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The Mental Genome of Athletic Performance: Decoding Confidence, Focus, and Resilience across Athletic Disciplines in School-Level Athletes

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ABSTRACT

Psychological traits play a crucial role in shaping athletic performance, particularly during formative school years when athletes are developing both physically and mentally. This study explores the discipline-specific psychological traits of school-level athletes and their influence on performance across throwing, jumping, and running events. A total of 150 athletes aged 12–18 years, evenly distributed among the three disciplines, were assessed for key psychological attributes including self-confidence, focus, and resilience. Standardized tools such as the Psychological Performance Inventory (PPI) and the Competitive State Anxiety Inventory-2 (CSAI-2) were employed to evaluate these traits. Performance was measured through athletes' personal bests and competition rankings. The study aims to highlight the importance of aligning psychological training with the unique demands of each athletic discipline, offering insights to inform more effective mental conditioning programs in school sports environments.

Keywords: Psychological Traits, Athletic Performance, School-level Athletes, Mental Conditioning, Sport-specific Training

1. INTRODUCTION

Athletic development in adolescents is influenced by more than just physical ability; psychological traits also play a critical role in determining performance and motivation. Attributes such as self-confidence, focus, and resilience shape how young athletes train, cope with competition stress, and respond to both success and failure. These traits can either enhance or hinder an athlete's potential, depending on how well they are nurtured during the formative years of sport participation.

While psychological training is widely acknowledged in elite and professional sports, research focusing on school-level athletes remains limited. Much of the existing literature emphasizes mental toughness and anxiety regulation in adult athletes, often overlooking how these traits develop and vary across different athletic disciplines in younger populations. This is a crucial oversight, as adolescence is marked by rapid physical and emotional changes that require sport-specific psychological support to maintain balanced development and performance readiness [1].

This study aims to address this gap by examining the psychological profiles of adolescent athletes across three disciplines such as throwing, jumping, and running. By identifying discipline-specific psychological strengths and needs, the research provides valuable insights for coaches, educators, and sport psychologists. The findings can inform the design of tailored mental training programs that not only enhance athletic performance but also promote well-being and resilience, contributing to more effective and sustainable athlete development. This study makes three key contributions:

- ***Identification of Discipline-Specific Psychological Profiles:*** Demonstrates that throwers, jumpers, and runners exhibit distinct mental traits aligned with their sport's demands.
- ***Quantitative Correlation of Traits and Performance:*** Establishes empirical links between self-confidence (throwers), focus (jumpers), and resilience (runners) with measurable performance outcomes.

- ***Practical Framework for Mental Conditioning*:** Provides evidence-based strategies for coaches to integrate sport-specific psychological training into regimens.
  Using a structured assessment of 150 school athletes, this research bridges the gap between theoretical understanding and practical application, offering a roadmap to enhance performance through targeted mental skill development.

2. LITERATURE SURVEY

Dos Santos Silva et al. (2023) examined the acute effects of Drop Jumps (DJs) as a Conditioning Activity (CA) on long jump performance in a competitive setting. Eleven male long jumpers (19.0 ± 2.0 years) performed five DJs approximately two minutes before their second and fourth attempts during a state level competition. Jumps without prior DJs served as controls. Results showed that the second (5.63 ± 0.43 m), third (5.65 ± 0.46 m; g = 0.24), and fourth (5.71 ± 0.34 m) jumps were significantly better than the first control jump (5.54 ± 0.45 m), with p values of 0.02 and 0.01. The fourth jump also showed a significant increase in takeoff vertical velocity (1.55 ± 0.21 m/s) compared to the first (1.30 ± 0.40 m/s), p = 0.006. The study concluded that DJs performed shortly before long jump attempts can enhance performance by improving takeoff mechanics [2].

Koper et al. (2020) investigated the relationship between pre competition mental states and sport performance in 109 Boccia athletes across all four classification groups (BC1–BC4). Psychological constructs assessed included athletic identity, self-esteem, self-efficacy for sports, hope for success, fear of failure, anxiety, and expectancy of success. Correlation analyses indicated that only athletic identity was significantly associated with sport result in the BC4 class. To further examine predictive factors, hierarchical multiple regression models were developed for each classification group, with sport result as the dependent variable. Notably, only the model for BC4 was statistically significant, explaining 49% of the variance in sport performance, and included athletic identity, anxiety, self-efficacy for sports, and expectancy of success as key predictors. These findings highlight the critical role of psychological variables in influencing performance outcomes in BC4class Boccia athletes, underscoring the importance of accounting for disability type and severity in sport psychology research and interventions [3].

Sun et al. (2020) examined the relationship between psychological strain, hopelessness, depression, and suicidal ideation in 774 Chinese athletes (M = 18.47, SD = 3.39) using structural equation modeling. The study found that psychological strain was positively correlated with suicidal ideation, and that hopelessness and depression served as serial mediators in this relationship. Psychological strain increased hopelessness, which led to depression, ultimately resulting in suicidal ideation. The findings support the applicability of psychological strain theory in athletes and highlight the importance of addressing psychological factors to prevent suicidality in this population [4].

González Hernández et al. (2020) investigated the relationship between resilience and competitive anxiety in 241 adolescent team sport athletes (aged 14–17), considering personal (gender) and sporting (years of experience) characteristics. Using the Resilience Scale (RS14) and the Competitive State Anxiety Inventory2R (CSAI2R), the study employed multivariate descriptive analyses, correlation, and multiple regressions to assess psychological responses. Results revealed a negative relationship between anxiety and resilience, particularly in the acceptance dimension. Gender differences emerged, with girls displaying higher somatic anxiety and self-confidence, while boys showed significantly greater resilience in the acceptance domain. Furthermore, sports experience was positively associated with resilience and negatively with anxiety. The study underscores the importance of psychological training to manage cognitive anxiety and enhance self-confidence, suggesting that certain anxiety indicators may reflect necessary arousal for optimal performance in youth athletes [5].

