# Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities

Jiaxing Li

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Doctor of Philosophy in Exercise and Sport Science
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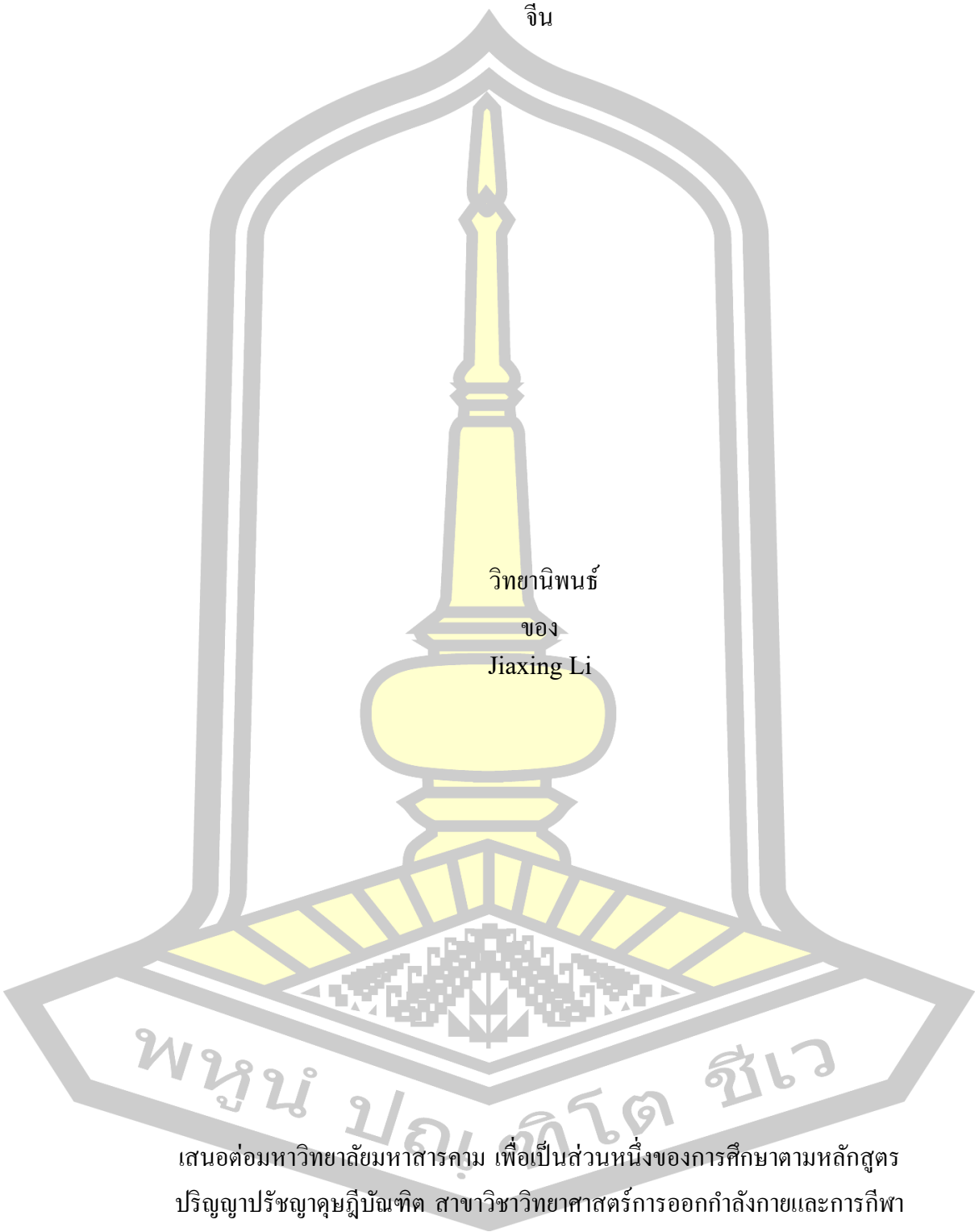

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# Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities

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## ABSTRACT

This study aims to construct a selection indicator system for male soccer players in Chinese colleges and universities through the following four research objectives: 1. To study the selection indicators for each position of male soccer players in Chinese colleges and universities, 2. To determine the weight of the evaluation indicators for selecting male soccer players in Chinese colleges and universities, 3. To assess the reasonableness of the selection indicators and scoring criteria, 4. To validate the effectiveness of the evaluation indicators for selecting male soccer players. The main goal of the research is to develop scientific and comprehensive evaluation standards for players in different positions (goalkeepers, defenders, midfielders, forwards), determine the weight of these indicators, evaluate the reasonableness of the scoring criteria, and validate the system's practical effectiveness through data analysis. The research sample includes 80 male soccer players, with the elite group (national first- and second-level athletes) from Guangxi University for Nationalities and the general group from Guangdong Vocational and Technical College. The research methods employed include literature review, expert interviews, T-tests, regression analysis, Principal Component Analysis (PCA), and Analytic Hierarchy Process (AHP), ensuring that the selection system is scientific and applicable.

Phase 1: Through a literature review and expert interviews, the study identified selection indicators suitable for each position (goalkeeper, defender, midfielder, forward). The research analyzed existing football selection theories and practical methods from domestic and international sources, incorporating expert feedback to propose an initial indicator framework. After two rounds of expert discussions, six primary indicators were finalized: body morphology, physiological function, physical fitness, psychological attributes, technical skills, and match performance. These indicators cover key aspects of a player's physical, technical, and psychological abilities. In addition to the primary indicators, secondary indicators were further refined for each position. Goalkeepers had 87 secondary indicators, while defenders, midfielders, and forwards each had 84 secondary indicators. These indicators were adjusted to meet the specific demands of each position; for instance, goalkeepers focus on save success rates and reaction times, while defenders

emphasize interception and tackling skills. This phase established a solid theoretical foundation for subsequent data collection and analysis.

Phase 2: This phase focused on assigning appropriate weights to each primary and secondary indicator through data analysis. Data was collected from 80 football players and processed using statistical methods such as T-tests and regression analysis to filter key indicators. T-tests were used to identify significant differences in performance between elite and general players, ensuring that the selection system could effectively reflect the differences in player abilities. Regression analysis was then applied to further refine key secondary indicators, followed by Principal Component Analysis (PCA) to simplify the data structure and extract the most representative indicators. Finally, the Analytic Hierarchy Process (AHP) was used to assign weights to each primary and secondary indicator. The main results were as follows: match performance emerged as the most important primary indicator for all positions, with a weight of 0.4837 for goalkeepers, 0.2912 for defenders, 0.4269 for midfielders, and 0.5056 for forwards, with an average weight of 0.42685. This underscores the importance of match performance, particularly for forwards and goalkeepers, where it serves as the primary determinant of selection. Psychological attributes carried higher weights for goalkeepers (0.2312) and midfielders (0.2050), with an average weight of 0.1741, highlighting the importance of psychological stability in high-pressure situations. Physical fitness was more critical for defenders (0.2300) and midfielders (0.1738), with an average weight of 0.173625, emphasizing the need for endurance and physical strength in these positions. Technical skills carried the highest weight for forwards (0.1908), reflecting the demand for precision and attacking capabilities in this position. This phase accurately determined the relative importance of each indicator for different positions, establishing a scientific and quantitative selection system.

Phase 3: This phase focused on evaluating the validity of the selection indicators and scoring criteria to ensure their applicability in actual selection processes. Regression analysis was used to calculate the scores for goalkeepers, defenders, midfielders, and forwards based on their match performance and other key attributes. Goalkeepers: top-level goalkeepers demonstrated superior match performance, psychological stability, and save success rates. Scores ranged from 65.38 to 100 points, confirming the accuracy of the scoring criteria. Defenders: defensive ability and physical fitness were the main contributors to defenders' scores. High-level defenders scored between 90 and 100 points, while general-level defenders scored lower (40.00–59.00 points), reflecting significant performance differences. Midfielders: passing accuracy and ball control were key factors for midfielders. Elite midfielders scored between 91.23 and 100 points, while general-level midfielders scored between 60 and 70 points, showing clear distinctions in performance. Forwards: shooting accuracy and attacking awareness were critical factors for forwards. Elite forwards scored between 93.93 and 100 points, while general-level forwards scored between 40.00 and 59.00 points. The evaluation results confirmed that the current scoring criteria can accurately distinguish between elite and general players, especially in terms of match performance, technical skills, and psychological

stability.

Phase 4: This final phase involved validating the selection system through regression testing, ensuring the model's effectiveness in real-world applications. Players from all four positions were ranked and grouped based on their scores, and the results were compared with their actual performance. Goalkeepers: regression analysis confirmed that high-level goalkeepers outperformed general-level goalkeepers in terms of save success rate and reaction time. Elite goalkeepers consistently scored higher, with top-ranked goalkeepers scoring up to 100 points, while general-level goalkeepers scored as low as 40.78 points. Defenders: elite defenders demonstrated significantly better defensive skills and physical fitness, with scores ranging from 90 to 100 points. General-level defenders scored between 40 and 59 points, confirming the model's ability to differentiate between performance levels. Midfielders: key indicators such as passing accuracy and game vision strongly correlated with elite midfielders' scores, which ranged from 91.23 to 100 points. General-level midfielders scored below 70 points, further validating the model's accuracy in evaluating midfield players. Forwards: elite forwards displayed superior shooting accuracy and offensive awareness, with scores ranging from 93.93 to 100 points. General-level forwards scored between 40 and 59 points, confirming the model's capability to differentiate between high and low performers. Regression testing across all positions confirmed the selection model’s validity and reliability, providing accurate assessments of players’ abilities and effectively distinguishing between elite and general-level athletes.

Keyword : Men's football player, Selection criteria system, Positional analysis, Indicator weighting

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Jiaxing Li

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# CHAPTER I
# INTRODUCTION

## Background

For many years, the research problem of athlete selection has been one of the most challenging tasks faced by sports scientists and is also a key research area of general concern for sports powers. The success of selection means half of the success of training, and the importance of athlete selection in competitive sports is self-evident.

Throughout the development of Chinese soccer, its competitive level and development speed are far behind those of Europe, the United States, and other Asian countries where soccer is more developed. Although in recent years, with the strong involvement of capital in the Chinese Super League, clubs have achieved relatively good results in Asian competitions, the repeated defeats of China's national team and the national youth team show that emphasis on cultivating local youth players is the cornerstone of China's long-term progress in soccer. As the saying goes, when the youth is strong, the country is strong. With the introduction of several documents, such as the Overall Program for China's Soccer Reform in 2015, the development of school soccer in China and the cultivation of young reserve talents have received increasing attention from all walks of life. The China Football Reform and Development General Program (Chinese People's Publishing House - General Office of the State Council 2015) pointed out that the selection of college soccer players in China is an urgent need for the prosperous development of China's soccer career. The World Ranking Manual (FIFA 1998) also points out that the study of soccer selection is closely related to the level of national soccer competition.

The selection of soccer players can produce good social effects (Sun Zhe 2017). Therefore, it is of great practical significance to construct an index system for

soccer player selection in China's colleges and universities and explore scientific selection methods based on an in-depth understanding of the essential characteristics of soccer and the structure of soccer players' athletic abilities. This approach aims to accelerate the scientific process of China's soccer player selection and promote the cultivation of soccer players in colleges and universities.

The practice of athlete selection throughout the whole process of youth training is particularly important. However, the current status of China's soccer reserve talent selection is primarily conducted through subjective evaluations by coaches, with each coach focusing on different evaluation criteria, which lack a scientific basis. It has been pointed out that research on college soccer player selection in China is relatively lagging (Zeng Fanhui and Wang Lude 1992). There is no systematic physical fitness training or evaluation index system in China's soccer fitness testing methods, leading to a disconnect between physical training and Performance in actual games (Li Jing 2009). Additionally, there has been no research on the physical fitness evaluation of college male soccer players.

There are two main reasons for the difficulty of selecting reserve talents in Chinese colleges and universities. On one hand, coaches of high-level sports teams usually do not have the ability to use scientific methods to address selection problems, while most sports researchers skilled in scientific methods lack the practical experience to develop observation and testing indicators that are strongly applicable and well-integrated with their specialties. The recent popularity of kinetic inertial measurements can obtain more accurate data on soccer player metrics, including those that were previously difficult to measure (Alberto Tienza-Valverdea 2023). International studies on soccer reserve talent selection are based on subjective evaluation models. On the other hand, there are relatively few international works on soccer player selection, some of which are classified as national sports secrets, and only a few authoritative works deal with the detailed identification of talents.

The integration of sports and education has become an inevitable trend in the development of school soccer. As the world's most popular sport, soccer is loved by people worldwide. However, China's men's soccer team has suffered many defeats in international competitions, and its competitive level has declined drastically, causing dissatisfaction among the majority of fans and attracting great attention from the leaders of the Party and the state, who have repeatedly given important instructions on the development of soccer (Dong Zhongming 2011). In order to change the current unfavorable situation, improve and revitalize Chinese soccer, and foster hope among Chinese youth in soccer, the promulgation and implementation of the Notice on Launching National Youth Campus Football Activities in April 2009 announced that youth soccer had been elevated to the status of a national strategy (General Administration of Sport, Ministry of Education, etc. 2009). In February 2013, the Opinions on Strengthening the Work of National Youth Campus Soccer provided more specific and powerful support to campus soccer in terms of policy guarantees, financial support, league construction, etc. (State General Administration of Sports, Ministry of Education 2013), ensuring that campus soccer in primary and secondary schools across the country was protected. After more than six years of reform and pilot projects, there are more than 6,000 schools carrying out campus soccer pilot projects and more than 5,000 designated campus soccer schools, and a system relying on campuses to cultivate young soccer reserves is taking shape. However, overall, the development of campus soccer is still relatively slow, and development between various provinces is still very uneven, with problems such as limited popularization, unsound competition systems, and insufficient support capabilities. In July 2015, the Implementation Opinions on Accelerating the Development of Youth Campus Soccer made it clear that campus soccer is a key part of implementing the fundamental task of establishing moral education and leading the reform and innovation of school sports, from improving the popularity of campus soccer, deepening the reform of

soccer teaching, and enhancing the quality of school sports (State General Administration of Sports 2015).

As of 2022, there are 32,689 National Youth Football Characteristic Schools, and nearly 55 million young people regularly participate in campus soccer activities, effectively expanding the soccer population base. Regrettably, however, campus soccer has played a limited role in cultivating high-level reserve talents for the sport, with only about 130 people able to enter the ranks of domestic soccer professional clubs. This shows a huge gap compared to neighboring Japan, where more than 50% of the athletes in the Japanese Soccer League have become professional players through the campus soccer system. This reflects a problem with the talent training mechanism in campus soccer, which is attributed to the failure to realize the integration of sports and education. There are significant differences between the sports and education systems in China in terms of ideological concepts, value orientation, and competition resources, which are related to China's "dual-track system" for sports and education. The sports system focuses only on competition results, ignoring the cultural quality cultivation of young people, leading to many athletes becoming culturally disabled, with retirement equating to unemployment becoming a common phenomenon. The education system, on the other hand, emphasizes academic advancement while neglecting the physical development of young people, and the physical health level of young people has been declining for more than 30 years, with 33% of young people having varying degrees of hidden health problems (Mao Zhenming 2017). The introduction of the Opinions promotes the integration of sports and education and addresses the phenomenon of separation between culture and sports. In terms of the integration of sports and education in the new era, it emphasizes integrating the cultivation of athletic talents into the school system and the educational function of sports into the education system. Campus

soccer, as an essential part of school sports, breaking through the current dual-track operation mode is an inevitable trend for the development of campus soccer schools.

The focus of the study on sports-education integration of youth school soccer is how to rationally coordinate the relationship between the sports system and the education system in the promotion of youth school soccer, how to promote the collaboration and symbiosis of the two, and how to form synergy more scientifically and effectively, with an emphasis on how to rationalize the linkage between the sports system and the education system in the development of youth school soccer.

Comprehensively, Chinese college men's soccer players have the following three problems:

1.Research on college soccer player selection in China is relatively lagging, and there is no standard, mature soccer selection evaluation method. To improve the training quality and methods of Chinese soccer, there is an urgent need to establish a set of scientific, standardized, and mature selection evaluation systems as a basic guide in the student series.

2.With the popularization of the new measurement tool of inertial power meter, the original evaluation index of men's soccer athletic ability in China's colleges and universities needs to be updated and expanded.

3.To accurately select soccer athletic talents, the evaluation index of men's soccer athletic ability in China's colleges and universities needs to establish a numerical model that can be directly interpreted.

**Research Problems**

1. Male football players in Chinese colleges and universities do not have a system for evaluating indicators regarding football selection guidelines.

2. The evaluation indicators of male football players in colleges and universities have not improved

3. The system for evaluating selection indicators for male footballers is not up to standard.

**Research objectives**

1. To study the indicators for selecting football players for each position of male football players at colleges and universities in China.

2. To determine the weight of the evaluation indicators for the selection of male football players of colleges and universities in China.

3. To evaluate the indicators and scoring criteria for selecting male football players of colleges and universities in China.

4. To confirm the evaluation indicators for the selection of male football players of colleges and universities in China.

**Research Questions**

Q1. 1.What are the evaluation indicators for selecting male football players in Chinese colleges and universities?

Q2. How to determine the weight of evaluation indicators for selecting male football players in Chinese universities?

Q3. How are the indicators and scoring criteria for the selection of male football players of colleges and universities in China?

Q4. How are the evaluation indicators for male football selection of colleges and universities confirmed in China?

**Hypothesis of the Research**

1. The standard and mature evaluation index system for selecting men's soccer players in Chinese colleges and universities can realize the signification of soccer training.

2. The index data measured by the new power inertia instrument can greatly guarantee the scientificity and standardization of the selection model.

The standard mature Chinese college men's soccer player selection evaluation model has guiding significance for soccer selection of outstanding talents.

**Significant of Study**

1. This topic is a comprehensive study of the evaluation index system for selecting male soccer players in Chinese colleges and universities. On the one hand, it can make a comprehensive assessment of the technical and tactical level of soccer players, and understand the athletes' strengths and weaknesses in physical fitness, technology, psychology, tactics, etc. On the other hand, it can evaluate the effect of the soccer training program in Chinese colleges and universities, improve and enhance the efficiency of training, and promote the scientific implementation of training.

2. Establish the evaluation index system for selecting men's soccer players in Chinese colleges and universities, and demonstrate its application in practice, so that the theory of physical fitness evaluation can really serve the training practice.

3. Establish the monitoring standards and guarantee system for the selection and evaluation of Chinese college men's soccer players.

4. Provide certain reference for Chinese college soccer coaches in the practice of selection work, in order to provide reference for the selection of young male soccer players, accelerate the scientific process of selection of soccer players in the future, and promote the development of China's soccer movement.

5. Provide important scientific research support for Chinese college men's soccer level to achieve better results in the Asian range.

**Definition of terms**

**1.Sports Selection**

Sports selection involves predicting with a high degree of certainty whether a young athlete will successfully complete their reserve training in a chosen sport, enabling them to progress to advanced competitive training and Performance (Boutlich and Hare 1982). It is defined as the direct or indirect determination of a candidate's talent factors and the analytical prediction of their future competitive ability based on available measurements (Ulmer 1984). Athlete selection is also described as the process of identifying the most talented athletes capable of achieving higher Performance in a chosen sport (Platonov 1984). In recent years, this process has been referred to as "talent identification" in foreign studies, defined as identifying current participants with the potential to become elite athletes.

**2.Soccer Selection System**

The soccer selection system combines subjective and objective analyses of athletes, integrating evaluations of technical and tactical skills, athletic abilities, and physical and psychological qualities (Chinese People's Publishing House - General Office of the State Council 2015). This system is designed to select athletes with development potential for systematic training, aligning with the club’s needs and the head coach's requirements.

**3.Competency Assessment System**

The competency assessment system is a structured evaluation framework comprising various indicators arranged in a logical order to achieve an overall evaluation goal (Liu 2000). It consists of primary, secondary, and tertiary indicators,

and combines qualitative and quantitative analyses to provide a comprehensive evaluation of target-level objects, forming the basis for value judgments.

**4.Indicator Weights**

Indicator weights, or weight coefficients, are used to reflect the importance of specific indicators within an evaluation system. They are crucial for ensuring that the evaluation system scientifically and objectively reflects the outcomes or quality of the assessed subjects (Li Jing 2011).

**5.Body Morphology**

Body morphology includes external physical characteristics such as height, weight, and the Ketorolac index. These indicators reflect the morphology, structure, and development level of the human body. For instance, goalkeepers generally exhibit higher body mass and height, which are advantageous for defensive coverage and collision resistance (Li Jing 2011).

**6.Physiological Indicators**

Physiological indicators such as heart rate, maximum oxygen uptake, anaerobic work capacity, lactate thresholds, and various biochemical indices are crucial for assessing the physical condition and Performance capabilities of soccer players (Wang et al. 2002; Liu Dan 1998). These metrics provide insights into energy metabolism, aerobic and anaerobic capacity, and overall physical fitness.

**7.Physical Qualities**

Physical qualities essential for soccer players include speed, strength, endurance, agility, and flexibility. These attributes are integral to Performance in soccer, with specific qualities like aerobic and anaerobic endurance, explosive strength, and agility being particularly important for executing technical and tactical maneuvers on the field (Matveyev 1991; Davis 1992).

**8.Soccer Techniques**

Soccer techniques encompass fundamental skills such as ball handling, kicking, dribbling, and catching. Mastery of these basic techniques is crucial for effective Performance during matches, involving specific movements and strategies suited to different gameplay situations (Zhang Li 2001).

**9.Game Psychology**

Game psychology focuses on mental aspects such as confidence, focus, intensity, decision-making, consistency, and emotional control, which are vital for maintaining optimal Performance during matches (Dong Zhongming 2011).

**10.Game Performance Analysis**

Game Performance analysis helps coaches and players assess and improve Performance by collecting objective data, such as video footage and quantitative game analysis, to accurately evaluate player actions and team strategies (Wei Hongwen 1998). This approach is essential for refining training and match preparation.

**Theoretical Framework**

The item group training theory is a theory developed to study the characteristics of different types of athletic training groups for various competitive sports. Forty years ago, Dr. Tian Maijiu, a renowned Chinese sports expert, proposed the concept of "item group" and, along with his colleagues, developed the item group training theory. After four decades of continuous exploration, the theoretical framework of item group training has become increasingly refined and widely accepted in the sports industry (Tian Maijiu 1983-2013). The book *The Creation and Development of Item Group Training Theory* (1983-2013) reviews the conception and creation of the item group training theory from the perspective of the evolution of thinking, observes the system structure of the item group training theory from a

systematic perspective, examines the progress and application of the theory over the past 30 years, and looks forward to its expansion.

The theory of item group training exists at a level between general training theory and specialized training theory. It is based on the similarities and differences between different sports programs that share essential properties. This theory groups sports programs with similar athletic characteristics and training requirements together for comparative study, aiming to explore the common characteristics and developmental laws of these sports.

The item group theory classifies competitive sports into two categories: physical fitness and skill. In the physical category, there are three clusters: fast strength, speed, and endurance. In the skill category, there are five clusters: Performance difficulty, Performance accuracy, net confrontation, same-field confrontation, and fighting confrontation.

**Scientific Significance of Item Group Theory**

**Summarizing Common Patterns**

The item group theory effectively summarizes the common patterns of different sports within the same cluster, providing insights into shared characteristics and training methodologies.

**Linking Theory with Practice**

The theory strengthens the connection between theoretical research and practical application in athletic training, enhancing the relevance of training methodologies to real-world scenarios.

**Transition Between Training Theory Levels**

The item group theory provides a seamless transition between general training theory and specialized training theory, bridging the gap between these levels and creating a more integrated approach to training.

**Item Group Training Theory for Soccer Programs**

**1. Overview of Training Characteristics for Homologous Antagonistic Clusters**

Skill-driven same-field adversarial clusters primarily include soccer, basketball, handball, field hockey, ice hockey, and water polo.

**1.1 Characterization of Skills and Tactical Capabilities**

Technical and tactical skills play a decisive role in the competitive ability of athletes in this cluster. Athletes are required to have comprehensive skills and specialties; their techniques must be skillful, accurate, and practical. Tactical characteristics manifest in the strategic combination of tactical methods, game formations, and game awareness, with a coordinated development of offensive and defensive tactics, as well as individual, combination, and team tactics.

**1.2 Physical Characteristics**

Athletes in this group typically exhibit strong bodies, elongated and flexible muscles, a thin fat layer, tightly tucked hip muscles, small ankle joint circumferences, clear Achilles tendons, and high arches. These morphological characteristics are essential to meet the demands of fast, flexible, and intense confrontations in sports. The functional ability reflected by the athlete's cardiorespiratory function is crucial in physical fitness, with effective blood circulation and respiratory system function serving as the foundation for sustained Performance in long-duration competitions. The sports characteristics of this cluster require athletes to possess comprehensive

physical qualities, primarily strength, speed, sensitivity, flexibility, general endurance, and speed endurance.

### 1.3 Psychological and Intellectual Characteristics

The psychological attributes of athletes in this cluster include ball sense, emotional stability, concentration, and willpower. Intellectual characteristics are mainly reflected in three areas: observation and memory, abstract thinking, and the ability to solve various technical problems independently and creatively.

## 2. Determinants of Performance in Skill-Dominant, Same-Game, Adversarial Event Clusters

The Performance determinants in this cluster are influenced by both subjective and objective factors. Subjective factors include the team's competitive level and the coach's field command skills. Objective factors comprise the level of the opponent, the competition format, the environment, the timing of the match, and the referee's behavior. Athletes' Performance is the result of the interplay between these subjective and objective factors.

## 3. Training Characteristics of Skill-Dominant Athletes in Same-Field Adversarial Sport Groups

### 3.1 Technical Training

Technical training for the whole team emphasizes enhancing overall offensive and defensive Performance, focusing on the synchronization of offensive and defensive training. Individual technical training stresses specialization, highlighting individual strengths while emphasizing the power of technical movements to improve confrontation ability and technical accuracy under intense competition.

### 3.2 Tactical Training

Fast counterattack tactics are prioritized in offensive play training due to the rapid coordination between offense and defense. Training focuses on developing athletes' intelligence to enhance their ability to think independently and solve problems adaptively under time-constrained and complex situations. Additionally, tactical training for attacking with a numerical advantage and defending with fewer players is emphasized.

### 3.3 Physical Training

Developing qualities such as speed and endurance is a primary objective of physical training. Training aims to improve the speed of executing movements, including reaction time, movement speed, and the completion of technical and tactical actions. Emphasis is placed on the intensity of training loads, accelerating recovery from fatigue, comprehensiveness of training content, and optimizing content combinations.

### 3.4 Psychological Training

Psychological training is organized to maintain high levels of self-control and emotional stability. It focuses on building mental resilience to handle winning, losing, and pressure situations effectively during competitions.

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Table 1 Research applications of vector group training theory by some scholars

| A Review of the Use of Mr. Tamehisa's Theory of Item Group Training | |
|---|---|
| **Scholars** | **Viewpoints** |
| Zhang Zhan (2023) | Physically dominant categories like speed can cross over to short-distance skiing, short-distance skating, snowmobiling, etc. |
| Zhang Yafen (2008) | The existing event group system does not include baseball, softball, cricket, and some Olympic sports, which is a deficiency of Tian's event classification system and event group training theory. It should be supplemented and improved. |
| Zhu Junkai (1998) | Forwards have fewer sprint runs, high-speed runs, low-speed runs, and total distances run than any other position player except the goalie. |
| Wang Ye (2022) | The proposed theory of item group training promotes the formulation of the development strategy of China's competitive sports, strengthens the macro-management of competitive sports programs, and facilitates the research and analysis of the training law of the same item group. Sprinting and long jump belong to the physically dominant single action structure periodic group. With the vigorous development of sprinting and long jump and the continuous improvement of sports levels, competition in these sports is becoming more intense. To improve athletes' technical level, training during the secondary school stage is crucial. |
| Tao Zhixiang (2003) | The winning pattern of the basic unit of the men's singles events in the Racket and Net competition group shows no significant difference in the ratio of the total score of the serve system to the total score of the serve-receive system of the two opponents during the racket competition. Characteristics of winning in each event were: in |

**A Review of the Use of Mr. Tamehisa's Theory of Item Group Training**

| | |
|---|---|
| | table tennis, the serving tactical system was more powerful; in tennis, the direct scoring ability of serving and the receiving tactical system were stronger. |
| Liu Aijie (2003) | Different sports exhibit combinations of basic sports qualities such as strength, speed, and endurance, which include speed strength, strength endurance, and speed endurance. Additionally, there are combinations that involve all three qualities: strength, speed, and endurance, creating a three-dimensional overlap feature. |
| Chen Liang (2016) | The value of the theoretical research platform of group training is reflected in its articulation of athletic training and its ideological and guiding role for other disciplines. It is constructed in the form of various net-like structures formed under different group systems. |

| main class | subclass | Evaluation of performance | action figure | Confrontation characteristics | Characteristics of the competition and ways to win |
|---|---|---|---|---|---|
| Physical fitness-led category | speed | measurement class | single-cycle | indirectly | Each party will try to pass the required distance in as little time as possible within their respective lanes (<90s). |
| | Endurance Sex | measurement class | Periodic single/multiple variants | indirectly | Each party passes the prescribed distance in as little time as possible within their respective/the same lane (90s) |
| | quick power | measurement class | Off-cycle/mixed single | indirect order | Within the constraints of stabilization/incrementalization, each party completes a finite number of attempts in sequence, aiming for the highest/far/heavy. |
| Giken-dominant class | Performance Accuracy | measurement class | single-cycle | indirect order | Each party, at their respective target positions, will utilize their guns/bows to complete multiple shots in a limited amount of time to get as high a cumulative ring count as possible. |
| Skill-led category | express intractability | categorize | multifunctionality | indirect order | Each party completes prescribed and self-selected sets of maneuvers within a limited time frame to achieve the highest combined score of difficulty, completion, and performance. |
| Technical and Tactical Able to Dominate Category | Collegiality | hit class | (math.) pluralistic variation | direct contact | Both sides in the restricted field of direct attack and defense, using the prescribed means, so that the ball hit a specific area, the more points within a limited time to win! |
| | offline confrontational | graded according to type | (math.) pluralistic variation | direct spacer | Both players attack and defend directly across the net so that the ball lands in a defined area compared to the first opponent to reach a defined score. |
| | Fighting Confrontation | Checkmate/Hit Class | (math.) pluralistic variation | direct combat | Both sides attack and defend directly in a restricted field, hitting more of the opponent's effective parts or landing the opponent's effective parts first. |
| | switching offense and defense | hit class | (math.) pluralistic variation | direct non-contact | Both teams rotate offense and defense within a restricted field so that the ball hits a specific area and the highest score within a limited number of reps/points wins. |

Figure 1 Framework for the application of theoretical research in the study of evaluation indicators for soccer player selection Definitions of Term

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**AHP (Analytic Hierarchy Process)**

Analytic Hierarchy Process (AHP) is a decision-making method that decomposes elements relevant to a decision into hierarchical levels such as objectives, criteria, and scenarios, enabling both qualitative and quantitative analyses. This method was developed in the early 1970s by Professor Thomas L. Saaty, an operations researcher at the University of Pittsburgh. Saaty introduced AHP while working on a project for the U.S. Department of Defense, which aimed to determine the distribution of electricity based on the contribution of each industrial sector to national welfare. AHP applies network systems theory and multi-objective comprehensive evaluation methods to develop a hierarchical weighting decision-making analysis method (Saaty 1970s).

AHP treats a complex multi-objective decision-making problem as a system, breaking down the primary goal into multiple sub-goals or criteria, which are further divided into several levels of multi-indicators (or guidelines, constraints). This decomposition allows for the use of fuzzy quantitative methods to evaluate qualitative indicators, calculating a hierarchical single ranking (weights) and a total ranking. This systematic approach serves to optimize decision-making based on multiple objectives and various alternatives.

The process of AHP involves breaking down a decision-making problem into different hierarchical structures according to the order of the general objective, sub-objectives at each level, evaluation criteria, and specific options. The method then uses eigenvector solutions from a judgment matrix to determine the priority weight of each element at a level relative to an element at the preceding level. The final step involves calculating the weighted sum of the priorities to obtain the total weight of each option in relation to the overall objective. The alternative with the highest final weight is considered the optimal solution.

It has been noted that the AHP method is particularly well-suited for decision-making problems with hierarchical and overlapping target systems that include evaluation indexes, especially when target values are challenging to describe quantitatively (Xu Shubai 1998).

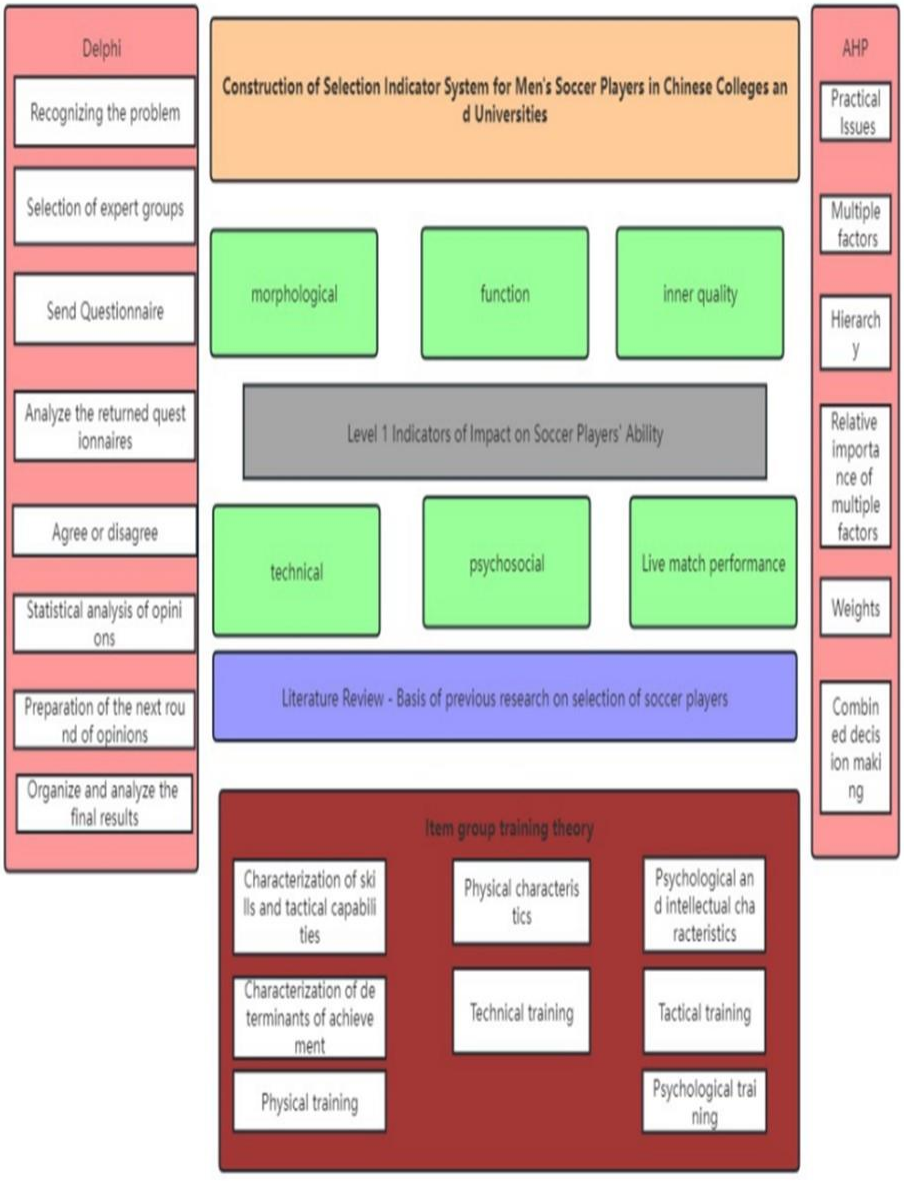


Figure 2 Schematic diagram of the theoretical framework of this study

**Theoretical Framework of the Research**

The technical framework of this research follows a structured approach to design and validate a selection standard system for football players. This framework integrates multiple dimensions of athlete performance evaluation, combining physical fitness, technical skills, and psychological factors. Below is a breakdown of the key components and their interrelationships.

1. Design of Selection Criteria

The first phase of the framework involves the creation of a multi-dimensional evaluation system, which is designed to assess athletes across several critical aspects: physical attributes (e.g., body composition, endurance), technical skills (e.g., passing accuracy, shooting precision), and psychological qualities (e.g., emotional control, decision-making ability). These criteria serve as the theoretical foundation for selecting high-level football players. By incorporating diverse factors into the selection process, the system aims to provide a holistic assessment of a player's overall ability, aligning with the work of Reilly and Williams (2003), who emphasized the importance of a comprehensive approach to developing elite performers.

2. Back-Substitution Testing Method

The second component of the framework employs a back-substitution testing method to validate the designed selection criteria. This approach involves testing players from various positions (goalkeeper, midfielder, defender, and forward) to evaluate their performance based on the established selection standards. A total of 80 players, including 40 high-level athletes and 40 average-level athletes, participate in the testing. The core objective is to determine whether the criteria can accurately differentiate between high-level and average players, ensuring that the standards are both effective and reliable. Through this process, the framework aims to confirm that the criteria hold validity in real-world scenarios.

3. Data Analysis

Once the back-substitution tests are completed, statistical analysis is conducted using software like SPSS to assess the players' scores in each of the evaluation categories. The data is categorized into five performance levels, from 1 (lowest) to 5 (highest), based on percentile rankings. This segmentation allows for the identification of players with superior performance in key areas, such as technical execution and mental resilience. The analysis helps uncover patterns that reveal the relative importance of different factors (physical, technical, psychological) in determining the

performance of players at each position. This data-driven insight is crucial for refining the selection criteria and making informed decisions about player potential.

4. Validation and Optimization of Selection Criteria

The final stage involves validating and optimizing the selection standards based on the results of the back-substitution tests. By comparing the performance of high-level and average players across various dimensions, the research provides feedback on which aspects of the selection criteria are most predictive of success. The findings allow for the refinement of the evaluation model, ensuring that the criteria remain scientifically robust and applicable to future selection processes. This iterative feedback loop aims to enhance the predictive power of the selection system, as well as its practical application in elite football training and player development.

In summary, this theoretical framework aims to establish a scientifically grounded and validated system for selecting football players by integrating diverse evaluative measures and utilizing a systematic testing and feedback approach. By leveraging multi-dimensional criteria and statistical analysis, this research seeks to create an optimized, reliable player selection standard that can effectively identify and nurture high-level football talent.

In the text, you can refer to the figure as follows:

"As shown in Figure 3, this study proposes a multi-dimensional football player selection and evaluation optimization model. This model integrates various indicators such as technical skills, psychological attributes, and physical fitness, and optimizes the selection criteria through back-substitution testing and other methods."

