THE IMPACT OF PHYSICAL ACTIVITY ON STUDENTS' ACADEMIC PERFORMANCE AND STRESS LEVELS

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1 Executive summary

This report investigates the relationship between physical activity, academic performance (GPA), and stress levels among 2,000 students. Physical activity duration was categorized into four groups to examine patterns and trade-offs. The analysis finds that students engaging in higher levels of daily physical activity tend to report lower stress but also slightly lower GPA. These findings support promoting balanced physical activity to enhance well-being without compromising academic success.

2 Introduction

Student well-being is increasingly recognized as a key component of academic success and overall academic experience. Physical activity is widely acknowledged to reduce stress, yet its relationship with academic performance remains less clear. This report addresses the question: **How does the amount of daily physical activity relate to students' GPA and perceived stress levels?** The data analyzed comes from a Google Form survey completed by 2,000 students, capturing self-reported lifestyle habits, GPA, and stress levels.

Students were categorized by their average daily exercise duration, as described in Methodology section (**?@sec-report-methodology**). And the Results section (Section 4) presents the observed trends. The aim of this report is to assess whether more physically active students experience better mental well-being and how this may relate to academic performance. Understanding these patterns can help inform strategies for promoting a balanced and productive student lifestyle.

3 Methodology

The data set consists of responses from 2,000 students collected through a standardized questionnaire. It includes data on self-reported academic performance (GPA), stress levels, and various lifestyle habits.

In this report, we focus on three key variables: Grade point average (GPA), which reflects students' academic performance on a 4.0 scale; stress levels, categorized as Low, Moderate, or High; and

daily physical activity duration, measured in hours.