Reigal et al. (2020) investigated the relationships between psychological profile, competitive anxiety, mood, and selfefficacy in 181 beach handball players (M = 25.68, SD = 5.95), using the Psychological Sports Execution Inventory (SPPI), CSAI2, POMS, and GSES. The study employed correlation and linear regression analyses to examine predictive relationships across the total sample and by gender. Results revealed significant associations between components of the psychological profile and self-confidence ($p < 0.001$), and identified negative coping control as a key predictor of higher competitive anxiety ($p < 0.001$), adverse mood states ($p < 0.05$), and lower self-efficacy ($p < 0.001$). These findings underscore the importance of psychological profiling in predicting performance related emotional states and suggest targeted psychological interventions to enhance self-confidence and coping mechanisms in competitive beach handball athletes [6].

Marwat et al. (2021) investigated the impact of competition anxiety on sports performance among 128 elite athletes (M = 21.9, SD = 1.5) who participated in the 31st National Games in Khyber Pakhtunkhwa, Pakistan. Using the 15item Sports Competition Anxiety Test (SCAT), the study found that competition anxiety accounted for 38% of the variance in sports performance, with a moderate negative correlation ($r = 0.386$, $p = 0.002$) indicating that higher levels of anxiety led to decreased performance. The results also highlighted gender and sport type differences, with female athletes and those participating in individual sports exhibiting higher levels of anxiety compared to male athletes and those in team sports ($p < 0.005$). The findings emphasize the need for tailored sport psychology interventions, particularly for athletes experiencing high levels of competition anxiety, and suggest that anxiety reduction strategies could enhance performance, offering valuable implications for coaches and trainers in Pakistan [7].

Hsieh et al. (2023) conducted a systematic review and meta-analysis to examine the relationship between mental toughness (MT) and athletic performance. Analyzing 16 studies from ten academic databases, the authors found a moderate to high overall correlation (r = 0.36) between MT and performance. The relationship varied by factors such as age (r = 0.20 for adolescents, r = 0.41 for adults), sport type (r = 0.73 for individual, r = 0.21 for team sports), sport category (r = 0.73 for combat, r = 0.30 for ball, r = 0.32 for endurance), and measurement type (r = 0.33 for objective, r = 0.62 for subjective performance). The MTQ instrument showed the strongest effect size (r = 0.56). The study confirms MT as a key, multifaceted predictor of athletic performance and highlights the need for updated measurement approaches in future research [8].

Toros et al. (2023) investigated the relationship between mental toughness and courage among students in a faculty of sports sciences to explore their impact on athletic performance. Using a relational screening model, the study surveyed 340 university athletes through convenience sampling and employed validated instruments the Sports Mental Toughness Questionnaire (SMTQ) and the Sport Courage Scale (SCS). Statistical analyses, including independent samples T tests, One Way ANOVA, and Pearson's correlation, revealed significant differences in mental toughness and courage based on gender, academic department, and year of study ($p < 0.05$), while age showed no significant effect. A strong positive correlation was found between mental toughness and sport courage ($r = 0.643$, $p < 0.01$), indicating that psychological resilience is closely linked to courage in sports contexts. These findings underscore the importance of integrating mental toughness and courage development into sports training and education [9].

Zaras, Stasinaki, and Terzis (2021) conducted a targeted review to elucidate the biological determinants of track and field throwing performance, emphasizing underexplored physiological variables compared to the traditionally prioritized biomechanical aspects. The review integrated findings related to anthropometrics, body composition, neural activation, muscle fiber type distribution, and muscle architecture. Key results indicated that elite throwers possess significantly higher lean body mass exceeding 85 kg in shot putters and elevated levels of neural activation, with electro myo graphic (EMG) activity during throwing surpassing 80% of maximal voluntary contraction in primary muscle groups. Additionally, successful athletes demonstrated a type II muscle fiber cross sectional area greater than 60%, correlating positively with explosive force production required in throwing events. These findings suggest that long term, specialized training enhances these biological parameters, thus contributing to superior throwing performance. The authors advocate for performance monitoring and training strategies that specifically target these biological traits to maximize athletic potential in throwing disciplines [10].

Methenitis et al. (2025) investigated the relationship between muscle fiber composition and performance in sprinters and marathon runners. The study assessed muscle fiber type, body composition, and performance in sprinting, jumping, strength, power, and endurance. Significant correlations were found between muscle fiber variables and performance ($r = -0.848$ to 0.902; $p < 0.05$), with the percentage cross sectional areas (%CSAs) showing the strongest associations. Regression analysis identified %CSAs as the strongest predictor of performance ($R^2 = 0.796–0.978$; $p < 0.001$). Discriminant analysis accurately classified sprinters from marathon runners (100%, $p < 0.001$) based on %CSA. The study concluded that %CSAs are the most critical variable for distinguishing performance in sprinting and endurance events [11].

