



Adding Pep to Your Step: Understanding the Relationship Between Steps and Stress

Harliv Kaur, Jake Diana, Dr. Annie Green Howard, Dr. Zachary Kerr

Introduction

Surveying ~90,000 students across 133 campuses in the US, more than 60% of students had at least one mental health problem in 2023.¹ Engaging in structured exercise can lead to a reduction of stress hormones such as adrenaline and cortisol, and an increase of endorphins. Exercise affects how resilient people are against difficult tasks and emotions impacting stress and perceived stress levels.² This study focuses on daily physical activity levels to see if it has a similar relationship with mental health as exercise does.

- Objective: Learn more about the associations between daily activity level measures and perceived stress outcomes
- Hypothesis: As daily activity level increases, measured by weighted daily average number of steps at cadence >100 >1m, PSS scores will significantly decrease

Study Background

Cardiometabolic Outcome Negation Through Early-adulthood ConteXT-specific Sedentary Behavior reduction (CONTEXT-SB)

- Longitudinal observational study recruiting 500 college-based young adults at UNC Chapel Hill
- Two in-person visits, 12 months apart
 - Lifestyle behavior questionnaires (including Perceived Stress Scale Test)
- Fitted for thigh-worn accelerometer to complete 7-day cycle

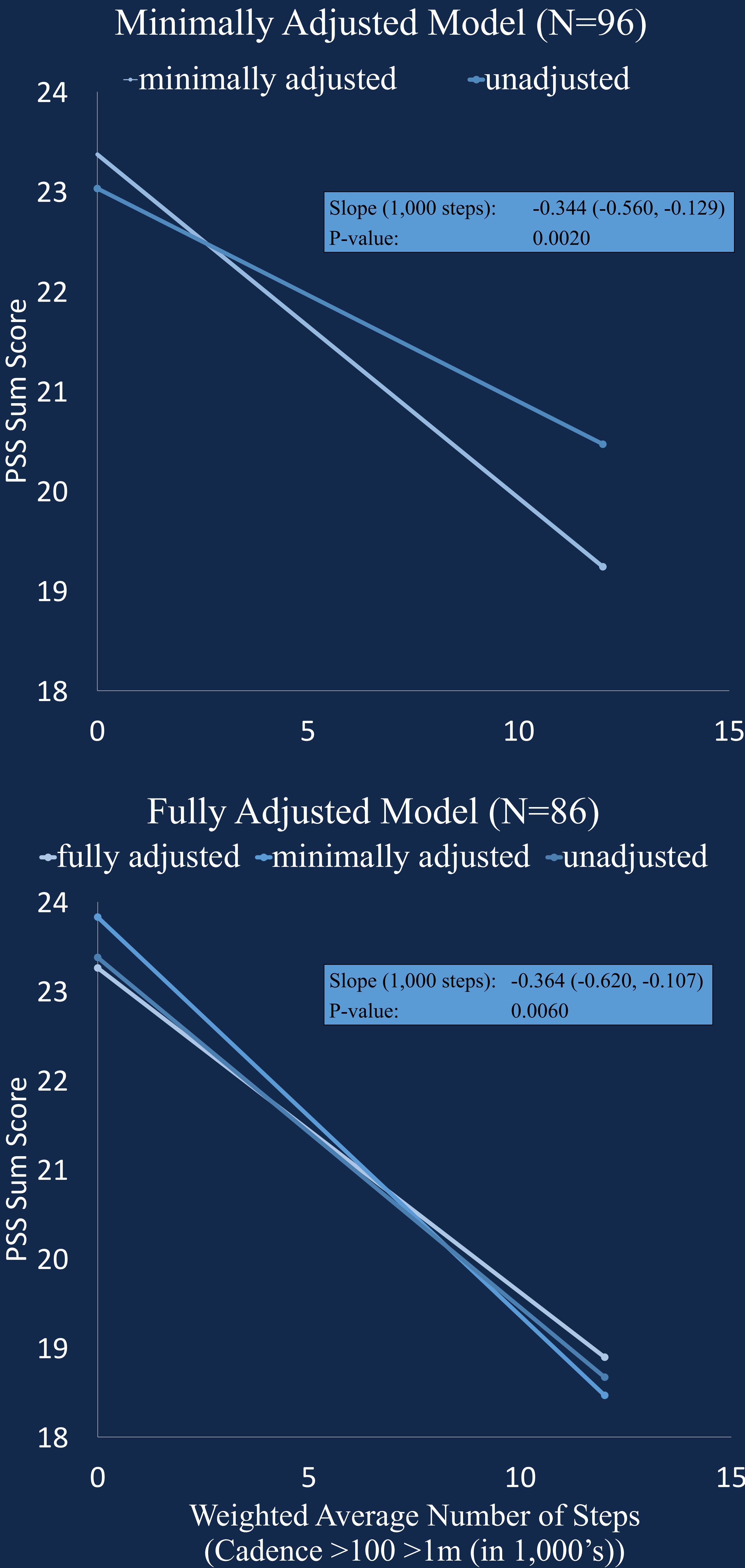


Methods

| Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 |
|---|--------------------------------------|---------------------------------------|--|
| Lowest weighted average number of steps | Low weighted average number of steps | High weighted average number of steps | Highest weighted average number of steps |
| 0 – 2,794.48 steps | 2,869.21 - 4,676.86 steps | 4,717.43 – 7,058.29 steps | 7,238.00 – 11,378.00 steps |
| N = 23 | N = 24 | N = 25 | N = 24 |

Calculated descriptive statistics and conducted linear regression models, quartile comparisons, and Wald tests as seen in the right panels

