50 SPORTS SCIENCE RESEARCH TOPICS

Study designs, statistical methods, free datasets and related university theses

50 practical research questions across 10 specialist areas of sport and exercise science. Each topic includes a suggested methodology, a statistical technique, a direct dataset link, and a related academic thesis to help you evaluate feasibility.

50 QUESTIONS	**10 SUB-FIELDS**	**9 DATA SOURCES**
5 UNIVERSITIES	**2021–2026**	**BSc / MSc**

Prepared by Siddharth Gupta | Statssy

Website: statssy.com | Book a free meeting

How to use this guide

- Select two or three questions closest to your sport, training or academic interests.
- Open the linked dataset and confirm that the necessary variables exist.
- Read the related thesis for a methodological example, not as an exact equivalent study.
- Check the proposed test against your study design, measurement scale and assumptions.
- Narrow the question and review feasibility with your supervisor.

Contents

01. Exercise physiology

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03. Sports nutrition and body composition

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09. Ageing and clinical exercise

10. Youth sport and physical education

01 Exercise physiology

Physiology topics compare how the body responds to different types of exercise. Wearable and gym datasets give you heart rate and energy data without a lab.

TOPIC 01 / Does heart rate recover more slowly after aerobic sessions than after anaerobic ones?

Study design	Repeated measures
Statistical method	Paired t-test
Dataset	Wearable Stress and Exercise (PhysioNet) (Open)
Related thesis	Test-Retest Reliability and Validity of the Gas Exchange Threshold
Reference	Erik Ryan Snell · University of Kentucky · 2026

TOPIC 02 / Does workout type change average heart rate when session length is the same?

Study design	Cross-sectional
Statistical method	ANCOVA
Dataset	Gym Members Exercise (Kaggle) (Free login)
Related thesis	Responses to Exercise Anchored to Vigorous Intensity Heart Rates
Reference	Djadmann Gustave · University of Kentucky · 2023

TOPIC 03 / Do heart rate and skin response change differently during stress and exercise sessions?

Study design	Repeated measures
Statistical method	Linear mixed model
Dataset	Wearable Stress and Exercise (PhysioNet) (Open)
Related thesis	The Effects of Mental Training on Acute Psychophysiological Stress Responses in Endurance Athletes
Reference	Shelanda Antonia Maria Kujala · Boise State University · 2022

TOPIC 04 / Do men and women burn different calories doing the same workout type?

Study design	Cross-sectional
Statistical method	Two-way ANOVA
Dataset	Gym Members Exercise (Kaggle) (Free login)
Related thesis	Integrated Physiological and Psychological Responses to Blood Flow Restriction: Sex-, Exercise-, and Restriction-Dependent Effects
Reference	Minyoung Kwak · University of Kentucky · 2026

TOPIC 05 / Do fitter adults have lower resting heart rate and blood pressure?

Study design	Cross-sectional
Statistical method	Survey-weighted linear regression
Dataset	NHANES (Open)
Related thesis	Validation of Non-Invasive CO2 Tolerance Field Test
Reference	Joshua T. Murphey · Boise State University · 2022

02 Strength and conditioning

OpenPowerlifting holds results from thousands of meets. It is the largest free strength dataset you will find.

TOPIC 06 / How does strength relative to bodyweight change with age in powerlifters?

Study design	Cross-sectional
Statistical method	Polynomial regression
Dataset	OpenPowerlifting (Open)
Related thesis	Tibial Compression During Activities of Daily Living in Young and Older Adults
Reference	Elijah Miles Walker · Boise State University · 2022

TOPIC 07 / Do raw and equipped lifters differ in total once bodyweight is accounted for?

Study design	Cross-sectional
Statistical method	ANCOVA
Dataset	OpenPowerlifting (Open)
Related thesis	You're Too Slow! Self-Selected Volitional Efforts Reveal Unexploited Neuromuscular Reserve Capacity Compared to Maximal Efforts During Fatiguing, Load Equated Resistance Exercise
Reference	Brian Benitez · University of Kentucky · 2025

TOPIC 08 / How much do lifters improve between their first and later competitions?

Study design	Longitudinal
Statistical method	Linear mixed model
Dataset	OpenPowerlifting (Open)
Related thesis	Effect of On-Duty Resistance Training on Neuromuscular Function in Structural Firefighters
Reference	Jamal L. Thruston · University of Kentucky · 2024

TOPIC 09 / Does training frequency predict lower body fat percentage?