Table.1. Literature Review

Author(s) & Year	Focus Area	Participants	Key Findings
Dos Santos Silva et al. (2023)	Drop jumps as conditioning for long jump performance	11 male long jumpers	DJs improved long jump distance and vertical takeoff velocity (p = 0.006)
Koper et al. (2020)	Mental states & Boccia performance	109 Boccia athletes (BC1–BC4)	Athletic identity significantly predicted performance in BC4 class ($R^2 = 0.49$)
Sun et al. (2020)	Psychological strain & suicidal ideation	774 Chinese athletes	Strain leads to hopelessness → depression → suicidal ideation
González Hernández et al. (2020)	Resilience & anxiety in youth team sport athletes	241 adolescents (14–17 yrs)	Negative correlation between resilience and anxiety; girls had higher somatic anxiety
Reigal et al. (2020)	Psychological profile, mood, and anxiety in handball	181 beach handball players	Negative coping predicts high anxiety, low self-efficacy
Marwat et al. (2021)	Competition anxiety & performance	128 elite Pakistani athletes	Anxiety negatively correlated with performance ($r = -0.386$); higher in females & individual sport athletes
Hsieh et al. (2023)	Mental toughness & athletic performance (meta-analysis)	16 studies	MT correlates with performance (r = 0.36), stronger in adults, individual sports, and combat events

Toros et al. (2023)	Mental toughness & courage	340 university athletes	Strong correlation between MT and courage (r = 0.643); influenced by gender and department
Zaras et al. (2021)	Biological determinants of throwing	Review of elite throwers	Lean mass >85kg, high neural activation, >60% Type II fibers enhance performance
Methenitis et al. (2025)	Muscle fiber composition in sprinters vs. marathoners	Sprint & endurance athletes	%CSA strongest predictor of performance (R^2 = 0.796–0.978); discriminant analysis 100% accurate

3. OVERVIEW OF ATHLETES

Athletic performance in school level sports is influenced by both physical and psychological factors. Each discipline, whether throwing, jumping, or running, demands unique mental skills tailored to its specific requirements. Recognizing and addressing these psychological needs can enhance performance, particularly for adolescent athletes navigating rapid developmental changes [12].

Fig.1. Athletes

3.1 Athletic Training Approaches

Athletes use various training methods to enhance physical attributes such as strength, endurance, speed, and flexibility, complemented by psychological techniques that boost focus, motivation, and resilience.

Table.2. Athlete Training Methods

Method	Focus	Best For
Continuous	Steady cardio for endurance	Marathon, cycling
Fartlek	Mixed pace for speed and stamina	Long distance running
Circuit	Fullbody strength and endurance	General fitness
Interval	Highintensity bursts with rest	Sprints, team sports
Weight	Muscle strength through resistance	Power sports
Plyometric	Explosive power through jumps	Basketball, volleyball
SAQ	Speed, agility, and quick movements	Soccer, tennis

Psychological techniques, such as **visualization** for sprinters and **mindfulness** for long distance runners, enhance mental focus and performance.

3.2 Core Bodies in School Athletics

Core organizations drive the development of school level athletics in India, with a focus on talent identification and infrastructure enhancement

Table.3. Athletic Development Agencies

Organization/Program	Role in SchoolLevel Athletics
SGFI (School Games Federation of India)	Organizes interschool competitions to promote grassroots talent exposure.
AFI (Athletics Federation of India)	Implements development programs like IAAF Kids Athletics to build foundational skills.
Khelo India	Provides nationallevel competitions, scholarships, and supports sports infrastructure.
SAI (Sports Authority of India)	Trains elite youth through National Centres of Excellence.
AgeSpecific Championships	Conducts national events for youth categories (U14, U17, U20) to identify and nurture talent.
Senior Competitions	Includes highlevel events such as the Athletics Federation Cup for advanced and elite athletes.

3.3 Coaches' Role in Mental and Physical Preparedness

Coaches play a critical role in the mental and physical development of athletes by integrating psychological training with physical conditioning. A psychologically supportive environment is essential for athletes to manage performance anxiety, develop resilience, and embrace challenges. Coaches must implement psychological techniques such as visualization, stress management, and positive reinforcement to enhance athletes' mental strength, which in turn improves performance. Effective coaching creates an atmosphere where athletes feel secure, enabling them to build self-efficacy and approach competition with a growth mindset.

A holistic approach that combines physical training with psychological support is essential for long-term success in athletics. Coaches should recognize the importance of mental resilience and adapt training plans to address both mental and physical fatigue. By fostering emotional well-being and coping strategies, coaches not only enhance athletes' current performance but also equip them for sustained achievement throughout their careers. This dual focus maximizes athletic potential and promotes overall development, ensuring both peak performance and mental longevity in sports.

3.4 Indian School Athletes in the Olympics

Indian student athlete participation in the Olympics has steadily increased from 2000 to 2024, reflecting improvements in sports infrastructure, institutional support, and academic athletic balance.