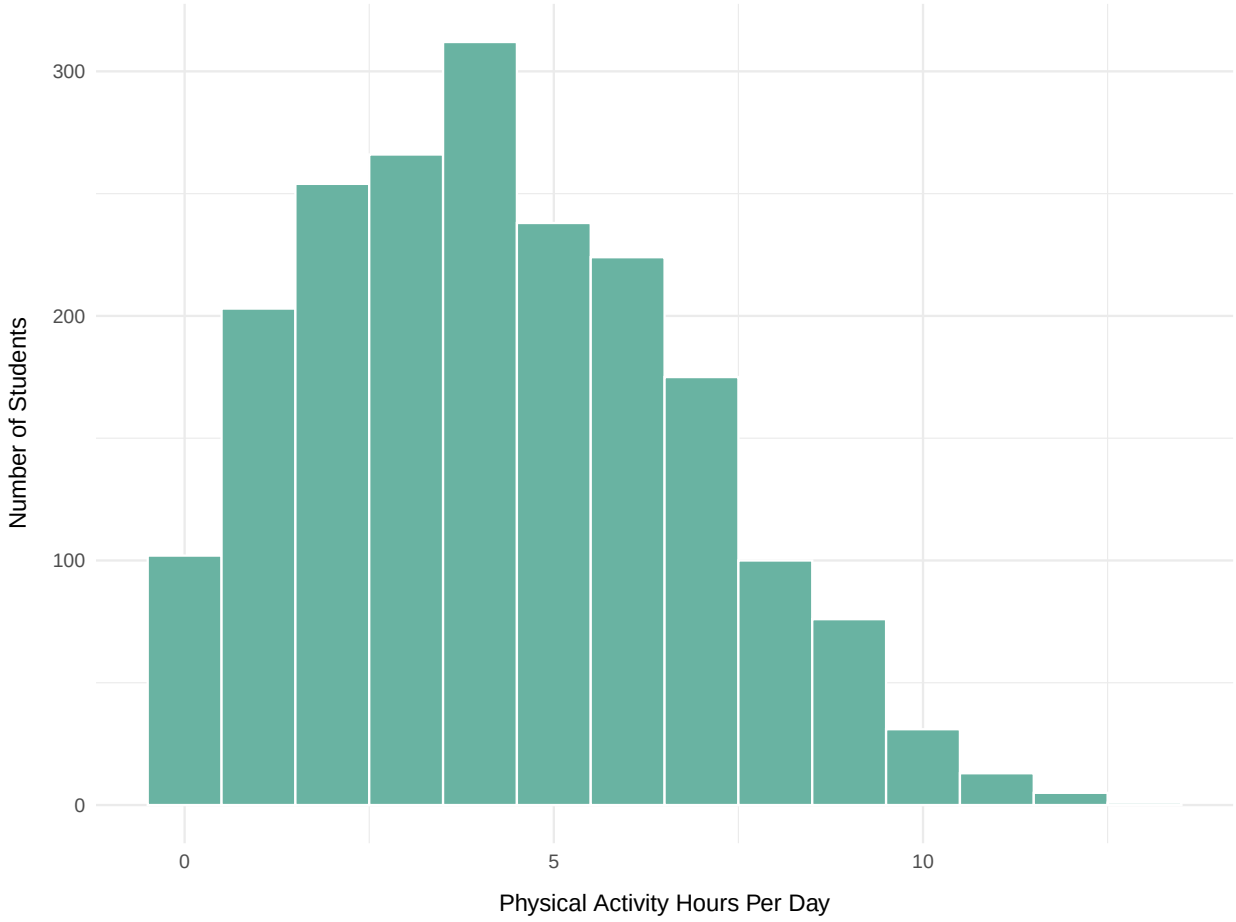

Figure 1: Distribution of physical activity hours per day

Figure 1 presents the distribution of physical activity hours per day among participants. The data show a unimodal and right-skewed pattern, indicating that most students engaged in moderate physical activity. The majority reported exercising between 2 and 6 hours daily, with a concentration around 3-5 hours. Very few students reported extremely low (0-1 hours) or extremely high (above 9 hours) activity levels. Based on this distribution, physical activity duration was grouped into four categories to facilitate comparison:

- Under 2 hours
- 2-3 hours
- 4-5 hours
- More than 6 hours

This grouping aims to balance sample size across categories while maintaining behavioral and health-related distinctions.

The summary statistics for each group are presented in Table 1. Stress level was numerically re-coded for analysis purposes: Low = 1, Moderate = 2, High = 3, such that a lower mean value represents lower average stress.

Table 1: Summary of GPA and stress level by physical activity group

Physical activity group	Number of students	Average GPA	Average stress level
Under 2 hours	394	3.26	2.64
2-3 hours	550	3.17	2.45
4-5 hours	526	3.09	2.25
More than 6 hours	530	2.98	2.19

The results show a gradual decrease in both GPA and perceived stress level with increasing physical activity. Students in the under-2-hour group reported the highest GPA but also the highest average stress level. Conversely, those in the more-than-6-hour group had the lowest GPA and the lowest stress level.

These patterns provide the foundation for further analysis in the Results section, where the impact of physical activity on academic performance and stress levels is examined using visualizations such as a jitter plot and a stacked bar chart.