- Minimally Adjusted for age and sex (N=96)
- Fully adjusted for age, sex, height, weight, race, ethnicity (N=86)



Results

Daily activity level quartiles were compared for all models, using quartile 4 as a reference group.

| Quartile | Unadjusted (N=96) | | Adjusted (age and sex) (N=96) | |
|----------------|--------------------|---------|-------------------------------|---------|
| | Estimate (95 % CI) | p-value | Estimate (95 % CI) | p-value |
| Q ¹ | 2.19 (0.60, 3.79) | 0.0392 | 2.35 (0.64, 4.06) | 0.0371 |
| Q2 | 1.42 (-0.16, 3.00) | | 1.52 (-0.07, 3.11) | |
| Q3 | 0.54 (-1.02, 2.11) | | 0.58 (-0.99, 2.15) | |
| Q4 | Reference | | Reference | |

Unadjusted and minimally adjusted models were similar for the subset of 86 participants. As daily activity level decreased from Q4 to Q1, average PSS scores per quartile increased.

| Quartile | Fully Adjusted (N=86) (age, sex, race, ethnicity, height, weight) | |
|----------|---|---------|
| | Estimate (95 % CI) | p-value |
| Q1 | 2.32 (0.36, 4.29) | 0.1748 |
| Q2 | 0.81 (-0.91, 2.54) | |
| Q3 | 0.41 (-1.24, 2.07) | |
| Q4 | Reference | |

Similarly, the pattern was seen in the fully adjusted model. However, when adjusting for all six covariates, there was a not a significant difference between the average PSS scores of the four quartiles.

Conclusion

The data provided by this study sufficiently showed how strong the PSS-10 is associated with physical activity in a day-to-day lifestyle and how relevant height, weight, race, and ethnicity are to the relationship. Despite these factors, this study highlights how important it is to incorporate physical activity in our daily lifestyles and the impactful effect it can have on our mental load and outlook on life.

References:

- NeaToday. (n.d.). Mental Health Crisis on College Campuses. <https://www.nea.org/nea-today/all-news-articles/mental-health-crisis-college-campuses>
- Harvard Health Publishing. (n.d.). Exercising to Relax. <https://www.health.harvard.edu/staying-healthy/exercising-to-relax>