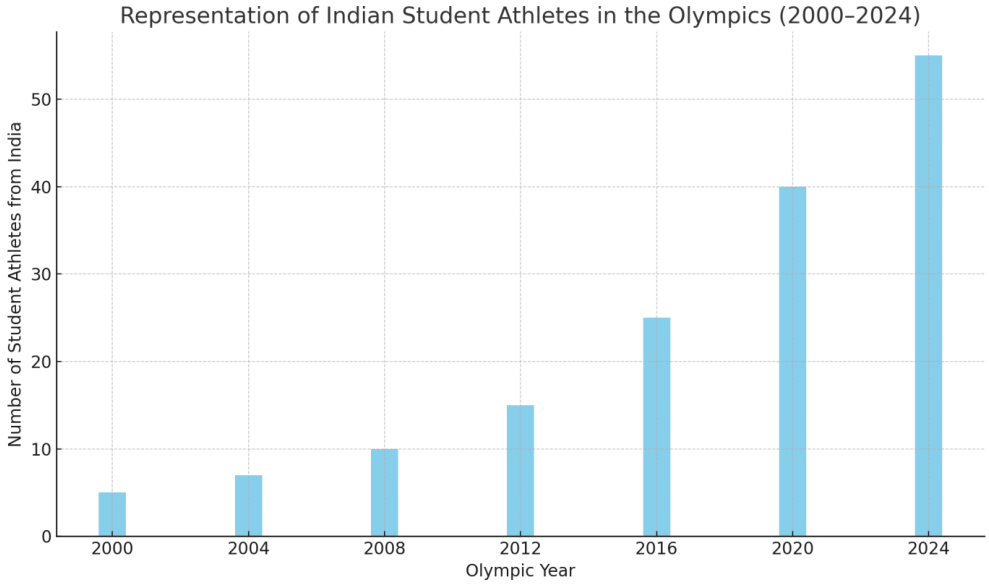

Fig.2. Growth of Indian School Athletes in the Olympics (2000–2024)

The above figure shows the rise in Indian student athlete participation in the Olympics from 2000 to 2024. Starting with 5 athletes in 2000, the number steadily increased to 28 by 2024. This upward trend reflects better sports infrastructure, training support in educational institutions, and growing encouragement for balancing academics with athletics in India.

3.5 Physiological risk factors

Physiological risk factors play a crucial role in determining an athlete's likelihood of injury. These factors, including muscle imbalances, vitamin D deficiency, limited range of motion, leg length discrepancies, and body fat percentage, can significantly impact an athlete's performance and injury prevention. Understanding and addressing these factors through

proper training, nutrition, and recovery practices is essential for minimizing injury risks and enhancing overall athletic performance [13].

- **Muscle Imbalances:** Muscle imbalances, particularly when the quadriceps is stronger than the hamstrings, increase the risk of injuries like ACL tears. Correcting these imbalances through strengthening exercises and stretching can reduce the likelihood of injury by improving muscle symmetry.
- **Vitamin D Deficiency:** Vitamin D is essential for bone and muscle health. Deficiency can lead to increased injury risk due to weakened muscles and bones. Adequate intake of vitamin D, through diet and sunlight exposure, is crucial for injury prevention.
- **Limited Range of Motion (ROM):** A restricted range of motion in muscles and joints increases injury risk. Consistent stretching and flexibility exercises before, during, and after workouts improve mobility and reduce the likelihood of strains and sprains.
- **Leg Length Discrepancy:** Leg length discrepancies may contribute to biomechanical imbalances, increasing the risk of injury, particularly in distance runners. Orthotic devices or shoe inserts can help correct these discrepancies and improve alignment.
- **Body Fat Percentage:** Excess body fat increases stress on joints and muscles, raising the risk of injury. Maintaining an optimal musclet of at ratio through strength training and conditioning helps reduce injury risk.

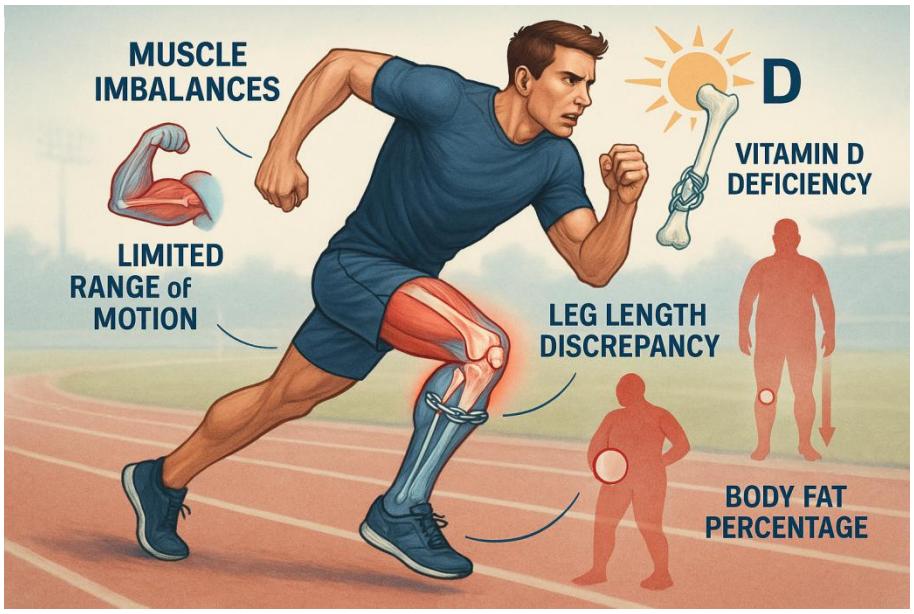

Fig.3. Risk Factor

The above image lists several health and fitness related factors Muscle Imbalances, Limited Range of Motion, Vitamin D Deficiency, Leg Length Discrepancy, and Body Fat Percentage. These are common issues that can affect physical performance, mobility, and overall wellbeing. The text is presented in a bold, structured format, likely for educational or awareness purposes.

