

# The Impact of Yoga on Post-Exercise Fatigue among College Students

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**Abstract:** This study aims to evaluate the effects of yoga on subjective fatigue and heart rate recovery in college students following high-intensity exercise. By comparing groups of students practicing yoga and those resting statically, the study will explore whether yoga is a viable recovery method for reducing fatigue and accelerating heart rate recovery. The results will provide scientific evidence for designing university sports curricula and offer references for managing students' exercise health.

**Keywords:** Yoga; Post-Exercise; Heart Rate Recovery.

## 1. Introduction

In university settings, students are increasingly participating in physical activities, especially high-intensity sports like basketball, football, and running. These activities not only improve physical fitness but also enhance cardiovascular function and muscle strength. However, such intense exercise is often accompanied by fatigue and physical strain. Fatigue is a complex phenomenon involving both psychological and physiological factors, manifesting in symptoms like muscle soreness, increased heart rate, shortness of breath, and mental exhaustion. If not addressed with effective recovery strategies, prolonged fatigue can affect students' academic performance and quality of life, even increasing the risk of sports injuries.

In the field of exercise science, the choice of recovery strategy is a key focus for researchers. Traditional recovery methods mainly include static rest, cold compresses, and massage. However, yoga, a gentle mind-body practice, has emerged as a popular recovery option after sports activities in recent years.

Existing research shows that yoga significantly improves flexibility, balance, and stress relief. Some studies have explored the application of yoga in post-exercise recovery, finding that it can promote muscle recovery and improve subjective fatigue. Compared to static rest, yoga is not just physical relaxation but also involves breathing and meditation exercises that help alleviate fatigue through psychological regulation, making it particularly appealing to college students who frequently engage in physical activities.

Although preliminary studies on yoga in post-exercise recovery exist, they primarily focus on professional athletes or specific populations, with relatively fewer studies on regular college students. The exercise frequency and intensity of college students vary, and they face considerable stress in their daily lives. Therefore, studying how to incorporate yoga into the university environment to help students alleviate post-exercise fatigue has significant practical importance.

This study aims to evaluate the effects of yoga on subjective fatigue and heart rate recovery in college students following high-intensity exercise. By comparing groups of students practicing yoga and those resting statically, the study will explore whether yoga is a viable recovery method for reducing fatigue and accelerating heart rate recovery. The

results will provide scientific evidence for designing university sports curricula and offer references for managing students' exercise health.

## 2. Research Methodology

### 2.1. Participants

Thirty healthy college students were randomly selected for this study, including 15 males and 15 females. All participants had no history of chronic disease or exercise injury. They were randomly assigned to an experimental group and a control group, with 15 students in each group.

(1) Experimental group: Practiced yoga for 20 minutes after high-intensity exercise.

(2) Control group: Rested statically for 20 minutes after high-intensity exercise without any yoga practice.

### 2.2. Experimental Design

#### 2.2.1. High-Intensity Exercise Task

Before the experiment, all participants performed a standardized high-intensity exercise to ensure they reached a state of sufficient fatigue. The exercise involved 15 minutes of continuous running at 70%-80% of their maximum heart rate, estimated using the formula "220 minus age." The entire exercise process was monitored in real time by the experimenters to ensure that all participants maintained the same exercise intensity.

#### 2.2.2. Yoga Practice

After completing the high-intensity exercise, the experimental group immediately practiced yoga for 20 minutes. The yoga session was specifically designed as a post-exercise recovery routine, focusing on simple stretching and relaxation exercises. The session consisted of the following key components:

(1) Breathing Regulation: Slow, deep breathing to regulate heart rate and relax the body.

(2) Stretching Exercises: Focused on stretching the lower limbs, back, and neck muscles to relieve post-exercise muscle tension.

(3) Relaxation and Meditation: A five-minute meditation session at the end to alleviate mental fatigue and restore psychological balance.

All yoga exercises were conducted under professional guidance to ensure participants' movements and breathing

were accurate.

### 2.2.3. Static Rest

Participants in the control group rested quietly for 20 minutes without any exercise or yoga practice. During the rest period, participants were seated in a quiet environment, and the experimenters ensured they did not engage in any distracting activities to maintain the static nature of the rest.