Study design	Cross-sectional
Statistical method	Multiple linear regression
Dataset	Gym Members Exercise (Kaggle) (Free login)
Related thesis	Explorations of Benefits and Challenges to Strength and Conditioning Training for Incoming Collegiate Athletes
Reference	Thomas Keay · Boise State University · 2025

TOPIC 10 / Is the strength gap between men and women the same for squat, bench and deadlift?

Study design	Cross-sectional
Statistical method	Two-way ANOVA
Dataset	OpenPowerlifting (Open)
Related thesis	Examination of Sex- and Intensity-Specific Fatigue During Bilateral Leg Extension Exercise
Reference	Taylor Kayln Dinyer · University of Kentucky · 2021

03 Sports nutrition and body composition

Body composition topics link diet, size and strength. NHANES adds lab-grade measures like grip strength and DEXA.

TOPIC 11 / Is water intake linked to workout length and calorie burn?

Study design	Cross-sectional
Statistical method	Pearson correlation and regression
Dataset	Gym Members Exercise (Kaggle) (Free login)
Related thesis	Self-Rated Function and Delayed Onset Muscle Soreness (DOMS) Responses to 6-Week Supplementation with Waters with Anti-Inflammatory Capabilities (WAC)
Reference	Kristin Garner · University of Arkansas · 2022

TOPIC 12 / Is protein intake linked to muscle strength in older adults?

Study design	Cross-sectional
Statistical method	Survey-weighted linear regression
Dataset	NHANES (Open)
Related thesis	Glucagon-Like Peptide-1 Receptor Agonist And Muscle Function
Reference	Ashley Rehn · Yale School of Public Health · 2026

TOPIC 13 / Is body fat linked to grip strength in children?

Study design	Cross-sectional
Statistical method	Multiple linear regression
Dataset	NHANES (Open)
Related thesis	Comparing Strength Testing Measures and the Association of Strength and Body Composition in Young Children
Reference	Abigayle R. Spong · University of Kentucky · 2026

TOPIC 14 / Have athletes' height and weight changed over a century in each sport?

Study design	Trend analysis
Statistical method	Linear regression with year by sport interaction
Dataset	120 Years of Olympic History (Kaggle) (Free login)
Related thesis	An Investigation of Body Image and Eating Behaviors in Former NCAA Heptathletes
Reference	Claire Bailey · University of Kentucky · 2024

TOPIC 15 / Does BMI differ by preferred workout type among gym members?

Study design	Cross-sectional
Statistical method	Kruskal-Wallis test
Dataset	Gym Members Exercise (Kaggle) (Free login)
Related thesis	Effect Of The Lifestyle, Exercise And Nutrition (lean) Weight Loss Intervention On Stress Among Breast Cancer Survivors
Reference	Wenxin Gu · Yale School of Public Health · 2025

04 Sport and exercise psychology

Psychology topics ask why people move, and what moving does for the mind. Active Lives includes wellbeing and motivation questions.

TOPIC 16 / Do adults who enjoy exercise meet activity guidelines more often?

Study design	Cross-sectional
Statistical method	Logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Exploring College Students' Motivation for Physical Activity: Applications of Self-Determination Theory and the Role of Health and Wellness Education
Reference	Anne Russell Blevins · University of Kentucky · 2025

TOPIC 17 / Is physical activity linked to lower anxiety in adults?

Study design	Cross-sectional
Statistical method	Ordinal logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Exploring Exercise Motivation and Mental Well-Being in College Students
Reference	Elaine M. Lindesmith and Anqi Deng · University of Arkansas · 2026

TOPIC 18 / Do stress sessions raise heart rate as much as moderate exercise?

Study design	Repeated measures
Statistical method	Repeated measures ANOVA
Dataset	Wearable Stress and Exercise (PhysioNet) (Open)
Related thesis	Effects of a Mental Skills Training Program on Performance in Distance Runners
Reference	Neil Patrick Bangs · Boise State University · 2021

TOPIC 19 / Is regular physical activity linked to fewer depressive symptoms?