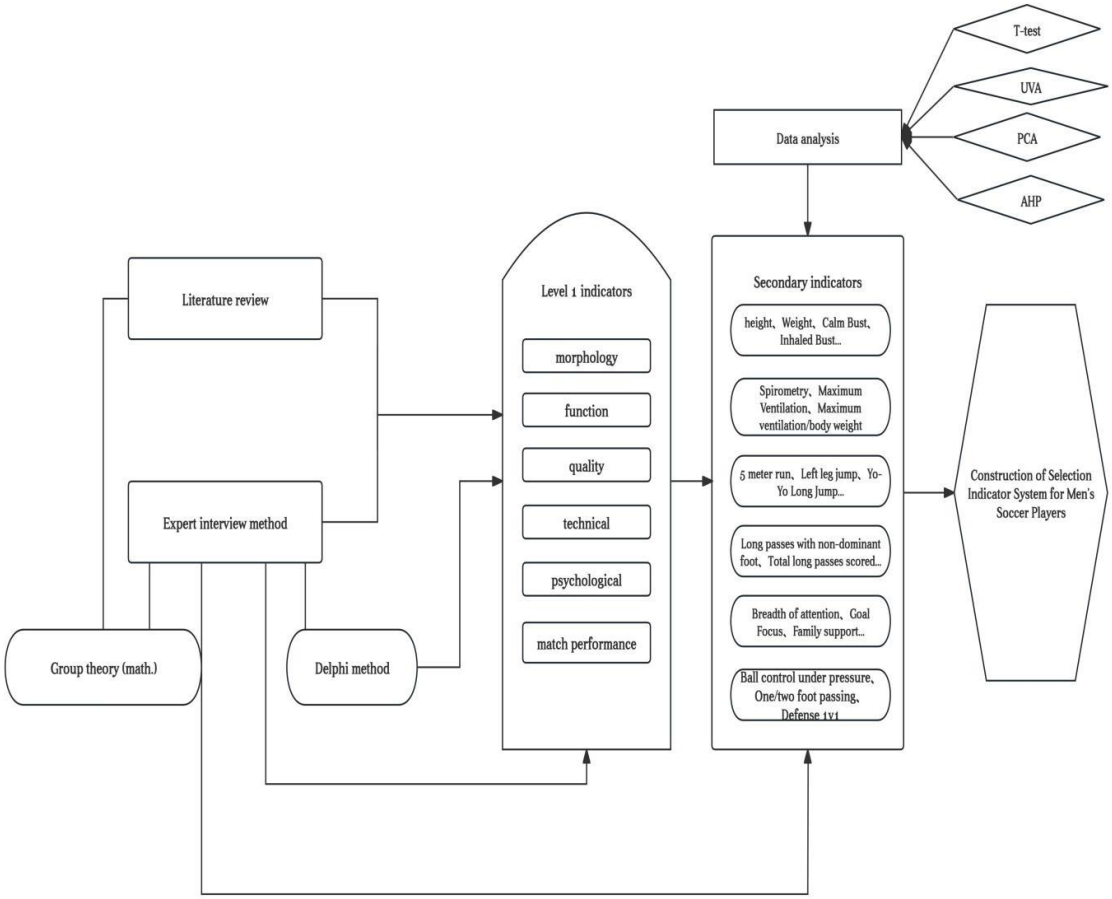


Figure 3 Multi-Dimensional Football Player Selection and Evaluation Optimization Model

# CHAPTER II
# LITERATURE REVIEW

In research Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities. The researcher has studied concepts, theories, documents, and related research of various individuals and agencies. They can be summarized as follows.

1. Principles for the construction of the selection index system
2. Progress of Chinese Athlete Selection Theory Research
3. Relevant research on the concept of athlete selection
4. Progress of Research on Selection of Soccer Players
5. The Direction of Integration of Physical Education Orientation
6. China University Football Association
7. Future Directions for the Development of Youth Soccer and University Soccer in China

## 2.1 Principles for the Construction of the Selection Index System

Principles are guidelines or norms on which actions and decisions are based (Merriam-Webster, 2013). Determining the selection index system is the first task of this study. Considering the growth and development characteristics of youth athletes and the program characteristics of modern soccer, it is essential to find the most scientific, reasonable, and effective indicators for youth soccer player selection to evaluate youth athletes comprehensively and objectively. To achieve this, it is necessary to study and analyze comprehensively according to certain principles. Based on consultations with youth soccer coaches and combining their practical experience in selection, the following basic principles are summarized for the selection process of youth soccer players.

### *2.1.1. Integral Principle*

The establishment of the indicator system should first consider the evaluation and analysis of the competitive ability of soccer players to achieve a comprehensive consideration. Attention should be paid to the structural balance of the indicator system without deliberately favoring a certain aspect. Instead, the selection should be based on the characteristics of soccer and adopt a holistic vision and thinking approach. According to Carling, Williams, and Reilly (2019), a comprehensive approach to player evaluation is crucial in youth soccer selection, as it ensures the evaluation of all relevant dimensions of performance, including physical, technical, and psychological attributes. A balanced selection system that considers multiple aspects can help identify well-rounded athletes with the potential for success in the sport.

### *2.1.2 Scientific Principle*

The determination of the indicator system must be based on system theory, methodology, and other scientific foundations. It requires a sufficient scientific basis. When selecting youth soccer player selection indicators, the reasonableness of the test methodology must be considered comprehensively, always adhering to the principle of science. The indicators should accurately and objectively reflect the characteristics of the soccer player and the current level of competition of Chinese male college soccer players. Larkin and O'Connor (2017) emphasized the need for scientifically grounded selection systems, arguing that talent identification must be informed by scientific principles and empirical data. Their research highlights that selection methods grounded in solid methodology are more likely to produce valid and reliable outcomes.

### *2.1.3. Feasibility Principle*

The construction of the index system and the design of the test method must consider the feasibility of the actual operation and implementation process. The selection of the indexes should repeatedly consider factors such as the test instrument, the test environment, and the difficulty for subjects to complete. If the process of instrument operation is too complicated, and it is not easy for young athletes to understand or master the test content, or the test environment is difficult to control, it will hinder the smooth progress of the study. In their study, Fanchini, Migliorini, and Impellizzeri (2018) emphasized that practical feasibility in the design of selection systems is crucial, particularly in the context of youth soccer. They suggested that test environments should be controlled to minimize external influences and maximize the accuracy of performance measurements.

### *2.1.4. Principle of Objectivity*

Starting from the characteristics of soccer specialization and the objective law of athletes' physical and mental development, the indicators must objectively reflect and evaluate the actual situation of young athletes' competitive abilities. Williams and Reilly (2021) highlighted the importance of objectivity in selection systems, noting that objective performance metrics, such as speed and endurance tests, are crucial for fair and reliable talent identification processes. They argue that objective systems reduce biases and provide a clearer picture of a player's potential.

### *2.1.5. Combination of Qualitative and Quantitative Principles*

Athletic ability can be quantitatively described through performance indicators, such as a 30-meter run reflecting speed ability. For non-quantitatively measurable indicators, qualitative analysis should be used, such as evaluating technical and tactical performance in games, which is difficult to quantify. Bradford, Miller, and Rotherham (2017) discussed the blending of quantitative and qualitative assessments in soccer talent identification. They emphasized that integrating objective performance metrics with subjective evaluations of technical and tactical skills can improve the overall accuracy and reliability of the selection process.

### *2.1.6. Principle of Non-Interference*

The selection process for youth soccer players needs to minimize the interference of external factors. This principle is particularly important in controlling the testing environment to ensure athletes' performances are accurately captured without unnecessary external influence. Gabbett and Domingues (2017) emphasized the importance of minimizing external influences during talent selection and performance testing. They suggested that athletes' natural abilities should be assessed under conditions that simulate real-game scenarios, free from distractions or undue pressure.

## 2.2 Progress of Chinese Athlete Selection Theory Research

### *2.2.1. Traceability of the Logical Paradigm of Chinese Athlete Selection Theory*

The development of Chinese athlete selection theory has been profoundly influenced by the successful practices of many sports powerhouses. In other countries, sports selection theory was highly prioritized, leading to the early formation of theoretical systems. For instance, Poland's Olympic selection method (Tyszkowski, 1978), the former Soviet Union's stage selection model (Matveyev, 1983), the former GDR's three-level selection system (Harre, 1985), and Hungary's 1:10 pyramid selection method based on the Olympic champion model (Tabori, 1987) were all established. Scholars from the former Soviet Union and Eastern Europe employed

large-scale research methods to develop different project selection index systems and models of athletic abilities for outstanding athletes. These selection models served as benchmarks for identifying physically gifted children and teenagers for initial training and orienting them towards specific sports programs.

In China, the formation of athlete selection theory was significantly influenced by Harley's elaboration on the stage selection model (Harley, 1980), which divides the selection stages into "basic selection" and "special selection," equivalent to "general selection" and "specialized selection." Another key influence is the sliding group selection method proposed by Lidor (2005), which involves determining performance standards for each age group, analyzing key factors affecting performance, and conducting regression analyses to identify predictive factors (Liu et al., 2011). This approach assumes that the diagnostic reliability of athletic ability and goal prediction inversely correlates with time. Therefore, instead of longitudinal tracking, simultaneous tests across different age groups are conducted to identify the best athletes, effectively minimizing the relative age effect in competitive sports (Liu et al., 2012). These methods have provided theoretical support for youth soccer selection in China.

### *2.2.2. Historical Review of Chinese Athlete Selection Theory Research*

Youth athlete selection is foundational to the development of high-level sports and marks the inception of competitive sports. Over the past 40 years, Chinese athlete selection research has evolved into a relatively comprehensive theoretical and methodological system, with each stage reflecting the unique characteristics of its social research background. This development process illustrates the evolution of athlete selection as a theoretical discipline.

From the late 1970s to the early 1980s, research on Chinese athlete selection began with a single-discipline theoretical focus, lacking a systematic theory and methodology (Xing, 2008). This period, considered the starting stage of scientific athlete selection in China, emphasized genetics, psychology, and physiology. The publication of *Research on Athlete Selection*, organized by the former National Sports Commission and the Institute of Sports Science, provided a foundational theoretical base for scientific athlete selection (Xing, 2008). This book's proposed selection theory influenced the selection methods of the time, especially in basic sports and youth sports training.

From the early 1980s to the mid-1990s, research on Chinese youth athlete selection entered a more standardized phase characterized by multidisciplinary integration. This period saw the initial formation of a scientific athlete selection theory and method system, which included scientifically defined age groupings,

diverse and quantitative selection indexes, and standardized evaluation methods (Zeng et al., 1992). Significant achievements during this time included *Research on Selection Criteria for Children and Youth Athletes*, which outlined the theoretical foundations, working steps, and selection criteria, marking the maturation of Chinese athlete selection theory.

During this period, several significant theoretical contributors emerged. The concept of the selection theory triangle, which integrates human genetics, growth and development laws, and environmental factors as the theoretical basis for sports selection, was introduced (Liu, 1991). Additionally, the theory concerning the timing and development types of adolescents' physical development was proposed, standardizing the procedures and steps for scientific selection (Zeng et al., 1992). This period also saw the addition of sports psychology, physiology, biomechanics, and biochemistry to the testing and evaluation indexes, further refining the model of athlete selection standards.

Post-mid-1990s, the basic theory of athlete selection became more mature and stable, with research focusing on integrating multidisciplinary theoretical results to form a goal-oriented model of athletic ability characteristics and ideal athlete selection standards (Yang, 2007). This integration significantly expanded theoretical research on Chinese athlete selection and facilitated its application in practice. Educational materials and thematic works further refined the theoretical system and clarified the research direction, offering detailed steps and methods for athlete selection and summarizing processes specific to various sports (Yang, 2007).

The integration of multiple disciplines has further refined the theoretical foundation of athlete selection. Anomalous exceptions in the conventional athlete selection theory paradigm prompted reflection and scrutiny. For example, studies based on National Sports Commission standards highlighted that while general laws of selection were followed, the concentration of athletic ability at the middle level and low selection rates suggested a need for more targeted selection practices (Chen et al., 2001). The *combined theory of selection and breeding* was proposed, emphasizing the complementary nature of selection and training (Kui, 2003). This theory highlighted that evaluating coaches' experience is a critical aspect of athlete selection, and structural models of athletic ability should guide theoretical evaluations. Concerns were raised about the current selection process, which often relies on discrete performance variables and one-dimensional genetic indicators during athletes' developmental phases, leading to a low selection success rate (Liu, 2015). An integrated approach using a comprehensive dynamic preferential selection database was suggested to enhance the accuracy and reliability of athlete selection (Liu et al., 2011).

### *2.2.3. Summary of the Research Process of Chinese Athlete Selection Theory*

Since the mid-1970s, Chinese athlete selection theory has undergone significant evolution, progressing from stages dominated by natural selection, empirical selection, and single-measurement evaluation to the current stage of multidisciplinary integration. The historical evolution of Chinese athlete selection research highlights a synthesis of multidisciplinary approaches, forming a mature theoretical and methodological system. This system incorporates quantitative and qualitative evaluations, expert experience, and interdisciplinary methodologies to construct a comprehensive model of athletes' competitiveness and establish a standard for comprehensive evaluation (Liu et al., 2011).

From the level of theoretical construction, the essence of athlete selection is to establish a comprehensive evaluation system to predict the potential competitive ability development of athletes (Yang, 2007). Many studies have been conducted under this logical framework. The athlete selection process consists of two main parts: the construction of the selection index system and the evaluation. Within this framework, constructing the selection index system is the core component of establishing the entire evaluation system. This process includes understanding the characteristics of the project and the group, classifying the selection indexes, empirical screening, and statistical screening (Yang, 2007).

By adhering to this comprehensive approach, the theoretical system of Chinese athlete selection has been refined, and a theoretical paradigm has been established. During this historical period, the "Selection Community" reached a consensus on the ontological cognition, conceptual thinking, norms, procedures, methods, and standards of athlete selection within the context of scientific research, with the target model of athletes' athletic ability and selection standards serving as the theoretical goal (Yang, 2007).

## 2.3 Relevant Research on the Concept of Athlete Selection

In the current literature, there are various terms used for sports selection, such as "sports selection," "athlete selection," "athlete scientific selection," and "scientific selection." However, the fundamental meaning remains largely consistent, with "sports selection" being the more general, concise, and widely recognized term. Notably, scholars from different countries define sports selection in distinct ways. For example, Buttrich from the former GDR defines sports selection as predicting with a high degree of certainty whether young athletes can successfully complete the selected sports reserve training and subsequently progress to advanced athletic training and achieve good results (Hartley, 1982). Professor Ulmer from the former Federal Republic of Germany defines sports selection as the direct or indirect

determination of a candidate's talent factors and the analytical prediction of their future competitive ability based on available measurement results (Ulmer, 1983). Platonov describes athlete selection as the process of identifying the most talented athletes who have the potential to achieve higher athletic performance in their chosen sport (Platonov, 1984). Liu Y. states that in recent years, athlete selection, also known as talent identification in foreign studies, can be defined as the process of identifying current participants who have the potential to become elite athletes (Liu, 2014).

The Chinese *Encyclopedic Dictionary of Sports* defines athlete selection as the process of accurately selecting people suitable for a particular sport from a small group through multi-indicator testing and prediction in accordance with the characteristics and requirements of the sport to improve the success rate of training (Chinese Encyclopedic Dictionary of Sports, 1979). Guo Jiaxing suggests that the early selection of athletes aims to find and discover those with high innate athletic ability and strong trainability later in life (Guo, 1988). Xu Benli believes that the selection of athletes is based on the specific characteristics of each sport and involves using scientific testing and prediction methods to accurately identify those who excel in terms of both innate and acquired athletic talent from a large group of children, adolescents, and reserve athletes (Xu, 1990).

Liu Xianwu et al. argue that the selection process involves directly or indirectly determining the talent factors of an individual's athletic ability and analyzing and predicting their future athletic potential based on test results (Liu et al., 1991). Zeng Fanhui, Wang Lude, and Xing Wenhua suggest that the scientific selection of athletes is a process of selecting individuals with superior innate conditions suitable for a specific sport from a young age, involving systematic training according to the characteristics and requirements of different sports, utilizing modern scientific methods, objective index tests, comprehensive evaluations, and predictions, while continuously monitoring their developmental trends (Zeng et al., 1992). Ye Guozhi et al. state in the *Guide to Scientific Selection of Athletes* that scientific selection is the process of selecting young athletes who meet the requirements by scientific methods (Ye et al., 1992).

Kui Jinshui redefines the concept of athlete selection as a dynamic process of selecting young children's and adolescents' sports talents in close conjunction with breeding. This approach requires combining the breeding situation for selection prediction and examining the data obtained in the breeding process rather than viewing the data obtained dogmatically and statically (Kui, 2003).

In recent years, the concept of athlete selection has evolved to incorporate more data-driven methods and technological advancements. Research on athlete selection now includes the integration of big data and machine learning algorithms to improve

prediction accuracy and efficiency (Tan & Zhang, 2021). For example, studies have focused on using artificial intelligence (AI) to analyze performance trends and predict future athletic potential, thereby offering more precise athlete selection models (Wang et al., 2018). Additionally, recent research emphasizes the importance of considering psychological and sociocultural factors in the selection process, as these elements play a significant role in an athlete's long-term success (Zhou, 2020).

Another area of advancement in athlete selection is the development of more individualized models, which take into account each athlete's unique development trajectory. This approach helps to reduce biases that might arise from generalized selection criteria (Li et al., 2021). Furthermore, studies have suggested that incorporating longitudinal tracking systems, which follow athletes over time, provides a better understanding of their potential and development (Chen et al., 2022). These approaches reflect a shift towards more personalized, data-driven selection methods that move beyond traditional measurement indicators, aiming to predict athletes' future success more reliably.

To summarize, although scholars' expressions and focuses on selection differ, they share a commonality: the process is based on scientific principles and methods for selecting outstanding athletes. It involves continuous testing and screening in training, primarily selecting those who have not yet undergone extensive training or have some training experience but are not yet elite athletes. These individuals are then typically subjected to more systematic and long-term training before they can participate in major competitions (Wang et al., 2019). The integration of new technologies and methodologies in recent years has enriched the selection process, making it more comprehensive and accurate.

## 2.4 Progress of Research on Selection of Soccer Players

### *2.4.1 Research Related to the Content of Soccer Players' Selection*

Since the emergence of theoretical research related to soccer player selection in 1995, the research has undergone several stages. The initial embryonic stage (1995-2002) focused primarily on anthropometric measurements of soccer players, the individual development of soccer players, and the theoretical construction of soccer selection. As the understanding of soccer player selection deepened, the research content and focus gradually broadened to include aspects such as the reliability of selection, growth and maturity of athletes, physical fitness, skills, and selection

models. This period witnessed a proliferation of research literature, leading to a phase of "research overheating" (2002-2008).

During this overheating period, although there was an increasing theoretical foundation in soccer player selection research, the advancement of research on selection methods, techniques, and equipment lagged behind the rapid developmental needs of selection processes. Consequently, the research entered a bottleneck stage (2009-2010), during which growth in the number of publications was steady, but breakthroughs in research focus were fewer, mainly building upon previous studies.

As research on soccer player selection continued to develop and integrate insights from other disciplines, combined with the emergence of new technologies and methods, the challenges faced during the bottleneck period were gradually addressed. Scholars began exploring more diverse perspectives, such as game-based selection research, development closely integrated with talent cultivation, and practical applications of team-wide selection. These topics became new research hotspots, leading to a more mature phase (2010-2016). With advancements in the selection process for soccer players and the integration of multiple disciplines, research themes have gradually diversified. The content of the research evolved from surface-level analysis to in-depth exploration, addressing both complex and simple aspects, combining dynamic and static elements, and focusing on both macro and micro perspectives to ensure effectiveness and reliability.

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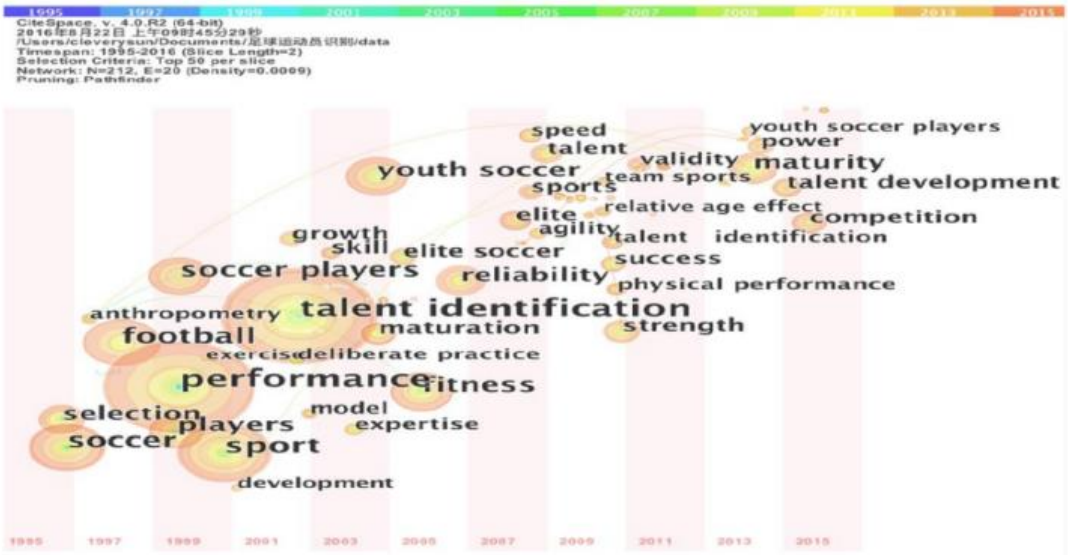


Figure 4 Hot Time Zones in Soccer Player Selection Research

With the extensive development of soccer worldwide, both national teams and professional soccer clubs have established comprehensive research and logistical support teams. For example, Leicester City FC, the English Premier League champion for the 2015-2016 season, employs a diverse range of staff, including a physical trainer, rehabilitator, statistical analyst, psych physiotherapist, and other specialists from various fields. This example illustrates that soccer is a multidisciplinary field that requires comprehensive research across multiple areas of study. Research indicates that the selection of soccer players involves multiple related disciplines, encompassing not only the natural sciences but also the application of social science theories to research and practice (Wang, Feng, & Bei, 2009).

By using software to apply the critical path algorithm for clustering analysis, a discipline co-occurrence network map of soccer player selection research can be generated, alongside a discipline-specific distribution of this research. As illustrated in Figures 1-3 and Tables 1-2, the field of soccer player selection research primarily involves 11 first-level disciplinary categories, including sports science, clinical medicine, basic medicine, biology, management, and traditional Chinese medicine.

Among these, sports science ranks first, accounting for 78.1% of the total, indicating that it remains the dominant discipline in soccer player selection research. This is followed by clinical medicine, basic medicine, biology, and special medicine, which rank second to fifth, accounting for 7.03%, 5.67%, 5.40%, and 5.13% of the total, respectively. Additionally, research on soccer player selection also involves disciplines such as management, economics, sociology, Chinese medicine, preventive medicine, and other social sciences.

This multidisciplinary cross-penetration and synthesis reflect the multidirectional fusion of micro and macro perspectives in soccer player selection research, as well as the separation and crossover of the involved disciplines.

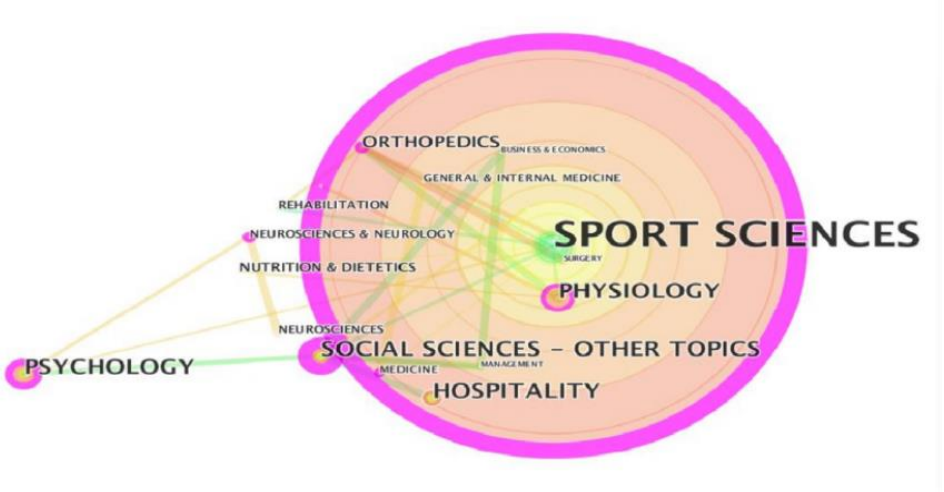


Figure 5 Co-occurrence mapping of soccer player selection research disciplines

### 2.4.2. Theory and Empirical Research Related to Youth Soccer Player Selection

From a holistic perspective, athlete selection and training should be regarded as an integrated, dynamic system, rather than a static or isolated process. It should not be seen merely as a series of tests or a cross-sectional screening of indices with pre-defined selection standards. Instead, youth soccer player selection should be viewed as a longitudinal and continuous process, where selection and training interpenetrate and evolve together. Artificially separating these two components is impractical;

despite the emphasis on talent selection at various stages, the selection process remains tightly coupled with ongoing talent development (Kui, 2003).

The *FIFA Coaching Manual* (2016) provides valuable guidance, suggesting that the selection of elite youth soccer players should focus on several key dimensions: physical and psychological motivation, personality and mental approach, social skills, as well as game-related factors such as technical skill mastery, tactical behavior, and strong tactical cognitive abilities. The manual divides the age range of 8 to 18 years into three developmental stages, clearly identifying the key factors that influence players' performance at each stage. It highlights that developing specialized skills is one of the main tasks in nurturing young players into future stars, offering specific directions for talent selection during these developmental periods.

Zeng Fanhui et al. (1992) contributed significantly to the understanding of soccer player selection by categorizing the selection system for children and youth soccer players into two primary groups: goalkeepers and field players (linemen). The selection index system they proposed is divided into morphology, function, quality, and technical skills. For goalkeepers, morphological indicators include height and finger length, while quality tests assess a range of physical capabilities, such as the 30-meter run, a 3-meter sliding touch, standing long jump, and pull-ups. Functional tests focus on lung capacity. For field players, morphological measurements include height and Ketole’s index, while quality tests include the 30-meter run, 3-meter toss, 12-minute run, and standing long jump. Functional tests assess lung capacity, body weight, and cardiac performance, while technical skills focus on set-piece shooting and long passes. These selection standards were established for different age groups and laid the foundation for soccer player selection in China. However, with the rapid evolution of the sport, these indicators and standards are increasingly insufficient to meet the demands of modern soccer talent identification.

In recent years, numerous studies have emphasized the importance of integrating reasonable physical fitness indicators into youth soccer player selection systems. Sun Yongsheng (2002), using a combination of expert evaluations and regression analysis, tested 27 indicators related to children's body composition, skills, quality, psychology, and technical ability. After statistical analysis, seven primary selection indicators were identified, with physical fitness being the most frequently assessed category. Liu Hongbing (2011) examined the physical fitness indicators used in youth soccer player selection across various countries, concluding that China’s selection criteria are quite similar to those of other nations, focusing on endurance, speed, and explosive power. This consensus underscores the universal importance of speed, endurance, and explosive power as the most fundamental attributes in soccer. Short-distance acceleration and sprinting ability are often used as reference indicators for speed, further reflecting the global recognition of these abilities in soccer selection.

Bradley et al. (2012) questioned the efficacy of the 12-minute run as an endurance test for soccer players, considering the sport's high-intensity, intermittent nature, which requires frequent acceleration, deceleration, and directional changes. In response to this concern, Bangsbo et al. (2010) proposed the maximal Yo-Yo intermittent endurance test, which is specifically designed to reflect the unique endurance demands of soccer, including continuous acceleration, deceleration, stopping, sprinting, and changes in direction. This test has since become more widely adopted in soccer talent identification due to its closer alignment with the sport's energy systems and performance demands.

Recent research continues to refine the understanding of physical, technical, and psychological factors that contribute to effective soccer player selection. Studies by Jovanovic et al. (2016) and Di Salvo et al. (2018) argue that combining physical fitness tests with psychological evaluations significantly improves the accuracy of predicting future soccer success. Jovanovic et al. (2016) demonstrated that psychological traits such as mental resilience, decision-making ability under pressure, and self-motivation were predictive of players' ability to perform under competitive conditions. Similarly, Di Salvo et al. (2018) proposed a holistic approach to player selection, which incorporates both the athlete's physical and mental characteristics, as well as their ability to function within a team environment.

Additionally, the integration of more sophisticated, data-driven methods is gaining traction in modern talent identification. Machine learning and AI-based models are now being employed to analyze large sets of player performance data, enabling the identification of patterns that human evaluators may miss. A study by Sánchez et al. (2021) demonstrated how AI could be used to optimize talent scouting, improving the identification process by integrating multiple factors, including physical performance metrics, tactical awareness, and game intelligence. This data-driven approach allows for a more personalized selection process, reducing biases and increasing the likelihood of identifying high-potential players.

In summary, youth soccer player selection has become a more nuanced and sophisticated process, integrating a range of physical, technical, psychological, and tactical factors. While the core principles of selection remain rooted in physical fitness and technical skill, emerging research continues to emphasize the importance of mental attributes, team dynamics, and data-driven approaches in creating a comprehensive selection system.

Table2 summarizes various studies on soccer players' technical performance, focusing on key indicators such as shooting accuracy, dribbling control, passing

accuracy, and ball handling, with different metrics like time, score, and distance used to evaluate performance.

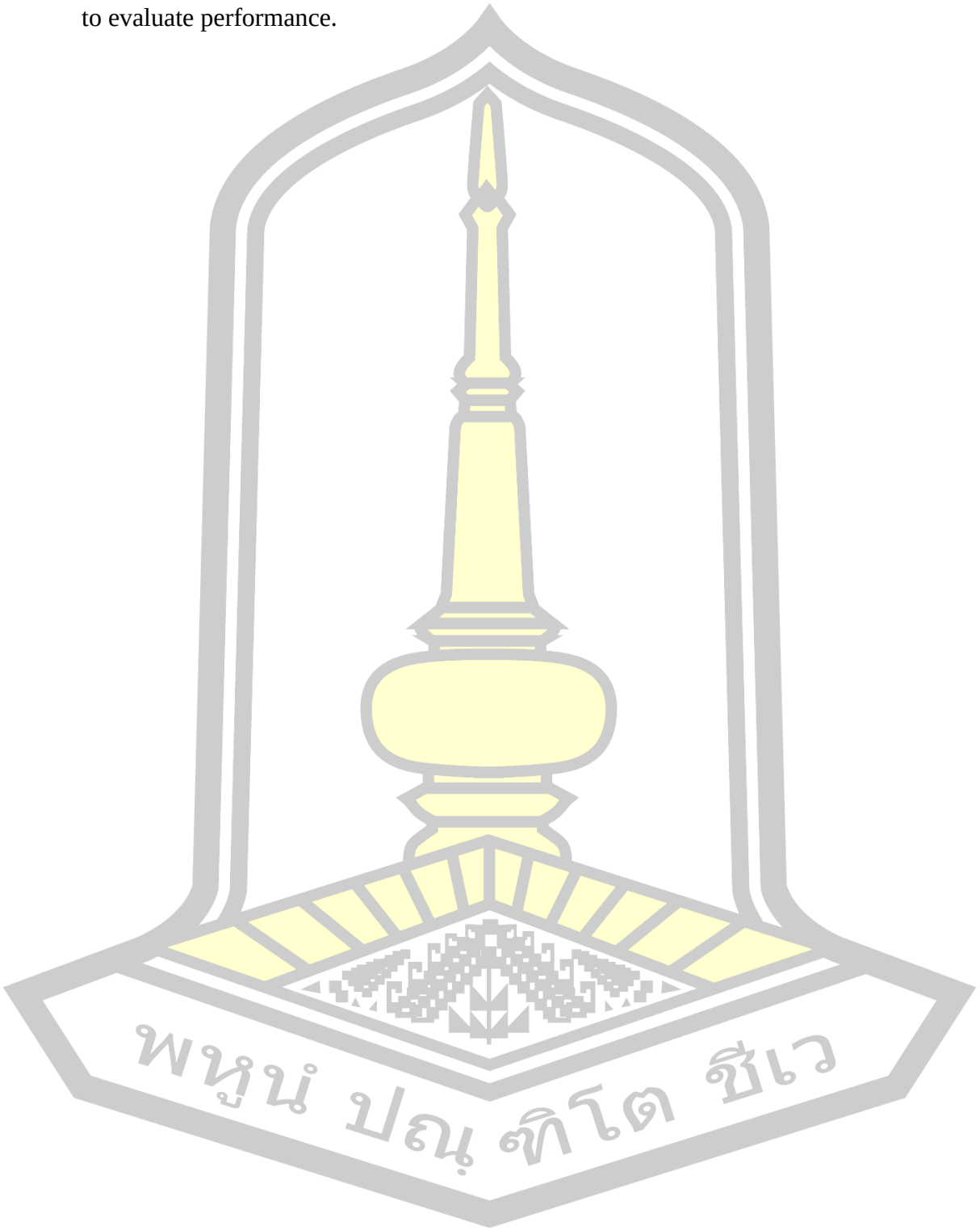

**Table 2 Table of objective indicators such as scores, times, game analysis data, etc.**

| Overview of Research on Technical Performance Evaluation of Soccer Players | | | |
|---|---|---|---|
| **Author** | **Technical Indicator** | **Breadth** | **Output Result** |
| Zelenka | Shooting | Accuracy | Score |
| | Dribbling | Ball control | Time |
| Reilly, Holmes | Turnover | Ball control | Ordinal number |
| | Dribbling | Ball control | Time |
| | Wall-to-wall passing | Ball control | Ordinal number |
| | Shooting | Accuracy | Score |
| McGregor | Dribbling | Ball control | Time |
| Northcott | Passing | Accuracy | Score |
| | Shooting | Accuracy | Score |
| Cox | Shooting | Accuracy | Score |
| Finnoff | Passing | Accuracy | Gap |
| Ali | Passing | Accuracy, Ball control | Time |
| Su Zhe | Shooting | Speed, Accuracy, Ball control | Speed and Scoring |
| Mirkov | Throw an out-of-bounds ball | Gap | Maximum distance |
| | Kick far | Gap | Maximum distance |

**Overview of Research on Technical Performance Evaluation of Soccer Players**

| | | | |
|---|---|---|---|
| | Dribbling | Ball control | Time |
| Rostgaard | Passing | Accuracy | Score |
| Currell | Dribbling | Ball control | Time |
| | Long passes | Accuracy | Score |
| | Heading | Gap | Maximum distance |

**Table 3 A study of relevant indicators for selection and technical evaluation of soccer players**

**A study of relevant indicators for selection and technical evaluation of soccer players**

| Author | Morph | Func | IQ | Tech | PsySoc | LMP | GK | DF | MD | FD |
|---|---|---|---|---|---|---|---|---|---|---|
| Cao Shiyun et al(1992) | √ | | | √ | | | | | | |
| Guan Li's(1994) | √ | | | √ | √ | √ | | | | |
| Sun Wenxin(2007) | | | √ | | | | | | | |
| Tian Maijiu(2000) | | √ | √ | √ | √ | √ | | | | |
| You Chunying(1985) | | √ | √ | | | | √ | √ | √ | √ |
| Yang Yimin(1994) | | √ | √ | | | | | | | |
| Sun Wenxin(1999) | | √ | √ | √ | √ | √ | | | | |
| Deng Fei(2001) | | | √ | | | | | | | |
| Zhao Jian'an(2004) | √ | √ | √ | | | | √ | √ | √ | √ |
| Liu shuhong(2004) | | √ | √ | √ | √ | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Huang xianguo(2004) | | | | | √ | | | | | |
| Jin Chuanjiang(2006) | √ | √ | √ | | √ | √ | √ | √ | √ | |
| HUGHES M, FRANKS I(2008) | | | | | | √ | √ | √ | √ | |
| FRANKS I M, MILLER G(1986) | √ | √ | √ | √ | | | | | | |
| FRANKS I M, MILLER G(1991) | | √ | √ | √ | | √ | √ | √ | √ | |
| LAIRD P, WATERS L(2008) | √ | √ | | √ | | | | | | |
| O'DONOGHUE P(2014) | | | | | √ | | | | | |
| O'DONOGHUE P(2014) | | √ | √ | √ | | √ | √ | √ | √ | |
| REEP C, BENJAMIN B(1968) | | √ | √ | √ | | | | | | |
| BARTLETT R(2001) | | | | | | √ | √ | √ | √ | |
| HUGHES M.(2004) | √ | √ | √ | √ | | | | | | |
| JAMES N(2006) | | √ | | | | | | | | |
| WADE A(1967) | | | | √ | √ | √ | √ | √ | √ | |
| OLSEN E, LARSEN O(1997) | | √ | √ | √ | √ | √ | | | | |
| CARLING C, WILLIAMS A M, REILLY T(2007) | | √ | √ | √ | √ | √ | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SARMENTO H, CLEMENTE F M, ARAúJO D, et al.(2018) | √ | √ | √ | √ | √ | √ | | | | |
| CARLING C, REILLY T, WILLIAMS A M.(2007) | | | | | | | √ | √ | √ | √ |
| DVORAK J, JUNGE A, GRAF-BAUMANN T, et al.(2004) | √ | √ | √ | √ | √ | √ | | | | |
| JAMES N.(2006) | | | | | | | √ | √ | √ | √ |
| GROOM R, CUSHION C(2004) | | | | | | | √ | √ | √ | √ |
| O'DONOGHUE P, MAYES A(2013) | | | | | | | √ | √ | √ | √ |
| O'DONOGHUE P(2006) | √ | √ | √ | √ | √ | √ | | | | |
| MAYES A, O'DONOGHUE P, GARLAND J, et al. (2009) | √ | √ | √ | √ | √ | √ | | | | |
| MACKENZIE R, CUSHION C(2013) | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| WRIGHT C, ATKINS S, JONES B, et al.(2013) | √ | √ | √ | √ | √ | √ | | | | |
| | **Morph** | **Func** | **IQ** | **Tech** | **PsySoc** | **LMP** | **GK** | **DF** | **MD** | **FD** |
| total | 13 | 21 | 22 | 18 | 14 | 14 | 13 | 13 | 13 | 13 |

**Table 4 35 Stats About Soccer on Factors That Influence Soccer**

| Literature Review Factor Ranking of 35 | | |
|---|---|---|
| **Ranking** | **Number of Analyses** | **Description** |
| **1. IQ** | 22 out of 35 | 22 of the 35 analyses of soccer's impact factors identified the inner quality of soccer players as important. |
| **2. Func** | 21 out of 35 | 21 of the 35 analyses of soccer's impact factors identified the function of soccer players as important. |
| **3.Tech** | 18 out of 35 | 18 scholars out of 35 analyses on soccer's impact factors considered soccer players' technical skills as important. |
| **4. PsySoc** | 14 out of 35 | 14 of the 35 analyses of soccer's impact factors identified the psychosocial aspects of soccer players as important. |
| **5. LMP** | 14 out of 35 | 14 of the 35 analyses of soccer's impact factors identified soccer players' live match Performance as important. |
| **6. Morph** | 13 out of 35 | 13 of the 35 analyses of soccer's impact factors identified the morphological characteristics of footballers as important. |

Table3-Table4 represents a summary of the analysis conducted on 35 different literature sources related to soccer's impact factors. The six primary indicators listed in the table have been ranked based on their importance as identified across these

studies. Each indicator reflects a key factor influencing soccer players' Performance, with the ranking determined by the frequency and emphasis placed on each factor within the reviewed literature. The six primary indicators are:

1. Inner Quality
2. Function
3. Technical Skills
4. Psychosocial Aspects
5. Live Match Performance
6. Morphological Characteristics

The number of analyses highlighting each factor as significant is noted alongside each indicator, showcasing their relevance in the context of soccer player evaluation and development.

Table5 presents various studies on soccer athletic ability and training, highlighting key findings such as the importance of body morphology, endurance, and explosive power for female soccer players (Li et al., 2023), the effectiveness of chain training for male soccer players' lower limb strength (Ho, 2023), and the role of anthropometry in physical fitness (ToroRomán, 2023). It also discusses the positive effects of aerobic and speed training combined with soccer-specific exercises on male players' fitness and mental health (Selmi, 2023), insights into the French youth soccer training model (Qiu & Yang, 2022), strategies to improve soccer talent development in China (Tian et al., 2020), and factors influencing strength training behavior in adolescents (Zhao, 2022).