## 2.3. Data Collection

### 2.3.1. Subjective Fatigue

Subjective fatigue was measured using the Borg Rating of Perceived Exertion (RPE) scale, a scoring system from 0 to 10, where 0 represents no fatigue and 10 represents extreme fatigue. Participants reported their fatigue at the following time points:

- (1) Immediately after exercise.
- (2) Immediately after the 20-minute yoga practice or static rest.
- (3) 24 hours after the experiment to assess long-term recovery.

### 2.3.2. Heart Rate Recovery

Heart rate recovery was measured using a portable heart rate monitor. Heart rate was recorded at the following time points:

- (1) Immediately after the high-intensity exercise.
- (2) After the 20-minute yoga practice or static rest.

Heart rate recovery speed was defined as the rate of decline in heart rate within 20 minutes after exercise; the faster the

recovery, the better the body's recovery capacity.

## 2.4. Control Variables

The experiment was conducted in a quiet, well-lit sports classroom to ensure that all participants completed the experiment under the same environmental conditions. To minimize interference, only participants and experimenters were present during the experiment. All participants maintained consistent dietary and lifestyle habits for 24 hours before the experiment and were prohibited from consuming caffeine-containing foods or drinks two hours before the experiment.

## 3. Results

### 3.1. Subjective Fatigue

The experimental group's immediate post-exercise fatigue score was 8.5, which decreased to 5.5 after 20 minutes of yoga and 2.5 after 24 hours. The control group's fatigue score was 8.3 immediately after exercise, decreasing only to 7.0 after 20 minutes of rest and 4.5 after 24 hours.

### 3.2. Heart Rate Recovery

The experimental group's heart rate was 150 beats per minute immediately after exercise, decreasing to 110 beats per minute after 20 minutes of yoga. The control group's heart rate was 152 beats per minute immediately after exercise, decreasing to 125 beats per minute after 20 minutes of static rest.

**Table 1.** Summary of subjective fatigue and heart rate recovery at different time periods after exercise

Index	Immediately after exercise.	20 minutes after the experiment	24 hours after the experiment	Immediately after exercise.(without yoga)	20 minutes after	24 hours after
RPE	8.5	5.5	2.5	8.3	7.0	4.5
Heart Rate	150	110	-	152	125	-

## 4. Results and Discussion

### 4.1. Subjective Fatigue

The experimental group, which practiced yoga, showed a significant reduction in fatigue within 20 minutes post-exercise. By 24 hours after the session, they had nearly returned to a fully relaxed state. In contrast, the control group, which rested statically, also experienced some reduction in fatigue, but the overall decline was smaller, and their recovery was notably slower compared to the experimental group. This indicates that yoga can not only alleviate fatigue more quickly following high-intensity exercise but also lead to more sustained improvements in physical state, allowing for a more thorough recovery within 24 hours.

### 4.2. Heart Rate Recovery

In terms of heart rate recovery, the experimental group exhibited significantly lower heart rates than the control group after 20 minutes, suggesting that yoga practice aids in accelerating heart rate recovery. Heart rate is a key indicator of the body's recovery status, with faster heart rate recovery reflecting better cardiovascular adaptation and overall recovery capacity. Yoga, through breathing regulation and physical relaxation, may positively influence the autonomic nervous system, helping the heart rate return to normal more

rapidly. This holds practical health significance for college students who frequently engage in high-intensity physical activities.

## 5. Conclusion

Based on the results of this study, the following conclusions can be drawn:

(1) Yoga as an Effective Recovery Method: Compared to static rest, yoga practice leads to quicker alleviation of post-exercise fatigue and faster heart rate recovery. Its simple, easy-to-learn movements, combined with breathing regulation, offer both physiological and psychological benefits for students.

(2) Sustained Recovery Effects of Yoga: Yoga not only shows short-term effects, such as reducing fatigue within 20 minutes post-exercise, but also continues to be effective in ensuring thorough recovery after 24 hours. Participants in the yoga group reported significantly lower fatigue levels than those in the control group, indicating more complete body recovery.

(3) Potential Application in University Sports Programs: Based on these findings, yoga can be recommended as a recovery method in university sports curricula. It helps students recover more quickly after high-intensity activities and aids in alleviating everyday stress, promoting both

physical and mental well-being.

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