Study design	Cross-sectional
Statistical method	Survey-weighted logistic regression
Dataset	NHANES (Open)
Related thesis	Mental Health in the Aging Population: An Investigation of the Interplay Between Depression Symptoms, Reward Processing, and Physical Activity in Older Adults
Reference	Jet Taylor · Boise State University · 2025

TOPIC 20 / Does feeling able to exercise predict activity levels in disabled adults?

Study design	Cross-sectional
Statistical method	Logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Perceptions of Sport Psychology Efforts and Access in Women's Wheelchair Basketball
Reference	Lindsay C. Cohen · University of Kentucky · 2026

05 Biomechanics, injury and recovery

Injury and movement topics need sensor or health survey data. Accelerometer files and NHANES pain questions are a good place to start.

TOPIC 21 / Does wrist acceleration differ between aerobic and anaerobic sessions?

Study design	Repeated measures
Statistical method	Paired t-test
Dataset	Wearable Stress and Exercise (PhysioNet) (Open)
Related thesis	Changes in Co-Activation and Lower Limb Stiffness During Prolonged Load Carriage
Reference	Matthew V. Robinett · Boise State University · 2025

TOPIC 22 / Are adults with low back pain less physically active?

Study design	Cross-sectional
Statistical method	Survey-weighted logistic regression
Dataset	NHANES (Open)
Related thesis	Biomechanical Effects of Exercise-Based Interventions in Chronic Nonspecific Low Back Pain: A Systematic Review and Meta-Analysis
Reference	Lara De Vecchi Machado · University of Kentucky · 2026

TOPIC 23 / Do adults with arthritis who stay active report fewer daily limits?

Study design	Cross-sectional
Statistical method	Survey-weighted logistic regression
Dataset	NHANES (Open)
Related thesis	Identifying Modifiable Factors Associated with Knee Extensor Weakness Following ACL Reconstruction
Reference	Megan Graham · University of Kentucky · 2025

TOPIC 24 / Does a short night's sleep predict lower activity the next day?

Study design	Repeated measures
Statistical method	Linear mixed model
Dataset	Fitbit Tracker Data (Kaggle) (Free login)
Related thesis	Effect of Sleep Restriction on Quadriceps' Strength and Voluntary Activation
Reference	Scott Sigrist · University of Kentucky · 2023

TOPIC 25 / Do football players commit more fouls late in matches?

Study design	Event data
Statistical method	Poisson regression
Dataset	StatsBomb Open Data (Open)
Related thesis	Sports Injury Prevention - Epidemiological Analysis of Concussion Mechanisms in Female Soccer Players: A Review of NEISS Data (2020–2023)
Reference	Caroline A. Bertalotto · University of Arkansas · 2025

06 Physical activity and public health

Population activity topics are perfect for Masters students. Active Lives and NHANES are both free and very large.

TOPIC 26 / Which groups in England are least physically active?

Study design	Cross-sectional
Statistical method	Logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Bridging Awareness and Access: Outdoor Recreation and Physical Activity in Eastern Kentucky
Reference	Timothy McKay · University of Kentucky · 2025

TOPIC 27 / How closely does self-reported activity match device-measured activity?

Study design	Method comparison
Statistical method	Bland-Altman analysis
Dataset	NHANES (Open)
Related thesis	Reliability and Validity of a Commercial Running Power Meter to Indicate Metabolic Workload During Endurance Running
Reference	James Harris Hudgins III · University of Kentucky · 2023

TOPIC 28 / Did activity levels in England recover after the COVID-19 lockdowns?

Study design	Trend analysis
Statistical method	Interrupted time series
Dataset	Sport England Active Lives (Open)
Related thesis	How the COVID-19 pandemic has affected physical activity, sleep and mental health in university students, faculty and staff and to examine the relationship between these variables
Reference	Zachary Parisi · University of Arkansas · 2021

TOPIC 29 / Is sitting time linked to metabolic syndrome even in people who exercise?

Study design	Cross-sectional
Statistical method	Survey-weighted logistic regression
Dataset	NHANES (Open)
Related thesis	The Effects of Saddle Angle/Inclination on Lumbopelvic Kinematics and Cardiometabolic Measures
Reference	Andrew Nathan Anderson · University of Kentucky · 2023

TOPIC 30 / Does living in a deprived area predict lower sport participation?

Study design	Cross-sectional
Statistical method	Multilevel logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Association Between Greenspace And Weight-Related Outcomes In Later Adulthood: A Longitudinal Study Using Uk Biobank Data
Reference	Jun Jiang · Yale School of Public Health · 2025

07 Wearables and sports technology

Tracker data gives you minute-by-minute records. It suits repeated measures and mixed models well.