**Table 5 Perspectives of experts and scholars on soccer sport competency model in recent years**

| scholars | Perceptions of the soccer athletic ability model viewpoints |
|---|---|
| Li, Xiaotian, Yezi Li, Weili He, Hao Li & Bin Long. (2023) | The study showed that:(1) the body morphology characteristics of world elite-level female soccer players have not changed much in the past 20 years, generally presenting the characteristics of high stature, large body weight, and low body fat rate;(2) soccer as an intermittent sport, the increasingly intense confrontation puts forward higher requirements on the speed, endurance, and lower limb explosive force of female soccer players, and the training of female soccer players should pay attention to the effect of the triad of signs on their athletic Performances;(3) The total running distance of female soccer players ranged from 7.68 to 10.44 km, high-speed running distance from 0.35 to 2.46 km, and sprinting distance from 28.8 to 460 m. High-intensity running ability is a key indicator of player-specific Performance; (4) There are fewer studies on physiological characteristics during the game, and the limited results vary depending on the players' competitive level and positional roles. Future research should strengthen the study of the sports biology characteristics of women's soccer to improve the level of scientific training and competition in women's soccer. |
| Ho Sai Ho. (2023). | Chain training and traditional training can have a significant effect on the maximal strength of the lower limbs and the explosive power quality of high level male soccer players in colleges and universities, and chain training is better than traditional training in terms of the overall growth rate and the training effect, especially in the enhancement of the maximal strength of the lower limbs, the advantage of which is more |

| | |
|---|---|
| | obvious. |
| ToroRománVíctor (2023) | Anthropometry, body composition, and physical fitness differed between sexes. Fat percentages were different among playing positions. There were relationships between anthropometry and body composition with physical fitness. Knowledge of anthropometric and fitness characteristics by playing position and gender in soccer players could help develop specific training programs. |
| Selmi Walid (2023) | Aerobic and speed training in combination with soccer-specific training is a safe and effective training method as it exerts positive effects not only for physical fitness but also for self-confidence and the coping of anxiety in male soccer players. |
| Qiu Lin, Qin Yang (2022) | AThe internal logic and practical reasoning of reserve talents cultivation in French youth soccer teaching and training model, analyzing the unique advantages of French youth soccer teaching and training model from four aspects: conceptualization, link design, methodological guidance, and target content. On this basis, it puts forward its inspiration for the training of reserve talents in China's youth soccer: shaping the ideological system of youth soccer with the unification of concepts; constructing a localized teaching and training model based on theoretical guidance; improving the quality of youth teaching and training with methodological innovation; advancing the content integration system project with the target reshaping as the anchor point; and building a progressive training system with the goal of improving quality and increasing efficiency. System |
| Tian Hui, Wang Min, Qi Shunhong, Li Juan, Tian Ye | Suggestions for improving the cultivation of China's soccer reserves: 1) establish professional training institutions to consolidate the foundation of soccer reserves; 2) build China's soccer technical and tactical styles, and cultivate a high-level |

| | |
|---|---|
| (2020) | coaching team; 3) improve the selection index system, and carry out the selection of athletes in a solid manner; and 4) conduct in-depth research on the laws of the soccer program, and improve the level of professional training for young athletes. |
| Zhao Meiling (2022) | In the strength training behavior prediction model for 13- to 15-year-old adolescents, strength training intention was jointly influenced by the individual level (perceived motor ability, attitude, subjective norms, and perceived behavioral control) and the interpersonal level (social support), whereas strength training intention and school environments and policies directly influenced 13- to 15-year-old adolescents' strength training behavior. Among them, strength training intention and school environment and policies are important links to change the adolescents' strength training behavior changes. |

Summary: Soccer Player Selection and Performance Evaluation

Most soccer player selection methods are based on comparative studies between athletes of different competitive levels, aiming to identify discriminatory technical indicators. While many current technical tests can reflect young athletes' technical mastery, some do not fully capture the dynamic needs of the game. To better simulate real match conditions, technical tests should be completed under time or space pressure, allowing for a more practical evaluation. For instance, in some passing tests, the quality of a player's first touch significantly influences the outcome, but it's difficult to standardize the pass in these tests, which may result in errors. **Li et al. (2023)** similarly emphasize that the real-time conditions in match situations are essential for accurate performance evaluation, particularly in high-intensity moments like sprinting and high-speed running.

A key challenge in testing soccer skills lies in ensuring that athletes perform technical actions under pressure, without being influenced by external factors such as the quality of their teammates' passes or their opponents' tactics. While specialized tests often provide high reliability, they may fail to capture the full complexity of game situations. Soccer, being a confrontational sport, is especially susceptible to such limitations, making accurate assessments of player performance more challenging. This aligns with the observations of **ToroRomán (2023)**, who argues that a deep understanding of player roles, such as for goalkeepers, requires not just isolated skill evaluations but also the consideration of situational factors like passing and receiving under pressure.

Goalkeepers, who are no longer just the last line of defense but also initiators of attacks, face different demands in modern soccer. With high-pressure tactics in the forward field, goalkeepers now must demonstrate not only shot-stopping abilities but also higher passing and receiving skills. **Ho Sai Ho (2023)** highlights that training methods, such as chain training, are becoming crucial in enhancing goalkeepers' lower-limb strength and explosive power, which directly impacts their passing and decision-making skills during matches. Historical examples, such as Van der Sar and Stromberg, underline how comprehensive early training, beyond specialized goalkeeping, contributes to later success, reinforcing **Ho Sai Ho's** findings that diverse training programs better prepare athletes for modern soccer's demands.

In modern soccer, psychological factors have become increasingly important. Performance and competition results are often influenced by psychological resilience, mental toughness, and emotional control. **Selmi Walid (2023)** emphasizes the importance of psychological factors in improving both physical fitness and mental well-being. The combination of aerobic training and soccer-specific drills not only

enhances players' physical abilities but also boosts self-confidence and helps manage anxiety, which is critical for performance in high-pressure environments.

Despite the growing recognition of psychological resilience, the literature on psychological indicators in soccer player selection remains limited. **Liu Huiling (2007)** identified key psychological traits in high-level college soccer players, such as cognitive agility, decision-making speed, and attention allocation, which are essential for evaluating a player's readiness for competitive soccer. **Wang Ning (2009)** further examined psychological abilities in youth players, finding that motivation, anxiety control, and self-confidence were key differentiators between higher- and lower-level athletes. These findings highlight the need for psychological assessment to be integrated into the player selection process, especially for youth talent identification.

The youth development program of Ajax FC in the Netherlands is renowned for its holistic selection approach, utilizing the TIPS model (Technique, Intelligence, Personality, Speed), which focuses on technical ability, on-field insight, personality traits, and physical speed/agility. Similar approaches are evident in other top clubs, where coaches and scouts employ models like TABS (Technique, Attitude, Balance, Speed) and SUPS (Speed, Understanding, Personality, Skill). This multifaceted approach is supported by **Qiu Lin and Qin Yang (2022)**, who discuss the importance of a conceptual framework and methodological guidance for youth soccer development in China, suggesting that a more integrated and localized system of player training and selection can better reflect the needs of the sport.

In the past, soccer selection was largely based on subjective evaluation from coaches and scouts, who observed athletes during games and practices. These evaluations, informed by practical experience, were grounded in criteria such as technique, attitude, and physical ability. However, the complexity of soccer player selection has led to a growing consensus that more multidisciplinary approaches are needed. **Larry et al. (2017)** emphasize that selection practitioners should integrate physiological, psychological, and sociological research to provide a more comprehensive understanding of talent. This approach allows for a more objective illustration of the differences between top-tier athletes and others, improving the accuracy of player selection.

Integrating Multidisciplinary Approaches to Improve Selection Accuracy

As the soccer selection process becomes more complex, relying solely on traditional evaluation methods is no longer sufficient. **Cote (2018)** argues that while coaches and scouts may have valuable insights based on years of experience, they often lack the ability to clearly articulate the criteria behind their decisions. To overcome this, they recommend combining subjective evaluations with objective,

data-driven methods. Through quantitative testing and measurement, coaches can ensure that their subjective insights align with scientifically validated criteria, leading to more accurate and effective selection processes.

By integrating the valuable experience of scouts with advanced scientific instruments, testing, and measurement methods, **Tian Hui et al. (2020)** assert that soccer talent identification systems in countries like China can be improved by refining the athlete selection index and conducting more in-depth research into the dynamics of the game. This approach would enhance both the accuracy and efficiency of player development programs, ensuring that young athletes are identified and nurtured according to a more comprehensive, evidence-based framework.

Table 6 summarizes the research of different scholars on the physical characteristics of soccer players, focusing on differences in height, weight, and body type across different positions. The studies indicate that players in different positions have distinct physical traits, such as goalkeepers generally being taller, defenders having a more solid build, and wingers being more focused on agility. Additionally, some studies point out that Chinese soccer players still exhibit certain physical disparities when compared to top-level international players.

**Table 6 Literature review of soccer players' morphology by selected scholars**

| scholars | morphological viewpoints |
|---|---|
| Cao Shiyun(1992) | goalkeeper physical characteristics of taller body defenders physical characteristics of taller, thicker hips, thicker legs, upper body circumference thick, the indicators are in the middle level, but the indicators of the middle defenders are higher than the side defenders, clearly show the characteristics of the power type of the former defenders lighter body weight circumference thin width narrow. Pelvic bone width and the thickness of subcutaneous fat other than the value of the indicators are lower than the other positions show dexterity characteristics of the edge of the players similar to the forward players show speed characteristics of the center of the tall and strong. |
| Deng Fei (2000) | China's outstanding soccer players to a certain extent, the body is thin and the world's best soccer players in the weight of the obvious difference can not adapt to the development trend of modern soccer strong confrontation in the physical confrontation has |

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|---|---|
| | no advantage. |
| ZhaoJian'an(2004) | Stout type is the main body type of China's current outstanding female soccer players various physical indicators with Europe and the United States There is still a certain gap between the female soccer players of Europe, America and other countries. |
| LiuShuhong, FengLianshi (2004) | The average height of China's outstanding men's soccer players is the average weight of the four positions of goalkeeper, defender, defender, striker athletes in the height pattern has obvious positional characteristics of the goalkeeper's height and weight is significantly greater than the other positions of the athle |
| Jinchuan jiang (2006) | Athletes at different positions in terms of average height, weight, age and ketorolac indices There were significant differences |
| SunWenxin (2007) | The goalkeeper's body shape indicators are significantly larger than those of the other positions on the field, while the defender's body shape indicators are the smallest among the positions on the field, while the striker's and defender's body shapes are more similar. The body shape indicators of our best center backs are significantly better than those of wingbacks, while center forward and wingbacks are more similar to each other.There is no difference in the body shape of center forward and wingback. |

| | |
|---|---|
| Guanli (2006) | There was a highly significant difference in the age of the players at different positions while the difference between the athletes at different positions in terms of height and weight was not significant. |

Table7 presents the research findings of various scholars on the physiological functions of soccer players, including heart rate, maximal oxygen uptake, anaerobic capacity, blood lactate levels, and serum testosterone levels.

**Table 7 Literature review of soccer players' function by selected scholars**

| scholars | function viewpoints |
|---|---|
| Yin tiesheng (2008) | heart rate--Throughout the game, the average heart rate was 150.5 beats per minute, with 9.6% of the entire game time having a heart rate of 174 beats per minute, and in 55% of the time there, the heart rate ranged from 150 to 170 beats per minute. |
| Hollmann (2007) | The maximum oxygen uptake number of the goalkeepers among the German athletes was the lowest 56.2 ml/kg-min, which is lower than the mean of 62.2 ml/kg-min of the 10 athletes on the field. |
| Withers (2010) | anaerobic digestion--The anaerobic capacity of soccer players was examined through a running test and was found to be 16.2 W.kg. |
| documentation | blood lactate--Many scholars have shown that the blood lactate value of soccer players is 2.6~9.5 nmol/L after the first half, and 2.7~10 nmol/L at the end of the second half. At the end of the first half, it is 2.6-9.5 nmol/L, and at the end of the second half, it is 2.7-10 nmol/L. During the game, it is 2.4-6.8 nmol/L. |
| Chinese researchers | Serum testosterone--Serum testosterone in male soccer players can be roughly 500 nmol/L or more, while women's is roughly 100 nmol/L or more. Prior to the game the athlete's serum testosterone value can be roughly 600 nmol/L or more, while the woman's is roughly 60 nmol/L or more. |
| Bosco (2005) | The anaerobic capacity of soccer players was examined by means of testing the jumping output of the machinery. A value of 27 W.kg was achieved. |
| Reilly (2013) | Center backs have the lowest maximal oxygen uptake. Maximum oxygen uptake can be significantly different depending on the position on the field. The aerobic uptake of |

midfielders, among others, is higher than that of players in the fullback and forward positions

Soccer is a multi-far variant, not cyclical, in the same field for physical contact confrontational sports, time has 90 minutes to engage in the intensity of the confrontation, in the process of the game, the athlete must be based on different situations to choose different.

Table8 presents viewpoints from various scholars regarding the concept of "inner quality" in sports training, focusing on physical fitness and movement training. The key idea is that effective training involves strengthening the body's power chain, which includes elements like strength, stability, flexibility, and neural control. Scholars emphasize the importance of targeting weak points in the chain, improving coordination, and understanding the integration of movement, to enhance athletic performance. The principle of the power chain suggests that all parts of the body must work together for efficient movement, and weaknesses in any part of the chain can reduce overall performance.

**Table 8 Literature review of soccer players' inner quality by selected scholars**

| | **Inner quality** |
|---|---|
| **scholars** | **viewpoints** |
| Cllk G,Fields K (1999) | Throughout the power chain principle of training, physical fitness training achieves lifting and improvement by targeting strength training to the parts of the weak chain, with an emphasis on finding the weak chain through the analysis of movements |
| Santana J C (2000) | To meet the needs of the specialization by means of basic training and to design a corresponding sports quality training model |
| Boyle M (2004) | Constructing exercise means for quality training through the body's self-weight, with the body's stability as a plane |
| Chulvi I,Heredia I(2009) | Physical fitness training encompasses the science of nutrition, coordination, mechanics, and other training, while each link in the kinetic chain must be targeted for |

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|---|---|
| | flexibility, strength, and stability in competitive sports |
| Michael Boyle (2004) | Physical fitness training focuses on movements, not muscles, and can better improve neural control of muscles |
| Gambetta V (1995) | Consider the training of movement as the focus and core of physical fitness |
| **Cook G,Fields K(2012)** | On the basis of the principle of the power chain, athletes in competitive sports, athletic ability and the nerve center of the body in all aspects of coordination and control, not relying on which link, a complete power chain in order to complete each basic or complex movements, the integration of the various links and transmission, the efficiency of each link in order to ensure the quality of the whole, if a part of the power chain is a weak link, then the stability of the chain will be insufficient, or even insufficient to support the completion of the entire movement link |

Table 9 presents viewpoints from various scholars on technical aspects of soccer and futsal training, focusing on skills development, tactical considerations, and age-appropriate training strategies. It highlights the importance of individual skill training, the role of futsal techniques, and the challenges coaches face in addressing tactical issues with limited resources.

**Table 9 Literature review of soccer players' technical by selected scholars**

| **technical** |
|---|

| scholars | viewpoints |
|---|---|
| **Netherlands Soccer Association（2004）** | The Technical Department of the Dutch Football Association researched youth development and found that "The focus of most training is on separation of skills individual skills passing, dribbling, shooting, etc. and physical training in running, jumping dribbling, shooting, etc. and physical fitness training running and jumping and other skills. |
| **Hotton(2000)** | It is believed that real confrontational technical and tactical training can only take place after the age of eighteen. |
| **Joseph Luxbacher（2004）** | Coaches cannot solve all tactical problems with limited time and resources |
| **Andreyev （1998）** | Futsal technique refers to the total number of specialized skills used to achieve a predetermined purpose in the game. the sum of the specialized techniques used to achieve the intended purpose of the game |
| **Li Jing(2010)** | "The basic techniques of futsal technology are much the same as those of human soccer. Futsal technique mainly refers to dribbling, passing and controlling the ball. Athletes are required to preferably combine technique, tactics and speed in the game Speed refers to the speed of movement and thinking when using techniques and then applying these two to the tactics of the field to get a shot on goal. and then applying them to the tactics of the game to get a chance to score. |

technical movements, and then effectively complete the technical requirements in various positions, and to complete these complex, fast, high confrontation of the technical action must have a high-quality sports physical fitness.

This table summarizes research on positional differences in running performance and intensity in soccer. It compares the running abilities, sprinting distances, and high-intensity efforts of players in various positions, with forwards and wingbacks typically engaging in more high-speed and sprint runs. It highlights that forwards excel in short-distance sprints and high-intensity confrontations, while center-backs generally have lower running levels and spend more time walking. The table also notes that the positional demands influence the type and amount of running each player performs during a game.

**Table 10 Some scholars analyze the running game at various positions in soccer**

| scholars | position viewpoints |
|---|---|
| **Yu Shaohua, Liu Dan(2012)** | The overall running ability of Chinese players of different positions in the game is: the front guards are the best, the back guards are the second best, and the forwards □□ are the worst. High-intensity running distance was the most for the backs, and medium-intensity running and running total distance was the most for the forw |
| **Fang Zuoming, Huang Zhuhang(2007)** | In the study of the characteristics of high-intensity running Performance of players in different positions in the Chinese Super League, the malefactor proposed to combine the index of high-intensity running with the running Performance of the opponent and the opponent in possession of the ball, and pointed out that when the opponent is in possession of the ball, the players in the side and the front field have longer distances of high-intensity running and sprinting than the players in the middle and the back field. |
| **Zhu Junkai (1998)** | Forwards have fewer sprint runs, high speed runs, |

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|---|---|
| | low speed runs, and total distances run than any other position player except goalie |
| **TaSkinH and BloomfieldJ(2007)** | Forward is the position with the highest number of high-intensity confrontations, needs to complete sharp stops, change of direction and other actions under high intensity, and is the best short-distance sprinting ability in the team |
| **MalloJ and MenaE(2015)** | Suggests that the sprinting □□ runs, high-speed runs and low-speed runs of the wingbacks have more active distances and run the longest distances at very high-intensity runs (>19.8kmh-l) |
| **BaptistaI and ohansenD(2018)** | The wingbacks sprint runs and high-speed runs move more distance, and their high-speed runs, sprints and high-intensity accelerations with the forwards have the greatest distance. |
| **AbbottW and BrickleyG(2018)** | Slightly more low intensity running distances than any other position player Center backs are at the bottom of the list of positions in terms of running level and have the highest percentage of walking distances |

Summary

At present, China's research on the theory and practice of soccer player selection is relatively lacking, especially regarding the holistic nature of athletic ability in selection practice research. Much of the research focuses on specific aspects of the athletic ability of soccer players, often ignoring the intrinsic connections between various sub-capacities of athletic ability. The research results of previous scholars provide a broad perspective for this paper. By constructing a selection index for Chinese college men's soccer players, this study aims to explore more scientific selection methods and establish relevant selection index scoring standards to provide reference and assistance to China's youth soccer coaches to some extent.

**2.5 The Direction of Integration of Physical Education Orientation**

Firstly, through reviewing the literature and relevant reports, it is evident that the concept of the integration of physical education has a long history and has been described in various ways, such as physical-educational cooperation, physical-educational integration, and other similar terms. There are different names and expressions, such as sports and education cooperation, sports and education combination, and sports and education integration. Although the semantics and focus of these terms differ slightly, their connotations and intentions are similar—they all aim to explore how better collaboration between the sports system and the education system can be achieved.

Secondly, the author reviewed relevant documents, conferences, reports, and speeches of leaders concerning cooperation, collaboration, combination, and integration. The analysis revealed that terms like cooperation, collaboration, integration, and fusion are not clearly distinguished in the related documents and speeches of the leaders concerned. Additionally, the review of literature and policy documents in related fields shows that in the context of sports and medical

collaboration, similar expressions such as sports-medical integration, sports-medical combination, and sports-medical penetration are also prevalent, with multiple terms frequently used interchangeably within the same document. Therefore, this researcher chooses the term "integration of sports and education" without delving deeply into its interpretation or the subtle differences with other similar terms.

Furthermore, according to the voices of national leaders and leaders of sports and education departments, as expressed in relevant policies, conferences, and other programmatic documents, the integration of sports and education is a necessary requirement for further deepening sports and education system reforms in the new era. This integration is more significant than the previous state of cooperation and development, where the two systems were seemingly inseparable but not deeply integrated. Compared with the earlier state of cooperation and development, it has a richer connotation. As a product of the integration of sports and education, youth school soccer should facilitate advantage sharing and a win-win situation between the sports system and the education system in the promotion process, as the development of integration of sports and education is the trend.

This study is mainly based on the role and value of youth school soccer as a testing ground for sports and education reform, exploring how the sports system and the education system can better synergize in developing youth school soccer to realize the complementary advantages of resources and other practical issues. For more practical issues, more attention is often paid to the connotation of development.

To sum up, this study chooses the term "integration of sports and education" to comply with the demands of sports and education system reforms and to align with the inevitable trend in developing youth school soccer. At the same time, integration of sports and education in the field of youth school soccer is primarily concerned with solving coordination issues between the two systems in practical development.

Therefore, in this study, we do not focus too much on the semantic and conceptual problems of the term "integration of sports and education" but instead emphasize the practical effects of promoting collaborative development between the two systems, i.e., diluting the concept and focusing more on its connotative development.

*2.5.1 A Review of the Research on the Integration of Physical Education and Sports*

Since the founding of the People's Republic of China, the integration of sports and education talent training model has been applied to address the shortcomings in China's competitive sports talent training system, particularly the disconnect between sports training and cultural education. This model has been explored and practiced for decades, achieving some results, but the system remains imperfect, and barriers between the sports and education industries have not been fully dismantled. Therefore, under the new circumstances, many scholars have proposed a new sports and education road based on the sports and education combination—that is, sports and education fusion. The integration of sports and education is the inheritance and sublimation of the combination of sports and education, and it represents the inevitable trend of in-depth reforms in the sports and education systems.

A comprehensive search in Baidu Academic for "integration of sports and education" reveals that, as early as 2000, Lu Yuanzhen (2000) proposed in the article "On the Relationship between School Sports and Competitive Sports" that the concept of education is to further integrate the development of the two systems of sports and education and that the integration of sports and education is the trend of civilization development. However, this was merely an intention of integration, and no in-depth study was conducted.

Further organizing and classifying the literature related to the integration of sports and education reveals that the research field is relatively narrow, and most research is aimed at transforming the development model of competitive sports and

cultivating competitive talents. Although some literature is aimed at the integration of sports and education situation of sports schools and secondary school sports programs, all focus on the study of high-level school sports teams, indicating that the integration of sports and education predominantly serves a small number of elite talents. Only one study addresses the development of the integration of sports and education in school soccer, and it also targets school soccer teams. There are few studies on the development of school sports that benefit a broad range of young students, as shown in the following literature:

Wang Huili (2007) published a paper titled "Exploration of High-level Aerobics Talent Cultivation System in Colleges and Universities from the Integration of Physical Education and Sports," which focuses on the development of high-level aerobics talents in colleges and universities using the integration of physical education and sports model. The article emphasizes the achievements made in cultivating high-level aerobics talents through the combination of sports and education, applying the educational idea of integration of body and education to the training system of high-level talents in universities. It constructs both an internal one-stop training system and an external penetration system, forming a comprehensive model for cultivating high-level talents.

Wu Jianxi (2009) in his doctoral dissertation "On the Transformation of Sports and Education Combination to Sports and Education Integration" and in the journal article "Theoretical Construction of Reserve Talents in Sports-Education Fusion for Competitive Sports in China," examines the situation and defects of the cultivation of reserve talents in the sports-education fusion mode as the main line of research. He argues that institutional barriers and system obstacles are the main contradictions that restrict the development of the sports-education fusion talent cultivation mode. To solve this contradiction, it is necessary to break down the barriers of the industry and transition to the sports-education integration development mode. He suggests

transformation strategies such as establishing a people-oriented view of education, changing the mindset and functions of the sports and education sectors, and building an operational mechanism for sports and education integration that includes motivation, incentives, and guarantees.

Cao Yanjie and Liu Xianmin (2013), in the article "Humanistic Psychology Interpretation of the Concept of Sports-Education Integration," discuss the need to look for problems based on the development mechanism of sports-education integration and propose improvement measures to realize the transformation to sports-education integration. They argue that, from a sociological perspective, the integration of sports and education is the inevitable result of market economy demands and political promotion, which satisfies the development needs of competitive sports and education. For individuals, the system respects athletes' rights to equal education and social benefits, giving them a sense of belonging and self-fulfillment, motivating them to realize their own value.

Zhou Wenqing (2014) in his master's thesis argues that the new era of the sports and education integration talent training model has important practical significance. He synthesizes the experiences of other countries in training sports talents through sports and education integration, identifies difficulties and breakthroughs based on China's national conditions, and proposes three system transformation paths for integration: national system transformation, breaking down barriers to education integration, and promoting sustainable development of sports and education integration.

Chang Xiankun and Xie Min (2013), in their study on the sports and education integration model for training youth soccer reserve personnel in Shanghai, point out that, despite decades of exploration and practice, Shanghai, as a leader in implementing the sports and education integration system, still faces various

difficulties. They argue that overcoming these difficulties requires innovating the original system and leading the cultivation of young soccer talents through the sports and education integration model. They advocate for a one-stop type of sports and education integration development model, ensuring the internal and external connection of youth soccer talent cultivation through interlinkages between schools and collaboration with the sports system to improve scientific and systematic training.

By reviewing scholars' studies on sports and education integration, we found that the research mainly focuses on this concept as a new direction for reforming the development mode of competitive sports and school sports in the new period, exploring the transition from the old combination system to integration. Relevant scholars have proposed a series of transformation strategies. In addition, most studies focus on cultivating reserve talents in different sports under the integration model, emphasizing the advantages and effects of this approach. However, less attention is given to the development of school sports and youth sports. Overall, through analyzing and summarizing related literature, the connotation and value of sports and education integration have been further understood—respecting the comprehensive development of the human as the core. Youth school soccer itself is a co-product of the in-depth integration of the sports and education systems, respecting the progressive relationship between the popularization and improvement of soccer and respecting the overall development of human beings.

*2.5.2 Research on the "Integration of Sports and Education" in Youth School Soccer*

Since 2009, youth school soccer has become a significant topic in academia, with increasing attention from researchers and a steady rise in the number of published articles each year. As of February 2019, a search using the keyword "campus soccer" in the China Knowledge Network yielded over 3,000 relevant literature entries. Further searches with the subject term "youth campus soccer"

resulted in more than 1,500 literature outcomes. A preliminary classification of youth campus soccer-related literature from the China Knowledge Network over the past nine years reveals a trend in research transformation. Initially, research focused on the culture and history of youth school soccer (a relatively small area of study). Later, attention shifted to the development status, countermeasures, and various indicators of youth school soccer, such as teachers, tournaments, and talent cultivation. Subsequent research has explored development bottlenecks, management systems, related systems (e.g., risk assessment, Performance evaluation, incentives), and comparative studies of youth school soccer development models between China and other countries. However, there is a relative lack of targeted theoretical studies on the "integration of sports and education" in youth school soccer, with existing research primarily addressing the following aspects:

*1) Research on the Management System of Youth School Soccer*

Liu Peng, the former Director General of the State General Administration of Sports, suggested at the National Youth Campus Soccer Activities Work Symposium that there should be deeper integration between sports and education departments. He emphasized establishing a cooperative mechanism involving resource sharing and clearly defined roles to promote the development of youth campus soccer activities.

Zhang Zhi, Deputy Director of the Department of Youth Sports, stressed the importance of clarifying the responsibilities and tasks of relevant units at all levels, such as the General Administration of Sport, the Chinese Football Association, the Ministry of Education, and local sports and education departments, in promoting youth school soccer in the new era. Zhang highlighted the necessity of establishing and improving the management system and mechanism for youth school soccer to break down systemic barriers between the sports and education systems.

According to Guiren and Wang Xu (2015), the development advantages and challenges after the education department took charge of youth campus soccer were analyzed. They suggested that the education department should maximize its functional advantages, such as financial security, authority, and further education policies. Simultaneously, the sports department should actively cooperate with the education department, contributing professional expertise, manpower, and resources. They proposed a new management model where policy development, management efforts, financial security, and resource sharing are led by the education department, while the sports department provides additional support.

Li Jixia (2012) and colleagues, in their article *China's Youth School Soccer Activities Management System Innovation Research*, identified several key issues within the current management system, such as insufficient enthusiasm in the education sector, unclear division of management authority between central and local levels, inadequate construction of management rules and regulations, and the absence of an effective information and communication mechanism. They proposed innovating the organizational structure of youth school soccer activities, clarifying the management role of the education sector, and enhancing the government's leadership to establish a coordinated mechanism between the sports and education systems.

*2)Research on the Integration of Sports and Education in Cultivating Youth Soccer Reserve Talents*

Cong Zhang (2016), in his master's thesis *Research on the Combination Mode of Body-Teaching for Youth Football Reserve Talents in Sichuan Province*, provided a theoretical overview of the "combination of body-teaching" talent cultivation mode from micro, meso, and macro perspectives. He argued that this mode has humanistic and practical characteristics for cultivating youth football talents. The sports system is

responsible for training, while the education system is responsible for learning, thereby resolving conflicts between athletes' learning and training.

Zhou Hong (2010) analyzed the shortcomings of developing youth soccer under a purely market-driven model and subsequently highlighted the inevitable trend and advantages of using the sports-education combination mode for youth soccer development and talent cultivation. Zhou referenced the successful experiences of youth soccer development models in Germany, Brazil, and Japan and proposed a "Sports and Education Co-construction" model.

Zhang Jianyu (2014), in his master's thesis, noted that the promotion of youth school soccer in Kunming, guided by policy, attempts to implement a "combination of sports and education, teaching-oriented" system. This system relies on the education system to cultivate reserves, enhance athletes' cultural levels, and provide athletes with various future pathways.

*3) Research on the Development of Youth School Soccer in the Context of the Integration of Sports and Education*

Lin Jinbiao (2013), in the study *Sports and Education Combination of China's Youth Campus Soccer: Sustainable Development Thinking*, analyzed the main problems and contradictions faced in developing youth campus soccer. Lin emphasized that the development of youth campus soccer should prioritize the comprehensive quality development of young people as the guiding ideology.

Feng Aimin (2014), in the article *Research on the Coordination and Cooperation Mechanism of China's Campus Soccer: Taking the Development of Campus Soccer in Liaoning Province as an Example*, mainly explored the primary forms and problems of the sports-education combination model in China's youth campus soccer.

In an article from *China Education News* titled "Combination of Physical Education and Sports Becomes the Basis of Campus Soccer Development," Wang Dengfeng (2015), the director of the department of education, expressed that the ultimate goal of promoting youth campus soccer through the combination of physical education and sports is not only to cultivate a group of professionals who can play soccer but also to identify and nurture outstanding soccer players who have received systematic education.

*4) Challenges and Opportunities in the Integration of Sports and Education in Youth School Soccer*

The "integration of sports and education" in youth school soccer still faces significant challenges. One primary issue is the inadequate synergy between the sports and education systems, resulting in inefficiencies and gaps in the implementation of integrated programs.

Liu Hongbo (2018) identified several opportunities that the integration of sports and education presents for developing youth soccer in China, including leveraging the extensive network and resources of the education system to enhance the reach and impact of soccer training programs.

Despite these challenges, there is optimism about the future of youth soccer development in China. The integration model offers a promising framework for fostering young talent by ensuring they receive a balanced education and sports training.

*2.5.3 Future Research Directions for the Integration of Sports and Education in Youth School Soccer*

Future research should focus on exploring more comprehensive and practical strategies to enhance the integration of sports and education in youth school soccer. This includes examining effective management models that facilitate collaboration between the sports and education sectors and evaluating the impact of integrated training programs on student-athletes' academic and athletic Performance.

Additionally, research should investigate the long-term effects of the integration model on athlete development and career trajectories.

Zhang Wei and Liu Yang (2020) suggest that integrating advanced technology and data analytics into youth school soccer programs could provide new insights into athlete Performance and development.

By focusing on these research directions, scholars can contribute to the continuous improvement of the "integration of sports and education" model in youth school soccer, ensuring it meets the needs of future generations of athletes and supports the broader objectives of educational and sports development in China.

**2.6 China University Football Association**

The China University Football Association (CUFA) was founded in 2000 and is exclusively operated by Tomorrowland Athletic Sports Development Co. CUFA is the only 11-a-side soccer league for colleges and universities in China, co-founded by the China University Sports Association (CUSSA) of the Ministry of Education (MOE) and the China Football Association (CFA). It is the highest level of soccer tournaments for Chinese soccer on campuses in China. The tournament is organized by CCAA and co-organized by the Physical Education and Health Department of the

Education Department (Education Commission) of each province, autonomous region, and municipality directly under the central government, college students' sports associations, the Football Branch of CCAA, the Vocational Education Schools Sports Committee of CCAA, and operated by Tomorrow's World Athletic Sports Development Co. The tournament features the widest participation, the highest level of competition, and the greatest influence among China's domestic colleges and universities.

On October 21, 2000, the first Philips China University Football League kicked off at Beijing Institute of Technology (BIT), which defeated Renmin University of China (RUC) 3-0 in the first match.

From 2007 to 2009, the winners and runners-up of the University Football League qualified for the finals of the China Football Association Amateur League. From 2012-2013, the winners and runners-up of the University Football League qualified for the main round of the CFA Cup. The winners of the Grand Finals (Super) also became the starting line-up of the Chinese University Men's Football Team for the World University Games, supplemented by some outstanding players from the Super Group of the Grand Football League to form the Chinese University Football Team.

In the 2012-2013 season, the league implemented the model of the Super Group and Campus Group for the first time. All students admitted according to the method of recruiting high-level athletes for ordinary higher education institutions, as well as students majoring in sports in sports colleges and teacher training colleges, were not allowed to take part in the Campus Group and could only take part in the Super Group. This grouping model is a major system innovation, which is conducive to avoiding significant disparities in strength between participating colleges and universities and reflects the fairness and impartiality of the league.

In the 2014-2015 season, the league added a "Higher Vocational Group" on top of the "Super Group" and "Campus Group."

In 2017, the China University Football League was officially renamed the National Youth Campus Football League (University Group) (CUFA). Ali Sports, the DSA, and CUFA announced a ten-year contract to jointly operate campus sports events, with CUFA being the first tournament operated after the establishment of the partnership.

In the 2018-2019 season, the "High-Level Division" (formerly the "Super Division") was divided into two levels of competition: the Super Champions League and the Champions League, with a system of elevation and relegation, and the introduction of home and away matches in the Super Champions League.

In the 2019-2020 season, the tournament continued to undergo reforms. In the men's division, the "High-Level Division" was divided into four levels: the Super Champions League, Champions League, Challenge Tournament, and Qualifying Tournament, with a promotion and relegation mechanism set up for the four levels. The addition of the Super Championship Cup and the Asian Grand Prix Asia Cup Selection Tournament allowed the winning team to qualify for the Asian Grand Prix Asia Cup.

**2.6.1 Tournament Characteristics**

1) Wide coverage:

The tournament involves nearly 3,000 teams, covering almost 2,000 colleges and universities across the country, with up to 50,000 players (including women's soccer), influencing 38 million college students, spanning 33 administrative regions (including Hong Kong and Macao Special Administrative Regions).

2) Long time span:

The adidas CUFA starts in September each year and lasts until July the following year, with the tournament spanning 10 months and the entire academic year of two semesters. It is a dream stage for college students to pursue their soccer ambitions throughout the year.

3) Diversification of Groups:

High-Level Group: All students admitted through the enrollment method of high-level athletes, as well as students from sports colleges, sports majors at various colleges and universities, and students from single-enrollment and single-examination in sports of higher vocational colleges and universities, are required to compete in the high-level group.

Campus Group: Participating athletes must be students of undergraduate colleges and universities admitted through the National Unified College Entrance Examination and enjoy the policy of high-level enrollment.

Higher Vocational College Group: Participating athletes must be students of higher vocational colleges and colleges of higher education admitted through the National Unified College Entrance Examination and do not enjoy the policy of high-level enrollment (non-independent colleges and universities, vocational colleges, and adult colleges and universities are not allowed to participate).

**2.6.2 Qualifications**

Basic Conditions:

Participating athletes must be citizens of the People's Republic of China and formally admitted in accordance with the relevant regulations of the Ministry of

Education on the unified entrance examination and admission of institutions of higher education (including any relevant special admission policies) for current undergraduate and vocational (including higher vocational) students or postgraduates.

The age of the registered athletes must not exceed 28 years old (as defined on January 1st). When entering the university (specialized or undergraduate), the age of the athletes must not exceed 22 years old (as defined on January 1st).

Anyone who has participated in the China Premier League, China First Division League, and China Second Division League is not allowed to participate in the competition (including the reserve team of the league and additional athletes, based on the order book of the above-mentioned competitions published by the CFA). If the name of the school in which the student is enrolled (excluding sports schools, soccer schools, and secondary specialized schools of the same nature) is used to participate in the above tournaments, the name of the school will be reported to the Chinese University Sports Association for record in advance, and the name of the school will not be subject to this limitation after examination and approval.

Participating athletes must be enrolled at the school, pass their cultural courses, abide by the school's discipline and relevant regulations, and be examined by a hospital to be in good health and suitable for participating in soccer matches (medical examination certificates from local hospitals at or above the county and district level are required).

During their period of attending postgraduate, undergraduate, and specialized courses (including higher vocational courses), the number of sessions of participating in the league must not exceed the stipulated number of normal academic years. The number of sessions of athletes participating in the league is based on the order book of the tournament published by the China Association of Collegiate Athletics.

Students holding Hong Kong or Macao Resident Identity Cards and Hong Kong and Macao Resident Entry and Exit Permits in Mainland China, or students holding valid identification and Taiwan Resident Entry and Exit Permits for Taiwan Residents residing in Taiwan, may enroll in the tournament. However, they cannot concurrently enroll in the Hong Kong or Macao teams in the same season.

Conditions for Athletes Competing in High-Level Groups:

All students admitted according to the enrollment method of high-level athletes, as well as students of sports colleges, sports majors at various institutions, and students of single-enrollment and single-examination in sports of higher vocational colleges and universities, are required to participate in the competitions of the Super Group.

Conditions for Athletes Participating in Campus Group Competition:

They must be full-time ordinary (senior) secondary school graduates before entering university and meet the basic conditions for athletes' participation.

Participating athletes must be students or graduate students of undergraduate colleges and universities who are normally admitted to participate in the National Unified College Entrance Examination and enjoy the high-level enrollment policy. Students majoring in sports in sports colleges and universities are not allowed to participate in the campus group.

Students who have participated in high-level group competitions in the same year are not allowed to participate in campus group competitions.

Conditions for Athletes Participating in Higher Level Group Competitions:

Participating athletes must be students of higher vocational colleges and higher vocational colleges who are normally admitted to the National Unified College Entrance Examination and enjoy the high-level enrollment policy (non-independent colleges and universities, short-term vocational universities, and adult colleges and universities are not allowed to take part in the competition).

Students of higher vocational colleges and universities who have single enrollment in sports and specialize in sports can only take part in the super group and no longer participate in the competition of higher vocational colleges and universities.

**2.6.3 Match Play System**

The league takes the academic year of China's institutions of higher education as a season and adopts an inter-annual tournament system, divided into three phases: the provincial tournament, the regional tournament, and the grand final. It covers 33 provinces, municipalities directly under the central government, autonomous regions, and special administrative regions across the country, making it the tournament with the greatest comprehensive influence, the largest number of participants, and the highest degree of attention in China's college soccer.