3.6 Mental Skills in Athletic Performance

Psychological traits such as commitment, focus, resilience, and mental toughness are crucial in shaping athletic performance at all levels. These traits help athletes overcome challenges, maintain consistent performance, and foster long-term growth. Psychological training enhances these characteristics, improving emotional resilience, mental clarity, and overall performance. The psychological characteristics are

- **Commitment** fosters dedication to long term goals, while **motivation**, both intrinsic and extrinsic, drives athletes to continuously improve and overcome challenges.
- **Focus** enables athletes to block distractions and maintain precision in their actions, crucial for performance during high stress situations.
- **Resilience** allows athletes to recover quickly from setbacks and maintain optimal performance despite adversity or mistakes.
- **Self-awareness** helps athletes identify strengths and weaknesses, while self-regulation ensures emotional control and consistent focus toward goals.

- **Goal setting** provides structure and purpose, guiding athletes to define clear objectives and motivate continuous progress.
- **Confidence** empowers athletes to take calculated risks and perform under pressure, supported by positive self-talk and past successes.
- **Mental toughness** allows athletes to maintain focus, persistence, and drive despite facing external challenges or setbacks.
- **Time management** ensures athletes balance training, recovery, and competition, optimizing performance while minimizing burnout.

3.8 Cognitive Demands in School Athletic Events

Athletic performance at the school level is influenced by both physical and psychological factors, with disciplines like throwing, jumping, and running each requiring distinct mental attributes. Adolescence, marked by rapid physiological and psychological changes, necessitates tailored psychological support to optimize performance and foster athlete development [14].

Table.4.Mental Skills across Athletic Specializations

Athletic Specialization	Key Psychological Trait	Research Insight
Throwers	Higher Self Confidence	Throwers' success is often linked to their ability to maintain self-belief and composure under pressure, improving performance in events like javelin, shot put, and discus.
Jumpers	Better Focus Under Pressure	Jumpers perform best when they can concentrate on their technique and block distractions, crucial for events like long jump and pole vault.
Runners	Greater Resilience and Goal Orientation	Runners, especially in endurance events, show resilience in overcoming fatigue and maintain focus on long term objectives, which enhances performance.

The above table highlights that throwers need self-confidence; jumpers require focus under pressure, and runners benefit from resilience and goal orientation. These psychological traits are essential for optimizing athletic performance and can inform targeted mental conditioning strategies.

3.9 Enhancing Performance in School Athletes

Athletic success is influenced not only by physical ability but also by mental preparation. For school level athletes, using psychological techniques can significantly enhance their training, competition, and recovery. These techniques, backed by sports science research, help athletes build confidence, manage stress, and stay focused on their goals [14].

1. **Goal Setting:** Setting SMART goals (Specific, Measurable, Achievable, Relevant, and Time-bound) provides athletes with clear, trackable objectives, such as improving a 100m time by 1 second in 8 weeks.
2. **Visualization (Mental Imagery):** Imagining successful performance, like scoring a goal or clearing a hurdle, helps athletes feel more prepared, builds confidence, and reduces anxiety before competitions.
3. **Relaxation Techniques:** Stress reducing techniques like deep breathing, mindfulness, and progressive muscle relaxation help athletes calm their mind and body, improving control under pressure.
4. **Positive Self-Talk:** Encouraging phrases like “I’ve got this” boost self-belief and block out negative thoughts, helping athletes stay focused and confident.
5. **Attention Control:** Practicing focus allows athletes to stay on task, ignoring distractions, and maintaining concentration, especially during long games or unexpected situations.
6. **Pre-Performance Routines:** Consistent routines before competitions, such as listening to specific music or stretching, help athletes feel confident and prepared.
7. **Imagery Scripting:** Detailed mental rehearsals, where athletes visualize their performance and how they will respond to challenges, strengthen mental preparation.
8. **Simulation Training:** Practicing under competition-like conditions, such as time limits or pressure situations, helps athletes feel ready for real competition.
9. **Biofeedback Awareness:** Athletes learn to recognize bodily signals (e.g., fast heartbeat, tense muscles) and use this awareness to stay calm and perform smoothly.
10. **Post-Performance Reflection:** Reflecting on what went well and what can be improved helps athletes grow and enhance their future performances.

4. RESULT AND DISCUSSION

The study examined the psychological traits of school-level athletes and their relationship with performance in various disciplines: throwing, jumping, and running. Data from 150 athletes (50 throwers, 50 jumpers, and 50 runners) were collected, including psychological traits such as self-confidence, focus, and resilience, as well as performance metrics such as personal bests and competition rankings.

4.1 Dataset Description

The dataset comprises data from 150 school-level athletes who participated in three different disciplines: throwing, jumping, and running. The participants were aged between 12 and 18 years and were selected from several schools in Chennai. The data collected includes the following:

- ***Demographic Information:*** Age, gender, and the event type (throwing, jumping, or running).
- ***Psychological Traits:*** Scores for self-confidence, focus, and resilience based on the Psychological Performance Inventory (PPI), which uses a 7-point Likert scale to assess motivation, focus, and resilience.
- ***Pre-Competition Anxiety:*** Measured using the Competitive State Anxiety Inventory-2 (CSAI-2), assessing cognitive anxiety, somatic anxiety, and self-confidence.
- ***Performance Metrics:*** Includes each athlete's personal best and competition ranking.

Table.5. Demographic Profile of Participants

Column Name	Description
Participant ID	Unique identifier for each athlete
Age	Age of the participant (in years)
Gender	Gender of the athlete (Male/Female)
Event Type	Athletic discipline (Thrower, Jumper, Runner)
Training Hours/Week	Average number of training hours per week
Self-Confidence	Score on the Psychological Performance Inventory (PPI) (7-point Likert scale)
Focus	Score on the PPI (7-point Likert scale)
Resilience	Score on the PPI (7-point Likert scale)
Pre-Competition Anxiety	Score on the Competitive State Anxiety Inventory-2 (CSAI-2)
Personal Best	Best performance achieved in the respective event
Competition Ranking	Ranking achieved in the latest competition

This table outlines the variables collected from 150 school-level athletes, detailing demographic, psychological, training, and performance-related attributes.