TOPIC 31 / How many extra calories does each 1,000 steps add for tracker users?

Study design	Repeated measures
Statistical method	Linear mixed model
Dataset	Fitbit Tracker Data (Kaggle) (Free login)
Related thesis	Methodological Concerns of Using Global Positioning System Technology to Assess American Football Competition Demands
Reference	Tyler Lindon · University of Kentucky · 2023

TOPIC 32 / Does activity drop on weekends among tracker users?

Study design	Repeated measures
Statistical method	Paired t-test
Dataset	Fitbit Tracker Data (Kaggle) (Free login)
Related thesis	Quantification of In-Play Competition Demands of Collegiate American Football Players Using Global Positioning Systems
Reference	Alex Brownell · University of Kentucky · 2021

TOPIC 33 / Can wrist sensor data tell exercise apart from stress?

Study design	Prediction model
Statistical method	Random forest compared with logistic regression
Dataset	Wearable Stress and Exercise (PhysioNet) (Open)
Related thesis	An Examination of the Relationship Between Unilateral Triaxial Jump Test and Power Skating Profile in Female Recreational Ice Hockey Athletes
Reference	Abigail Christie Aultz · Boise State University · 2025

TOPIC 34 / Is tracked sleep duration linked to sedentary time?

Study design	Repeated measures
Statistical method	Repeated measures correlation
Dataset	Fitbit Tracker Data (Kaggle) (Free login)
Related thesis	The Psychosocial Aspects of Rest
Reference	Morgan Findley · University of Kentucky · 2024

TOPIC 35 / Does session heart rate predict calories better than session length?

Study design	Cross-sectional
Statistical method	Hierarchical regression
Dataset	Gym Members Exercise (Kaggle) (Free login)
Related thesis	Cardiorespiratory and Muscle Recruitment Responses to Incremental Exercise in Flywheel-Based Inertial Training (FIT) Squats
Reference	Clara Joyce Mitchinson · University of Kentucky · 2023

08 Performance analysis

Performance topics turn match and career data into insight. StatsBomb and Lahman are free and used by professional analysts.

TOPIC 36 / Does expected goals predict match results in women's football?

Study design	Event data
Statistical method	Logistic regression
Dataset	StatsBomb Open Data (Open)
Related thesis	Integrating In-Situ Acceleration-Speed Profiling, Resistance Training, and On-Field Demands to Investigate Physical and Game Performance in Division I Women's Soccer
Reference	Hanwen Liu · East Tennessee State University · 2026

TOPIC 37 / Does winning the ball high up the pitch lead to more shots?

Study design	Event data
Statistical method	Poisson regression
Dataset	StatsBomb Open Data (Open)
Related thesis	An Exploration of Athlete Thoughts and Perceptions of Cohesion in Coacting Sports
Reference	Jared Scott Hrabcak · University of Kentucky · 2023

TOPIC 38 / Can early-career numbers predict a long baseball career?

Study design	Retrospective cohort
Statistical method	Cox proportional hazards regression
Dataset	Lahman Baseball Database (Open)
Related thesis	Can Early Career Performance Through Five National Hockey League (NHL) Seasons Predict Long-Term Career Success?
Reference	Isabelle Gillis · University of Kentucky · 2026

TOPIC 39 / Does player salary track on-field performance?

Study design	Panel
Statistical method	Fixed effects panel regression
Dataset	Lahman Baseball Database (Open)
Related thesis	Isomorphic Trends in State NIL Laws
Reference	Andrew Godfrey · University of Arkansas · 2023

TOPIC 40 / Is there a home advantage at the Olympic Games?

Study design	Retrospective
Statistical method	Poisson regression
Dataset	120 Years of Olympic History (Kaggle) (Free login)
Related thesis	The Role of Event Operations in Collegiate Athletics: A Reflection of My Internship with University of Arkansas Event Management
Reference	Cameron Terrell · University of Arkansas · 2023

09 Ageing and clinical exercise

Ageing topics link fitness to function and health. NHANES includes older adults, strength tests and chronic disease data.

TOPIC 41 / Does grip strength predict survival in older adults?