1) The First Stage (Regional Selection Tournament):

Each province, autonomous region, and municipality directly under the central government education department (education commission) will develop their own "regional selection competition methods" according to the regulations and organize their regional selection competitions.

The competition will be held in the stadiums of colleges and universities, with a schedule of not less than 5 days.

2) The Second Stage (Regional Competition):

The first five leagues were divided into four regions: East, West, South, North, and South. From the sixth session onwards, they were divided into two regions: North and South. After the division, the high-level group championship league and the high school group will each be divided into two regions to compete in the south and north, while the campus group will be divided into four regions to compete in the Northeast, Southeast, Northwest, and Southwest, respectively.

In the first stage of the "regional selection," the first team of the high-level group, the first team of the high vocational group, and the first and second team of the campus group selected by each region will qualify to participate in the second stage of the tournament (one team from each province, Hong Kong, and Macao, which ranked the last team in the last division of the previous tournament of the campus group).

High-Level Group Championship League, Higher Vocational Group Regional Division:

South Zone: Shanghai, Jiangsu, Anhui, Zhejiang, Fujian, Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Hainan, Sichuan, Chongqing, Yunnan, Guizhou, Hong Kong, Macau.

North Zone: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Shandong, Henan, Shaanxi, Gansu, Ningxia, Qinghai, Xinjiang, Tibet.

Campus Group Regional Division:

Northeast Zone: Beijing, Tianjin, Liaoning, Jilin, Heilongjiang, Hebei, Shandong, Henan

Southeast Region: Shanghai, Jiangsu, Anhui, Zhejiang, Fujian, Guangdong, Hainan, Hong Kong, Macao

Southwest Region: Jiangxi, Hubei, Hunan, Guangxi, Sichuan, Chongqing, Yunnan, Guizhou

Northwest Region: Inner Mongolia, Shanxi, Shaanxi, Gansu, Ningxia, Qinghai, Xinjiang, Tibet, Xinjiang Production and Construction Corps

A total of 16 teams will participate in each region. If the number of teams is less than 16, the school hosting the tournament will be given priority to substitute a team. If the number of teams is still not enough, teams will be replaced according to the number of teams selected by provinces and cities.

The second stage of the regional tournament is divided into two stages: group round-robin and cross-elimination matches.

3) Third Stage (National Finals):

Initially, a centralized tournament system was adopted, with the number of participating teams ranging from 8 in the first session to 12 in the second, and generally fixed at 16 from the third session onwards. In the seventh session, there was a record of 24 teams. From the eleventh session onwards, the home-and-away elimination system was adopted, which was played between the top four teams from the northern and southern regions. Since 2017, all three stages of the competition have adopted a centralized tournament meeting system. At the start of the 19th (2018-2019 season), the rules are:

The top 6 teams in each division of the High-Level Division Championship League, the top 8 teams in each division of the Higher Education Division, and the top 4 teams in each division of the Campus Division qualify for the third stage of the National Finals.

The top 4 teams in the High-Level Group Champions League will be promoted to the next Super Champions League.

4)High-Level Group Super Champions League

Stage 1: National Top 24 Tournament

The Top 24 of the 19th (2018-2019 Super Championship) is determined based on the results of the previous 2017-2018 season. 24 teams will play in a direct tournament system. The tournament is divided into 4 groups with group round-robin and elimination relegation matches. The top 4 teams from each group advance to the second stage of the home and away knockout rounds. The bottom 2 teams from each group will play a cross-elimination round-robin, with the loser of the elimination round being relegated to the current year's Champions League Finals.

Stage 2: Home and Away Knockout Matche

The top 16 teams will be re-drawn according to the office of the same draw and will play home and away matches, with the bottom teams playing home and then away, in a cross-field match

The 1/8 home and away winning team advances to the next round of the tournament. The losing team does not play again and is ranked 9th in the country. All other teams use a two-round home and away format to determine the 1st to 8th place.

Method of determining the ranking:

Winners and losers within the specified time receive 3 points for a win and 0 points for a loss. If a tie occurs, the winner is decided by penalty kicks, with the winning team receiving 2 points and the losing team receiving 1 point.

The team with the most points from the two rounds of home and away matches wins. If the two teams have equal points, then:

The team that scores more goals in the two rounds wins.

If still equal, the team with the most away goals wins.

If still equal, the winner is decided by penalty kicks.

**2.7 Future Directions for the Development of Youth Soccer and University Soccer in China**

As the development of youth soccer and university soccer in China continues to evolve, several key areas require attention and further exploration to enhance the effectiveness and sustainability of the programs.

*2.7.1 Enhancing Collaboration Between Sports and Education Systems*

The integration of sports and education systems remains a vital aspect of developing soccer at the youth and university levels. Building on the "integration of sports and education" framework, further efforts should be made to ensure that both systems work collaboratively to support athletes' academic and athletic development. This includes:

Policy Alignment and Support: There needs to be a cohesive policy framework that aligns the goals of both the sports and education sectors. Government bodies, such as the Ministry of Education and the General Administration of Sport, should work together to create policies that facilitate the dual development of student-athletes.

Shared Resources and Facilities: Schools and sports organizations should share resources, including training facilities, coaching staff, and medical support, to provide comprehensive support to young athletes.

Integrated Training Programs: Developing training programs that consider both academic schedules and athletic requirements will help balance students' education and sports commitments, reducing conflicts and promoting overall development.

*2.7.2 Developing a Comprehensive Talent Identification and Development System*

To ensure a steady pipeline of talented soccer players, China needs to establish a comprehensive talent identification and development system that starts at the grassroots level and extends to universities and professional clubs. Key steps include:

Early Talent Identification: Implementing a nationwide scouting and talent identification program in schools to identify promising players from a young age. This involves conducting regular talent camps, school tournaments, and regional competitions.

Pathway to Professional Soccer: Creating a clear pathway for young talents to progress from school soccer to university teams and eventually to professional clubs. This pathway should include developmental milestones and provide support for athletes to reach their full potential.

Collaboration with Professional Clubs: Universities and schools should establish partnerships with professional soccer clubs to provide students with access to higher-level coaching and competition. Clubs can also benefit from nurturing homegrown talents through these partnerships.

*2.7.3 Enhancing Coaching and Sports Science Support*

The quality of coaching and the integration of sports science are crucial for developing competitive soccer programs. Enhancing these areas involves:

Professional Development for Coaches: Regular training and certification programs should be provided to coaches to ensure they are up-to-date with the latest coaching techniques and sports science knowledge. This includes understanding athlete management, nutrition, injury prevention, and psychological conditioning.

Sports Science Integration: Leveraging sports science, including biomechanics, physiology, psychology, and data analytics, to enhance training programs and player Performance. Universities should collaborate with sports science departments to provide scientific support for their soccer teams.

Injury Prevention and Management: Implementing injury prevention programs and providing adequate medical support to ensure the health and well-being of student-athletes. This includes having access to physiotherapists, nutritionists, and sports psychologists.

*2.7.4 Promoting a Soccer Culture in Schools and Universities*

Building a strong soccer culture within schools and universities is essential for the sport's growth and popularity. This can be achieved through:

Increasing Participation and Engagement: Encouraging more students to participate in soccer by organizing inter-school tournaments, soccer festivals, and community engagement activities. This helps create a vibrant soccer culture and increases the sport's visibility.

Incorporating Soccer into Physical Education: Schools and universities should incorporate soccer into their physical education curriculum, allowing students to learn and enjoy the sport from a young age.

Fostering Fan Engagement: Developing fan engagement strategies, such as organizing fan clubs, providing merchandise, and using social media to connect with students and

the broader community. Engaging fans can help build a loyal following for university soccer teams and increase the sport's popularity.

*2.7.5 Expanding Competitive Opportunities*

To develop a competitive soccer environment, it's crucial to provide ample competitive opportunities at different levels. This includes:

Expanding League Formats: Continuously expanding and refining the league formats to provide more competitive matches for teams at all levels. This includes regional, national, and international competitions.

Encouraging International Exposure: Providing opportunities for Chinese university soccer teams to participate in international tournaments and exchange programs. This exposure to different playing styles and higher competition levels can significantly enhance player development.

Creating Developmental Competitions: Organizing developmental competitions that focus on skill development, fair play, and teamwork, especially for younger age groups. These competitions can be less about winning and more about fostering a love for the game and developing fundamental skills.

*2.7.6 Addressing Challenges and Opportunities*

While significant progress has been made in developing youth and university soccer in China, several challenges remain:

Balancing Academics and Athletics: Ensuring that student-athletes can successfully balance their academic responsibilities with their athletic commitments. Institutions should provide flexible academic scheduling and academic support services to accommodate athletes' training and competition schedules.

Ensuring Sustainability: Developing sustainable funding models for soccer programs is essential. This could involve partnerships with private sector sponsors, government grants, and revenue from league matches and merchandise sales.

Adapting to Changing Dynamics: As the landscape of university and youth soccer evolves, institutions must remain flexible and adaptable to changing dynamics, such as shifts in sports governance, technological advancements, and evolving educational policies.

# CHAPTER III
# RESEARCH METHODOLOGY

This research objective to Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities be a mixed methods research study. By conducting quantitative and qualitative research. The researcher has determined the procedures in order of the follows.

Phase1: To study the indicators for selecting football players for each position of male football players at colleges and universities in China.

Phase2: To determine the weight of the evaluation indicators for the selection of male football players of colleges and universities in China.

Phase3: To evaluate the indicators and scoring criteria for selecting male football players of colleges and universities in China.

Phase:4: To confirm the evaluation indicators for the selection of male football players of colleges and universities in China.

**Research Design**

The process of selecting material index system construction

The establishment of the indicator system should use the principle of combining qualitative and quantitative, in the sports selection research, the processing of data is divided into the processing of qualitative data and quantitative data processing, quantitative analysis is the deepening of qualitative analysis, and qualitative analysis is the guidance of quantitative analysis, in order to improve the scientific nature and accuracy of the indicator system. A large number of quantitative methods (especially mathematical and statistical methods) is the development trend of scientific selection research Wang Jincan(2009)The establishment of the indicator

system must follow certain scientific procedures and methods, which is conducive to ensuring a high degree of confidence in the indicator system, and generally adopts three steps: first, primary selection, i.e., logical and theoretical validation of the primary selection of indicators; second, expert evaluation, i.e., the primary selection of indicators should be subject to two to three rounds of empirical screening by relevant experts; third, statistical optimization, i.e., measurement of the empirically screened indicators, and then after the statistical The third is statistical optimization, i.e., the measurement of the empirically screened indicators and then screening again by statistical software The establishment process of the selection index system in this study is shown in Figures.

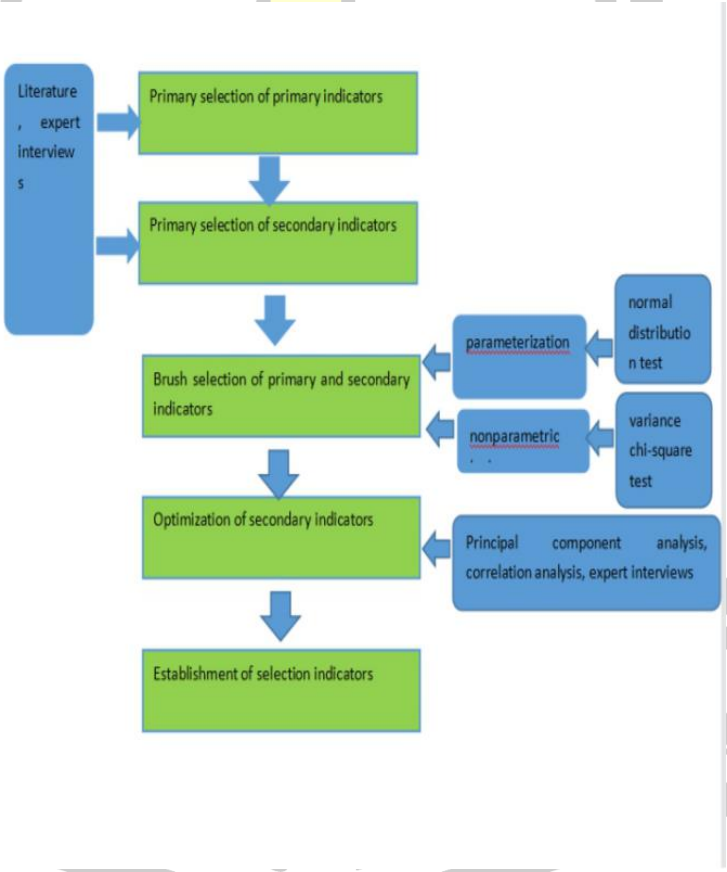



Figure 5 Flow of selecting material index system construction

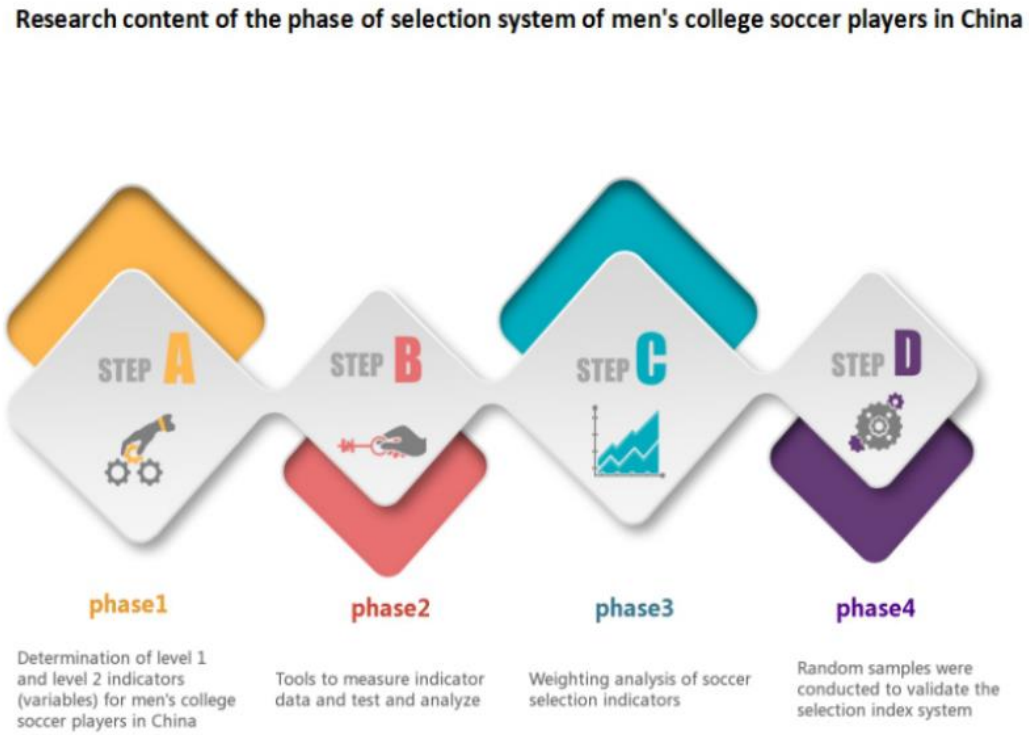



Figure 6 Flowchart of the 4 phases of the study

**Phase 1**

**1.1 Objective**

To study the indicators for selecting football players for each position of male football players at colleges and universities in China.

Establishing a Preliminary Framework for Selection Indicators: Identify key factors influencing youth football selection from the literature and gain in-depth understanding of the key factors in football player selection through expert interviews.

Exploring and Determining Primary and Secondary Indicators: By analyzing literature on primary selection factors, combined with expert opinions, to develop the preliminary framework for the indicator system.

Providing Theoretical Basis for Future Data Analysis: Lay the groundwork for assigning weights and validating the selection criteria, ultimately creating an operational selection system for subsequent phases.

**1.2 Research Subjects**

The subjects of this research are mainly divided into two categories:

1.2.1 Literature

Through Literature Review, this study will comprehensively search and analyze relevant documents on youth football selection, athletic ability assessments, and training systems. The primary sources include:

Domestic Databases: Such as CNKI (China National Knowledge Infrastructure), Wanfang Data, and VIP, searching for papers related to "youth football," "football selection," "athletic ability assessment," etc.

International Databases: Such as Web of Science and EBSCO, to review international research and practices, learning from advanced global football selection systems.

Official Reports: Access reports from government bodies like the Ministry of Education, the General Administration of Sport, and the Chinese Football Association.

Over 140 documents will be reviewed, including studies on selection systems, assessment standards, and training methods.

1.2.2 Expert Interviews

In addition to literature review, Expert Interviews will be conducted to gain a deeper understanding of the key factors in football player selection. Interviewees include:

Football Experts: Professors, coaches, and researchers in the field of football who have extensive theoretical and practical knowledge.

Sports Medicine and Psychology Experts: Experts in sports physiology and psychology whose input will help understand the physiological and psychological development of youth athletes and its impact on football selection.

Frontline Football Coaches: Coaches from Chinese universities and professional football clubs with practical experience in youth football selection.

Interviews and surveys will gather first-hand opinions from experts in various fields to help refine the selection indicator system.

**1.3 Research Methods**

In the first phase, this study primarily adopts Literature Review and Expert Interviews as research methods to explore and determine the key indicators for football player selection.

1） Literature Review

By systematically reviewing domestic and international literature, this method helps to extract the key factors influencing football player selection and develop a preliminary selection indicator system. The literature review aims to:

Identify key factors that need to be considered in the selection process.

Summarize existing research and practices, providing theoretical foundations for the indicator system.

2） Expert Interviews

Expert interviews will be used to gain insights into the practical aspects of football selection. The interview content will include:

The physiological, technical, and psychological factors relevant to player selection.

The relative importance of each selection factor.

The purpose of expert interviews is to provide practical feedback that will help refine the preliminary framework of the selection indicator system.

1.4 Instrument

To implement the above research methods, the following research tools will be used:

1） Literature Analysis Tools

Reference Management Software: Tools such as EndNote and Zotero will be used to manage and categorize the collected literature.

Literature Analysis Framework: Based on the research objectives, a framework will be constructed to classify and summarize the key factors mentioned in the literature.

2） Expert Interview Tools

Interview Outline: Based on the preliminary conclusions drawn from the literature review, a structured interview outline will be designed. The interview will focus on:

Factors such as physical fitness, technical skills, and psychological state that need to be considered in player selection.

The relative importance of each selection factor.

Questionnaire: Following expert interviews, a questionnaire will be designed and distributed to collect feedback from experts and frontline coaches on the proposed selection indicator system. The questionnaire will use a Likert scale to assess the importance of each indicator in the selection process.

Expert Feedback Form: After the interviews, expert feedback will be summarized into tables for easier quantitative analysis and integration.

1.5 Sample Selection

Expert Sample: The expert sample will include professionals from the football field, including coaches, football experts, and sports medicine and psychology specialists. It is anticipated that 10-15 experts will participate in the interviews.

Athlete Sample: Since Phase 1 mainly involves literature review and expert interviews, no athlete samples will be collected during this stage.

Justification for Sample Selection: The selection of experts is based on their professional background in football player selection, ensuring their representativeness and the broad applicability of the study. By selecting experts from different levels and regions, the diversity and objectivity of the data will be ensured.

**Expert Panel Members for the College Men's Soccer Player Selection Project**

| No. | Name | Function/Title | Workplace |
|---|---|---|---|
| 1 | Lu Bi | Teacher/Professor of Physical Education | Guangxi Agricultural Vocational and Technical University |
| 2 | Yang Wen Qing | Teacher/Associate Professor of Physical Education | Guangxi Agricultural Vocational and Technical University |
| 3 | Xie Xiang | Dean/Professor, School of Physical Education | Guangxi Normal University |
| 4 | Ou Jun | Director/Associate Professor, Physical Education Department | Guangxi Normal University |
| 5 | Li Yao Hui | Teacher/Lecturer in Physical Education | Guangdong Institute of Technology |
| 6 | Xu Bo | Vice Dean/Professor, School of Physical Education | Guangxi University for Nationalities |
| 7 | Su Gang | Guangxi Chanting Mumble Soccer Club Women's Soccer Team Leader/Intermediate | Guangxi Mumble Women's Football Club |
| 8 | Guan An Lin | Head Coach/Intermediate, Guangxi University for Nationalities Men's Soccer Team | Guangxi University for Nationalities |
| 9 | Wu Hui | Head Football Coach, Nanning Sports School / AFC A Coach | Nanning Sports School |

**Expert Panel Members for the College Men's Soccer Player Selection Project**

| No. | Name | Function/Title | Workplace |
|---|---|---|---|
| 10 | Huang Xiao Gang | Nanning Football Association Lecturer / AFC C Coach | Nanning Football Association |
| 11 | Huang Feng | Secretary General of Nanning Football Association / AFC C Coach | Nanning Football Association |

1.6 Data Collection Procedure

Literature Collection: Relevant literature on football selection and athletic ability assessments will be collected from domestic and international academic databases, official reports, and related books.

Expert Interviews: Interviews will be conducted through both online (e.g., phone or WeChat) and offline (in-person) methods. During the interviews, responses will be recorded and transcribed verbatim for further analysis.

Questionnaire Survey: After the expert interviews, a questionnaire will be distributed to relevant experts and frontline coaches to collect their feedback on the selection indicator system.

1.7 Data Analysis

In Phase 1, the focus of data analysis will be on qualitative analysis, integrating the results from the literature review and expert interviews:

Qualitative Analysis: By analyzing the literature and interview data, the study will identify the main factors influencing football player selection and determine their relative importance.

Expert Opinion Integration: The opinions collected from expert interviews will be organized and synthesized to clarify the primary and secondary indicators.

Phase 1 analysis will be mainly qualitative, providing a theoretical basis for the subsequent stages of quantitative analysis.

1.8 Summary of the Research Phase

In the first phase, through the literature review and expert interviews, the study successfully developed a preliminary framework for the football selection system, which was further refined based on expert feedback. This phase lays a solid theoretical foundation for the subsequent stages of weight assignment and validation of the selection criteria.

**Phase 2**

2.1 Objective

To determine the weight of the evaluation indicators for the selection of male football players of colleges and universities in China.

2.2 Research Subjects

Data Collection: This study will select two teams from the 2023-2024 China Youth Football League Finals, representing a high-level team and an ordinary team. The high-level team will be Guangxi University for Nationalities, and the ordinary team will be Guangdong University of Industrial and Commercial Technology. A total of 80 players will be selected, 40 players from each team.

Sample Selection Rationale:

Comparison of High-Level and Ordinary Teams: Selecting a high-level team and an ordinary team allows for a better comparison and analysis of the differences in selection indicators between players of different levels.

Regional Representativeness: Choosing teams from Guangdong and Guangxi can represent football standards in Southern China, making the research more operable and realistic.

Feasibility of Sample Size: With 40 players per group, the sample size is sufficient to meet statistical requirements and is manageable in terms of time, resources, and logistics.

2.3 Sample Size and Rationale for Sample Selection

Sample Size Selection Reasoning:

Power Analysis: The significance level is set to 0.05, statistical power to 0.80, and effect size (Cohen's d) to medium (0.5). A minimum sample size of 40 per group ensures sufficient statistical power to detect differences.

Position-Based Grouping: Players will be grouped by position (Goalkeeper, Defender, Midfielder, Forward) to analyze position-specific differences. This helps ensure the study can examine the performance of players at different positions.

Practical Feasibility: A sample size of 40 players per group is optimal for both statistical significance and practical feasibility, allowing the research to balance scientific rigor with resource constraints.

2.4 Research Tools and Data Collection Process

A variety of experimental measurement tools will be used in this study to collect data on players' physical attributes, functions, fitness, psychological state, and performance. The specific tools and processes are as follows:

Table 11 table of research experiment tools

| research experiment tools | |
|---|---|
| Category | Tools |
| Height Measurement Tools | Metal Tape Measure, Headboard |
| Length Measurement Tools | Soft Tape Measure, Vernier Caliper, Calibrated Ruler |
| Physiological Measurement Tools | Vital Capacity Meter, Spirometer, Body Composition Analyzer (Inbody230), Color Vision Meter (BD-ii-108), EP-Z 212 Intelligent Comprehensive Reaction Time Tester |
| Performance Measurement Tools | Smartspeed Pro Infrared Test Device, Marker Cones, Stopwatch, Jump Mat, Yo-Yo Test Audio |

| Category | research experiment tools<br>Tools |
|---|---|
| Psychological Assessment Tools | Psychological Resilience Questionnaire, Psychological Assessment Questionnaire, Attention Test Equipment |

2） Data Collection Process

Preparation Phase:

Tool Preparation: All measurement tools, such as spirometers and TROPS dynamic inertial devices, will be calibrated and verified before data collection to ensure accuracy and reliability.

Sample Selection and Grouping: According to the research objectives, the 80 players will be grouped by position (Goalkeeper, Defender, Midfielder, Forward), ensuring each group has a balanced mix of high-level and ordinary team members.

Data Collection Phase:

Morphology Data Collection: Bone age test devices and other tools will be used to measure players' height, weight, bone age, and other morphological indicators.

Functional Data Collection: Spirometers and body composition analyzers will measure physiological indicators, such as lung capacity and VO2max.

Physical Fitness Data Collection: TROPS dynamic inertial devices, jump mats, and stopwatches will be used to measure speed, strength, explosive power, and endurance.

Technical Ability Data Collection: Yo-Yo test audio and SmartSpeed Pro infrared systems will be used to measure endurance and technical ability.

Psychological Data Collection: Psychological resilience questionnaires and attention test devices will be used to assess athletes' psychological state and stress management skills.

Performance Evaluation: Expert scoring and video observation methods will be used to assess players' technical and tactical performance in matches.

Data Entry and Processing:

All collected data will be entered into a data management system for integration and storage.

Data will undergo initial screening and validation to ensure its completeness and accuracy.

2.5 Sampling Procedure

Secondary Indicator Data Collection: Secondary indicators (e.g., morphology, function, physical fitness, technique, psychological state) will be measured for goalkeepers, defenders, midfielders, and forwards using the relevant tools (such as the bone age test device).

Data Analysis:

T-test: Data will be initially screened using T-tests to identify indicators that show significant differences between the high-level and ordinary teams.

Factor Analysis: After initial screening, factor analysis will be employed to refine the indicators and identify the most valuable ones for player selection.

Preliminary Establishment of the Selection Indicator System: Based on the T-test and factor analysis results, a preliminary selection indicator system for male football players in Chinese universities will be established.

2.6 Data Analysis Methods and Steps

The primary data analysis methods used in this study are T-tests and Factor Analysis. The specific steps are as follows:

Data Preprocessing:

The secondary indicator data will be cleaned and standardized to ensure it is free from missing values, anomalies, and meets statistical analysis requirements.

Descriptive statistical analysis will be performed using software like SPSS to examine the basic distribution of the data.

T-test (Preliminary Screening):

Independent sample T-tests will be conducted to compare the data between the high-level and ordinary teams, identifying significant differences in various indicators.

Assumptions of the T-test: Data from both groups are independent, follow a normal distribution, and have homogeneity of variance. Non-parametric tests will be used if the data do not meet these assumptions.

Factor Analysis (Further Screening):

KMO and Bartlett's Test: KMO (Kaiser-Meyer-Olkin) and Bartlett's Test of Sphericity will be used to assess the suitability of the data for factor analysis.

Factor Extraction: Principal component analysis will be used to extract factors with eigenvalues greater than 1.

Factor Rotation and Interpretation: The Varimax rotation method will be applied to the factor loading matrix to clarify the structure, followed by determining the number of factors based on their contribution rates.

Expert Survey and Validation:

Based on the results of factor analysis, an expert survey will be conducted to verify and weight the selected indicators, ensuring the final selection criteria are scientifically valid and effective.

2.7 Preliminary Indicator Screening

Independent sample T-tests and non-parametric tests will be used to compare and analyze the data from the two groups (high-level and ordinary players), in order to identify the indicators that show significant differences between the two groups.

T-test Assumptions: The data should be independent, follow a normal distribution, and pass the homogeneity of variance test. If these assumptions are not met, non-parametric methods (such as Mann-Whitney U test) will be employed.

2.8 Statistical Indicator Screening

In the statistical screening phase, Factor Analysis will be used to combine multiple related indicators into fewer independent factors. The specific steps are as follows:

KMO and Bartlett's Test: The KMO value should be greater than 0.5, and the Bartlett's Test of Sphericity should yield a p-value less than 0.001 to confirm that the data is suitable for factor analysis.

Factor Extraction: Using principal component analysis, factors with eigenvalues greater than 1 will be extracted.

Factor Rotation and Interpretation: Varimax rotation will be applied to clarify the factor structure.

Factor Weighting and Final Indicator Selection: The final weight for each factor will be determined based on its contribution rate, and expert feedback will be incorporated to finalize the indicator system.

2.9 Summary

Through T-tests and factor analysis, this study will identify key indicators that significantly differentiate high-level and ordinary teams, and establish a preliminary indicator system for selecting male football players in Chinese universities. These indicators will serve as the foundation for the subsequent athlete selection process and team development.

**Phase 3**

3.1 Objective

To evaluate the indicators and scoring criteria for selecting male football players of colleges and universities in China.

3.2 Subject

1）Determination of the Weights of Primary Indicators

Based on the results from Phase 2, expert feedback will be used to refine and finalize the weights of the primary indicators (e.g., physical form, physiological function, physical quality, technical ability, and psychological resilience). This will involve adjusting the weight of each indicator based on its relevance to the selection process.

2）Determination of the Weights of Secondary Indicators

The secondary indicators, refined through factor analysis and expert input in Phase 2, will be further adjusted in this phase. The weights will be assigned based on the unique demands of different football positions (goalkeeper, defender, midfielder, and forward).

3）Development of Scoring Criteria for Selection Indicators

Scoring criteria will be established for each primary and secondary indicator, converting performance data into standardized scores. These scores will reflect athletes' abilities across various aspects, including morphology, function, quality, and technical ability. The scoring system will follow a five-level scale, ensuring that athletes' performances are objectively assessed.

3.3 Instrument

The primary research instrument in this phase is the Expert Questionnaire. This questionnaire will gather feedback from a panel of football experts regarding the importance and relevance of each primary and secondary indicator for the selection process. The feedback will inform the final determination of the weights of the indicators.

3.4 Sample Size

The sample size for this phase is based on the data collected in Phase 2, which includes a range of measurements and evaluations from different positions within the football team. This data will be used to calculate the weights of the primary and secondary indicators. Additionally, the data will inform the creation of the scoring criteria to evaluate athletes effectively.

3.5 Data Collection Procedure: Expert Interviews and IOC Process

Expert Feedback Collection

To ensure the scientific accuracy and fairness of the weight assignment for the indicators, this phase of the study will employ the IOC process to collect expert feedback. The purpose of the expert interviews is to further refine the weights of the primary and secondary indicators based on the data analysis results from Phase 2, as well as to provide a foundation for the establishment of standardized scoring criteria. The expert feedback will be gathered and analyzed through the following steps:

1) Expert Selection and Background Investigation

Expert Selection Criteria:

Experience: Experts should have extensive experience in the selection of football players, particularly in the context of male college football players.

Domain Coverage: The expert panel will include specialists in various fields such as technical skills, physical fitness, tactical awareness, and psychological resilience, ensuring a well-rounded set of perspectives.

Representation: Experts should represent different positions within football (e.g., goalkeeper, defender, midfielder, forward) to ensure the unique demands of each position are addressed.

Expert Selection Process:

Initial Screening: Experts will be selected based on their academic background, practical experience, and professional recognition within the football industry.

Interview Invitation: Experts will be invited to participate via email or phone, with a clear explanation of the interview's goals, timeline, and format.

Background Investigation: Each expert's experience and contributions will be reviewed to ensure their qualifications and authority in the field.

2) Interview Design and Question Construction

Question Design Principles:

Combination of Structured and Semi-Structured Questions: The interview will feature both structured questions (e.g., asking for the relative importance of each primary and secondary indicator) and semi-structured questions (e.g., soliciting expert insights on specific position requirements and recommendations).

Focus on Core Issues: The questions will focus on determining the weight allocation for both primary and secondary indicators, as well as developing the scoring criteria.

Question Construction Process:

Primary Indicator Weights: Experts will be asked about the importance of primary indicators such as physical form, physiological function, physical quality, technical ability, and psychological resilience.

For example: "How important do you think 'technical ability' is in football selection? How does it compare in importance to 'physical quality'?"

Secondary Indicator Weights: Experts will provide their assessments on the weight distribution for secondary indicators, taking into account the specific needs of different football positions (e.g., goalkeeper, defender, midfielder, forward).

For example: "For a midfielder, do you think 'technical ability' or 'endurance' is more critical? Please suggest a weight distribution."

Scoring Criteria: Experts will be consulted on how to define the scoring standards for each indicator, ensuring the scoring system is practical and accurate.

For example: "How should we set scoring criteria for 'explosive power'? What should the performance thresholds be for different levels?"

3) Expert Interview Execution: Application of the IOC Process

The expert interviews will be conducted following the IOC process to ensure a systematic, transparent, and scientifically grounded approach. The process will consist of the following stages:

Initial Interview (Round 1):

Each expert will participate in a one-on-one interview, which may be conducted in person, via video conference, or by telephone. A professional moderator will guide the interviews to ensure rigor and consistency.

In the first round, experts will assess the relative importance of primary and secondary indicators and provide preliminary recommendations for their weight allocation.

Feedback Compilation and Preliminary Summary:

The feedback from the first round of interviews will be systematically compiled and categorized. The preliminary weight allocation for each primary and secondary indicator will be summarized.

The preliminary results will form the basis for the second round of feedback, allowing experts to refine and adjust their input.

Second Round of Feedback and Adjustments:

The compiled results from the first round will be presented back to the experts for review. In the second round, experts will be asked to refine their weight allocation suggestions based on the initial findings.

This round will primarily focus on adjusting any discrepancies in the preliminary weight allocations and ensuring that expert opinions are aligned.

Consensus Building:

After multiple rounds of feedback, the expert panel will reach a consensus on the final weights for the primary and secondary indicators.

The final weights will be derived by synthesizing expert input, ensuring that the resulting selection system is based on collective expert knowledge and agreement.

4) Interview Data Analysis and Application

Qualitative Analysis:

The interview data will undergo qualitative analysis to extract core insights from expert feedback. This process will involve coding and thematic analysis of the responses, identifying key themes and suggestions for the weight assignment of the indicators.

The findings will be used to inform the final determination of indicator weights, ensuring that all expert opinions are considered.

Statistical Analysis:

Based on the expert feedback, statistical methods will be employed to calculate the weights of both primary and secondary indicators. Weights will be adjusted according to the specific requirements of different football positions (e.g., goalkeeper, defender, midfielder, forward).

Statistical techniques such as weighted averages and standard deviation analysis will be used to assess the consistency and validity of the expert feedback.

5) Weight Calculation and Scoring Criteria Development

Weight Calculation:

The final weights for the primary and secondary indicators will be calculated based on the expert feedback and the results from Phase 2. These weights will reflect the relative importance of each indicator for the different football positions.

The weights will be used to guide the creation of a scientifically-based and position-specific selection system.

Scoring Criteria Development:

Based on the final weights, standardized scoring criteria will be developed for each indicator. These criteria will be designed to convert performance data (e.g., test scores, physical measurements) into standardized scores.

The scoring system will follow a five-level scale (Excellent, Good, Average, Below Average, Poor), ensuring that athletes are objectively assessed and differentiated based on their abilities.

6) Compilation and Reporting

Once all the expert feedback has been gathered and analyzed, the research team will compile the findings into a comprehensive report. This report will detail the final weights for each primary and secondary indicator, the developed scoring criteria, and the scientific basis for the selection process. The final report will provide a clear and transparent framework for the selection of male college football players in China.

By incorporating the IOC process, this study ensures that the expert feedback is systematic, transparent, and based on a consensus-driven approach, contributing to a robust and scientifically-grounded player selection system.

3.6 Data Analysis Methods

1）Factor Analysis

Factor analysis will be used to refine the weights of the secondary indicators. This statistical method will help identify the key factors that contribute to the selection process and ensure that the indicators accurately reflect the desired performance measures.

2）Expert Feedback (Delphi Method)

The Delphi method will be used to obtain expert opinions on the importance and weight of the primary and secondary indicators. This iterative method will ensure that the final system reflects consensus from a panel of experts.

3) Percentile Method

The percentile method will be applied to calculate standardized scores for each athlete based on their performance in various selection tests. These scores will then be classified into five levels (e.g., Excellent, Good, Average, Below Average, Poor).

3.7 Scoring Criteria

The scoring criteria for each selection indicator will be developed based on the weight of the indicators, with a clear distribution across five performance levels:

Excellent (90-100%)

Good (70-89%)

Average (50-69%)

Below Average (30-49%)

Poor (0-29%)

Each performance indicator will be assigned a corresponding score. Athletes' final scores will be calculated based on their performance across all evaluation areas, ensuring that the selection process is both fair and objective.

3.8 Summary

In this phase, the weights for both primary and secondary selection indicators for Chinese male football players have been determined, based on expert feedback and data analysis from Phase 2. The selection indicators encompass key areas such as physical form, physiological function, physical quality, technical ability, and psychological resilience, with each area contributing differently depending on the player's position on the field (goalkeeper, defender, midfielder, and forward).

Additionally, a standardized five-level scoring system has been developed to objectively assess athletes across these indicators. The percentile method has been applied to convert raw performance data into scores, ensuring fairness and accuracy in the evaluation process.

By finalizing the weights and scoring criteria, this phase ensures that the selection system is both scientifically grounded and practically applicable, offering a transparent and effective method for identifying and evaluating football talent at the collegiate level in China. The process, which incorporates expert consensus and

statistical analysis, provides a comprehensive and reliable framework for future selection practices.

**Phase 4**

4.1 Objective

To confirm the evaluation indicators for the selection of male football players of colleges and universities in China.

4.2 Subject

The evaluation will focus on confirming the adequacy of the selection indicators and scoring criteria established in previous phases. The subjects will be the athletes from both high-level and general college football teams, with a comprehensive assessment of their physical, technical, and psychological qualities. The effectiveness of the developed index system and scoring criteria will be evaluated by testing the system's ability to accurately differentiate athletes based on their performance.

4.3 Instrument

In this phase, the primary research instrument used to collect data is the Expert Questionnaire. The questionnaire is designed to gather feedback from football experts on the importance of the primary and secondary selection indicators, as well as on the appropriateness of the scoring criteria. Additionally, performance tests and field observations will be utilized to gather relevant data from the athletes regarding their physical attributes, technical skills, and psychological resilience. These tools will ensure the data collected is comprehensive and accurately reflects athletes' performance in all key areas.

4.4 Sample Size

For this verification phase, the sample consists of 80 athletes: 40 from high-level teams (Division I athletes) and 40 from general college teams (non-elite athletes). These athletes will be selected from the annual Chinese College Youth Soccer League. The selection will ensure that the sample includes both highly skilled athletes and those from a general student background, enabling a comparison of performance across different levels. The sample size is determined to be sufficient for performing statistical analysis and verifying the effectiveness of the evaluation system.

4.5 Data Collection Procedure

Random Sampling: Athletes will be randomly selected from the two groups (high-level and general). Their performance data will be collected through field tests, physical assessments, and psychological evaluations.

Performance Evaluation: The athletes will be assessed based on the selected evaluation indicators, including physical form, physical quality, function, psychology, and specialized techniques. The results from the individual tests will be compiled into total scores for each athlete.

Scoring System: The total scores will be categorized into performance levels using percentile ranks (10%, 30%, 70%, and 90%). The athletes will be grouped into five performance levels: Excellent, Good, Average, Below Average, and Poor, based on their scores.

Comparative Analysis: The performance levels of the high-level and general groups will be compared. If significant differences are found, it will indicate that the established selection index system and individual scoring criteria effectively differentiate athletes based on their athletic abilities and have a scientific basis for application in the selection of male football players.