4 Results

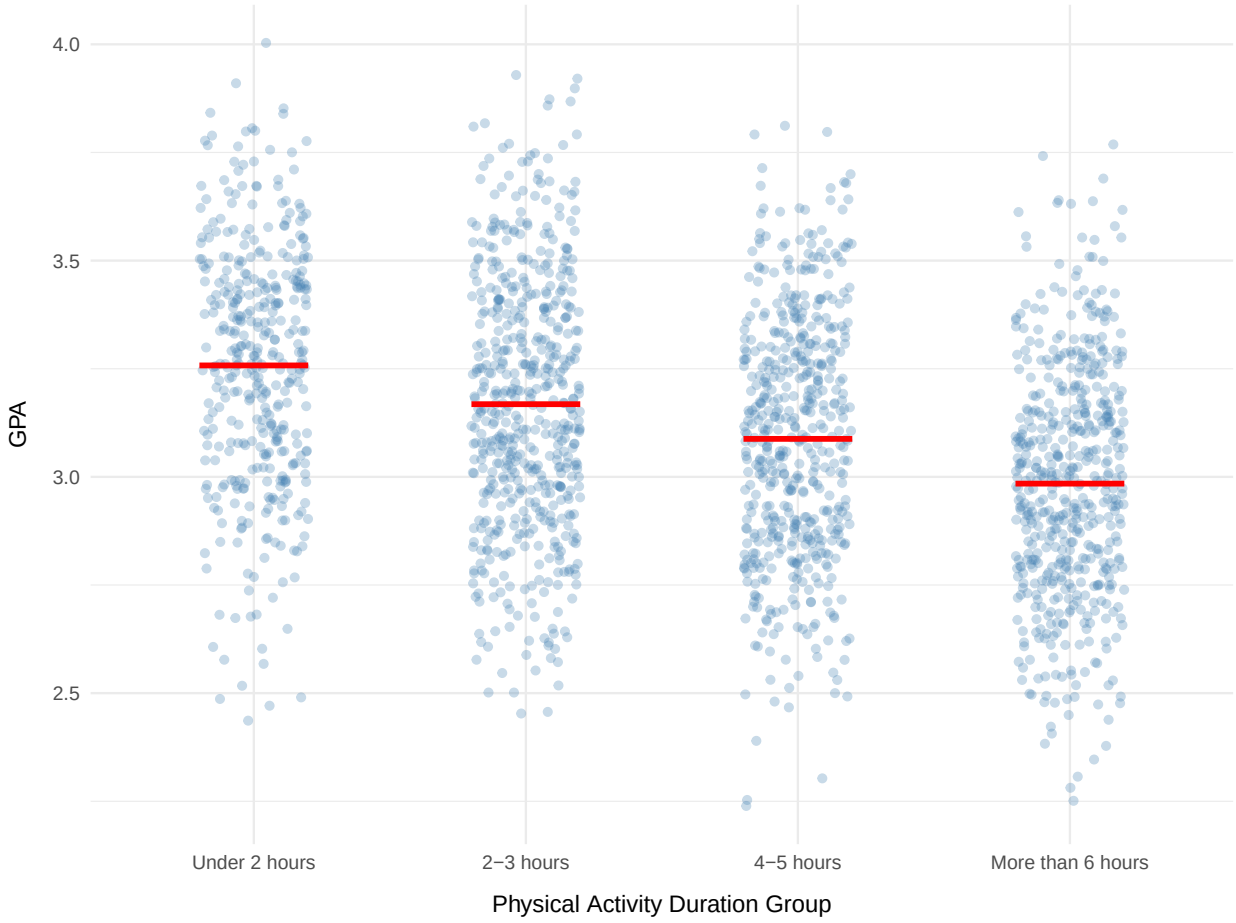

Figure 2: GPA distribution by physical activity group

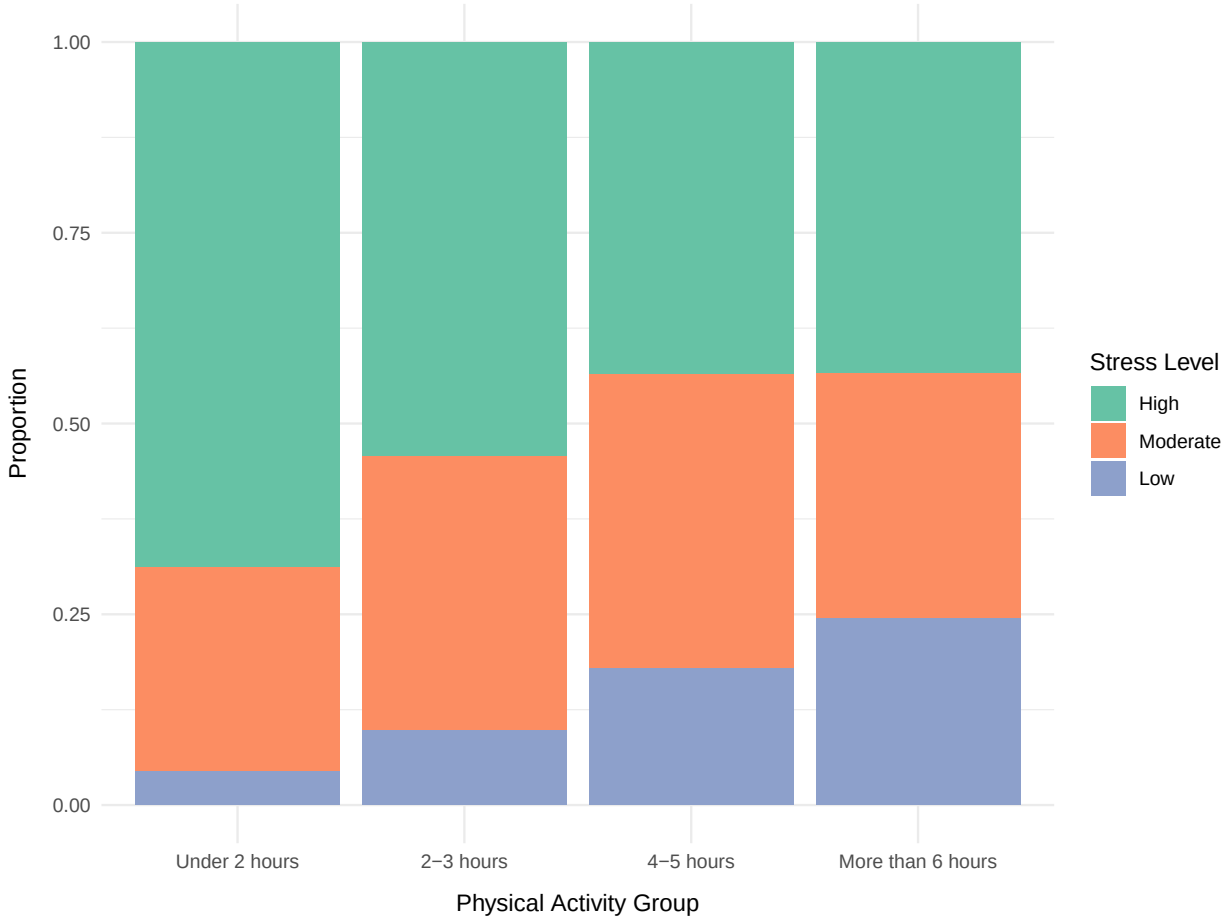

Figure 3: Stress level distribution by physical activity group

Figure 2 presents the distribution of GPA across four physical activity groups. While individual GPAs vary substantially within each group, the mean GPA (marked in red) shows a slight downward trend as physical activity duration increases. Students exercising under 2 hours daily achieved the highest average GPA, while those in the more-than-6-hour group reported the lowest, suggesting a potential inverse relationship between physical activity and academic performance.

Figure 3 displays the relative proportions of stress levels for each group. A clear shift is observed: students with low physical activity levels tend to report higher stress, whereas those engaging in 4-5 hours or more than 6 hours of physical activity are more likely to report moderate or low stress. The more-than-6-hour group has the highest proportion of low-stress individuals and the lowest proportion for high stress.

Together, these figures suggest that while higher physical activity may contribute to stress reduction,

it might also correlate with a slight drop in GPA. These opposing trends point to a potential trade-off between academic focus and well-being.

5 Discussion

The findings highlight a nuanced relationship between physical activity, academic performance, and stress among students. While increased physical activity appears to reduce perceived stress levels, as shown in Figure 3, it may also be associated with a marginal decline in GPA (Figure 2). These opposing trends reflect a possible trade-off between mental well-being and academic output.

Several factors may contribute to this pattern. Students engaging in more physical activity may prioritize health and social balance over academic intensity, potentially reducing time or energy devoted to study. Conversely, those with limited physical activity may be more academically driven but face higher stress, possibly due to reduced outlets for relaxation or physical release.

It is important to note that these associations do not imply causation. Self-reported measures of both GPA and stress may be subject to bias, and unmeasured confounders - such as sleep quality, part-time work, or social support - could influence the observed trends. Moreover, the decline in GPA across groups is modest and should not be overstated.

Ultimately, these findings suggest that encouraging moderate physical activity may enhance student well-being without severely compromising academic outcomes. Future research could explore optimal activity ranges or the role of time management in balancing study and health.