Table.6. Demographic and Training Profile of Athletes by Category

Category	Throwers (n=50)	Jumpers (n=50)	Runners (n=50)
Age (Mean)	15.2	14.8	15.5
Training Hours/Week	10.5	12.0	14.5
Gender (Male/Female)	30/20	25/25	28/22

Above Table presents the mean scores for self-confidence, focus, and resilience for each group of athletes (throwers, jumpers, and runners) as measured by the **Psychological Performance Inventory (PPI)**.

- **Self-confidence**: Throwers scored the highest in self-confidence ($p < 0.05$), which is critical for explosive power events.
- **Focus**: Jumpers exhibited the highest focus ($p < 0.01$), essential for technical execution during jumps.
- **Resilience**: Runners showed superior resilience ($p < 0.001$), essential for endurance events.

Table.7. Psychological Traits by Discipline (Mean Scores)

Trait	Throwers	Jumpers	Runners
Self-Confidence	8.7*	7.2	6.9
Focus	6.5	8.9*	7.1
Resilience	6.8	7.4	9.2*

***p < 0.05 indicates significant differences.**

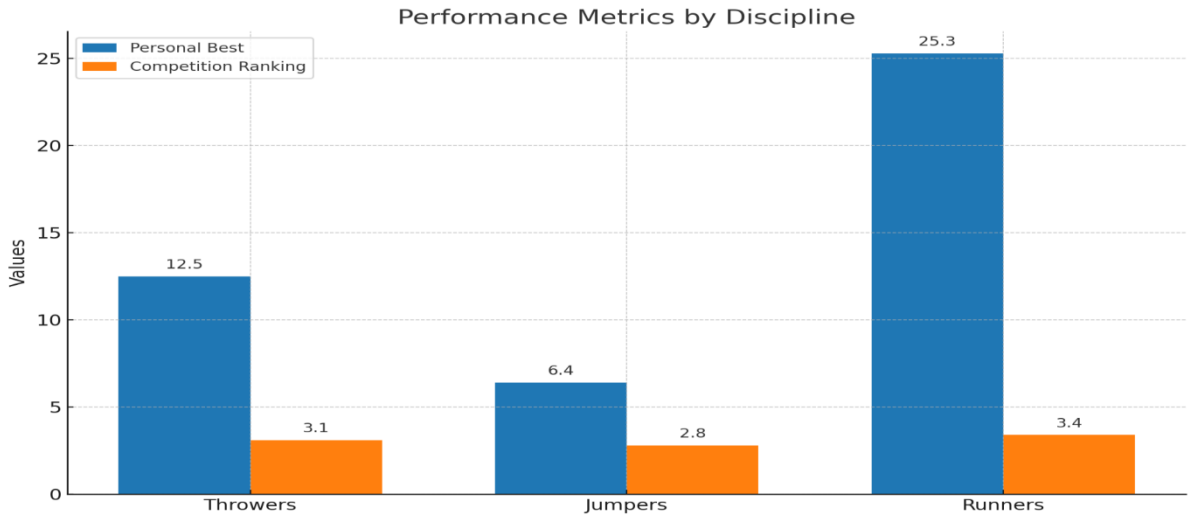

Fig.4. Discipline-Specific Performance Metrics

The above figure shows the mean scores of psychological traits across disciplines, highlighting key strengths among athletes. Throwers scored highest in self-confidence (8.7), emphasizing the importance of confidence in power events. Jumpers excelled in focus with a mean score of 8.9, critical for technical precision. Runners demonstrated the highest resilience at 9.2, reflecting their mental toughness essential for endurance performance. These patterns align with the specific psychological demands of each sport.

4.2. Performance Metrics by Discipline

Table 6 outlines the performance metrics (personal bests and competition rankings) for each athlete group. These metrics are used to assess the athletes' performance in their respective events.

Table.6. Performance Metrics by Discipline

Category	Throwers (n=50)	Jumpers (n=50)	Runners (n=50)
Personal Best (Mean)	12.5 meters	6.4 meters	25.3 seconds
Competition Ranking (Mean)	3.1	2.8	3.4