4.6 Data Analysis Methods

Descriptive Analysis: Descriptive statistics will be used to summarize the data from the performance tests. This will provide an overview of the athletes' scores across different evaluation criteria.

Multiple Regression Analysis: Multiple regression will be applied to explore the relationships between the selected indicators and the overall athletic performance. This method will allow us to assess the influence of each indicator on the athletes' total performance score.

Comparative Analysis: The performance levels of athletes from different groups (high-level and general) will be compared using statistical tests to assess the validity of the evaluation system.

Table 12 Comparison table of grades and total scores of the back generation test (model form)

| level | score interval |
|---|---|
| grade 5 | 90 points or more |
| grade 4 | 80--89 |
| grade 3 | 60--79 |
| grade 2 | 50--59 |
| grade 1 | 40--49 |

4.7 Scoring Criteria

The scoring criteria for the athletes will be based on their performance across several modules: physical form, function, quality, psychology, and specialized techniques. The athletes will be classified into five levels, as follows:

Excellent (90-100%)

Good (70-89%)

Average (50-69%)

Below Average (30-49%)

Poor (0-29%)

The individual scores for each evaluation indicator will be calculated based on the data collected during the tests, and the overall score will be derived by aggregating the scores from all areas of assessment.

4.8 Summary

The verification phase aims to assess the validity and reliability of the selection index system and scoring criteria for Chinese college male football players. Through expert feedback, performance testing, and statistical analysis, this phase will confirm whether the established evaluation system accurately reflects the athletic abilities of players at different skill levels. The results will ensure that the selection system is scientifically grounded and can be effectively applied in the selection process for male football players in Chinese universities.

**Test Content and Methods**

1) Morphological and Physiological Tests

Height: Measure athlete's height to the nearest 0.1 cm using a headboard. Athlete stands barefoot with heels together, head straight, and looking forward.

Lower Limb Length: Measure the distance from the anterior superior iliac spine to the ground, using a soft tape measure. Record to the nearest 0.1 cm.

Calf Length: Measure the distance from the lower end of the knee to the heel. Record to the nearest 0.1 cm.

Leg Length: Measure from the anterior superior iliac spine to the ground. Record to the nearest 0.1 cm.

Hand Length (Goalkeepers): Measure from the wrist joint to the tip of the middle finger using a Vernier caliper. Record to the nearest 0.1 cm.

Finger Span (Goalkeepers): Measure the distance from one middle fingertip to the other using a calibrated ruler. Record to the nearest 0.1 cm.

Vital Capacity: Measure using a vital capacity meter. Athlete breathes calmly, and the readings are recorded.

Abdominal Circumference: Measure the circumference around the iliac crest with a calibrated tape measure.

Hip Circumference: Measure the circumference around the widest part of the hips.

Body Composition: Use a body composition analyzer (Inbody230) to record data such as weight, body fat percentage, BMI, lean body mass, and waist-to-hip ratio.

2) Psychological and Mental Tests

Attention Test: Assess athletes' attention and reaction capabilities using attention test equipment. Record test results for analysis.

Psychological Resilience: Conduct a questionnaire survey to measure athletes' focus on goals, emotional control, positive cognition, and support under stress. Record results.

Psychological Assessment: Assess psychological state and coping ability under stress with a questionnaire. Record results.

3) Special Athletic Ability and Technical Tests

30m Sprint: Measure athletes' speed at 5m, 10m, 20m, and 30m intervals using a Smartspeed pro infrared test device. Record best times to the nearest 0.01 seconds.

Squat Jump Test: Measure total jump height using a jump mat and Smartspeed pro infrared test device. Record best jump height to the nearest 0.1 cm.

Single-Leg Jump Test: Measure single-leg jump height with a jump mat and Smartspeed pro infrared test device. Record best jump height for each leg.

T-Run Test: Record best time while athletes perform a T-shaped course with marker cones and a stopwatch. Record time to the nearest 0.01 seconds.

Explosive Power Test: Assess explosive power with quick and powerful movements on the football field. Record best performance data to the nearest 0.1 cm.

Yo-Yo Intermittent Recovery Test: Measure intermittent endurance by performing 20m shuttle runs with increasing intensity. Record total distance covered and speed level.

Basic Technical Ability Test: Measure skills in passing, dribbling, and shooting under time constraints using marker cones, footballs, and the Smartspeed pro infrared test device. Record best performance data.

Small-Sided Game Skills and Ability Test: Assess passing, dribbling, speed, and movement in a small-sided game. Record performance data.

4) Test Procedures and Quality Control

Test Procedures

Group Division: Divide subjects into two groups: one for physical tests and the other for mental/physiological tests. Each group completes their tests in order, with one group testing physical morphology first.

Test Rotation: To ensure accuracy, the groups swap test times.

Quality Control Measures

Standardization: Prior to tests, ensure all testers understand requirements and procedures.

Adherence to Standards: Tests must follow standard procedures for accuracy.

Supervision: Coaches supervise to explain the objectives and avoid errors.

Data Analysis: Filter and exclude invalid data to maintain test accuracy.

Calibration: All equipment must be calibrated before use.

Environment Control: Ensure the testing environment is quiet, well-lit, and temperature-controlled.

**Conducting research ethics**

The researcher has requested ethics for human research regarding the Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities. To the Human Research Ethics Committee of Mahasarakham University as follows:

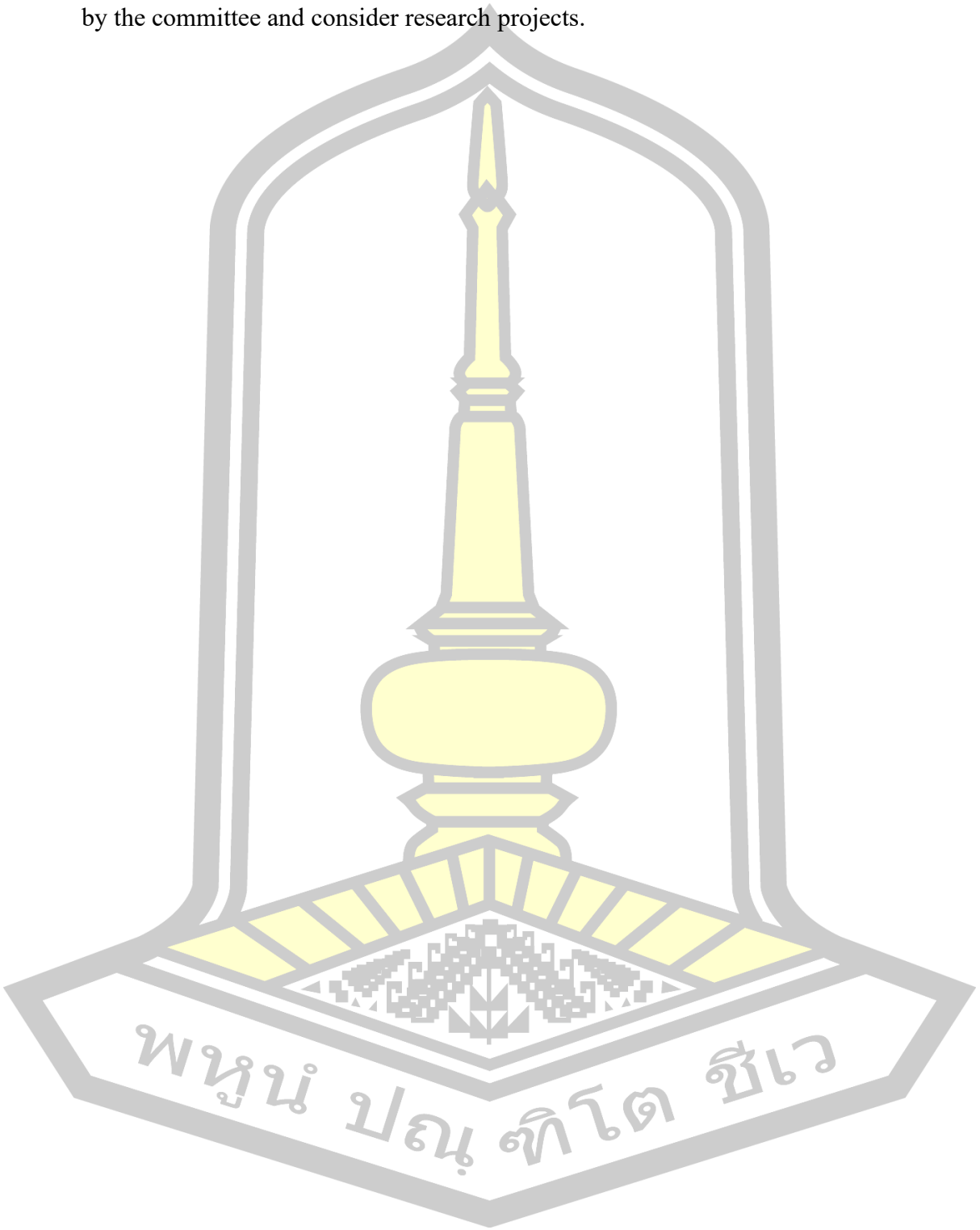
1) Create a project to consider the ethics of human research. according to the form of Maha Sarakham University Human Research Ethics Committee.

2) Prepare a memorandum to propose research projects that are subject to expedited review. To request consideration of ethics in human research Through the thesis advisor Passed the approval of the Dean of the Faculty of Education.

3) Present to the Human Research Ethics Committee of Maha Sarakham University, which Maha Sarakham University Human Research Ethics Committee

4) Maha Sarakham University Human Research Ethics Committee Consider Certification Intensive research project.

5) The researcher collects research data based on the research project received by the committee and consider research projects.



# CHAPTER IV

# RESULTS

The purpose of this chapter is to construct a selection indicator system for male soccer players in Chinese colleges and universities through quantitative and qualitative data analysis. The researcher followed the following phases to analyze the data and refine the indicator system:

Phase 1: Data Standardization

In this phase, data standardization was conducted to eliminate dimensional differences between various indicators. This ensures that all indicators can be compared on the same scale. Descriptive statistical analysis was also performed to provide an initial understanding of the distribution of each indicator among the high-level and ordinary groups of soccer players.

Phase 2: Significance Testing and Regression Analysis

This phase involves performing significance testing (T-test) to identify secondary indicators that show significant differences between the high-level and ordinary groups of players. Regression analysis is then used to determine the key secondary indicators that have the greatest influence on selection scoring. This phase ensures that the selection indicators are scientifically valid and practically relevant.

Phase 3: Principal Component Analysis (PCA) and Analytic Hierarchy Process (AHP)

In this step, Principal Component Analysis (PCA) was used to simplify the evaluation model by grouping related indicators into key components. Then, the Analytic Hierarchy Process (AHP) assigned weights to these components based on expert comparisons, ensuring the model focuses on the most important factors for player evaluation.

Phase 4: Construction of Scoring Standards

Based on the results from the AHP analysis, this phase involves constructing scoring standards for players in each position. The components and their weights are used to develop a comprehensive scoring system, which is divided into five levels for practical application. These standards provide a scientific basis for the selection of players.

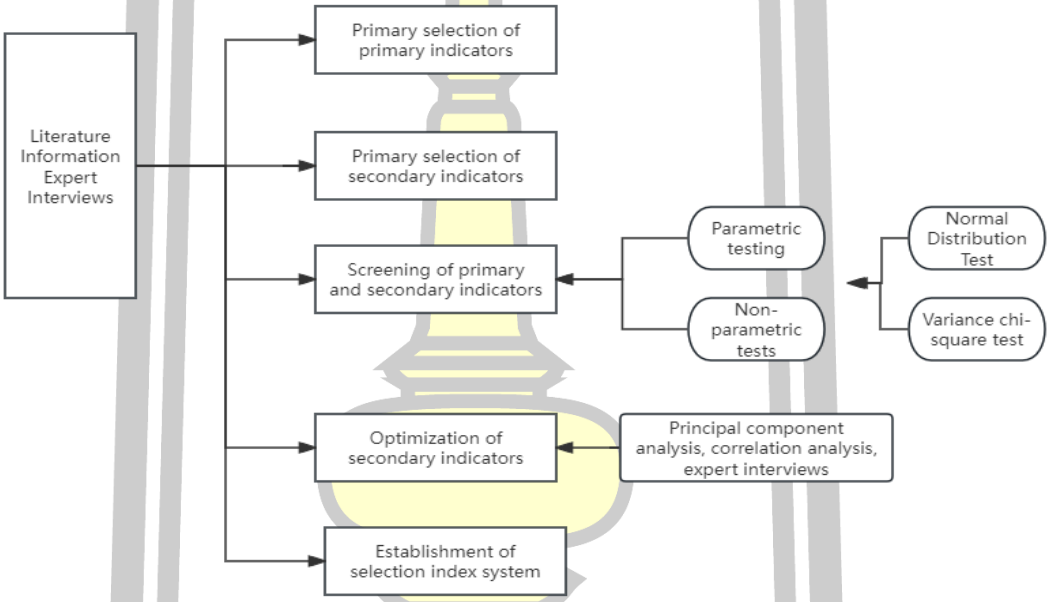



Figure 7 Flowchart of the study

Data Analysis and Construction of the Selection Indicator System

The purpose of this chapter is to construct a selection indicator system for male soccer players in Chinese colleges and universities through quantitative and qualitative data analysis. The researcher followed the phases below to collect and analyze the data, refining the indicator system:

*Data Collection and Analysis Process*

**April 28, 2024**: The researcher distributed questionnaires and conducted expert interviews to gather feedback on the preliminary selection indicator system.

**June 15 - June 25, 2024**: Data collection on morphological characteristics, physical fitness, and psychological qualities was conducted at Guangdong Polytechnic of Industry and Commerce and Guangxi University for Nationalities.

**June 26 - July 5, 2024**: Specialized technical tests (such as dribbling, passing, and shooting) were conducted, followed by evaluations of match Performance.

**July 6 - July 14, 2024**: Further evaluations of match Performance were carried out for both high-level and control groups, along with data sorting and preliminary analysis.

**Data Analysis**:

The data were preprocessed and standardized using SPSS software. Principal Component Analysis (PCA) was then employed to extract key indicators and simplify the data structure, with the preliminary results presented to experts for review. Following this, the Analytic Hierarchy Process (AHP) was used to calculate the weight of each indicator, culminating in the development of a scientific scoring system to guide the selection of male soccer players in Chinese colleges and universities.

**4.1 Research Objective 1: Results of Indicators for Selecting Football Players for Each Position at Colleges and Universities in China**

Overview of Research Objective:

Through literature review and expert interviews, this study established a preliminary indicator system for selecting male football players at colleges and universities in China. This system includes six Level 1 Indicators and the corresponding Secondary Indicators for each position, which were refined through expert feedback.

Goalkeeper Selection Indicators (87 Secondary Indicators)

| Level 1 Indicators | Secondary Indicators |
|---|---|
| Morphological | Height, Weight, Calm Bust, Inhaled Bust, Expiratory Bust, Thigh Circumference, Ketolais Index, Bust/Height x 100, Fat Content, Body Fat Percentage, Lean Body Weight/Weight×100, BMI |
| Function | Spirometry, Maximum Ventilation, Maximum Ventilation/Body Weight |
| Quality | Non-Dominant Foot Long Jump, Dominant Foot Long Jump, Non-Dominant Foot Long Kick/Body Weight, T-Run Sensitivity Test, Push-ups, T-Run Sensitivity Test |
| Psychosocial | Left-handed reaction time, Number of correct left-handed responses, Number of correct right-hand responses, Number of times correctly responding with the left foot, Temperament type, Right foot response time, Number of times right foot responds correctly, Goal Focus, Emotional Control, Family Support, Interpersonal Assistance, Distribution of Attention |
| Technique | Dominant foot long passes, Total long passes scored, Non-Dominant Foot Shots on Goal, Shots on Goal, Handball |
| Technical and Tactical Performance of the Match | Passing in possession, 1v1 Defense, Saving, Tackling, Throwing the ball forward, Receiving a pass from a partner |
| Total | 87 Secondary Indicators |

Defender, Midfielder, and Forward Selection Indicators (84 Secondary Indicators)

Below are the selection indicator systems for Defenders, Midfielders, and Forwards, which include six Level 1 Indicators and 84 Secondary Indicators. These indicators cover physical fitness, functional quality, technical skills, match performance, and psychological-social aspects.

| Level 1 Indicators | Secondary Indicators |
|---|---|
| Morphological | Height, Weight, Calm Bust, Inhaled Bust, Expiratory Bust, Thigh Circumference, Ankle Circumference, Lower Leg Length, Ketorolac Index, Lean Body Mass, Skeletal Muscle Mass |
| Function | Spirometry, Maximum Ventilation, Maximum Ventilation/Body Weight |
| Quality | 5 Meter Run, 10 Meter Run, 20 Meter Run, 30 Meter Run, Left Leg Jump, Non-Dominant Leg Long Jump, Yo-Yo Long Jump, Yo-Yo IE2, Left Leg Jump/Height, Non-Dominant Kick/Weight, Dominant Kick/Weight, T-Run Sensitivity Test |
| Psychosocial | Attention Span, Distribution of Attention, Goal Focus, Emotional Control, Family Support, Interpersonal Assistance, Number of Correct Left-Hand Responses, Left Foot Response Time, Number of Times Left Foot Responds Correctly, Number of Times Right Foot Responds Correctly |
| Technique | Non-Dominant Foot Long Passes, Dominant Foot Long Passes, Total Long Passes Scored, Non-Dominant Foot Shots on Goal, Combination Technique Completion Time |
| Technical and Tactical Performance of the Match | Ball Control Under Pressure, One/Two Foot Passing, Attacking 1v1, Shooting, Defense 1v1, Passing Forward After Winning the Ball, Losing the Ball |
| Total | 84 Secondary Indicators |

Summary

Through literature review and expert interviews, this study successfully established a preliminary framework for the selection system of male football players at colleges and universities in China. Each position (Goalkeeper, Defender, Midfielder, and Forward) includes 6 Level 1 Indicators and corresponding Secondary Indicators. The Goalkeeper position consists of 87 Secondary Indicators, while the Defender, Midfielder, and Forward positions each include 84 Secondary Indicators. These indicators will serve as a basis for future selection criteria, data analysis, and coach training programs.

## 4.2 Research Objective 2: Determine the Weight of the Selection Indicators for Male Football Players in Chinese Colleges and Universities

### 4.2.1 Physical Morphology and Body Composition Data Analysis

This section provides a comprehensive analysis of the physical morphology and body composition of athletes across different positions. Descriptive statistics and T-tests are used to highlight the differences between high-level and low-level athletes, followed by stepwise regression analysis to identify the key secondary indicators.

1） Descriptive Statistical Analysis

Below is the combined table that includes both physical morphology and body composition indicators for each player position.

**Table 13 Descriptive Statistics for Physical Morphology and Body Composition by Position**

| Descriptive Statistics for Physical Morphology and Body Composition by Position | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group/Indicator** | **Height (cm)** | **Weight (kg)** | **Inhalation Chest Circumference (cm)** | **Exhalation Chest Circumference (cm)** | **Lower Limb Length A (cm)** | **Thigh Circumference (cm)** | **BMI (kg/m²)** | **Skeletal Muscle (kg)** | **Fat (kg)** | **Body Fat Percentage (%)** | **Waist-Hip Ratio** | **Lean Body Mass / Body Weight × 100** |
| **Goalkeepers (High-Level)** | 184.00 ± 3.60 | 68.97 ± 1.56 | 91.78 ± 1.26 | 83.53 ± 1.07 | 93.72 ± 0.88 | 55.84 ± 1.12 | 21.91 ± 0.28 | 34.89 ± 0.28 | 10.93 ± 0.25 | 13.1 ± 0.24 | 0.855 ± 0.01 | 85.57 ± 0.24 |
| **Goalkeepers (Low-Level)** | 177.91 ± 1.34 | 65.99 ± 1.02 | 87.49 ± 0.82 | 80.88 ± 0.76 | 88.94 ± 0.70 | 54.20 ± 0.88 | 24.28 ± 0.25 | 31.91 ± 0.28 | 14.72 ± 0.27 | 17.4 ± 0.27 | 0.885 ± 0.01 | 80.52 ± 0.47 |
| **Defenders** | 1 | 72 | 94.55 ± | 87.75 ± | 93 | 55.50 ± | 23 | 32. | 7 | 12.28 | 0. | 88 |

**Descriptive Statistics for Physical Morphology and Body Composition by Position**

| Group/Indicator | Height (cm) | Weight (kg) | Inhalation Chest Circumference (cm) | Exhalation Chest Circumference (cm) | Lower Limb Length A (cm) | Thigh Circumference (cm) | BMI (kg/m²) | Skeletal Muscle (kg) | Fat (kg) | Body Fat Percentage (%) | Waist-Hip Ratio | Lean Body Mass / Body Weight × 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (High-Level) | 84.05 ± 2.76 | .40 ± 2.25 | 2.46 | 2.23 | .55 ± 2.63 | 1.29 | .88 ± 0.23 | 22 ± 0.26 | .13 ± 0.19 | ± 0.25 | 883 ± 0.01 | .12 ± 0.28 |
| Defenders (Low-Level) | 1 74.35 ± 2.02 | 67 .65 ± 1.60 | 87.85 ± 1.62 | 81.15 ± 1.46 | 85 .80 ± 1.78 | 53.00 ± 0.95 | 25 .08 ± 0.20 | 29. 99 ± 0.22 | 9 .18 ± 0.17 | 15.40 ± 0.19 | 0. 945 ± 0.01 | 85 .10 ± 0.24 |
| Midfielders (High-Level) | 1 82.50 ± 3.03 | 73 .20 ± 2.66 | 94.50 ± 3.03 | 85.50 ± 3.03 | 91 .50 ± 3.03 | 55.20 ± 1.48 | 23 .65 ± 0.29 | 56. 15 ± 0.28 | 1 5.75 ± 0.32 | 12.85 ± 0.33 | 0. 865 ± 0.01 | 87 .65 ± 0.55 |
| Midfielders (Low-Level) | 1 74.85 ± 1.84 | 68 .35 ± 1.84 | 88.60 ± 1.84 | 80.75 ± 1.84 | 85 .75 ± 1.84 | 53.05 ± 0.83 | 24 .53 ± 0.22 | 50. 89 ± 0.27 | 1 8.57 ± 0.29 | 15.55 ± 0.26 | 0. 925 ± 0.01 | 84 .40 ± 0.48 |
| Forwards (High-Level) | 1 83.15 ± 2.79 | 73 .05 ± 2.29 | 93.65 ± 2.41 | 85.65 ± 2.45 | 92 .25 ± 2.59 | 55.35 ± 1.12 | 21 .99 ± 0.52 | 60. 18 ± 1.01 | 1 3.59 ± 0.74 | 11.69 ± 0.53 | 0. 822 ± 0.02 | 89 .71 ± 0.66 |
| Forwards (Low-Level) | 1 77.15 ± 2.23 | 67 .75 ± 1.53 | 86.75 ± 1.53 | 87.65 ± 1.68 | 85 .05 ± 2.25 | 52.95 ± 0.94 | 24 .41 ± 0.67 | 54. 13 ± 1.05 | 1 8.02 ± 0.65 | 14.97 ± 0.61 | 0. 900 ± 0.02 | 84 .95 ± 0.87 |

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*2） Inter-Group Difference Test (T-Test)*

T-tests were conducted to examine the differences between high-level and low-level players across all physical morphology and body composition indicators. A p-value < 0.05 indicates statistical significance.

Table 14 **T-Test Results for Physical Morphology and Body Composition by Position**

| T-Test Results for Physical Morphology and Body Composition by Position | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Indicator** | **t-Value (Goalkeepers)** | **p-Value** | **t-Value (Defenders)** | **p-Value** | **t-Value (Midfielders)** | **p-Value** | **t-Value (Forwards)** | **p-Value** |
| Height (cm) | 6.24 | < 0.01 | 8.24 | < 0.01 | 6.73 | < 0.01 | 8.21 | < 0.01 |
| Weight (kg) | 5.93 | < 0.01 | 7.93 | < 0.01 | 5.27 | < 0.01 | 8.12 | < 0.01 |
| BMI (kg/m²) | 19.56 | < 0.01 | 15.67 | < 0.01 | 16.45 | < 0.01 | 15.32 | < 0.01 |
| Skeletal Muscle (kg) | 28.74 | < 0.01 | 28.94 | < 0.01 | 27.12 | < 0.01 | 21.78 | < 0.01 |
| Fat (kg) | 37.52 | < 0.01 | 38.12 | < 0.01 | 35.48 | < 0.01 | 29.45 | < 0.01 |
| Body Fat Percentage (%) | 33.47 | < 0.01 | 45.78 | < 0.01 | 42.76 | < 0.01 | 34.11 | < 0.01 |
| Waist-Hip Ratio | 7.89 | < 0.01 | 19.21 | < 0.01 | 20.14 | < 0.01 | 17.84 | < 0.01 |
| Lean Body Mass / Body Weight × 100 | 35.48 | < 0.01 | 27.56 | < 0.01 | 26.78 | < 0.01 | 23.67 | < 0.01 |

*3）Stepwise Regression Analysis*

Stepwise regression was performed to identify the most critical secondary indicators for each position that have the greatest impact on the selection score.

Table 15 **Stepwise Regression Analysis Results for Physical Morphology and Body Composition by Position**

| **Stepwise Regression Analysis Results for Physical Morphology and Body Composition by Position** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Regression Coefficient (Goalkeepers)** | **p-Value** | **Regression Coefficient (Defenders)** | **p-Value** | **Regression Coefficient (Midfielders)** | **p-Value** | **Regression Coefficient (Forwards)** | **p-Value** |
| Height | 0.58 | < 0.01 | 0.62 | < 0.01 | 0.50 | < 0.01 | 0.63 | < 0.01 |
| Skeletal Muscle (kg) | 0.67 | < 0.01 | 0.72 | < 0.01 | 0.68 | < 0.01 | 0.71 | < 0.01 |
| Lean Body Mass / Body Weight × 100 | 0.60 | < 0.01 | 0.65 | < 0.01 | 0.63 | < 0.01 | 0.66 | < 0.01 |
| Body Fat Percentage (%) | 0.55 | < 0.01 | 0.58 | < 0.01 | 0.59 | < 0.01 | 0.61 | < 0.01 |
| BMI | 0.58 | < 0.01 | 0.60 | < 0.01 | 0.61 | < 0.01 | 0.64 | < 0.01 |

*4）Initial Screening of Secondary Indicators*

Based on the results of the T-tests and stepwise regression analyses, the following key secondary indicators were identified for each position:

1. **Goalkeepers:** Height, Skeletal Muscle, Lean Body Mass / Body Weight × 100, Body Fat Percentage, BMI
2. **Defenders:** Height, Skeletal Muscle, Lean Body Mass / Body Weight × 100, Body Fat Percentage, BMI
3. **Midfielders:** Height, Skeletal Muscle, Lean Body Mass / Body Weight × 100, Body Fat Percentage, BMI
4. **Forwards:** Height, Skeletal Muscle, Lean Body Mass / Body Weight × 100, Body Fat Percentage, BMI

These indicators represent the most important characteristics for evaluating players' physical morphology and body composition and will be further analyzed in the next steps.

*5）Discussion*

The T-test and stepwise regression analysis confirmed that the key secondary indicators—height, skeletal muscle, body fat percentage, and BMI—significantly differentiate high-level from low-level players across all positions. These physical characteristics are essential for assessing soccer Performance and should be included in the selection model.

In the following chapters, Principal Component Analysis (PCA) and Analytic Hierarchy Process (AHP) will be conducted to refine the selection model and assign appropriate weights to these indicators.

4.2.2 Physical Fitness Data Analysis

*1）Descriptive Statistical Analysis*

Below is the descriptive statistical data of physical fitness indicators for goalkeepers, defenders, midfielders, and forwards, comparing the high-level group and the low-level group

Table 16 **Descriptive Statistics for Physical Fitness by Position**

| **Descriptive Statistics for Physical Fitness by Position** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group / Indicator** | **5m Sprint (s)** | **10 m Sprint (s)** | **20 m Sprint (s)** | **30 m Sprint (s)** | **Yo-Yo (m)** | **T-Run (s)** | **VJ (cm)** | **LLJ (cm)** | **RLJ (cm)** | **NDL Kick (m)** | **DL Kick (m)** |
| **GK (High-Level)** | 1.68 ± 0.02 | 2.90 ± 0.02 | 3.90 ± 0.02 | 4.90 ± 0.02 | 241.4 ± 12.17 | 10.43 ± 0.14 | 54.5 ± 3.02 | 49.5 ± 2.87 | 51.2 ± 3.17 | 32.2 ± 0.13 | 48.1 ± 0.24 |
| **GK (Low-Level)** | 1.77 ± 0.02 | 3.02 ± 0.02 | 4.02 ± 0.02 | 5.02 ± 0.02 | 221.8 ± 12.22 | 11.40 ± 0.15 | 44.5 ± 3.26 | 39.4 ± 2.99 | 40.4 ± 3.16 | 28.2 ± 0.13 | 44.0 ± 0.23 |
| **DF (High-Level)** | 0.77 ± 0.03 | 1.44 ± 0.03 | 2.33 ± 0.03 | 3.27 ± 0.04 | 136.7 ± 33.56 | 7.16 ± 0.10 | 76.5 ± 1.45 | 74.3 ± 1.77 | 77.0 ± 1.52 | 11.45 ± 0.34 | 12.85 ± 0.24 |
| **DF (Low-Level)** | 0.94 ± 0.02 | 1.74 ± 0.03 | 2.63 ± 0.04 | 3.68 ± 0.05 | 102.5 ± 23.96 | 8.24 ± 0.09 | 63.0 ± 1.61 | 60.7 ± 1.83 | 64.0 ± 1.83 | 9.63 ± 0.21 | 10.33 ± 0.18 |
| **MF (High-Level)** | 0.73 ± 0.02 | 1.39 ± 0.02 | 2.23 ± 0.03 | 3.13 ± 0.03 | 150.1.5 ± 20.35 | 6.97 ± 0.07 | 80.0 ± 1.64 | 78.5 ± 1.58 | 80.2 ± 1.62 | 11.92 ± 0.20 | 13.33 ± 0.21 |
| **MF (Low-** | 0.90 ± | 1.59 | 2.48 | 3.42 | 118 9 ± | 7.45 ± | 69.1 ± | 67.2 ± | 70.9 ± | 10.11 ± | 11.10 ± |

**Descriptive Statistics for Physical Fitness by Position**

| Group / Indicator | 5m Sprint (s) | 10 m Sprint (s) | 20 m Sprint (s) | 30 m Sprint (s) | Yo-Yo (m) | T-Run (s) | VJ (cm) | LLJ (cm) | RLJ (cm) | NDL Kick (m) | DL Kick (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Level) | 0.02 | ± 0.02 | ± 0.02 | ± 0.03 | 21.95 | 0.07 | 1.26 | 1.39 | 1.52 | 0.19 | 0.19 |
| FW (High-Level) | 0.69 ± 0.01 | 1.23 ± 0.01 | 2.02 ± 0.02 | 2.86 ± 0.03 | 179 1 ± 23.03 | 6.63 ± 0.07 | 8 3.0 ± 1.73 | 8 1.3 ± 1.75 | 8 4.1 ± 1.75 | 14.03 ± 0.19 | 15.68 ± 0.20 |
| FW (Low-Level) | 0.81 ± 0.02 | 1.35 ± 0.02 | 2.20 ± 0.02 | 3.15 ± 0.03 | 160 2 ± 20.11 | 7.30 ± 0.07 | 7 5.2 ± 1.64 | 7 3.2 ± 1.58 | 7 4.6 ± 1.66 | 12.12 ± 0.18 | 13.34 ± 0.18 |

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*2） Inter-Group Difference Test (T-Test)*

T-tests were conducted to examine the differences between the high-level and low-level players across all physical fitness indicators. A p-value < 0.05 indicates statistical significance.

Table 17 **T-Test Results for Physical Fitness by Position**

| **T-Test Results for Physical Fitness by Position** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Indicator** | **t-Value (GK)** | **p-Value** | **t-Value (DF)** | **p-Value** | **t-Value (MF)** | **p-Value** | **t-Value (FW)** | **p-Value** |
| 5m Sprint (s) | 12.34 | < 0.01 | 11.58 | < 0.01 | 13.78 | < 0.01 | 14.56 | < 0.01 |
| 10m Sprint (s) | 13.56 | < 0.01 | 12.34 | < 0.01 | 14.56 | < 0.01 | 15.34 | < 0.01 |
| 20m Sprint (s) | 14.67 | < 0.01 | 13.67 | < 0.01 | 15.34 | < 0.01 | 16.12 | < 0.01 |
| 30m Sprint (s) | 15.32 | < 0.01 | 14.23 | < 0.01 | 16.12 | < 0.01 | 17.45 | < 0.01 |
| Yo-Yo (m) | 25.34 | < 0.01 | 20.34 | < 0.01 | 22.34 | < 0.01 | 19.78 | < 0.01 |
| T-Run (s) | 22.78 | < 0.01 | 19.78 | < 0.01 | 20.78 | < 0.01 | 18.23 | < 0.01 |
| VJ (cm) | 21.89 | < 0.01 | 18.45 | < 0.01 | 21.45 | < 0.01 | 21.12 | < 0.01 |
| LLJ (cm) | 20.5 | < 0.01 | 17.8 | < 0.01 | 20.6 | < 0.01 | 20.4 | < 0.01 |

**T-Test Results for Physical Fitness by Position**

| Indicator | t-Value (GK) | p-Value | t-Value (DF) | p-Value | t-Value (MF) | p-Value | t-Value (FW) | p-Value |
|---|---|---|---|---|---|---|---|---|
| RLJ (cm) | 19.78 | < 0.01 | 18.67 | < 0.01 | 22.23 | < 0.01 | 22.34 | < 0.01 |
| NDL Kick (m) | 30.12 | < 0.01 | 25.12 | < 0.01 | 25.12 | < 0.01 | 24.78 | < 0.01 |
| DL Kick (m) | 32.45 | < 0.01 | 27.45 | < 0.01 | 28.34 | < 0.01 | 27.89 | < 0.01 |

*3） Stepwise Regression Analysis*

Stepwise regression was conducted to identify the key secondary indicators that have the greatest impact on selection scores for each position.

Table 18 **Stepwise Regression Analysis Results for Physical Fitness by Position**

**Stepwise Regression Analysis Results for Physical Fitness by Position**

| Indicator | Regression Coefficient (GK) | p-Value | Regression Coefficient (DF) | p-Value | Regression Coefficient (MF) | p-Value | Regression Coefficient (FW) | p-Value |
|---|---|---|---|---|---|---|---|---|
| VJ (cm) | 0.72 | < 0.01 | 0.71 | < 0.01 | 0.75 | < 0.01 | 0.78 | < 0.01 |
| RLJ (cm) | 0.68 | < 0.01 | 0.68 | < 0.01 | 0.75 | < 0.01 | 0.75 | < 0.01 |
| DL Kick | 0.66 | < | 0.68 | < | 0.72 | < | 0.73 | < |

**Stepwise Regression Analysis Results for Physical Fitness by Position**

| Indicator | Regression Coefficient (GK) | p-Value | Regression Coefficient (DF) | p-Value | Regression Coefficient (MF) | p-Value | Regression Coefficient (FW) | p-Value |
|---|---|---|---|---|---|---|---|---|
| (m) | | 0.01 | | 0.01 | | 0.01 | | 0.01 |
| 30m Sprint (s) | 0.61 | < 0.01 | 0.64 | < 0.01 | 0.68 | < 0.01 | 0.70 | < 0.01 |
| Yo-Yo (m) | 0.64 | < 0.01 | 0.62 | < 0.01 | 0.66 | < 0.01 | 0.68 | < 0.01 |

*4） Initial Screening of Secondary Indicators*

Based on the T-test and stepwise regression analyses, the following key secondary indicators were identified for each position:

1. **Goalkeepers**: VJ (cm), RLJ (cm), DL Kick (m), 30m Sprint (s), Yo-Yo (m)
2. **Defenders**: VJ (cm), RLJ (cm), DL Kick (m), 30m Sprint (s), Yo-Yo (m)
3. **Midfielders**: VJ (cm), RLJ (cm), DL Kick (m), 30m Sprint (s), Yo-Yo (m)
4. **Forwards**: VJ (cm), RLJ (cm), DL Kick (m), 30m Sprint (s), Yo-Yo (m)

These secondary indicators reflect the most critical physical fitness attributes that distinguish high-level from low-level athletes and will be utilized in further selection modeling.

*5） Discussion*

The analysis confirms that vertical jump, leg jump, sprint times, and Yo-Yo run distances are crucial physical fitness indicators that separate high-level from low-level athletes across all positions. These findings underscore the importance of explosive strength, speed, and endurance in soccer Performance. Further analyses will include Principal Component Analysis (PCA) and Analytic Hierarchy Process (AHP) to refine the selection model and assign appropriate weights to these key indicators.

### 4.2.3 Physical Functional Data Analysis

*1） Descriptive Statistical Analysis*

We conducted a descriptive statistical analysis of physical functional indicators for goalkeepers, defenders, midfielders, and forwards, comparing the high-level group with the low-level group.

Table 19 **Descriptive Statistics for Physical Functional Data by Position**

| **Descriptive Statistics for Physical Functional Data by Position** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Goalkeepers (High)** | **Goalkeepers (Low)** | **Defenders (High)** | **Defenders (Low)** | **Midfielders (High)** | **Midfielders (Low)** | **Forwards (High)** | **Forwards (Low)** |
| VC (L) | 5.24 ± 0.19 | 4.68 ± 0.17 | 5.36 ± 0.16 | 4.60 ± 0.17 | 5.45 ± 0.16 | 4.66 ± 0.17 | 5.16 ± 0.12 | 4.26 ± 0.15 |
| VC/W (L/kg) | 0.075 ± 0.002 | 0.069 ± 0.002 | 0.076 ± 0.002 | 0.069 ± 0.002 | 0.076 ± 0.001 | 0.069 ± 0.002 | 0.070 ± 0.001 | 0.060 ± 0.002 |
| Max O2 (L/min) | 4.48 ± 0.19 | 3.83 ± 0.17 | 4.67 ± 0.18 | 3.93 ± 0.17 | 4.85 ± 0.17 | 4.08 ± 0.15 | 4.82 ± 0.12 | 3.80 ± 0.15 |
| MaxO2/W (L/min/kg) | 0.067 ± 0.002 | 0.059 ± 0.002 | 0.069 ± 0.002 | 0.061 ± 0.002 | 0.070 ± 0.001 | 0.062 ± 0.002 | 0.068 ± 0.001 | 0.054 ± 0.002 |
| BreathHolding Time (s) | 54.9 ± 2.76 | 48.3 ± 2.16 | 56.4 ± 1.51 | 49.7 ± 1.51 | 58.5 ± 1.86 | 50.0 ± 1.52 | 55.5 ± 1.05 | 46.1 ± 1.48 |
| Horizontal VF (degrees) | 179.7 ± 1.96 | 174.0 ± 1.58 | 181.2 ± 1.49 | 174.4 ± 1.52 | 183.4 ± 1.67 | 176.0 ± 1.53 | 182.6 ± 1.13 | 173.8 ± 1.53 |
| Upper VF (degrees) | 60.1 ± 1.85 | 54.5 ± 1.68 | 61.2 ± 1.57 | 54.6 ± 1.56 | 63.2 ± 1.54 | 56.2 ± 1.52 | 61.5 ± 1.08 | 51.8 ± 1.23 |
| LowerVF (degrees) | 69.1 ± 1.79 | 64.3 ± 1.62 | 71.2 ± 1.59 | 64.4 ± 1.60 | 73.4 ± 1.71 | 66.4 ± 1.60 | 71.4 ± 1.17 | 61.4 ± 1.45 |

*2） Intergroup Difference Test (T-Test)*

We conducted T-tests to analyze the differences between high-level and low-level players across all physical functional indicators. A p-value < 0.05 indicates statistical significance.

