- Heart rate showed no significant difference post-stressor ( $M = 74.43$ ,  $SD = 9.72$ ) compared to pre-stressor ( $M = 74.71$ ,  $SD = 16.43$ ;  $t(50) = .12$ ,  $p = .452$ ,  $d = .02$ ; see figure).



- Participants reported higher levels of stress post-stressor ( $M = 4.06$ ,  $SD = 1.14$ ) than pre-stressor ( $M = 2.95$ ,  $SD = 1.18$ ;  $t(50) = -8.20$ ,  $p < .001$ ,  $d = -1.15$ ).

## DISCUSSION

- Diastolic blood pressure and self-reported stress were higher post-social stressor compared to pre-stressor among undergraduates, aligning with past research (Allen et al., 2014; Lehman et al., 2009).
- Systolic blood pressure and heart rate showed no significant changes, possibly due to the less active social component in our adapted-TSST.
- The pre-post design limits causal inference, and external validity is constrained by the unique convenience sample of college students.
- Future research should utilize experimental designs and larger, more representative samples to enhance generalizability.
- The results of higher stress emotion and diastolic blood pressure from an acute stressor highlight the importance of promoting healthy coping in college.

## REFERENCES

- Allen, A. P., Kennedy, P. J., Cryan, J. F., Dinan, T. G., & Clarke, G. (2014). Biological and psychological markers of stress in humans: Focus on the Trier Social Stress Test. *Neuroscience and Biobehavioral Reviews*, 38, 94 - 124. <https://doi.org/10.1016/j.neubiorev.2013.11.005>
- Elfering, A., & Grebner, S. (2012). Getting used to academic public speaking: Global self-esteem predicts habituation in blood pressure response to repeated thesis presentations. *Applied Psychophysiology and Biofeedback*, 37(2), 109 - 120. <https://doi.org/10.1007/s10484-012-9184-3>
- Kirschbaum, C., Pirke, K., & Hellhammer, D. H. (1993). The 'Trier Social Stress Test' - A tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology*, 28(1-2), 76-81. <https://doi.org/10.1159/000119004>
- Lehman, B. J., Taylor, S. E., Kiefe, C. I., & Seeman, T. E. (2009). Relationship of early life stress and psychological functioning to blood pressure in the CARDIA study. *Health Psychology*, 28(3), 338-346. <https://doi.org/10.1037/a0013785>
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38(2), 227-242.