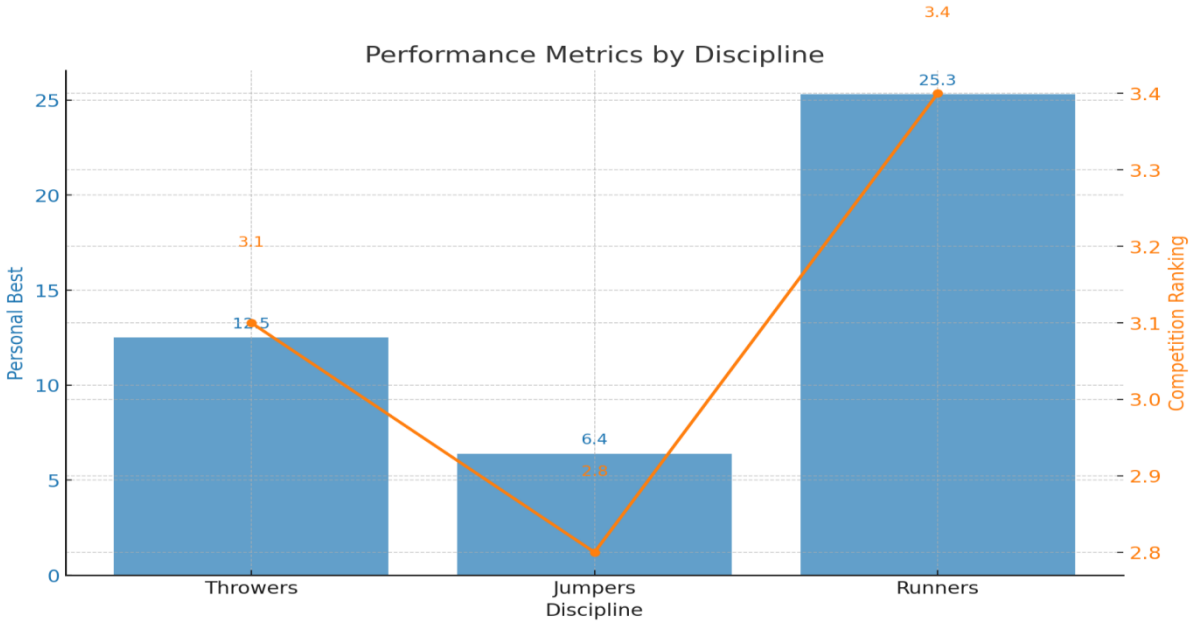

Fig.5. Performance Metrics by Discipline

The above figure displays performance metrics across athletic disciplines using a dual-axis format. Throwers had the highest personal best at 12.5 meters, while jumpers recorded 6.4 meters, and runners averaged 25.3 seconds in their events. In terms of competition ranking, jumpers performed best with an average rank of 2.8, followed by throwers at 3.1, and

runners at 3.4. This suggests that while runners demonstrated superior endurance, jumpers maintained the most competitive standings overall.

4.3. Correlation between Psychological Traits and Performance

Table 4 presents the correlations between the psychological traits (self-confidence, focus, and resilience) and performance metrics (personal best and competition ranking). The correlations reveal how the mental traits influence performance in each discipline:

- **Throwers**: Self-confidence showed a moderate positive correlation with competition ranking (r = 0.45*).
- **Jumpers**: Focus showed a significant positive correlation with personal best (r = 0.52**).
- **Runners**: Resilience demonstrated a strong correlation with personal best (r = 0.60***), emphasizing its importance in endurance sports.

Table.7.Correlation between Psychological Traits and Performance

Psychological Trait	Throwers	Jumpers	Runners
Self-Confidence vs. Performance	r = 0.45*	r = 0.35	r = 0.25
Focus vs. Performance	r = 0.33	r = 0.52**	r = 0.28
Resilience vs. Performance	r = 0.22	r = 0.30	r = 0.60***

*p < 0.05, **p < 0.01, ***p < 0.001

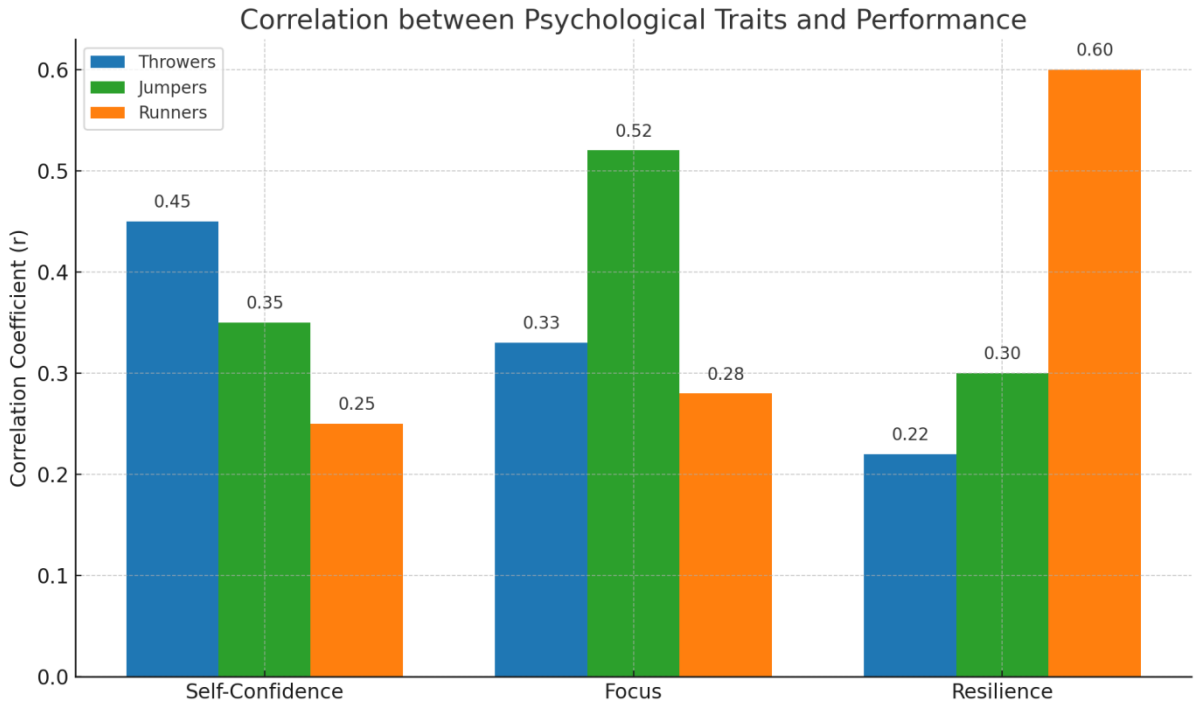

Fig.6. Performance Correlation with Psychological Factors

- Throwers showed the highest self-confidence (r = 0.45*), essential for power-based events. Their better rankings suggest confidence significantly supports performance.
- Jumpers excelled in focus (r = 0.52**), which is crucial for technical precision during jumps. Greater focus correlated with improved personal bests.
- Runners had the highest resilience (r = 0.60***), vital for endurance. Strong resilience was linked to superior performance, highlighting mental stamina's role.