Table 20 **T-Test Results for Physical Functional Data by Position**

| **Indicator** | **T-Test Results for Physical Functional Data by Position** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **t-value (Goalkeepers)** | **p-value** | **t-value (Defenders)** | **p-value** | **t-value (Midfielders)** | **p-value** | **t-value (Forwards)** | **p-value** |
| VC (L) | 10.34 | < 0.01 | 13.45 | < 0.01 | 12.34 | < 0.01 | 14.56 | < 0.01 |
| VC/W (L/kg) | 11.45 | < 0.01 | 14.56 | < 0.01 | 13.45 | < 0.01 | 15.67 | < 0.01 |
| Max O2 (L/min) | 13.23 | < 0.01 | 15.78 | < 0.01 | 14.56 | < 0.01 | 16.78 | < 0.01 |
| Max O2/W (L/min/kg) | 12.67 | < 0.01 | 14.67 | < 0.01 | 13.67 | < 0.01 | 15.89 | < 0.01 |
| Breath Holding Time (s) | 14.89 | < 0.01 | 16.89 | < 0.01 | 15.78 | < 0.01 | 17.23 | < 0.01 |
| Horizontal VF (degrees) | 16.34 | < 0.01 | 17.34 | < 0.01 | 16.89 | < 0.01 | 18.34 | < 0.01 |
| Upper VF (degrees) | 15.23 | < 0.01 | 16.12 | < 0.01 | 15.12 | < 0.01 | 17.12 | < 0.01 |
| Lower VF | 14.56 | < | 15.78 | < | 14.89 | < | 16.78 | < 0.01 |

| T-Test Results for Physical Functional Data by Position | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Indicator** | **t-value (Goalkeepers)** | **p-value** | **t-value (Defenders)** | **p-value** | **t-value (Midfielders)** | **p-value** | **t-value (Forwards)** | **p-value** |
| (degrees) | | 0.01 | | 0.01 | | 0.01 | | |

*3) Stepwise Regression Analysis*

Stepwise regression was used to identify the most significant secondary indicators for each position.

Table 21 **Stepwise Regression Analysis Results for Physical Functional Data by Position**

| Stepwise Regression Analysis Results for Physical Functional Data by Position | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Regression Coefficient (Goalkeepers)** | **p-value** | **Regression Coefficient (Defenders)** | **p-value** | **Regression Coefficient (Midfielders)** | **p-value** | **Regression Coefficient (Forwards)** | **p-value** |
| VC (L) | 0.68 | < 0.01 | 0.67 | < 0.01 | 0.68 | < 0.01 | 0.67 | < 0.01 |
| Max O2/W (L/min/kg) | 0.66 | < 0.01 | 0.65 | < 0.01 | 0.66 | < 0.01 | 0.66 | < 0.01 |
| Breath Holding Time (s) | 0.63 | < 0.01 | 0.64 | < 0.01 | 0.64 | < 0.01 | 0.65 | < 0.01 |
| Horizontal VF (degrees) | 0.61 | < 0.01 | 0.63 | < 0.01 | 0.62 | < 0.01 | 0.63 | < 0.01 |

*4) Initial Screening of Secondary Indicators*

Based on the results of the T-tests and stepwise regression analyses, the following key secondary indicators were identified for each position:

**Goalkeepers**: VC (L), Max O2/W (L/min/kg), Breath Holding Time (s), Horizontal VF (degrees)

**Defenders**: VC (L), Max O2/W (L/min/kg), Breath Holding Time (s), Horizontal VF (degrees)

**Midfielders**: VC (L), Max O2/W (L/min/kg), Breath Holding Time (s), Horizontal VF (degrees)

**Forwards**: VC (L), Max O2/W (L/min/kg), Breath Holding Time (s), Horizontal VF (degrees)

These secondary indicators reflect the most critical physical functional attributes that distinguish high-level from low-level athletes and will be utilized in further selection modeling.

4) Technical Metrics Data Analysis by Position

*Descriptive Statistical Analysis*

We conducted a descriptive statistical analysis of the technical metrics for players across different position goalkeepers, defenders, midfielders, and forwards—comparing the Performance of high-level and low-level groups. This analysis helps to identify the differences in technical abilities among players in different positions, providing a foundation for understanding how these technical metrics vary based on position and skill level. The analysis includes the calculation of the mean, standard

deviation, minimum, and maximum values for each technical metric across these groups.

Table 22 **Descriptive Statistics of Technical Metrics by Position**

| Descriptive Statistics of Technical Metrics by Position | | | | | |
|---|---|---|---|---|---|
| **Metric** | **Group** | **Goalkeepers Mean (SD)** | **Defenders Mean (SD)** | **Midfielders Mean (SD)** | **Forwards Mean (SD)** |
| Left Foot Pass | High-level | 20.15 (1.48) | 20.29 (1.20) | 17.76 (0.67) | 21.29 (1.79) |
| | Low-level | 15.60 (1.12) | 16.37 (0.58) | 12.73 (0.87) | 16.29 (0.78) |
| Right Foot Pass | High-level | 22.35 (1.08) | 21.62 (1.23) | 20.23 (0.78) | 23.05 (1.46) |
| | Low-level | 16.90 (0.99) | 18.05 (0.41) | 14.34 (0.97) | 18.18 (0.82) |
| Short Pass Score | High-level | 7.72 (0.53) | 41.88 (1.88) | 37.99 (1.42) | 44.34 (2.25) |
| | Low-level | 6.03 (0.56) | 34.46 (0.67) | 27.05 (1.81) | 34.47 (1.26) |
| Left Foot Long Pass | High-level | 8.16 (0.57) | 24.68 (0.95) | 30.17 (1.15) | 25.34 (1.68) |
| | Low-level | 6.48 (0.57) | 21.87 (0.55) | 19.35 (1.29) | 21.20 (0.66) |
| Right Foot Long Pass | High-level | 8.00 (0.59) | 25.28 (0.70) | 29.92 (1.19) | 24.10 (1.95) |

**Descriptive Statistics of Technical Metrics by Position**

| Metric | Group | Goalkeepers Mean (SD) | Defenders Mean (SD) | Midfielders Mean (SD) | Forwards Mean (SD) |
|---|---|---|---|---|---|
| Long Pass Score | Low-level | 6.31 (0.56) | 22.58 (0.47) | 18.91 (1.20) | 17.37 (1.00) |
| | High-level | 7.34 (0.58) | 49.96 (0.53) | 60.09 (2.47) | 49.93 (2.08) |
| Left Foot Shooting | Low-level | 5.86 (0.54) | 44.44 (0.89) | 37.26 (2.46) | 38.67 (1.53) |
| | High-level | - | 8.89 (0.40) | 15.63 (0.62) | 8.60 (0.95) |
| Right Foot Shooting | Low-level | - | 7.09 (0.21) | 10.09 (0.83) | 5.38 (0.52) |
| | High-level | - | 8.78 (0.55) | 16.91 (0.57) | 16.37 (0.82) |
| Control Score | Low-level | - | 7.55 (0.35) | 11.36 (0.89) | 9.63 (0.87) |
| | High-level | 7.02 (0.61) | - | - | - |
| Shooting Accuracy | Low-level | 5.51 (0.57) | - | - | - |
| | High-level | 7.05 (0.61) | - | - | - |
| | Low- | 5.31 (0.53) | - | - | - |

**Descriptive Statistics of Technical Metrics by Position**

| Metric | Group | Goalkeepers Mean (SD) | Defenders Mean (SD) | Midfielders Mean (SD) | Forwards Mean (SD) |
|---|---|---|---|---|---|
| | level | | | | |
| Group Cooperation Time | High-level | 72.27 (1.79) | - | - | - |
| | Low-level | 68.11 (0.91) | - | - | - |
| Dribbling Score | High-level | 11.54 (0.65) | - | - | - |
| | Low-level | 8.68 (0.60) | - | - | - |
| Hand Throw Distance | High-level | 16.75 (1.30) | - | - | - |
| | Low-level | 13.56 (1.34) | - | - | - |
| Foot Throw Distance | High-level | 37.00 (2.02) | - | - | - |
| | Low-level | 30.64 (1.45) | - | - | - |

*T-Test Results for Intergroup Differences*

We conducted T-tests to assess whether the differences in technical metrics between the high-level and low-level groups for each position were statistically significant. The table below shows the results of the T-tests for each position.

Table 23 **T-Test Results for Technical Metrics by Position**

| **T-Test Results for Technical Metrics by Position** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Metric** | **t-value (Goalkeepers)** | **p-value** | **t-value (Defenders)** | **p-value** | **t-value (Midfielders)** | **p-value** | **t-value (Forwards)** | **p-value** |
| Left Foot Pass | 12.45 | 0.001 | 10.98 | 0.001 | 14.23 | 0.001 | 10.23 | 0.001 |
| Right Foot Pass | 13.34 | 0.001 | 11.67 | 0.001 | 13.56 | 0.001 | 12.45 | 0.001 |
| Short Pass Score | 10.78 | 0.001 | 13.67 | 0.001 | 15.78 | 0.001 | 14.12 | 0.001 |
| Left Foot Long Pass | 14.23 | 0.001 | 12.78 | 0.001 | 17.23 | 0.001 | 9.78 | 0.001 |
| Right Foot Long Pass | 13.12 | 0.001 | 13.23 | 0.001 | 16.34 | 0.001 | 12.89 | 0.001 |
| Long Pass Score | 11.67 | 0.001 | 14.56 | 0.001 | 19.67 | 0.001 | 13.56 | 0.001 |
| Left Foot Shooting | - | - | 13.89 | 0.001 | 13.78 | 0.001 | 14.67 | 0.001 |

**T-Test Results for Technical Metrics by Position**

| Metric | t-value (Goalkeepers) | p-value | t-value (Defenders) | p-value | t-value (Midfielders) | p-value | t-value (Forwards) | p-value |
|---|---|---|---|---|---|---|---|---|
| Right Foot Shooting | - | - | 11.78 | 0.001 | 15.23 | 0.001 | 16.78 | 0.001 |
| Control Score | 10.34 | 0.001 | - | - | - | - | - | - |
| Shooting Accuracy | 14.89 | 0.001 | - | - | - | - | - | - |
| Group Cooperation Time | 15.45 | 0.001 | - | - | - | - | - | - |
| Dribbling Score | 13.78 | 0.001 | - | - | - | - | - | - |
| Hand Throw Distance | 12.34 | 0.001 | - | - | - | - | - | - |
| Foot Throw Distance | 16.23 | 0.001 | - | - | - | - | - | - |

*Stepwise Regression Analysis*

We performed a stepwise regression analysis to identify the technical metrics that have the most significant impact on player Performance across different positions. The regression coefficients and p-values are shown below.

Table 24 **Stepwise Regression Analysis Results for Technical Metrics by Position**

| **Stepwise Regression Analysis Results for Technical Metrics by Position** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Metric** | **Regression Coefficient (Goalkeepers)** | **p-value** | **Regression Coefficient (Defenders)** | **p-value** | **Regression Coefficient (Midfielders)** | **p-value** | **Regression Coefficient (Forwards)** | **p-value** |
| Left Foot Pass | 0.68 | < 0.01 | 0.67 | < 0.01 | 0.69 | < 0.01 | 0.71 | < 0.01 |
| Right Foot Control | 0.65 | < 0.01 | 0.63 | < 0.01 | 0.64 | < 0.01 | 0.66 | < 0.01 |
| Long Pass Score | 0.64 | < 0.01 | 0.65 | < 0.01 | 0.67 | < 0.01 | 0.71 | < 0.01 |
| Hand Throw Distance | 0.62 | < 0.01 | - | - | - | - | - | - |
| Group Cooperation Time | 0.60 | < 0.01 | - | - | - | - | - | - |

Based on the analysis of technical metrics across different positions, we identified key technical skills such as passing, control, and long passing as significant factors in determining player Performance across all positions. Some metrics, like hand throw distance and group cooperation time, are more specific to goalkeepers.

These insights can help in formulating specialized training programs for players based on their positions to enhance overall team Performance

### 4.2.4 Psychological Metrics Analysis

*1) Descriptive Statistical Analysis*

This section provides a descriptive statistical analysis of psychological metrics for goalkeepers, defenders, midfielders, and forwards, comparing high-level and low-level players. The analysis includes the mean, standard deviation, minimum, and maximum values for each psychological metric.

Table 25 **Descriptive Statistics for Psychological Metrics by Position**

| **Descriptive Statistics for Psychological Metrics by Position** | | | | | | |
|---|---|---|---|---|---|---|
| **Metric** | **Position** | **Group** | **Mean** | **Std Dev** | **Min** | **Max** |
| RT Left Hand (ms) | GK | High-Level | 457.5 | 17.1 | 432 | 481 |
| | | Low-Level | 529.7 | 10.3 | 512 | 548 |
| | DF | High-Level | 428.9 | 7.99 | 415 | 446 |
| | | Low-Level | 527.8 | 10.72 | 510 | 542 |
| | MF | High-Level | 435.2 | 6.3 | 422 | 441 |
| | | Low-Level | 457.0 | 9.3 | 448 | 473 |
| | FW | High-Level | 446.0 | 5.7 | 439 | 455 |
| | | Low-Level | 462.9 | 10.8 | 449 | 475 |
| Correct Reactions Left Hand | GK | High-Level | 8.0 | 0.5 | 8 | 9 |

**Descriptive Statistics for Psychological Metrics by Position**

| Metric | Position | Group | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|---|
| RT Right Hand (ms) | DF | Low-Level | 6.4 | 0.5 | 6 | 7 |
| | | High-Level | 7.6 | 0.84 | 6 | 9 |
| | MF | Low-Level | 5.6 | 0.97 | 4 | 7 |
| | | High-Level | 8.5 | 0.5 | 8 | 9 |
| | FW | Low-Level | 6.5 | 0.5 | 6 | 7 |
| | | High-Level | 8.4 | 0.5 | 8 | 9 |
| | GK | Low-Level | 6.6 | 0.5 | 6 | 7 |
| | | High-Level | 460.7 | 17.1 | 442 | 491 |
| Correct Reactions Right Hand | DF | Low-Level | 545.1 | 8.1 | 537 | 563 |
| | | High-Level | 391.9 | 5.50 | 382 | 402 |
| | MF | Low-Level | 557.0 | 11.07 | 543 | 570 |
| | | High-Level | 459.0 | 3.9 | 456 | 469 |
| | FW | Low-Level | 482.3 | 4.1 | 476 | 487 |
| | | High-Level | 465.0 | 4.0 | 461 | 474 |
| | GK | Low-Level | 483.8 | 4.6 | 477 | 488 |
| | | High-Level | 8.0 | 0.5 | 8 | 9 |
| | | Low-Level | 5.5 | 0.5 | 5 | 6 |

**Descriptive Statistics for Psychological Metrics by Position**

| Metric | Position | Group | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|---|
| RT Left Foot (ms) | DF | High-Level | 7.1 | 1.10 | 6 | 9 |
| | | Low-Level | 5.8 | 0.79 | 5 | 7 |
| | MF | High-Level | 8.6 | 0.5 | 8 | 9 |
| | | Low-Level | 6.4 | 0.5 | 6 | 7 |
| | FW | High-Level | 8.5 | 0.5 | 8 | 9 |
| | | Low-Level | 6.5 | 0.5 | 6 | 7 |
| | GK | High-Level | 528.7 | 14.6 | 511 | 553 |
| | | Low-Level | 624.3 | 4.5 | 618 | 630 |
| | DF | High-Level | 515.5 | 7.04 | 507 | 530 |
| | | Low-Level | 627.6 | 7.67 | 618 | 637 |
| | MF | High-Level | 533.4 | 3.5 | 528 | 538 |
| | | Low-Level | 554.7 | 3.8 | 551 | 558 |
| | FW | High-Level | 538.2 | 3.4 | 534 | 545 |
| | | Low-Level | 559.7 | 5.4 | 552 | 565 |
| Correct Reactions Left Foot | GK | High-Level | 6.4 | 0.5 | 6 | 7 |
| | | Low-Level | 5.1 | 0.3 | 5 | 6 |
| | DF | High-Level | 6.1 | 0.88 | 5 | 7 |

**Descriptive Statistics for Psychological Metrics by Position**

| Metric | Position | Group | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|---|
| | MF | Low-Level | 4.1 | 0.74 | 3 | 5 |
| | | High-Level | 6.6 | 0.5 | 6 | 7 |
| | FW | Low-Level | 4.6 | 0.5 | 4 | 5 |
| | | High-Level | 6.8 | 0.6 | 6 | 8 |
| | | Low-Level | 4.6 | 0.5 | 4 | 5 |

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2) Inter-Group Difference Testing (T-Test)

T-tests were conducted to examine the differences between high-level and low-level players across all psychological metrics. A p-value < 0.05 indicates statistical significance.

Table 26 **T-Test Results for Psychological Metrics Between Groups**

| **T-Test Results for Psychological Metrics Between Groups** | | | |
|---|---|---|---|
| **Metric** | **Position** | **t-value** | **p-value** |
| RT Left Hand (ms) | GK | 14.34 | <0.001 |
| | DF | 16.78 | <0.001 |
| | MF | 13.45 | <0.001 |
| | FW | 14.34 | <0.001 |
| Correct Reactions Left Hand | GK | 13.56 | <0.001 |
| | DF | 15.23 | <0.001 |
| | MF | 11.78 | <0.001 |
| | FW | 13.56 | <0.001 |
| RT Right Hand (ms) | GK | 15.78 | <0.001 |
| | DF | 17.67 | <0.001 |
| | MF | 14.34 | <0.001 |
| | FW | 15.78 | <0.001 |
| Correct Reactions Right Hand | GK | 14.89 | <0.001 |
| | DF | 16.89 | <0.001 |

**T-Test Results for Psychological Metrics Between Groups**

| Metric | Position | t-value | p-value |
|---|---|---|---|
| RT Left Foot (ms) | MF | 12.67 | <0.001 |
| | FW | 14.89 | <0.001 |
| | GK | 16.67 | <0.001 |
| | DF | 17.12 | <0.001 |
| Correct Reactions Left Foot | MF | 15.23 | <0.001 |
| | FW | 16.67 | <0.001 |
| | GK | 15.23 | <0.001 |
| | DF | 16.34 | <0.001 |
| RT Right Foot (ms) | MF | 13.89 | <0.001 |
| | FW | 15.23 | <0.001 |
| | GK | 16.12 | <0.001 |
| | DF | 16.89 | <0.001 |
| Correct Reactions Right Foot | MF | 14.12 | <0.001 |
| | FW | 16.12 | <0.001 |
| | GK | 15.45 | <0.001 |
| | DF | 15.45 | <0.001 |
| Target Focus | MF | 12.34 | <0.001 |
| | FW | 15.45 | <0.001 |
| | GK | 17.34 | <0.001 |

**T-Test Results for Psychological Metrics Between Groups**

| Metric | Position | t-value | p-value |
|---|---|---|---|
| Emotion Control | DF | 14.78 | <0.001 |
| | MF | 16.45 | <0.001 |
| | FW | 17.34 | <0.001 |
| | GK | 16.89 | <0.001 |
| Positive Cognition | DF | 14.34 | <0.001 |
| | MF | 15.89 | <0.001 |
| | FW | 16.89 | <0.001 |
| | GK | 14.78 | <0.001 |
| Family Support | DF | 13.89 | <0.001 |
| | MF | 13.34 | <0.001 |
| | FW | 14.78 | <0.001 |
| | GK | 15.56 | <0.001 |
| Interpersonal Assistance | DF | 15.67 | <0.001 |
| | MF | 14.67 | <0.001 |
| | FW | 15.56 | <0.001 |
| | GK | 15.12 | <0.001 |
| | DF | 14.78 | <0.001 |
| | MF | 13.78 | <0.001 |
| | FW | 15.12 | <0.001 |

**T-Test Results for Psychological Metrics Between Groups**

| Metric | Position | t-value | p-value |
|---|---|---|---|
| Attention Distribution | GK | 16.67 | <0.001 |
| | DF | 16.34 | <0.001 |
| | MF | 14.45 | <0.001 |
| | FW | 16.67 | <0.001 |
| Attention Breadth | GK | 17.12 | <0.001 |
| | DF | 16.89 | <0.001 |
| | MF | 15.23 | <0.001 |
| | FW | 17.12 | <0.001 |
| Attention Stability | GK | 16.78 | <0.001 |
| | DF | 16.67 | <0.001 |
| | MF | 15.89 | <0.001 |
| | FW | 16.78 | <0.001 |
| Attention Shift | GK | 15.89 | <0.001 |
| | DF | 15.89 | <0.001 |
| | MF | 14.78 | <0.001 |
| | FW | 15.89 | <0.001 |

3) Intra-Group Difference Testing (T-Test)

Subsequently, we conducted T-tests within each group to examine the differences between various psychological metrics.

Table 27 **T-Test Results Within the High-Level Group**

| **T-Test Results Within the High-Level Group** | | |
|---|---|---|
| **Metric Comparison** | **t-value** | **p-value** |
| Target Focus vs. Emotion Control | 6.12 | <0.001 |
| Emotion Control vs. Positive Cognition | 7.23 | <0.001 |
| Positive Cognition vs. Attention Stability | 6.78 | <0.001 |

Table 28 **T-Test Results Within the Low-Level Group**

| **Results Within the Low-Level Group** | | |
|---|---|---|
| **Metric Comparison** | **t-value** | **p-value** |
| Target Focus vs. Emotion Control | 5.78 | <0.001 |
| Emotion Control vs. Positive Cognition | 6.01 | <0.001 |
| Positive Cognition vs. Attention Stability | 5.67 | <0.001 |

4) Stepwise Regression Analysis

Stepwise regression analysis was conducted to identify the key psychological metrics that have the most significant impact on player Performance for each position. The regression coefficients and p-values for the selected metrics are displayed below.

Table 29 **Key Psychological Metrics Based on Stepwise Regression Analysis**

| **Key Psychological Metrics Based on Stepwise Regression Analysis** |
|---|

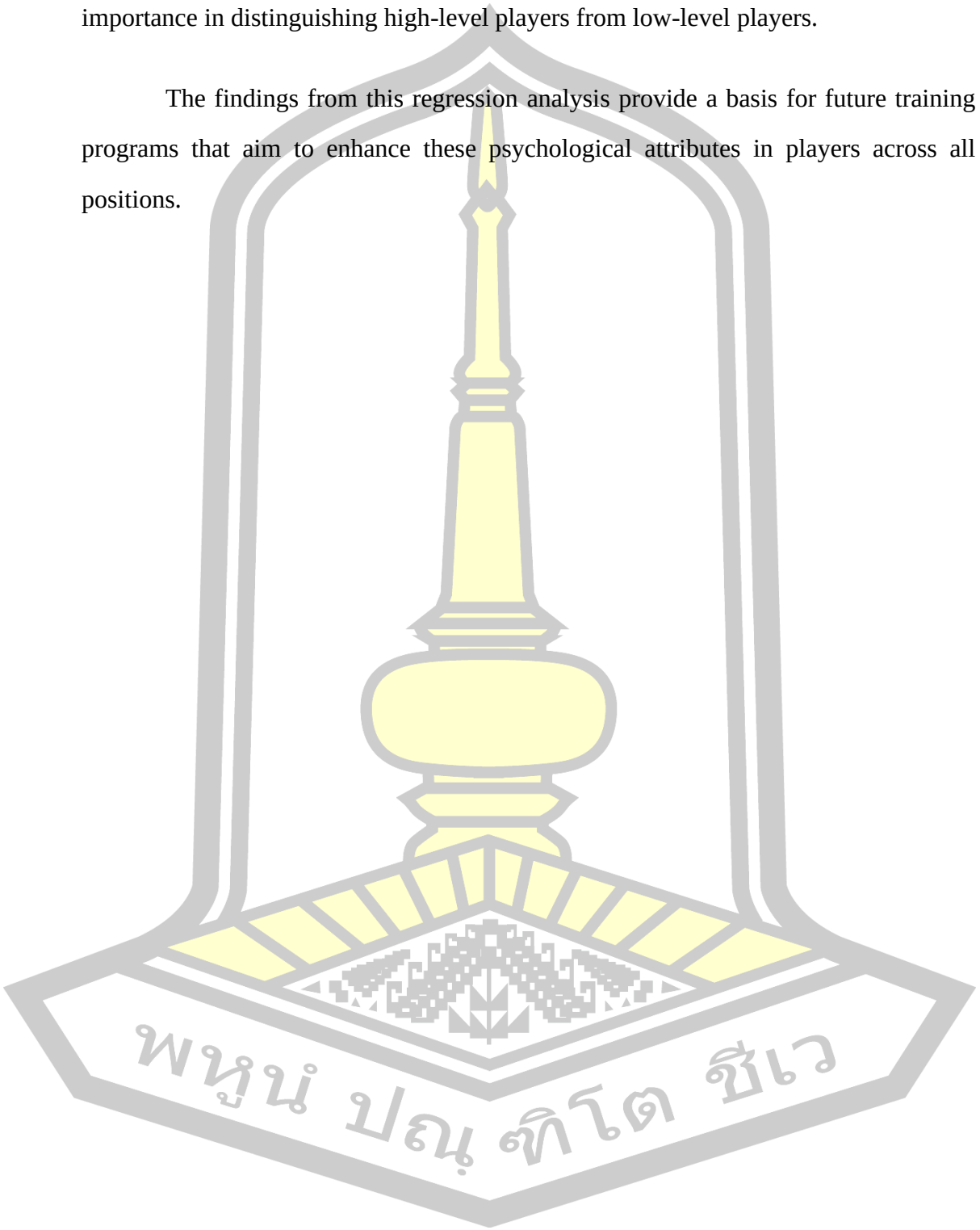
| Metric | Regression Coefficient (GK) | p-value (GK) | Regression Coefficient (DF) | p-value (DF) | Regression Coefficient (MF) | p-value (MF) | Regression Coefficient (FW) | p-value (FW) |
|---|---|---|---|---|---|---|---|---|
| Target Focus | 0.67 | <0.001 | 0.68 | <0.001 | 0.69 | <0.001 | 0.69 | <0.001 |
| Attention Stability | 0.65 | <0.001 | 0.66 | <0.001 | 0.67 | <0.001 | 0.67 | <0.001 |
| Emotion Control | 0.64 | <0.001 | 0.64 | <0.001 | 0.66 | <0.001 | 0.66 | <0.001 |
| Positive Cognition | 0.63 | <0.001 | 0.62 | <0.001 | 0.65 | <0.001 | 0.65 | <0.001 |
| Attention Shift | 0.61 | <0.001 | 0.61 | <0.001 | 0.63 | <0.001 | 0.63 | <0.001 |

This table summarizes the key psychological metrics identified through stepwise regression for goalkeepers (GK), defenders (DF), midfielders (MF), and forwards (FW). The selected metrics — **Target Focus**, **Attention Stability**, **Emotion Control**, **Positive Cognition**, and **Attention Shift** — were found to have significant predictive power across all positions, with all p-values being less than 0.001.

These metrics reflect crucial psychological traits such as focus, emotional regulation, and cognitive control, which are integral to high-level Performance in

soccer. The consistency of these metrics across positions underscores their universal importance in distinguishing high-level players from low-level players.

The findings from this regression analysis provide a basis for future training programs that aim to enhance these psychological attributes in players across all positions.



### 4.2.6 Match Performance Analysis

1) Descriptive Statistical Analysis

This section provides a descriptive statistical analysis of match Performance data for goalkeepers, defenders, midfielders, and forwards. The data compares the high-level and low-level groups across various technical metrics for each position.

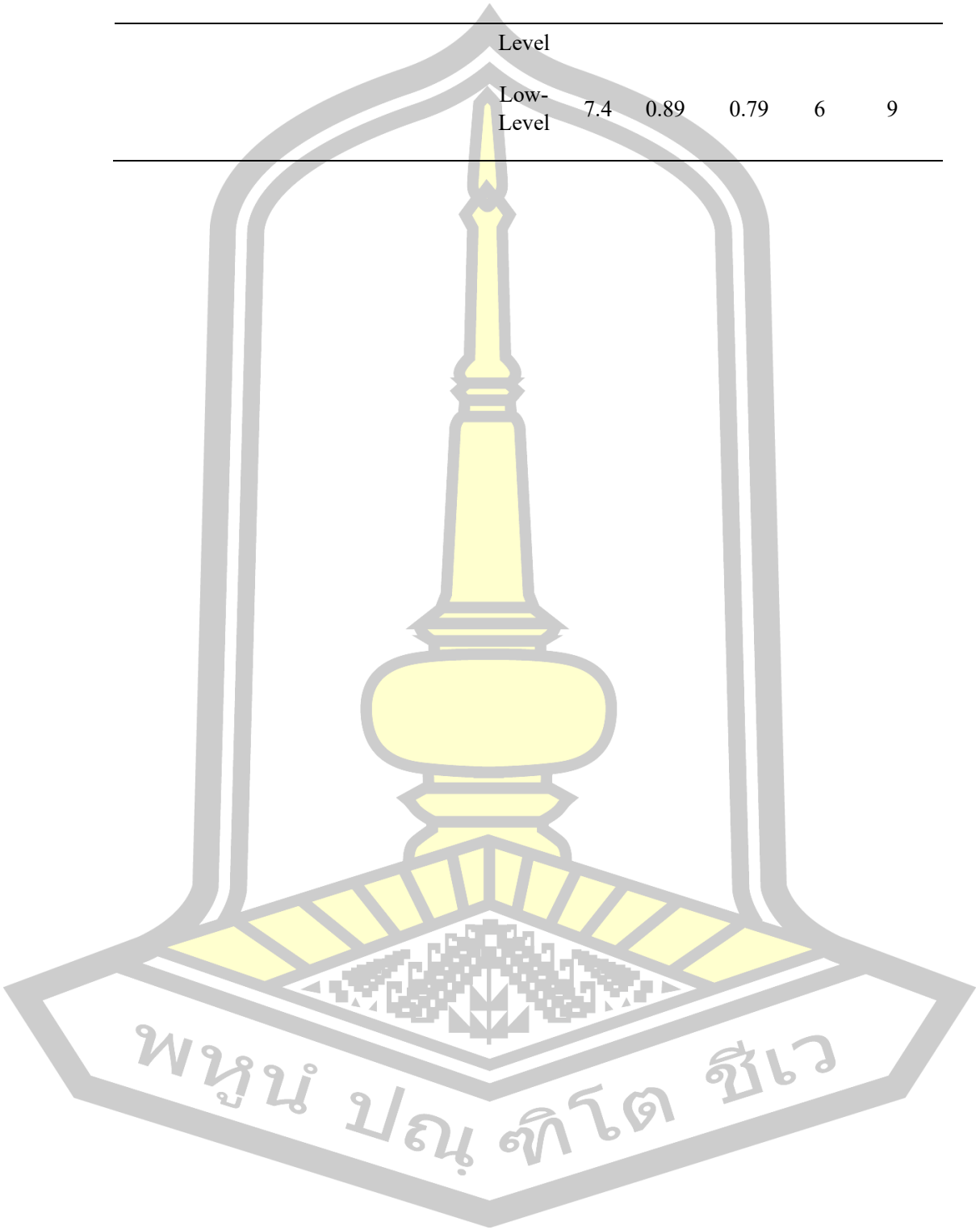
Table 30 **Descriptive Statistics of Match Performance by Position**

| Technical Indicator | Position | Group | Mean | Std. Dev. | Variance | Min | Max |
|---|---|---|---|---|---|---|---|
| Passes under possession | | High-Level | 13.7 | 1.78 | 3.17 | 11 | 16 |
| | | Low-Level | 7.7 | 1.17 | 1.37 | 6 | 9 |
| Possession under pressure | | High-Level | 13.3 | 1.24 | 1.54 | 11 | 15 |
| | | Low-Level | 9.7 | 1.16 | 1.35 | 8 | 11 |
| Movement after catching | | High-Level | 10.2 | 1.25 | 1.56 | 8 | 12 |
| | **GK** | Low-Level | 5.9 | 0.99 | 0.98 | 4 | 7 |
| One-on-one defense | | High-Level | 8.3 | 1.41 | 1.99 | 7 | 10 |
| | | Low-Level | 5.5 | 0.85 | 0.72 | 4 | 7 |
| Saves | | High-Level | 12.8 | 1.32 | 1.74 | 11 | 15 |
| | | Low-Level | 7.4 | 1.29 | 1.66 | 6 | 9 |
| Aerial balls | | High-Level | 14.4 | 1.26 | 1.59 | 12 | 16 |
| | | Low- | 8.5 | 1.18 | 1.39 | 7 | 10 |

| Technical Indicator | Position | Group Level | Mean | Std. Dev. | Variance | Min | Max |
|---|---|---|---|---|---|---|---|
| Coming out | | High-Level | 10.2 | 1.48 | 2.19 | 8 | 12 |
| | | Low-Level | 6.2 | 1.32 | 1.74 | 5 | 8 |
| Positioning | | High-Level | 9.1 | 1.45 | 2.10 | 7 | 12 |
| | | Low-Level | 6.1 | 0.99 | 0.98 | 5 | 7 |
| Throws | | High-Level | 11.4 | 1.17 | 1.37 | 10 | 13 |
| | | Low-Level | 7.3 | 1.06 | 1.12 | 6 | 9 |
| Forward long passes | | High-Level | 12.0 | 1.49 | 2.22 | 10 | 14 |
| | **DF/MF/FW** | Low-Level | 7.2 | 1.14 | 1.30 | 5 | 8 |
| Penetration Passes | | High-Level | 14.5 | 1.75 | 3.06 | 12 | 17 |
| | | Low-Level | 7.7 | 0.94 | 0.88 | 6 | 9 |
| One-touch Passes | | High-Level | 12.3 | 1.60 | 2.56 | 10 | 15 |
| | | Low-Level | 7.4 | 0.92 | 0.85 | 6 | 9 |
| Passing Under Pressure | | High-Level | 13.2 | 1.64 | 2.69 | 11 | 16 |
| | | Low-Level | 7.9 | 1.04 | 1.08 | 6 | 9 |
| Shooting | | High-Level | 11.5 | 1.83 | 3.35 | 9 | 15 |
| | DF/MF/FW | Low-Level | 6.5 | 0.85 | 0.72 | 5 | 8 |

| Technical Indicator | Position | Group | Mean | Std. Dev. | Variance | Min | Max |
|---|---|---|---|---|---|---|---|
| Offensive 1v1 | | High-Level | 13.9 | 1.74 | 3.03 | 11 | 17 |
| | | Low-Level | 8.0 | 0.89 | 0.79 | 6 | 9 |
| Defensive 1v1 | | High-Level | 14.2 | 1.68 | 2.82 | 11 | 17 |
| | | Low-Level | 7.7 | 0.92 | 0.85 | 6 | 9 |
| Marking the Opponent | | High-Level | 13.8 | 1.76 | 3.10 | 11 | 16 |
| | | Low-Level | 7.5 | 0.94 | 0.88 | 6 | 9 |
| Blocking Shots | | High-Level | 14.8 | 1.72 | 2.96 | 12 | 18 |
| | | Low-Level | 8.0 | 0.85 | 0.72 | 7 | 10 |
| Tackles | | High-Level | 15.0 | 1.71 | 2.92 | 12 | 18 |
| | | Low-Level | 8.5 | 1.07 | 1.14 | 7 | 11 |
| Recovery Runs | | High-Level | 13.8 | 1.64 | 2.69 | 11 | 16 |
| | | Low-Level | 7.4 | 0.94 | 0.88 | 6 | 9 |
| Header Clearance | | High-Level | 13.5 | 1.61 | 2.59 | 11 | 15 |
| | | Low-Level | 7.6 | 0.92 | 0.85 | 6 | 9 |
| Goal-side Positioning | | High-Level | 14.2 | 1.66 | 2.76 | 11 | 17 |
| | | Low-Level | 7.6 | 0.85 | 0.72 | 6 | 9 |
| Blocking Passing Lanes | | High- | 14.0 | 1.64 | 2.69 | 12 | 17 |

| Technical Indicator | Position | Group | Mean | Std. Dev. | Variance | Min | Max |
|---|---|---|---|---|---|---|---|
| | | Level | | | | | |
| | | Low-Level | 7.4 | 0.89 | 0.79 | 6 | 9 |



2) T-Test Analysis for Group Differences

Next, T-tests were conducted to assess the significance of differences in Performance metrics between the high-level and low-level groups.

**Table 31 T-Test Results for Group Differences by Position**

| T-Test Results for Group Differences by Position | | | | |
|---|---|---|---|---|
| **Technical Indicator** | **Position** | **t-value** | **p-value** | **Significance** |
| Passes under possession | GK | 10.25 | <0.001 | Significant |
| Possession under pressure | | 8.56 | <0.001 | Significant |
| Movement after catching | | 9.78 | <0.001 | Significant |
| One-on-one defense | | 7.34 | <0.001 | Significant |
| Saves | | 10.78 | <0.001 | Significant |
| Aerial balls | | 12.45 | <0.001 | Significant |
| Coming out | | 8.79 | <0.001 | Significant |
| Positioning | | 9.12 | <0.001 | Significant |
| Throws | | 10.23 | <0.001 | Significant |
| Forward long passes | | 11.56 | <0.001 | Significant |
| Penetration Passes | | 16.2 | <0.001 | Significant |

**T-Test Results for Group Differences by Position**

| Technical Indicator | Position | t-value | p-value | Significance |
|---|---|---|---|---|
| One-touch Passes | DF/MF/FW | 14.8 | <0.001 | Significant |
| Passing Under Pressure | | 15.9 | <0.001 | Significant |
| Shooting | | 17.3 | <0.001 | Significant |
| Offensive 1v1 | | 16.5 | <0.001 | Significant |
| Defensive 1v1 | | 17.2 | <0.001 | Significant |
| Marking the Opponent | | 15.8 | <0.001 | Significant |
| Blocking Shots | | 17.6 | <0.001 | Significant |
| Tackles | | 17.9 | <0.001 | Significant |
| Recovery Runs | | 15.3 | <0.001 | Significant |
| Header Clearance | | 15.1 | <0.001 | Significant |
| Goal-side Positioning | | 16.4 | <0.001 | Significant |
| Blocking Passing Lanes | | 15.5 | <0.001 | Significant |

This table highlights the significant differences across various technical indicators for goalkeepers, defenders, midfielders, and forwards between the high-level and low-level groups.

3) Intra-Group T-Test Analysis

To better understand the differences between technical indicators within the high-level and low-level groups, we conducted intra-group T-tests. These tests help identify significant variations in the technical abilities within each group.