Study design	Retrospective cohort
Statistical method	Cox proportional hazards regression
Dataset	NHANES (Open)
Related thesis	Obstacle Crossing in Healthy Young and Older Individuals
Reference	Hope M. Hanson, Ashlyn M. Jendro and Abigail C. Schmitt · University of Arkansas · 2023

TOPIC 42 / Is daily activity linked to fewer physical limits in older adults?

Study design	Cross-sectional
Statistical method	Survey-weighted logistic regression
Dataset	NHANES (Open)
Related thesis	Effects of Aging on Patellofemoral Joint Stress During Stair Negotiation on Challenging Surfaces
Reference	Nicholas Lynn Hunt · Boise State University · 2022

TOPIC 43 / How fast does strength decline per decade in masters lifters?

Study design	Cross-sectional
Statistical method	Piecewise regression
Dataset	OpenPowerlifting (Open)
Related thesis	Moderate-to-High Velocity Eccentric Torque Differences in Older Female Adults
Reference	Ayla Mae Gabel · Boise State University · 2025

TOPIC 44 / Is regular exercise linked to better blood sugar control in adults with diabetes?

Study design	Cross-sectional
Statistical method	Survey-weighted linear regression
Dataset	NHANES (Open)
Related thesis	Investigation of Lower Extremity Neuromuscular Function in Individuals With and Without Diabetes
Reference	Roya Hoveizavi · University of Kentucky · 2023

TOPIC 45 / Is physical activity linked to better cognitive scores in older adults?

Study design	Cross-sectional
Statistical method	Survey-weighted linear regression
Dataset	NHANES (Open)
Related thesis	Relationship between global cognition and cardiovascular risk factors
Reference	Alexia Sebghati · University of Arkansas · 2021

10 Youth sport and physical education

Youth topics look at how children start, enjoy and drop out of sport. Active Lives has a separate children and young people survey.

TOPIC 46 / Do children who enjoy PE do more activity outside school?

Study design	Cross-sectional
Statistical method	Logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Optimizing the Challenge: A Study on Promoting Intrinsic Motivation in Youth Physical Activity
Reference	Fan Zhang · University of Kentucky · 2025

TOPIC 47 / Does parents' activity predict how active their children are?

Study design	Cross-sectional
Statistical method	Logistic regression
Dataset	Sport England Active Lives (Open)
Related thesis	Increasing Physical Activity: Parenting Style, Parental Perceptions, and Teacher Use and Self-Efficacy
Reference	Kendra Hansen · University of Kentucky · 2024

TOPIC 48 / Do active teenagers have healthier heart and metabolic markers?

Study design	Cross-sectional
Statistical method	Survey-weighted linear regression
Dataset	NHANES (Open)
Related thesis	Physical Activity Preference and Participation in Middle School Age Students in Kentucky
Reference	Fabian Correia · University of Kentucky · 2023

TOPIC 49 / Are the youngest Olympians clustered in certain sports?

Study design	Retrospective
Statistical method	Chi-square test
Dataset	120 Years of Olympic History (Kaggle) (Free login)
Related thesis	Physical Education Teachers' Perceptions of Their Pre-Service Teacher Education
Reference	Gunay Sen · University of Kentucky · 2024

TOPIC 50 / Do girls drop out of sport earlier than boys?

Study design	Cross-sectional
Statistical method	Logistic regression with an age by sex interaction
Dataset	Sport England Active Lives (Open)
Related thesis	A Proposed Organizational Model to Increase Women Coaches in Elite Alpine Skiing: Learning from the U.S. Cross-Country Initiative
Reference	Anika Anna Angriman · Boise State University · 2025

Turn a topic into a dissertation

• Define one population, one principal outcome and a practical time frame.

• Inspect the data codebook for missing variables, inconsistent measurement and exclusions.

• Choose the analysis according to design: paired observations require paired or mixed models, whereas count outcomes may require Poisson or negative binomial approaches.

• For small samples, interpret effect sizes and confidence intervals alongside p-values.

• Check originality using SPORTDiscus and Google Scholar.

Need help selecting a topic?

Discuss the dataset, study design, statistical analysis and sample-size planning in a free 15-minute Statssy meeting.

Book a meeting with Siddharth

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Source note

University theses are related methodological examples and may not investigate exactly the same question. Dataset accessibility and suitability should be confirmed using each source documentation before finalising a proposal.