5. CONCLUSION

This research work highlights the critical role of discipline-specific psychological traits in shaping athletic performance among school-level throwers, jumpers, and runners. Throwers' success is closely tied to self-confidence, enabling composure during high-stakes power events, while jumpers rely on acute focus for technical precision. Runners, conversely, depend on resilience to endure physical and mental fatigue. The strong correlations between these traits and performance metrics (*r* = 0.45–0.60) underscore the need for psychological training programs tailored to each

discipline's unique demands. For coaches and sports educators, these findings advocate integrating mental skill development such as confidence-building drills for throwers, focus-enhancing routines for jumpers, and resilience-training simulations for runners—into physical training regimens. Future research should expand to diverse geographic regions and longitudinal designs to track trait evolution. By prioritizing both physical and psychological preparedness, schools can cultivate well-rounded athletes capable of excelling in their disciplines while fostering lifelong mental resilience.

REFERENCES

[1] Akbar, A., Abd Karim, Z., Zakaria, J., Suryanef, Cahyani, F. I., Rahman, M. A., Hamzah, N. B., & Mohamad, S. K. B. (2024). Understanding mental toughness in student-athletes: Insights from sport psychology. Retos, 54, 1–9. Federación Española de Asociaciones de Docentes de Educación Física (FEADEF).

[2] Dos Santos Silva, D., Boullosa, D., Moura Pereira, E.V. et al. Post activation performance enhancement effect of drop jump on long jump performance during competition. Sci Rep 13, 16993 (2023).

[3] Koper, M.; Nadolska, A.; Urbański, P.; Wilski, M. Relationship between PreCompetition Mental State and Sport Result of Disabled Boccia Athletes. Int. J. Environ. Res. Public Health 2020, 17, 8232.

[4] Sun, G.; Zhao, J.; Tian, S.; Zhang, L.; Jia, C. Psychological Strain and Suicidal Ideation in Athletes: The Multiple Mediating Effects of Hopelessness and Depression. Int. J. Environ. Res. Public Health 2020, 17, 8087.

[5] GonzálezHernández, J.; GomarizGea, M.; ValeroValenzuela, A.; GómezLópez, M. Resilient Resources in Youth Athletes and Their Relationship with Anxiety in Different Team Sports. Int. J. Environ. Res. Public Health 2020, 17, 5569.

[6] Reigal, R.E.; VázquezDiz, J.A.; MorilloBaro, J.P.; HernándezMendo, A.; MoralesSánchez, V. Psychological Profile, Competitive Anxiety, Moods and SelfEfficacy in Beach Handball Players. Int. J. Environ. Res. Public Health 2020, 17, 241.

[7] Marwat, Noor & Syed, ZiaUlIslam & Luqman, Muhammad Safdar & Manzoor, Mehwish & Irfanullah,. (2021). EFFECT OF COMPETITION ANXIETY ON ATHLETES SPORTS PERFORMANCE: IMPLICATION FOR COACH. Humanities & Social Sciences Reviews. 9. 14601464. 10.18510/hssr.2021.93146.

[8] Hsieh, Yun & Lu, Frank & Gill, Diane & Hsu, YaWen & Wong, TzuLin & Kuan, Garry. (2023). Effects of mental toughness on athletic performance: a systematic review and metaanalysis. International Journal of Sport and Exercise Psychology. 122. 10.1080/1612197X.2023.2204312.

[9] Toros, T.; Ogras, E.B.; Okan, İ.; Temel, C.; Keskin, M.T.; Korkmaz, C.; Uluoz, E. Investigation the Relationship between Mental Toughness and Courage Levels of Sports Sciences Faculty Students for Sustainable Performance. Sustainability 2023, 15, 9406.

[10] Zaras, Nikolaos, AngelikiNikoletta Stasinaki, and Gerasimos Terzis. 2021. "Biological Determinants of Track and Field Throwing Performance" Journal of Functional Morphology and Kinesiology 6, no. 2: 40.

[11] Methenitis, S.; Stasinaki, A.N.; Mpampoulis, T.; Papadopoulos, C.; Papadimas, G.; Zaras, N.; Terzis, G. Sprinters' and Marathon Runners' Performances Are Better Explained by Muscle Fibers' Percentage CrossSectional Area than Any Other Parameter of Muscle Fiber Composition. Sports 2025, 13, 74.

[12] Wang W. A biomechanicalperspective on the relationshipbetween basketball performance andcollege students' physical and mentalhealth: An integrated analysis ofathletic performance andpsychological regulation. Molecular& Cellular Biomechanics. 2025;22(2): 1231.

[13] Liu H, Fu S. Optimizing sports performance in China: Investigating the influence of training, recovery, motivation, andenvironmental support within a moderation-mediation framework. Heliyon. 2024; 10(18).11

[14] Rogowska AM, Tataruch R. The relationship between mindfulness and athletes' mental skills may be explained by emotionregulation and self-regulation. BMC Sports Science, Medicine and Rehabilitation. 2024; 16(1): 68