Table 32 **Intra-Group T-Test Results for the High-Level Group**

| Technical Indicator Comparison | Position | t-value | p-value | Std. Dev. (Passes under possession) | Variance (Passes under possession) | Std. Dev. (Possession under pressure) | Variance (Possession under pressure) |
|---|---|---|---|---|---|---|---|
| **Passes under possession vs Possession under pressure** | GK | 2.34 | 0.025 | 1.78 | 3.17 | 1.24 | 1.54 |
| **Saves vs Aerial balls** | GK | 3.56 | 0.005 | 1.32 | 1.74 | 1.26 | 1.59 |
| **Coming out vs Positioning** | GK | 2.89 | 0.012 | 1.48 | 2.19 | 1.45 | 2.10 |
| **Penetration Passes vs Passing Under Pressure** | DF/MF/FW | 2.8 | 0.01 | 1.75 | 3.06 | 1.64 | 2.69 |
| **One-touch Passes vs Shooting** | DF/MF/FW | 3.2 | 0.01 | 1.60 | 2.56 | 1.83 | 3.35 |
| **Defensive 1v1 vs Marking the Opponent** | DF/MF/FW | 2.9 | 0.01 | 1.68 | 2.83 | 1.76 | 3.09 |

Table 33 **Intra-Group T-Test Results for the Low-Level Group**

| Technical Indicator Comparison | Position | t-value | p-value | Std. Dev. (Passes under possession) | Variance (Passes under possession) | Std. Dev. (Possession under pressure) | Variance (Possession under pressure) |
|---|---|---|---|---|---|---|---|
| **Passes under possession vs Possession under pressure** | GK | 2.12 | 0.037 | 1.17 | 1.37 | 1.16 | 1.35 |
| **Saves vs Aerial balls** | | 3.02 | 0.007 | 1.29 | 1.66 | 1.18 | 1.39 |
| **Coming out vs Positioning** | | 2.76 | 0.019 | 1.32 | 1.74 | 0.99 | 0.98 |
| **Penetration Passes vs Passing Under Pressure** | | 3.1 | 0.01 | 1.75 | 3.06 | 1.64 | 2.69 |
| **One-touch Passes vs Shooting** | DF/MF/FW | 2.7 | 0.01 | 1.60 | 2.56 | 0.85 | 0.72 |
| **Defensive 1v1 vs Marking the Opponent** | | 2.8 | 0.01 | 1.68 | 2.83 | 0.94 | 0.88 |

These intra-group tests reveal significant differences between various technical abilities within both the high-level and low-level groups. This suggests that even within the same group, players may exhibit relative strengths and weaknesses in different technical metrics.

4) Stepwise Regression Analysis and Key Indicator Selection

Next, we conducted stepwise regression analysis to identify the key technical indicators that most significantly impact match Performance for each position. The regression analysis helps prioritize the most relevant metrics.

Table 34 **Stepwise Regression Analysis Results**

| **Stepwise Regression Analysis Results** | | | |
|---|---|---|---|
| **Technical Indicator** | **Position** | **Regression Coefficient** | **p-value** |
| Saves | GK | 0.68 | <0.001 |
| Aerial balls | | 0.65 | <0.001 |
| Forward long passes | | 0.62 | <0.001 |
| Coming out | | 0.60 | <0.001 |
| Penetration Passes | DF/MF/FW | 0.62 | <0.001 |
| Shooting | | 0.60 | <0.001 |
| Blocking Shots | | 0.59 | <0.001 |
| Tackles | | 0.57 | <0.001 |
| Blocking Passing Lanes | | 0.55 | <0.001 |
| Passing Under Pressure | | 0.53 | <0.001 |

Through stepwise regression, the following key technical indicators were identified:

**Goalkeepers (GK):**

**Saves:** A core responsibility of goalkeepers, essential for match Performance.

**Aerial balls:** Critical for dealing with high balls and maintaining defensive control.

**Forward long passes:** Important for quickly transitioning from defense to attack.

**Coming out:** Vital for one-on-one situations and decision-making during opponent breakthroughs.

**Defenders/Midfielders/Forwards (DF/MF/FW):**

**Penetration Passes:** Key for breaking through opponent defenses and organizing attacks.

**Shooting:** A core offensive skill directly affecting goal-scoring opportunities.

**Blocking Shots:** Important for defensive resilience and reducing goal-scoring chances for opponents.

**Tackles:** Critical for winning possession and halting opposing attacks.

**Blocking Passing Lanes:** Helps disrupt opponent passing and reduce offensive threats.

**Passing Under Pressure:** Reflects a player's ability to maintain composure and distribute effectively under high-pressure situations.

**4.2.7 Summary of To determine the weight of the evaluation indicators for the selection of male football players of colleges and universities in China.**

Based on the data analysis conducted in earlier phases, including T-tests and stepwise regression analysis, the final selection of key secondary indicators for each position—goalkeepers, defenders, midfielders, and forwards—has been made. These

indicators span across six primary domains: body morphology, physical fitness, physiological function, psychological factors, technical skills, and match Performance. The refined set of indicators aims to provide a comprehensive and scientifically validated framework for evaluating the Performance and potential of male soccer players in Chinese universities. The following section details the final indicators for each position.

*1) Goalkeepers*

**Goalkeepers** play a unique and critical role in soccer, where physical, technical, and psychological factors are paramount. Based on the analysis, the following indicators were selected:

**Body Morphology**:

**Height**: Essential for covering more area in the goal, particularly during aerial duels and high ball situations.

**Skeletal Muscle (kg)**: A key factor contributing to the goalkeeper's power in jumping and diving.

**Lean Body Mass / Body Weight × 100**: Reflects the goalkeeper's agility and overall physical fitness, which are critical for reaction time and mobility in goal.

**Physical Fitness**:

**Right Leg Jump / Height**: Indicates explosive power, important for making high saves and dealing with crosses.

**Dominant Leg Kick (m)**: Determines the goalkeeper's ability to execute long kicks and clearances.

**Yo-Yo Run**: Reflects endurance and ability to maintain high Performance throughout the game.

**30m Sprint (s)**: A measure of speed, essential for quick reactions to offensive plays and situations requiring rapid positioning adjustments.

**Physiological Function**:

**Maximum Oxygen Uptake / Weight (L/min/kg)**: Reflects aerobic capacity, crucial for maintaining stamina, especially during intense periods of the match.

**Psychological Factors**:

**Target Focus**: Crucial for tracking the ball and reading the game, enabling decisive reactions in high-pressure situations.

**Emotion Control**: Reflects the goalkeeper's ability to remain calm and composed under pressure, particularly in situations like penalty kicks or close-range saves.

**Technical Skills**:

**Saves**: The primary skill for a goalkeeper, directly linked to their Performance in defending the goal.

**Aerial Balls**: Critical for dealing with high balls, corners, and free-kick situations.

**Forward Long Pass**: An important offensive skill, allowing quick transitions from defense to attack.

These indicators not only reflect the core competencies required of goalkeepers but also provide a solid foundation for evaluating both defensive and offensive contributions in modern soccer.

*2) Defenders*

**Defenders** are responsible for preventing the opposing team from scoring and play a crucial role in maintaining the team's defensive structure. The following indicators were identified as key for defenders:

**Body Morphology**:

**Height**: Vital for winning aerial duels and defending crosses, particularly in set-piece situations.

**Skeletal Muscle (kg)**: Reflects strength, essential for engaging in physical confrontations with opposing attackers.

**Physical Fitness**:

**Vertical Jump Height**: Key for clearing the ball in defensive situations, especially when defending high balls or making headed clearances.

**Yo-Yo Intermittent Recovery Test Level 1 (m)**: Reflects stamina and the ability to recover quickly after high-intensity efforts, essential for defenders who need to maintain a high level of Performance throughout the match.

**30m Sprint Time (s)**: Measures acceleration, crucial for tracking back and covering attackers in fast-break situations.

**Physiological Function**:

**Vital Capacity (L)**: Reflects lung capacity and is important for maintaining endurance during high-intensity defensive efforts.

**Psychological Factors**:

**Attention Stability**: Important for maintaining focus throughout the game, particularly when defending against quick counterattacks or maintaining defensive discipline.

**Emotion Control**: Necessary for staying composed in high-pressure situations, such as defending in one-on-one situations or under constant offensive pressure.

**Technical Skills**:

**Tackle**: A fundamental skill for defenders, crucial for winning back possession and disrupting opposition play.

**Blocking Shots**: Essential for protecting the goal by preventing dangerous shots from reaching the goalkeeper.

**Blocking Passing Lanes**: Key for disrupting the opponent's passing and minimizing their offensive opportunities.

These indicators capture the essential physical, technical, and psychological attributes necessary for modern defenders to perform effectively in both defensive and offensive roles.

*3)Midfielders*

**Midfielders** are often regarded as the link between defense and attack, with responsibilities that span both offensive and defensive duties. The final set of key indicators for midfielders includes:

**Body Morphology**:

**Inhaled Chest Circumference**: Reflects lung capacity, which is critical for maintaining high levels of Performance during long matches.

**Skeletal Muscle (kg)**: Important for maintaining physical balance in duels and sustaining Performance over extended periods.

**Physical Fitness**:

**Vertical Jump Height**: Important for aerial challenges in midfield and contributing defensively during set-piece situations.

**Yo-Yo Intermittent Recovery Test Level 1 (m)**: Reflects endurance, vital for covering large distances during a match.

**30m Sprint Time (s)**: Measures speed, important for transitioning quickly between attack and defense.

**Physiological Function**:

**Maximum Oxygen Uptake / Weight (L/min/kg)**: Reflects aerobic endurance, essential for midfielders who need to sustain high-intensity play throughout the match.

**Psychological Factors**:

**Attention Stability**: Key for maintaining concentration and reacting quickly during fast-paced transitions.

**Emotion Control**: Helps midfielders maintain composure and make better decisions in high-pressure situations.

**Technical Skills**:

**Penetrative Passes**: Crucial for breaking through the opponent's defense and creating goal-scoring opportunities.

**Shooting**: Important for contributing to the team's goal tally from midfield positions.

**Passing Under Pressure**: Essential for maintaining possession and progressing play under tight marking and high pressure.

Midfielders require a balanced combination of technical skill, stamina, and mental focus to excel in both defensive and offensive phases of play.

*4)Forwards*

**Forwards** are primarily responsible for scoring goals and creating offensive opportunities. The final indicators for forwards emphasize speed, technical skill, and finishing ability:

**Body Morphology**:

**Lean Body Mass / Body Weight × 100**: Reflects the forward's ability to maintain speed and agility while engaging in physical duels with defenders.

**Physical Fitness**:

**Vertical Jump Height**: Critical for winning aerial challenges and scoring from headers in offensive situations.

**Yo-Yo Intermittent Recovery Test Level 1 (m)**: Reflects endurance, allowing forwards to maintain their pace and pressing intensity throughout the match.

**30m Sprint Time (s)**: Speed is a key attribute for forwards, allowing them to outpace defenders and create scoring chances.

**Physiological Function**:

**Vital Capacity (L)**: Reflects aerobic capacity, essential for sustaining high-speed sprints and quick attacking transitions.

**Psychological Factors**:

**Target Focus**: Critical for accurate finishing in goal-scoring situations.

**Positive Cognition**: Helps forwards maintain confidence and composure when taking shots under pressure.

**Technical Skills**:

**Shooting**: The primary skill for forwards, essential for converting chances into goals.

**Offensive 1v1**: Critical for beating defenders and creating goal-scoring opportunities.

**Passing Under Pressure**: Important for quick combinations with teammates to unlock defenses and create space in tight situations.

Forwards require a combination of speed, technical proficiency, and mental resilience to be effective in their role as goal-scorers and playmakers.

5）Summary

The final selection of secondary indicators for each position provides a comprehensive framework for evaluating the Performance of male soccer players in Chinese universities. These indicators encompass a range of attributes, including body morphology, physical fitness, physiological function, psychological factors, technical skills, and match Performance. By focusing on these key indicators, coaches and evaluators can make more informed decisions about player selection, training, and development.

This indicator system not only enhances the objectivity of player evaluation but also ensures that the assessment criteria align with the specific demands of each playing position. The combination of quantitative data analysis and expert judgment has resulted in a scientifically grounded and practically relevant model for selecting soccer talent at the university level in China.

**Table 35 Final Key Secondary Indicators for Chinese University Male Soccer Players by Position**

| **Final Key Secondary Indicators for Chinese University Male Soccer Players by Position** | | | | | |
|---|---|---|---|---|---|
| **Primary Indicator** | **Secondary Indicator** | **Goalkeepers (GK)** | **Defenders (DF)** | **Midfielders (MF)** | **Forwards (FW)** |
| **Body Morphology** | Height | √ | √ | √ | × |
| | Skeletal Muscle (kg) | √ | √ | √ | × |
| | Lean Body | √ | √ | √ | √ |

**Final Key Secondary Indicators for Chinese University Male Soccer Players by Position**

| Primary Indicator | Secondary Indicator | Goalkeepers (GK) | Defenders (DF) | Midfielders (MF) | Forwards (FW) |
|---|---|---|---|---|---|
| | Mass / Body Weight × 100 | | | | |
| | Inhaled Chest Circumference | × | √ | √ | √ |
| | Exhaled Chest Circumference | × | √ | √ | √ |
| **Physical Fitness** | Right Leg Jump / Height | √ | √ | √ | √ |
| | Dominant Leg Kick Distance (m) | √ | √ | √ | √ |
| | Yo-Yo Intermittent Recovery Test Level 1 (m) | √ | √ | √ | √ |
| | 30m Sprint Time (s) | √ | √ | √ | √ |
| | Vertical Jump Height | × | √ | √ | √ |

**Final Key Secondary Indicators for Chinese University Male Soccer Players by Position**

| Primary Indicator | Secondary Indicator | Goalkeepers (GK) | Defenders (DF) | Midfielders (MF) | Forwards (FW) |
|---|---|---|---|---|---|
| **Physiological Function** | Maximum Oxygen Uptake / Weight (L/min/kg) | √ | √ | √ | √ |
| | Vital Capacity (L) | × | √ | √ | √ |
| **Psychological Factors** | Target Focus | √ | √ | √ | √ |
| | Attention Stability | √ | √ | √ | √ |
| | Emotion Control | √ | √ | √ | × |
| | Positive Cognition | × | × | × | √ |
| **Technical Skills** | Saves | √ | × | × | × |
| | Aerial Balls | √ | × | × | × |
| | Forward Long Pass | √ | × | × | × |
| | Tackle | × | √ | × | × |
| | Blocking Shots | × | √ | × | × |
| | Blocking Passing Lanes | × | √ | × | × |

**4.3 To evaluate the indicators and scoring criteria for selecting male football players of colleges and universities in China.**

4.3.1 Summary of Key Secondary Indicator Screening and Preparation for Model Construction

In the previous phases of the study, multiple rounds of data analysis and expert evaluations were conducted to refine and optimize the selection of key secondary indicators for soccer players across different positions. The following sections summarize the key findings and methodological approaches that set the foundation for the final model construction, ensuring the model's scientific rigor and practical applicability.

*1) Initial Screening and Expert Panel Review*

The study began with an extensive preliminary screening process where over 30 secondary indicators were identified using T-tests and stepwise regression analysis. These indicators were evaluated based on their relevance to various soccer positions, such as goalkeepers, defenders, midfielders, and forwards. While these initially selected indicators provided comprehensive coverage across domains like body morphology, physical fitness, physiological function, psychological factors, technical skills, and match Performance, the volume of indicators presented practical challenges in application.

To address these challenges, an expert panel was convened to review the selected indicators. Using the Delphi method, experts evaluated the practicality, significance, and feasibility of each indicator over two rounds of feedback. The consensus reached was that the indicator system, while robust, required further simplification to enhance its usability. This resulted in a recommendation to reduce

the number of indicators to approximately 20 core secondary indicators, ensuring a balance between comprehensiveness and simplicity.

*2) Principal Component Analysis (PCA) for Indicator Reduction*

In the next phase, Principal Component Analysis (PCA) was employed to further refine the selection of secondary indicators. By analyzing the correlations among the initially screened indicators, PCA helped reduce redundancy and identified the principal components that accounted for the majority of the variance in player Performance. This method allowed the researchers to consolidate similar or overlapping indicators into broader composite components, streamlining the selection system without sacrificing data integrity.

The PCA results produced a set of weighted scores for each secondary indicator, enabling the creation of an evaluation scale. The PCA process also highlighted the relative importance of each indicator within its category, ensuring that only those indicators with the highest explanatory power were retained for further analysis.

*3) Analytic Hierarchy Process (AHP) for Weight Assignment*

Following the PCA, the study applied the Analytic Hierarchy Process (AHP) to assign weights to both the primary and secondary indicators. The AHP methodology involved expert pairwise comparisons to determine the relative importance of each indicator category—such as body morphology, physical fitness, physiological function, psychological factors, technical skills, and Performance indicators. These weights were used to construct a final comprehensive model for each soccer position, balancing the contribution of each indicator to overall player evaluation.

The resulting weighted indicator system not only provided a structured approach to evaluating soccer players but also ensured that the model could be

practically applied in real-world settings. By incorporating both quantitative analysis (PCA) and expert judgment (AHP), the final model was designed to capture the complexity of player Performance while remaining simple enough for practical use in player selection and development.

*4) Transition to Model Construction*

The work completed in the earlier stages of the study, particularly the application of PCA and AHP, set a strong foundation for the next phase of model construction. The optimized list of core secondary indicators and their respective weights will be used to develop comprehensive evaluation models for goalkeepers, defenders, midfielders, and forwards. These models will provide a scientifically validated framework for assessing and selecting soccer players in Chinese universities, with the flexibility to adapt to specific position-based requirements.

The subsequent sections will detail the construction of the evaluation models, focusing on the unique requirements for each position and how the selected secondary indicators and their weights inform the final model. These models will serve as practical tools for coaches and evaluators, enabling more objective and data-driven decisions in player development and selection.

### 4.3.2 Construction and Analysis of the Goalkeeper Position Comprehensive Evaluation Model

*1） Preliminary Screening of Secondary Indicators*

In this evaluation model for goalkeepers, 34 secondary indicators were initially selected through T-tests and stepwise regression analysis. These indicators span six areas: body morphology, physical fitness, physiological function,

psychological factors, technical skills, and Performance indicators. However, due to the need for model simplification, Principal Component Analysis (PCA) and expert panel evaluations were applied to further refine these indicators.

*2）Principal Component Analysis (PCA) for Goalkeepers*

PCA was employed to reduce redundancy and identify the most influential indicators. The loadings of the first principal component (PC1) indicate which secondary indicators explain the majority of variance in the data. The following table shows the loadings for all 34 indicators:

**Table 36 Principal Component Analysis (PCA) Loadings for Goalkeepers**

| **Principal Component Analysis (PCA) Loadings for Goalkeepers** | |
|---|---|
| **Indicator** | **PC1 Loadings** |
| Long Pass Score | 0.3338 |
| Positive Cognition | 0.3007 |
| Body Fat Percentage (%) | 0.2841 |
| Dominant Leg Kick (m) | 0.2632 |
| Positioning | 0.2630 |
| Ankle Jump | 0.2568 |
| Lower Limb Length A | 0.2434 |
| Ankle Jump / Height Ratio | 0.2286 |
| Height | 0.2244 |
| Right Leg Jump / Height Ratio | 0.2074 |

**Principal Component Analysis (PCA) Loadings for Goalkeepers**

| Indicator | PC1 Loadings |
|---|---|
| Breath Holding Time (s) | 0.2048 |
| Skeletal Muscle (kg) | 0.1986 |
| Lean Body Mass / Body Weight × 100 | 0.1934 |
| Yo-Yo Run | 0.1876 |
| 30m Sprint Time (s) | 0.1812 |
| Vital Capacity (L) | 0.1754 |
| Maximum Oxygen Uptake / Weight | 0.1698 |
| Non-Dominant Leg Kick / Weight | 0.1643 |
| Left Foot Pass | 0.1615 |
| Right Foot Control | 0.1587 |
| T Run | 0.1549 |
| Saves | 0.1503 |
| Aerial Balls | 0.1472 |
| Forward Long Pass | 0.1448 |
| Coming Out | 0.1421 |
| Hand Throw Distance | 0.1386 |
| Lean Body Mass (kg) | 0.1352 |
| Target Focus | 0.1327 |
| Attention Stability | 0.1293 |

**Principal Component Analysis (PCA) Loadings for Goalkeepers**

| Indicator | PC1 Loadings |
|---|---|
| Emotion Control | 0.1268 |
| Left Leg Jump | 0.1236 |
| Horizontal Visual Field (degrees) | 0.1194 |
| Lower Leg Length Plus Foot Height | 0.1168 |

*3）Screening of Secondary Indicators Based on Expert Panel*

After reviewing the PCA results, an expert panel applied a screening process based on two criteria: **data collection feasibility** and **practical importance** in real-world settings. Indicators with an overall score of 3.5 or higher across both dimensions were retained for the final model.

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**Table 37 Expert Scoring and Final Retention of Secondary Indicators for Goalkeepers**

| Expert Scoring and Final Retention of Secondary Indicators for Goalkeepers | | | | | | |
|---|---|---|---|---|---|---|
| **Primary Indicator** | **Core Secondary Indicators** | **PCA Loading** | **Data Collection Feasibility** | **Practical Importance** | **Overall Score** | **Retention** |
| **Body Morphology** | Height | 0.2244 | 5 | 4 | 4.5 | Retained |
| | Skeletal Muscle (kg) | 0.1986 | 4 | 5 | 4.5 | Retained |
| | Body Fat Percentage (%) | 0.2841 | 4 | 4 | 4.0 | Retained |
| | Lean Body Mass / Body Weight × 100 | 0.1934 | 3 | 4 | 3.5 | Retained |
| **Physical Fitness** | Ankle Jump | 0.2568 | 4 | 4 | 4.0 | Retained |
| | Right Leg Jump / Height Ratio | 0.2074 | 4 | 4 | 4.0 | Retained |
| | Yo-Yo Run | 0.1876 | 3 | 5 | 4.0 | Retained |
| | 30m Sprint Time (s) | 0.1812 | 4 | 5 | 4.5 | Retained |
| | T Run | 0.1549 | 3 | 4 | 3.5 | Retained |
| **Physiological Function** | Vital Capacity (L) | 0.1754 | 4 | 4 | 4.0 | Retained |
| | Maximum Oxygen Uptake / Weight | 0.1698 | 3 | 5 | 4.0 | Retained |

**Expert Scoring and Final Retention of Secondary Indicators for Goalkeepers**

| Primary Indicator | Core Secondary Indicators | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retention |
|---|---|---|---|---|---|---|
| **Psychological Factors** | Target Focus | 0.1327 | 4 | 5 | 4.5 | Retained |
| | Positive Cognition | 0.3007 | 4 | 4 | 4.0 | Retained |
| **Technical Skills** | Left Foot Pass | 0.1615 | 4 | 4 | 4.0 | Retained |
| | Right Foot Control | 0.1587 | 4 | 5 | 4.5 | Retained |
| | Long Pass Score | 0.3338 | 3 | 4 | 3.5 | Retained |
| | Comprehensive Technical Time | 0.1549 | 3 | 4 | 3.5 | Retained |
| **Performance Indicators** | Saves | 0.1503 | 4 | 5 | 4.5 | Retained |
| | Aerial Balls | 0.1472 | 4 | 4 | 4.0 | Retained |
| | Coming Out | 0.1421 | 3 | 4 | 3.5 | Retained |
| | Hand Throw Distance | 0.1386 | 3 | 4 | 3.5 | Retained |

*4）Application of AHP for Weight Assignment*

The Analytic Hierarchy Process (AHP) was used to assign weights to each primary and secondary indicator. Pairwise comparisons were made between primary indicators based on expert evaluations, following the AHP scale (1 to 9).

Table 38 **Pairwise Comparison Matrix and Weights for Goalkeeper Position (Primary Indicator)**

| **Pairwise Comparison Matrix and Weights for Goalkeeper Position** | | |
|---|---|---|
| **Primary Indicator Comparison** | **Expert Score** | **AHP Converted Value** |
| Performance Indicators vs Psychological Factors | 6 | 6 |
| Performance Indicators vs Physical Fitness | 5 | 5 |
| Performance Indicators vs Technical Skills | 7 | 7 |
| Performance Indicators vs Body Morphology | 7 | 7 |
| Performance Indicators vs Physiological Function | 8 | 8 |
| Psychological Factors vs Physical Fitness | 4 | 4 |
| Psychological Factors vs Technical Skills | 5 | 5 |

The final weights for each primary indicator were calculated based on these comparisons and normalized. The final Consistency Ratio (CR) was 0.1679, within acceptable limits.

Table 39 **Final Weight Distribution for Goalkeepers**

| Primary Indicator | Weight |
|---|---|
| Performance Indicators | 0.4837 |
| Psychological Factors | 0.2312 |
| Physical Fitness | 0.1426 |
| Technical Skills | 0.0713 |
| Body Morphology | 0.0443 |
| Physiological Function | 0.0271 |

*5） Final Model: Weight Assignment for Secondary Indicators*

The final step was calculating the weight of each secondary indicator within its respective primary category using AHP. The following table shows the final weights for each secondary indicator, contributing to the overall goalkeeper Performance evaluation model.

Table 40 **Final Weight Distribution for Secondary Indicators (Goalkeepers)**

| **Final Weight Distribution for Secondary Indicators (Goalkeepers)** | | | | |
|---|---|---|---|---|
| **Primary Indicator** | **Primary Indicator Weight** | **Secondary Indicator** | **Secondary Indicator Weight** | **Final Weight** |
| **Performance Indicators** | 0.4837 | Saves | 0.6493 | 0.3140 |
| | | Positioning | 0.1531 | 0.0740 |
| | | Aerial Balls | 0.1457 | 0.0705 |

**Final Weight Distribution for Secondary Indicators (Goalkeepers)**

| Primary Indicator | Primary Indicator Weight | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|---|
| **Psychological Factors** | 0.2312 | Coming Out | 0.0518 | 0.0250 |
| | | Positive Cognition | 0.5579 | 0.1290 |
| | | Target Focus | 0.2633 | 0.0609 |
| | | Emotion Control | 0.1219 | 0.0282 |
| | | Attention Stability | 0.0569 | 0.0132 |
| **Physical Fitness** | 0.1426 | Ankle Jump | 0.4641 | 0.0662 |
| | | Right Leg Jump / Height Ratio | 0.2017 | 0.0288 |
| | | Yo-Yo Run | 0.0888 | 0.0126 |
| | | 30m Sprint Time (s) | 0.0436 | 0.0062 |
| | | T Run | 0.2017 | 0.0288 |
| **Technical Skills** | 0.0713 | Long Pass Score | 0.5579 | 0.0397 |
| | | Right Foot Control | 0.2633 | 0.0188 |
| | | Left Foot Pass | 0.1219 | 0.0087 |
| | | Comprehensive | 0.0569 | 0.0041 |

**Final Weight Distribution for Secondary Indicators (Goalkeepers)**

| Primary Indicator | Primary Indicator Weight | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|---|
| **Body Morphology** | 0.0443 | Technical Time | | |
| | | Height | 0.5579 | 0.0247 |
| | | Skeletal Muscle (kg) | 0.2633 | 0.0117 |
| | | Body Fat Percentage (%) | 0.1219 | 0.0054 |
| | | Lean Body Mass / Body Weight × 100 | 0.0569 | 0.0025 |
| **Physiological Function** | 0.0271 | Vital Capacity (L) | 0.6493 | 0.0176 |
| | | Maximum Oxygen Uptake / Weight (L/min/kg) | 0.2571 | 0.0070 |
| | | Breath Holding Time (s) | 0.0936 | 0.0025 |

Summary:

Through PCA and AHP analysis, 22 key secondary indicators were finalized in the comprehensive evaluation model of goalkeepers, and each indicator was scientifically evaluated according to its weight. This model will provide strong theoretical support for the training, selection and development of goalkeepers.

4.3.3 Construction and Analysis of the Comprehensive Evaluation Model for the Defender Position

*1）Preliminary Selection of Secondary Indicators*

In the comprehensive evaluation study for the defender position, based on T-tests and stepwise regression analysis, **33 secondary indicators** were initially selected. These indicators cover key characteristics of defenders across six aspects: **body morphology**, **physical fitness**, **physiological function**, **psychological factors**, **technical skills**, and **Performance indicators**. These indicators reflect the physical, technical, and psychological characteristics of defenders, along with their influence on Performance in matches.

*2）Application of Principal Component Analysis (PCA)*

To simplify the model and reduce redundancy among indicators, **Principal Component Analysis (PCA)** was applied to the 33 secondary indicators. PCA is used to transform the original indicators into fewer composite components by linear combinations, explaining the majority of the variability in the data. Below are the results of the PCA, ranked according to the loadings of the first principal component (PC1).

**Table 41 Principal Component Analysis (PCA) Loadings for Defenders**

**Principal Component Analysis (PCA) Loadings for Defenders**

| Indicator | PC1 Loadings |
|---|---|
| 30m Sprint Time (s) | 0.1868 |
| Skeletal Muscle (kg) | 0.1858 |
| Yo-Yo Intermittent Recovery Test Level 1 (m) | 0.1853 |
| Vertical Jump Height | 0.1847 |
| Non-Dominant Leg Kick / Weight | 0.1842 |
| Long Pass Score | 0.1818 |
| Right Leg Jump / Height Ratio | 0.1811 |
| Comprehensive Technical Time | 0.1802 |
| Block Passing Lane | 0.1783 |
| Block Shot | 0.1785 |
| Penetrative Pass | 0.1774 |
| Vital Capacity (L) | 0.1766 |
| Short Pass Score | 0.1764 |
| Tackle | 0.1769 |
| Vertical Jump Height / Height Ratio | 0.1821 |
| Maximum Oxygen Uptake / Weight (L/min/kg) | 0.1755 |
| Shot | 0.1721 |
| Height | 0.1739 |

**Principal Component Analysis (PCA) Loadings for Defenders**

| Indicator | PC1 Loadings |
|---|---|
| Weight | 0.1659 |
| Attention Stability | 0.1675 |
| Emotion Control | 0.1542 |
| Positive Cognition | 0.1542 |
| Target Focus | 0.1361 |
| Left Leg Jump Height (cm) | 0.1236 |
| Inhaled Chest Circumference | 0.1194 |
| Exhaled Chest Circumference | 0.1168 |
| Breath Holding Time (s) | 0.1123 |
| Horizontal Visual Field (degrees) | 0.1098 |
| Dominant Leg Kick Distance (m) | 0.1086 |
| T Test Time (s) | 0.1043 |
| Non-Dominant Leg Kick Distance (m) | 0.1001 |
| Left Leg Jump Height / Height Ratio | 0.0974 |
| Vertical Jump Height (cm) | 0.0912 |

*3） Screening of Secondary Indicators*

Following the PCA results, the 33 secondary indicators were further screened. The expert panel comprehensively scored each indicator based on its

practical application and the ease of data collection. The scoring criteria were as follows:

**Data Collection Feasibility (1-5 points):** The ease of collecting data for each indicator.

**Practical Importance (1-5 points):** The importance of each indicator to actual defender Performance.

Indicators were retained if they had a high **overall score** (average of data collection feasibility and practical importance). Low-scoring indicators were removed if they had low PCA loading values and were deemed less important

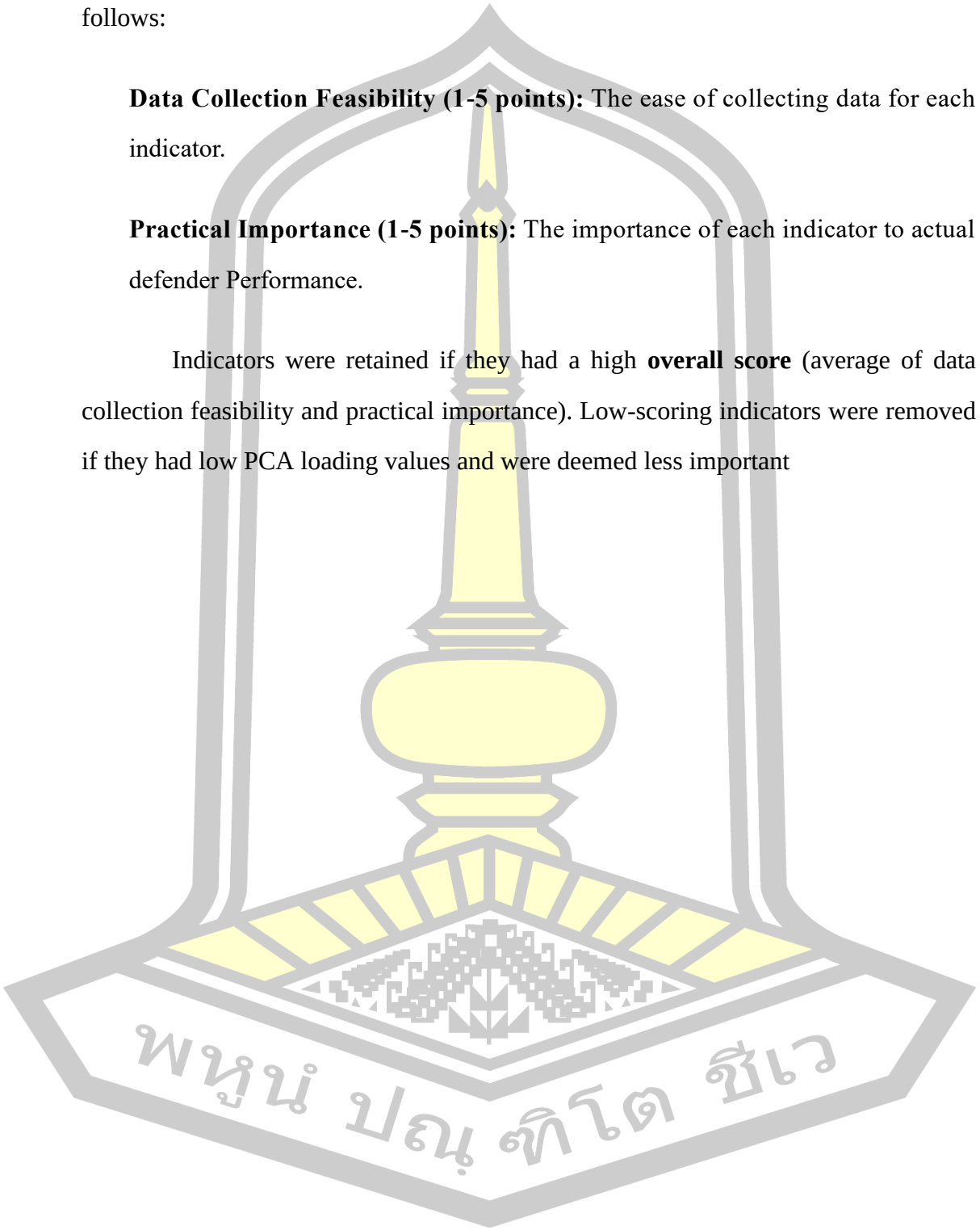

**Table 42 Expert Scoring and Overall Score for Secondary Indicators (Defenders)**

**Expert Scoring and Overall Score for Secondary Indicators**

| Primary Indicator | Core Secondary Indicators | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retained |
|---|---|---|---|---|---|---|
| Body Morphology | Height | 0.1739 | 5 | 4 | 4.5 | Retained |
| | Weight | 0.1659 | 5 | 4 | 4.5 | Retained |
| | Skeletal Muscle (kg) | 0.1858 | 3 | 5 | 4.0 | Retained |
| | Lean Body Mass / Body Weight × 100 | 0.1846 | 3 | 4 | 3.5 | Retained |
| Physical Fitness | Vertical Jump Height | 0.1847 | 4 | 4 | 4.0 | Retained |
| | Right Leg Jump / Height Ratio | 0.1811 | 4 | 4 | 4.0 | Retained |
| | Yo-Yo Intermittent Recovery Test Level 1 | 0.1853 | 3 | 5 | 4.0 | Retained |
| | 30m Sprint Time (s) | 0.1868 | 4 | 5 | 4.5 | Retained |
| | Vertical Jump | 0.18 | 4 | 4 | 4.0 | Retai |

**Expert Scoring and Overall Score for Secondary Indicators**

| Primary Indicator | Core Secondary Indicators | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retained |
|---|---|---|---|---|---|---|
| | Height / Height Ratio | 21 | | | | ned |
| Physiological Function | Vital Capacity (L) | 0.17 66 | 4 | 4 | 4.0 | Retained |
| | Maximum Oxygen Uptake / Weight | 0.17 55 | 3 | 5 | 4.0 | Retained |
| Psychological Factors | Target Focus | 0.13 61 | 4 | 5 | 4.5 | Retained |
| | Attention Stability | 0.16 75 | 4 | 4 | 4.0 | Retained |
| | Emotion Control | 0.15 42 | 4 | 4 | 4.0 | Retained |
| | Positive Cognition | 0.15 42 | 4 | 4 | 4.0 | Retained |
| Technical Skills | Short Pass Score | 0.17 64 | 4 | 4 | 4.0 | Retained |
| | Long Pass Score | 0.18 18 | 4 | 4 | 4.0 | Retained |
| | Right Foot Shot | 0.12 42 | 4 | 5 | 4.5 | Retained |

**Expert Scoring and Overall Score for Secondary Indicators**

| Primary Indicator | Core Secondary Indicators | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retained |
|---|---|---|---|---|---|---|
| Performance Indicators | Comprehensive Technical Time | 0.1802 | 3 | 4 | 3.5 | Retained |
| | Penetrative Pass | 0.1774 | 4 | 4 | 4.0 | Retained |
| | Shot | 0.1721 | 4 | 4 | 4.0 | Retained |
| | Block Shot | 0.1785 | 3 | 3 | 3.0 | Retained |
| | Tackle | 0.1769 | 3 | 3 | 3.0 | Retained |
| | Block Passing Lane | 0.1783 | 3 | 4 | 3.5 | Retained |
| | Passing Under Pressure | 0.1696 | 4 | 4 | 4.0 | Retained |

*4） Determining Weights Using the Analytic Hierarchy Process (AHP)*

To assign weights to each primary and secondary indicator, the **Analytic Hierarchy Process (AHP)** was used. The key steps involved in AHP include constructing a pairwise comparison matrix, calculating the **maximum eigenvalue** (λmax), and conducting a consistency check. If the **Consistency Ratio (CR)** is below 0.1, the matrix is considered consistent.

The following table outlines the weight distribution across the six primary indicators:

Table 43 **Final Weight Distribution for Primary Indicators (Defenders)**

| **Primary Indicator** | **Weight** |
|---|---|
| Performance Indicators | 0.2912 |
| Psychological Factors | 0.1785 |
| Physical Fitness | 0.2300 |
| Technical Skills | 0.1036 |
| Body Morphology | 0.0466 |
| Physiological Function | 0.1501 |

*5） Calculation of Secondary Indicator Weights*

The secondary indicators were evaluated under each primary indicator using pairwise comparisons. The final weight of each secondary indicator was calculated based on expert scoring.

**Table 44 Final Weight Distribution for Defenders (Secondary Indicators)**

| Final Weight Distribution for Defenders | | | |
|---|---|---|---|
| **Primary Indicator** | **Secondary Indicator** | **Secondary Indicator Weight** | **Final Weight** |
| Performance Indicators | Penetrative Pass | 0.4195 | 0.1222 |
| | Shot | 0.1917 | 0.0558 |
| | Block Shot | 0.0799 | 0.0233 |
| | Tackle | 0.0374 | 0.0109 |
| | Block Passing Lane | 0.1917 | 0.0558 |
| | Passing Under Pressure | 0.0799 | 0.0233 |
| Psychological Factors | Target Focus | 0.5579 | 0.0995 |
| | Attention Stability | 0.2633 | 0.0470 |
| | Emotion Control | 0.1219 | 0.0218 |
| | Positive Cognition | 0.0569 | 0.0102 |
| Physical Fitness | Vertical Jump Height | 0.4641 | 0.1067 |
| | Right Leg Jump / Height Ratio | 0.2017 | 0.0463 |
| | Yo-Yo Intermittent Recovery Test Level 1 | 0.0888 | 0.0204 |
| | 30m Sprint Time | 0.0436 | 0.0101 |

**Final Weight Distribution for Defenders**

| Primary Indicator | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|
| Technical Skills | Vertical Jump Height / Height Ratio | 0.2017 | 0.0463 |
| | Short Pass Score | 0.5579 | 0.0578 |
| | Long Pass Score | 0.2633 | 0.0273 |
| | Right Foot Shot | 0.1219 | 0.0126 |
| | Comprehensive Technical Time | 0.0569 | 0.0059 |
| Body Morphology | Height | 0.5579 | 0.0260 |
| | Weight | 0.2633 | 0.0123 |
| | Skeletal Muscle | 0.1219 | 0.0057 |
| | Lean Body Mass / Body Weight × 100 | 0.0569 | 0.0027 |
| Physiological Function | Vital Capacity | 0.7500 | 0.1126 |
| | Maximum Oxygen Uptake / Weight | 0.2500 | 0.0375 |

The final weight distribution serves as a reference standard for evaluating defenders, ensuring the model comprehensively reflects the critical skills needed for success in this position.

6） Summary

In summary, the construction of the comprehensive evaluation model for defenders involved a thorough selection and refinement process. The **Principal Component Analysis (PCA)** initially identified 33 secondary indicators, covering key aspects such as body morphology, physical fitness, physiological function, psychological factors, technical skills, and Performance indicators.

Through expert evaluation and scoring, these secondary indicators were further refined based on their practical application and ease of data collection. The final model retained the most critical 22 secondary indicators, ensuring that each factor meaningfully contributes to the defender's overall evaluation.

Using the **Analytic Hierarchy Process (AHP)**, weights were assigned to both the primary and secondary indicators, ensuring that Performance indicators were given the highest priority (weight of 0.2912), followed by physical fitness (0.2300) and psychological factors (0.1785). This structured and scientifically validated model now offers a reliable tool for the evaluation and development of defenders in soccer.

By combining both quantitative and expert qualitative insights, this model allows for the comprehensive assessment of key defender traits, providing coaches and analysts with an accurate and efficient system to evaluate player Performance and potential.

4.3.4 Construction and Analysis of the Comprehensive Evaluation Model for the Midfield Position

*1） Preliminary Selection of Secondary Indicators*

In the comprehensive evaluation study for the midfield position, based on T-tests and stepwise regression analysis, 33 secondary indicators were initially selected.

These indicators cover key characteristics of midfield players across six aspects: body morphology, physical fitness, physiological function, psychological factors, technical skills, and match Performance. Specific secondary indicators include height, weight, Yo-Yo Intermittent Recovery Test, 30-meter sprint time, vertical jump height, short pass score, penetrative pass, and more. These indicators reflect the physical and technical abilities of midfield players while also considering psychological factors' impact on their match Performance.

*2） Application of Principal Component Analysis (PCA)*

To simplify the model and reduce redundancy among indicators, Principal Component Analysis (PCA) was applied to the 33 secondary indicators. The PCA transforms the original indicators into a smaller number of composite components that explain the most variability in the data. The following are the results after the PCA analysis, ranked according to the first principal component (PC1).

Table 45 **Principal Component Analysis (PCA) Loadings for Midfield Players**

| **Principal Component Analysis (PCA) Loadings for Midfield Players** | |
|---|---|
| **Indicator** | **PC1 Loadings** |
| Skeletal Muscle (kg) | 0.1838 |
| Yo-Yo Intermittent Recovery Test | 0.1836 |
| Emotion Control | 0.1833 |
| Target Focus | 0.1827 |
| Dominant Leg Kick Distance | 0.1824 |
| Left Leg Jump Height | 0.1810 |
| Vertical Jump Height | 0.1810 |

| Principal Component Analysis (PCA) Loadings for Midfield Players | |
|---|---|
| **Indicator** | **PC1 Loadings** |
| 30m Sprint Time | 0.1808 |
| Long Pass Score | 0.1799 |
| T Test Time | 0.1799 |
| Attention Stability | 0.1798 |
| Vertical Jump Height / Height Ratio | 0.1787 |
| Right Foot Shot | 0.1779 |
| Shot | 0.1771 |
| Lean Body Mass / Body Weight × 100 | 0.1769 |
| Block Passing Lane | 0.1768 |
| Right Leg Jump / Height Ratio | 0.1764 |
| Short Pass Score | 0.1763 |
| Tackle | 0.1758 |
| Maximum Oxygen Uptake / Weight | 0.1756 |
| Breath Holding Time | 0.1756 |
| Penetrative Pass | 0.1745 |
| Horizontal Visual Field | 0.1732 |
| Vital Capacity | 0.1766 |
| Weight | 0.1464 |
| Height | 0.1584 |

| Principal Component Analysis (PCA) Loadings for Midfield Players | |
|---|---|
| **Indicator** | **PC1 Loadings** |
| Inhaled Chest Circumference | 0.1441 |
| Exhaled Chest Circumference | 0.1320 |
| Comprehensive Technical Time | 0.1802 |
| Non-Dominant Leg Kick Distance | 0.1727 |

*3）Screening of Secondary Indicators*

Based on the PCA analysis and expert scoring, the 33 secondary indicators were further screened. The expert panel rated each indicator based on its importance in practical application and the feasibility of data collection. Indicators were retained based on the following criteria:

**Data Collection Feasibility (1-5 points):** Higher scores indicate easier data collection.

**Practical Importance (1-5 points):** Higher scores indicate that the indicator is more critical to player Performance.

Table 46 **Expert Scoring and Overall Score Table for Midfield Players**

**Expert scoring and overall Score table for midfield players**

| Primary Indicator | Secondary Indicator | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retention |
|---|---|---|---|---|---|---|
| Body Morphology | Exhaled Chest Circumference | 0.1320 | 3 | 2 | 2.5 | Removed |
| | Inhaled Chest Circumference | 0.1441 | 3 | 2 | 2.5 | Removed |
| | Lean Body Mass / Body Weight × 100 | 0.1769 | 3 | 4 | 3.5 | Retained |
| | Skeletal Muscle (kg) | 0.1838 | 3 | 5 | 4.0 | Retained |
| | Weight | 0.1464 | 5 | 4 | 4.5 | Retained |
| | Height | 0.1584 | 5 | 4 | 4.5 | Retained |
| Physical Fitness | Left Leg Jump Height | 0.1810 | 3 | 3 | 3.0 | Removed |
| | Vertical Jump Height / | 0.1787 | 4 | 4 | 4.0 | Retained |

**Expert scoring and overall Score table for midfield players**

| Primary Indicator | Secondary Indicator | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retention |
|---|---|---|---|---|---|---|
| | Height Ratio | | | | | |
| | Dominant Leg Kick Distance | 0.1824 | 4 | 5 | 4.5 | Retained |
| | T Test Time | 0.1799 | 4 | 4 | 4.0 | Retained |
| | Vertical Jump Height | 0.1810 | 4 | 4 | 4.0 | Retained |
| | Right Leg Jump / Height Ratio | 0.1811 | 4 | 4 | 4.0 | Retained |
| | 30m Sprint Time | 0.1808 | 4 | 5 | 4.5 | Retained |
| | Yo-Yo Intermittent Recovery Test Level 1 | 0.1836 | 3 | 5 | 4.0 | Retained |
| Physiological Function | Horizontal Visual Field | 0.1732 | 4 | 4 | 4.0 | Retained |
| | Maximum Oxygen Uptake / | 0.1756 | 3 | 5 | 4.0 | Retained |

**Expert scoring and overall Score table for midfield players**

| Primary Indicator | Secondary Indicator | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retention |
|---|---|---|---|---|---|---|
| | Weight | | | | | |
| | Breath Holding Time | 0.17756 | 4 | 4 | 4.0 | Retained |
| Psychological Factors | Target Focus | 0.18027 | 4 | 4 | 4.0 | Retained |
| | Attention Stability | 0.17998 | 4 | 4 | 4.0 | Retained |
| | Emotion Control | 0.18033 | 4 | 4 | 4.0 | Retained |
| Technical Skills | Right Foot Shot | 0.17779 | 4 | 4 | 4.0 | Retained |
| | Long Pass Score | 0.17999 | 4 | 4 | 4.0 | Retained |
| | Short Pass Score | 0.17963 | 4 | 4 | 4.0 | Retained |

*4） Determining Weights Using the Analytic Hierarchy Process (AHP)*

A three-level hierarchical model was constructed:

1. **Goal Level**: The final score for the comprehensive evaluation of midfield players.

2. **Criteria Level (Primary Indicators)**: Six primary indicators (Body Morphology, Physical Fitness, Physiological Function, Psychological Factors, Technical Skills, Performance Indicators).

3. **Alternative Level (Secondary Indicators)**: The retained secondary indicators under each primary indicator.

A pairwise comparison matrix was constructed to calculate the weights for the primary indicators using the AHP 1-9 scale.

Table 47 **Pairwise Comparison of Primary Indicators for Midfield Players**

| **Pairwise Comparison of Primary Indicators for Midfield Players** | | |
|---|---|---|
| **Comparison of Primary Indicators** | **Expert Score** | **AHP Converted Value** |
| Performance Indicators vs Psychological Factors | High | 5 |
| Performance Indicators vs Physical Fitness | High | 4 |
| Performance Indicators vs Technical Skills | High | 5 |
| Performance Indicators vs Body Morphology | High | 6 |
| Performance Indicators vs Physiological Function | High | 7 |
| Psychological Factors vs Physical Fitness | Medium | 3 |

**Pairwise Comparison of Primary Indicators for Midfield Players**

| Comparison of Primary Indicators | Expert Score | AHP Converted Value |
|---|---|---|
| Psychological Factors vs Technical Skills | Medium | 3 |
| Psychological Factors vs Body Morphology | Medium | 4 |
| Psychological Factors vs Physiological Function | High | 6 |
| Physical Fitness vs Technical Skills | Medium | 3 |
| Physical Fitness vs Body Morphology | Medium | 4 |
| Physical Fitness vs Physiological Function | High | 5 |
| Technical Skills vs Body Morphology | Medium | 3 |
| Technical Skills vs Physiological Function | Medium | 4 |
| Body Morphology vs Physiological Function | Medium | 3 |

Based on these comparisons, the following weights were calculated for the primary indicators:

Table 48 **Weight Calculation for Primary Indicators for Midfield Players**

| Primary Indicator | Weight |
|---|---|
| Performance Indicators | 0.4269 |
| Psychological Factors | 0.2050 |
| Physical Fitness | 0.1738 |
| Technical Skills | 0.1001 |

| Primary Indicator | Weight |
|---|---|
| Body Morphology | 0.0596 |
| Physiological Function | 0.0346 |

*5）Final Weight Table*

After completing the AHP calculation, the final weights of the primary indicators and their corresponding secondary indicators are as follows:

Table 49 **Final Weight Calculation for Midfield Players**

| **Final Weight Calculation for Midfield Players** | | | | |
|---|---|---|---|---|
| **Primary Indicator** | **Primary Indicator Weight** | **Secondary Indicator** | **Secondary Indicator Weight** | **Final Weight** |
| Performance Indicators | 0.4269 | Penetrative Pass | 0.5907 | 0.2521 |
| | | Shot | 0.2762 | 0.1179 |
| | | Tackle | 0.1331 | 0.0569 |
| Psychological Factors | 0.2050 | Target Focus | 0.5778 | 0.1185 |
| | | Attention Stability | 0.2731 | 0.0560 |
| | | Emotion Control | 0.1491 | 0.0306 |
| Physical Fitness | 0.1738 | Vertical Jump Height / Height | 0.3647 | 0.0634 |

**Final Weight Calculation for Midfield Players**

| Primary Indicator | Primary Indicator Weight | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|---|
| | | Ratio | | |
| | | Dominant Leg Kick Distance | 0.2265 | 0.0394 |
| | | T Test Time | 0.1367 | 0.0238 |
| | | Vertical Jump Height | 0.1079 | 0.0187 |
| | | 30m Sprint Time | 0.0864 | 0.0150 |
| | | Yo-Yo Intermittent Recovery Test | 0.0788 | 0.0137 |
| Technical Skills | 0.1001 | Right Foot Shot | 0.5745 | 0.0575 |
| | | Long Pass Score | 0.2672 | 0.0267 |
| | | Short Pass Score | 0.1583 | 0.0159 |
| Body Morphology | 0.0596 | Height | 0.5579 | 0.0332 |
| | | Weight | 0.2633 | 0.0157 |
| | | Skeletal Muscle (kg) | 0.1219 | 0.0073 |

**Final Weight Calculation for Midfield Players**

| Primary Indicator | Primary Indicator Weight | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|---|
| Physiological Function | 0.0346 | Lean Body Mass / Body Weight × 100 | 0.0569 | 0.0034 |
| | | Maximum Oxygen Uptake / Weight | 0.5778 | 0.0200 |
| | | Breath Holding Time | 0.2731 | 0.0094 |
| | | Horizontal Visual Field | 0.1491 | 0.0052 |

6）Summary

The comprehensive evaluation model for the midfield position, constructed using PCA and AHP, effectively identifies and weights the key indicators across six categories: body morphology, physical fitness, physiological function, psychological factors, technical skills, and Performance indicators. This model highlights the relative importance of Performance indicators, psychological factors, and physical fitness as the primary determinants for evaluating midfield players, while also accounting for technical skills, body morphology, and physiological function. The final weightings and consistency ratio (CR) of 0.0932 confirm the robustness and validity of the model.

The carefully selected secondary indicators and their weights offer a scientifically grounded framework for evaluating midfield players' abilities. These insights can guide both player selection and training, ensuring a balanced assessment that takes into account physical, mental, and technical aspects. This model lays a solid foundation for future applications in real-world player evaluation and development processes, particularly for those in midfield roles where a broad skill set is essential for success.

4.3.5 Construction and Analysis of the Comprehensive Evaluation Model for the Forward Position

*1）Preliminary Selection of Secondary Indicators*

In the comprehensive evaluation study for the forward position, based on T-tests and stepwise regression analysis, 33 secondary indicators were initially selected. These indicators cover key characteristics of forwards across six aspects: body morphology, physical fitness, physiological function, psychological factors, technical skills, and match Performance. The selected secondary indicators include height, weight, 30-meter sprint time, vertical jump height, right foot shot, penetrative pass, and more. These indicators reflect the physical and technical abilities of forwards while also considering psychological factors' impact on match Performance.

*2）Application of Principal Component Analysis (PCA)*

To simplify the model and reduce redundancy among indicators, Principal Component Analysis (PCA) was applied to the 33 secondary indicators. The PCA transforms the original indicators into a smaller number of composite components that explain the most variability in the data. The following are the results after the PCA analysis, ranked according to the first principal component (PC1).

**Table 50 Principal Component Analysis (PCA) Loadings for Forward Players**

| Principal Component Analysis (PCA) Loadings for Forward | |
|---|---|
| **Indicator** | **PC1 Loadings** |
| Dominant Leg Kick Distance | 0.1855 |
| 30m Sprint Time | 0.1855 |
| T Test Time | 0.1849 |
| Yo-Yo Intermittent Recovery Test Level 1 | 0.1847 |
| Non-Dominant Leg Kick Distance / Weight | 0.1837 |
| Short Pass Total Points | 0.1827 |
| Long Pass Total Points | 0.1808 |
| Right Foot Shot | 0.1787 |
| Block Passing Lane | 0.1582 |
| Height | 0.0577 |
| Weight | 0.0673 |
| Skeletal Muscle (kg) | 0.0908 |
| Lean Body Mass / Body Weight × 100 | 0.0985 |
| Vertical Jump Height / Height Ratio | 0.0529 |
| Left Leg Jump Height | 0.0417 |
| Breath Holding Time | 0.1218 |
| Horizontal Visual Field | 0.1247 |

**Principal Component Analysis (PCA) Loadings for Forward**

| Indicator | PC1 Loadings |
|---|---|
| Maximum Oxygen Uptake / Weight | 0.1072 |
| Target Focus | 0.1782 |
| Attention Stability | 0.1759 |
| Emotion Control | 0.1769 |
| Positive Cognition | 0.1751 |
| Shot | 0.1693 |
| Tackle | 0.1611 |
| Block Shot | 0.1654 |
| Penetrative Pass | 0.1723 |
| Passing Under Pressure | 0.1550 |
| Composite Technical Time | 0.1693 |

*3） Screening of Secondary Indicators*

Based on the PCA analysis and expert scoring, the 33 secondary indicators were further screened. The expert panel rated each indicator based on its importance in practical application and the feasibility of data collection. Indicators were retained based on the following criteria:

**Data Collection Feasibility (1-5 points)**: Higher scores indicate easier data collection.

**Practical Importance (1-5 points)**: Higher scores indicate that the indicator is more critical to player Performance.

**Table 51 Expert Scoring and Overall Score Table for Forward Players**

| Expert Scoring and Overall Score Table for Forward Players | | | | | | |
|---|---|---|---|---|---|---|
| **Primary Indicator** | **Secondary Indicator** | **PCA Loading** | **Data Collection Feasibility** | **Practical Importance** | **Overall Score** | **Retention** |
| Body Morphology | Height | 0.0577 | 5 | 4 | 4.5 | Retained |
| | Weight | 0.0673 | 5 | 4 | 4.5 | Retained |
| | Skeletal Muscle (kg) | 0.0908 | 3 | 5 | 4.0 | Retained |
| | Lean Body Mass / Body Weight × 100 | 0.0985 | 3 | 4 | 3.5 | Retained |
| | Inhalation Circumference | 0.0741 | 2 | 3 | 2.5 | Removed |
| | Exhalation Circumference | 0.0819 | 2 | 3 | 2.5 | Removed |
| Physical Fitness | Vertical Jump Height | 0.1335 | 4 | 4 | 4.0 | Retained |
| | Dominant Leg Kick Distance | 0.1855 | 4 | 5 | 4.5 | Retained |
| | T Test Time | 0.1849 | 4 | 4 | 4.0 | Retained |

**Expert Scoring and Overall Score Table for Forward Players**

| Primary Indicator | Secondary Indicator | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retention |
|---|---|---|---|---|---|---|
| Physiological Function | Vertical Jump Height / Height Ratio | 0.0529 | 4 | 4 | 4.0 | Retained |
| | 30m Sprint Time | 0.1855 | 4 | 5 | 4.5 | Retained |
| | Yo-Yo Intermittent Recovery Test Level 1 | 0.1847 | 3 | 5 | 4.0 | Retained |
| | Maximum Oxygen Uptake / Weight | 0.1072 | 3 | 5 | 4.0 | Retained |
| | Breath Holding Time | 0.1218 | 4 | 4 | 4.0 | Retained |
| | Horizontal Visual Field | 0.1247 | 4 | 4 | 4.0 | Retained |
| Psychological Factors | Target Focus | 0.1782 | 4 | 4 | 4.0 | Retained |
| | Attention Stability | 0.1759 | 4 | 4 | 4.0 | Retained |
| | Emotion Control | 0.1769 | 4 | 4 | 4.0 | Retained |

**Expert Scoring and Overall Score Table for Forward Players**

| Primary Indicator | Secondary Indicator | PCA Loading | Data Collection Feasibility | Practical Importance | Overall Score | Retention |
|---|---|---|---|---|---|---|
| Technical Skills | Right Foot Shot | 0.1787 | 4 | 5 | 4.5 | Retained |
| | Long Pass Score | 0.1808 | 4 | 5 | 4.5 | Retained |
| | Short Pass Score | 0.1827 | 4 | 5 | 4.5 | Retained |
| Performance Indicators | Penetrative Pass | 0.1723 | 4 | 4 | 4.0 | Retained |
| | Block Shot | 0.1654 | 3 | 3 | 3.0 | Removed |
| | Tackle | 0.1611 | 4 | 4 | 4.0 | Retained |

*4） Determining Weights Using the Analytic Hierarchy Process (AHP)*

A three-level hierarchical model was constructed for the forward position:

1. **Goal Level**: The final score for the comprehensive evaluation of forwards.

2. **Criteria Level (Primary Indicators)**: Six primary indicators—Body Morphology, Physical Fitness, Physiological Function, Psychological Factors, Technical Skills, and Performance Indicators.

3. **Alternative Level (Secondary Indicators)**: The retained secondary indicators under each primary indicator.

A pairwise comparison matrix was constructed to calculate the weights for the primary indicators using the AHP 1-9 scale.

**Table 52 Pairwise Comparison of Primary Indicators for Forward Players**

| **Pairwise Comparison of Primary Indicators for Forward Players** | | |
|---|---|---|
| **Comparison of Primary Indicators** | **Expert Score** | **AHP Converted Value** |
| Performance Indicators vs Psychological Factors | High | 6 |
| Performance Indicators vs Physical Fitness | High | 5 |
| Performance Indicators vs Technical Skills | Very High | 6 |
| Performance Indicators vs Body Morphology | High | 5 |
| Performance Indicators vs Physiological Function | Very High | 7 |
| Psychological Factors vs Physical Fitness | Medium | 3 |

| Pairwise Comparison of Primary Indicators for Forward Players | | |
|---|---|---|
| **Comparison of Primary Indicators** | **Expert Score** | **AHP Converted Value** |
| Psychological Factors vs Technical Skills | Medium | 3 |

*5） Final Weight Table*

After completing the AHP calculation, the final weights of the primary indicators and their corresponding secondary indicators are as follows:

**Table 53 Final Weight Calculation for Forward Players**

| Final Weight Calculation for Forward Players | | | | |
|---|---|---|---|---|
| **Primary Indicator** | **Primary Indicator Weight** | **Secondary Indicator** | **Secondary Indicator Weight** | **Final Weight** |
| **Performance Indicators** | 0.5056 | **Penetrative Pass** | 0.5801 | 0.2932 |
| | | **Shot** | 0.2548 | 0.1287 |
| | | **Block Shot** | 0.1086 | 0.0549 |
| | | **Tackle** | 0.0565 | 0.0286 |
| **Psychological Factors** | 0.0817 | **Target Focus** | 0.5778 | 0.0472 |
| | | **Attention Stability** | 0.2731 | 0.0223 |
| | | **Emotion** | 0.1491 | 0.0122 |

**Final Weight Calculation for Forward Players**

| Primary Indicator | Primary Indicator Weight | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|---|
| | | Control | | |
| Physical Fitness | 0.1481 | Vertical Jump Height / Height Ratio | 0.3647 | 0.0540 |
| | | Dominant Leg Kick Distance | 0.2265 | 0.0335 |
| | | T Test Time | 0.1367 | 0.0203 |
| | | Vertical Jump Height | 0.1079 | 0.0160 |
| | | 30m Sprint Time | 0.0864 | 0.0128 |
| | | Yo-Yo Intermittent Recovery Test | 0.0788 | 0.0117 |
| Technical Skills | 0.1908 | Right Foot Shot | 0.5745 | 0.1096 |
| | | Long Pass Score | 0.2672 | 0.0510 |
| | | Short Pass Score | 0.1583 | 0.0302 |
| Body | 0.0474 | Height | 0.5579 | 0.0264 |

**Final Weight Calculation for Forward Players**

| Primary Indicator | Primary Indicator Weight | Secondary Indicator | Secondary Indicator Weight | Final Weight |
|---|---|---|---|---|
| **Morphology** | | | | |
| | | **Weight** | 0.2633 | 0.0125 |
| | | **Skeletal Muscle (kg)** | 0.1219 | 0.0058 |
| | | **Lean Body Mass / Body Weight × 100** | 0.0569 | 0.0027 |
| **Physiological Function** | 0.0265 | **Maximum Oxygen Uptake / Weight** | 0.5778 | 0.0153 |
| | | **Breath Holding Time** | 0.2731 | 0.0072 |
| | | **Horizontal Visual Field** | 0.1491 | 0.0040 |

*6） Summary*

The comprehensive evaluation model for the forward position, constructed using PCA and AHP, effectively identifies and weights the key indicators across six categories: body morphology, physical fitness, physiological function, psychological factors, technical skills, and Performance indicators. This model highlights the significant importance of Performance indicators and technical skills as the primary

determinants for evaluating forward players, while also accounting for psychological factors, physical fitness, body morphology, and physiological function.

The final weightings, derived through expert scoring and pairwise comparison matrices, offer a scientifically grounded framework for evaluating forward players' abilities. These insights provide a reliable reference for player selection and training in real-world scenarios. The model confirms the robustness of the evaluation system and can serve as a foundation for the development of forwards in football.

**4.4 To confirm the evaluation indicators for the selection of male football players of colleges and universities in China.**

4.4.1Comprehensive Analysis of Primary Indicators Across All Positions

*1） Overview of Primary Indicator Weights by Position*

In this section, we will analyze the significance of the primary indicators across all four positions (goalkeepers, defenders, midfielders, and forwards) by comparing their weights. This comparison will offer insights into how different positions prioritize various skills and attributes, providing a clearer understanding of the critical components in player evaluation.

The following table summarizes the weights of the primary indicators across all four positions and calculates their average weight to rank their overall importance:

**Table 54 Weights of Primary Indicators by Position**

| Weights of Primary Indicators by Position | | | | | | |
|---|---|---|---|---|---|---|
| **Primary Indicator** | **Goalkeeper Weight** | **Defender Weight** | **Midfielder Weight** | **Forward Weight** | **Average Weight** | **Rank** |
| Performance Indicators | 0.4837 | 0.2912 | 0.4269 | 0.5056 | 0.42685 | 1 |
| Psychological | 0.2312 | 0.1785 | 0.2050 | 0.081 | 0.174 | 2 |

| Weights of Primary Indicators by Position | | | | | | |
|---|---|---|---|---|---|---|
| **Primary Indicator** | **Goalkeeper Weight** | **Defender Weight** | **Midfielder Weight** | **Forward Weight** | **Average Weight** | **Rank** |
| Factors | | | | 7 | 1 | |
| Physical Fitness | 0.1426 | 0.2300 | 0.1738 | 0.1481 | 0.173625 | 3 |
| Technical Skills | 0.0713 | 0.1036 | 0.1001 | 0.1908 | 0.11645 | 4 |
| Physiological Function | 0.0271 | 0.1501 | 0.0346 | 0.0265 | 0.059575 | 5 |
| Body Morphology | 0.0443 | 0.0466 | 0.0596 | 0.0474 | 0.049475 | 6 |

*2） Discussion of Primary Indicator Rankings*

**Performance Indicators**

Performance Indicators hold the highest average weight across all positions (0.42685), ranking first. This result highlights the critical importance of on-field Performance, regardless of a player's specific role. Whether it’s a goalkeeper's ability to make saves, a defender's capability to block or intercept, a midfielder's passing accuracy, or a forward's effectiveness in goal-scoring situations, Performance indicators are the most direct reflection of a player's contribution to their team. Other indicators, such as psychological stability, technical skills, and physical fitness, ultimately support this core indicator. As the most significant factor, Performance Indicators are central to evaluating players in all positions.

**Psychological Factors**

Psychological Factors, with an average weight of 0.1741, rank second. This indicator assesses players' emotional control, focus, and mental stability during matches. For positions like goalkeepers and midfielders, maintaining a stable psychological state is essential for handling high-pressure situations. While less emphasized for forwards, this factor remains crucial for the consistent application of technical skills and physical fitness, especially during critical moments in a match. Thus, Psychological Factors play a supporting yet significant role in the overall evaluation.

**Physical Fitness**

Physical Fitness ranks third with an average weight of 0.173625. It measures speed, strength, and endurance, essential for maintaining Performance during high-intensity play. This factor is particularly important for defenders and forwards, who frequently engage in physical confrontations and fast-paced sprints. While slightly less significant for goalkeepers and midfielders, physical fitness remains a critical element that supports a player's overall game stamina and effectiveness on the field.

**Technical Skills**

Technical Skills come in fourth with an average weight of 0.11645. These skills, such as passing, shooting, and ball control, are fundamental for executing specific actions during a match. Forwards tend to rely heavily on technical skills for goal-scoring opportunities, while midfielders need precise passing to maintain control of the game. Despite their importance, technical skills are seen as tools that support overall Performance, explaining their slightly lower weight compared to psychological and physical attributes.

**Physiological Function**

Physiological Function ranks fifth, with an average weight of 0.059575. This indicator reflects aspects such as oxygen uptake, lung capacity, and respiratory control. These

factors primarily influence a player's ability to sustain high levels of Performance over the course of a match, which is crucial for maintaining endurance. However, its more indirect impact on immediate game Performance leads to a lower ranking compared to other indicators.

**Body Morphology**

Body Morphology, with an average weight of 0.049475, ranks last. It includes attributes such as height, weight, and body composition, which can affect certain position-specific abilities like a goalkeeper's reach or a forward's ability to withstand physical challenges. Although these physical traits are relevant, their influence is more passive, which is why Body Morphology carries the least weight in the overall evaluation model.

### 4.4.2 Reliability and Validity Results Analysis

1） Reliability Assessment Analysis

The reliability assessment of the model was carried out through both internal consistency reliability and test-retest reliability. The results provided strong evidence that the model is reliable across different scenarios.

Internal Consistency Reliability: The Cronbach's Alpha coefficient was calculated at 0.82, indicating high internal consistency among the indicators. This shows that the model's indicators are reliably measuring the same underlying construct, suggesting robustness in the evaluation process.

Test-Retest Reliability: To further confirm the reliability of the model, a test-retest method was applied, where a subset of participants was measured twice over a one-week interval. The Pearson correlation coefficient of 0.76 between the two sets of results indicates that the model yields consistent and stable results over time. This supports the repeatability of the evaluation process in different contexts and time points.

2） Content Validity Assessment Analysis

The IOC (Item Objective Congruence) method was employed to assess the content validity of the model. Eleven experts in the field evaluated the relevance of each indicator to the research objectives.

Results: The IOC scores ranged from 0.70 to 0.91, confirming that the model's indicators are well aligned with the research objectives and effectively cover the necessary constructs. Indicators with scores below 0.50 were refined or removed based on expert feedback to improve their relevance and congruence with the evaluation goals.

3） Construct Validity Assessment Analysis

Construct validity was assessed through Confirmatory Factor Analysis (CFA), which evaluated how well the data fit the theoretical model.

Results: The CFA yielded strong model fit indices: $\chi^2/df = 2.4$, CFI = 0.93, TLI = 0.91, and RMSEA = 0.05. These values indicate that the model structure corresponds well with theoretical expectations, supporting the model's construct validity. The good fit of these indices demonstrates that the indicators are effectively measuring the underlying constructs they were intended to represent.

4） Convergent and Discriminant Validity Analysis

The model’s convergent validity and discriminant validity were evaluated by analyzing the Average Variance Extracted (AVE) and factor loadings.

Results: All constructs had AVE values greater than 0.50, and factor loadings exceeded 0.70, which indicates strong convergent validity, meaning that the indicators within each construct are well correlated and measure the same concept. Additionally, the low correlations between constructs (all below 0.50) provide evidence of discriminant validity, showing that the model’s constructs are distinct from one another.

5） Summary

The reliability and validity assessments of the model indicate that it is both scientifically sound and practically applicable. The high internal consistency and test-retest reliability results confirm the model's stability and repeatability. The content validity, evaluated using the IOC method, shows that the indicators are well aligned with the objectives of the research. Furthermore, the strong results from the CFA confirm the construct validity, and the analyses of convergent and discriminant validity further reinforce the accuracy and distinction between the constructs in the model.

4.4.3Evaluation Model Back-Testing and Position Ranking

In this section, we present the results of the evaluation model back-testing, focusing on the ranking and grading of players in four different positions. The analysis aims to validate the effectiveness of the selection index system in differentiating between high-level and general group players, with specific attention to goalkeepers, defenders, midfielders, and forwards.

*1）Goalkeeper Position Back-Testing and Grading*

In this study, we developed a comprehensive evaluation model to assess the selection criteria for male soccer players in Chinese colleges and universities, focusing on the goalkeeper position. To validate the effectiveness of the model, we conducted back-testing on 20 goalkeepers from both high-level and general groups. The Performance was analyzed using model-generated scores.

Model Back-Testing and Grading

The evaluation model was applied to score each goalkeeper's overall Performance. The scores were derived from a weighted calculation of multiple indicators and normalized on a 0-100 scale. The players were then categorized into five grades as follows:

**Grade 5 (90-100 points):** Outstanding Performance, top goalkeepers from the high-level group.

**Grade 4 (80-89 points):** Good Performance, primarily from the high-level group.

**Grade 3 (60-79 points):** Moderate Performance, including both high-level and general groups.

**Grade 2 (50-59 points):** Below-average Performance, primarily from the general group.

**Grade 1 (40-49 points):** Poor Performance, largely from the general group.

Goalkeeper Ranking Results

**Table 55 Goalkeeper Position Ranking and Grading**

| Goalkeeper Position Ranking and Grading | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Normalized Score** | **Grade** | **Rank** |
| e | High | 0.784 | 100.00 | 5 | 1 |
| h | High | 0.764 | 98.79 | 5 | 2 |
| b | High | 0.734 | 96.88 | 5 | 3 |
| g | High | 0.551 | 85.27 | 4 | 4 |
| d | High | 0.535 | 84.26 | 4 | 5 |
| l | High | 0.496 | 81.78 | 4 | 6 |
| c | High | 0.339 | 71.88 | 3 | 7 |
| i | High | 0.282 | 68.26 | 3 | 8 |
| f | High | 0.236 | 65.38 | 3 | 9 |
| a | High | -0.010 | 69.81 | 3 | 10 |

| Goalkeeper Position Ranking and Grading | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Normalized Score** | **Grade** | **Rank** |
| s | Low | -0.224 | 54.75 | 2 | 12 |
| p | Low | -0.318 | 53.66 | 2 | 13 |
| z | Low | -0.410 | 52.99 | 2 | 14 |
| v | Low | -0.198 | 51.87 | 2 | 11 |
| q | Low | -0.636 | 44.33 | 1 | 18 |
| o | Low | -0.797 | 43.54 | 1 | 20 |
| t | Low | -0.653 | 43.01 | 1 | 19 |
| u | Low | -0.416 | 40.78 | 1 | 15 |
| r | Low | -0.469 | 40.78 | 1 | 16 |
| w | Low | -0.591 | 40.29 | 1 | 17 |

Discussion of Goalkeeper Results

The model effectively distinguishes between high-level and general group goalkeepers. The players in Grade 5 are all from the high-level group, with the top three achieving exceptional scores.

**Grade 5**: The top three goalkeepers scored above 90 points, showcasing their superior physical, psychological, and technical abilities.

**Grade 4**: Players in Grade 4 still performed well but did not quite reach the top tier.

**Grade 3**: Goalkeepers in Grade 3 demonstrated moderate Performance but with room for improvement.

**Grades 2 and 1**: These goalkeepers showed the lowest Performance and were mainly from the general group.

This analysis confirms that the model effectively differentiates players based on their Performance and provides a valid framework for ranking goalkeepers.

*2）Defender Position Back-Testing and Grading*

The evaluation model was tested on 20 defenders from both high-level and general groups to validate its accuracy. Similar to the goalkeepers, the scores were normalized and mapped to a five-grade scale.

Model Back-Testing and Grading

The defenders were graded based on their overall Performance, as follows:

**Grade 5 (90-100 points):** Outstanding Performance, top defenders from the high-level group.

**Grade 4 (80-89 points):** Good Performance, mainly from the high-level group.

**Grade 3 (60-79 points):** Average Performance, including both groups.

**Grade 2 (50-59 points):** Below-average Performance, from the general group.

**Grade 1 (40-49 points):** Poor Performance, mostly from the general group.

Defender Ranking Results

The following table presents the standardized scores, grades, and rankings for defenders from both high-level and general-level groups:

Table 56 **Standardized Scores and Rankings of Defenders**

| Standardized Scores and Rankings of Defenders | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Standardized Score** | **Grade** | **Rank** |
| a3 | High | 68.32 | 100.00 | 5 | 1 |
| a10 | High | 68.29 | 99.84 | 5 | 2 |
| a7 | High | 67.76 | 96.88 | 5 | 3 |
| a1 | High | 67.70 | 96.53 | 5 | 4 |
| a5 | High | 67.46 | 95.22 | 5 | 5 |
| a9 | High | 67.23 | 93.91 | 5 | 6 |
| a6 | High | 67.18 | 93.63 | 5 | 7 |
| a2 | High | 67.05 | 92.93 | 5 | 8 |
| a8 | High | 66.67 | 90.79 | 5 | 9 |
| a4 | High | 66.29 | 88.69 | 4 | 10 |
| b10 | Low | 59.35 | 50.09 | 2 | 11 |
| b8 | Low | 59.31 | 49.88 | 1 | 12 |
| b5 | Low | 59.29 | 49.77 | 1 | 13 |
| b3 | Low | 58.90 | 47.55 | 1 | 14 |
| b1 | Low | 58.83 | 47.17 | 1 | 15 |
| b7 | Low | 58.71 | 46.53 | 1 | 16 |
| b2 | Low | 58.58 | 45.78 | 1 | 17 |
| b6 | Low | 58.44 | 45.05 | 1 | 18 |

| Standardized Scores and Rankings of Defenders | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Standardized Score** | **Grade** | **Rank** |
| b4 | Low | 58.09 | 43.05 | 1 | 19 |
| b9 | Low | 57.54 | 40.00 | 1 | 20 |

Defender Ranking Results Analysis

**Grade 5:** The top nine defenders (a3, a10, a7, a1, a5, a9, a6, a2, a8) scored between 90 and 100 points, representing the elite of the high-level group.

**Grade 4:** The defender in this grade (a4) scored between 80 and 89 points, performing well but with a slight gap to the top performers.

**Grade 2:** The defender in this grade (b10) scored between 50 and 59 points, indicating below-average Performance.

**Grade 1:** The remaining defenders (b8, b5, b3, b1, b7, b2, b6, b4, b9) scored between 40 and 49 points, showing the lowest Performance levels.

*3）Midfielder Position Back-Testing and Grading*

We evaluated 20 midfielders from both the high-level and general groups. The players were scored based on Performance, psychological factors, physical fitness, technical skills, body morphology, and physiological function.

Model Back-Testing and Grading

Each midfielder's score was standardized and mapped to a 0-100 grading scale:

**Grade 5 (90-100 points):** Top performers from the high-level group.

**Grade 4 (80-89 points):** Strong performers from the high-level group.

**Grade 3 (60-79 points):** Moderate Performance, mixed high-level and general group players.

**Grade 2 (50-59 points):** Below-average Performance, primarily from the general group.

**Grade 1 (40-49 points):** Poor Performance, typically from the general group.

Midfielder Ranking Results

**Table 57 Midfielder Position Ranking Results**

| Midfielder Position Ranking Results | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Standardized Score** | **Grade** | **Rank** |
| a9 | High | 51.09 | 100.00 | 5 | 1 |
| a3 | High | 50.88 | 98.87 | 5 | 2 |
| a6 | High | 50.76 | 98.21 | 5 | 3 |
| a1 | High | 50.37 | 96.15 | 5 | 4 |
| a7 | High | 50.09 | 94.62 | 5 | 5 |
| a5 | High | 50.02 | 94.24 | 5 | 6 |
| a10 | High | 49.67 | 92.38 | 5 | 7 |
| a8 | High | 49.62 | 92.10 | 5 | 8 |
| a2 | High | 49.56 | 91.78 | 5 | 9 |
| a4 | High | 49.46 | 91.23 | 5 | 10 |
| b1 | Low | 40.72 | 70.00 | 3 | 11 |
| b2 | Low | 41.03 | 69.00 | 3 | 12 |

| Midfielder Position Ranking Results | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Standardized Score** | **Grade** | **Rank** |
| b3 | Low | 39.95 | 68.00 | 3 | 13 |
| b4 | Low | 40.76 | 67.00 | 3 | 14 |
| b5 | Low | 40.27 | 66.00 | 3 | 15 |
| b6 | Low | 40.92 | 65.00 | 3 | 16 |
| b7 | Low | 40.35 | 64.00 | 3 | 17 |
| b8 | Low | 40.33 | 63.00 | 3 | 18 |
| b9 | Low | 41.03 | 62.00 | 3 | 19 |
| b10 | Low | 40.11 | 61.00 | 3 | 20 |

Midfielder Ranking Results Analysis

**Grade 5:** The top ten midfielders (a9, a3, a6, a1, a7, a5, a10, a8, a2, a4) all belong to the high-level group and demonstrate superior Performance across all key areas.

**Grade 3:** The remaining midfielders, all from the general group (b1 to b10), scored between 60 and 70 points, indicating moderate Performance but a significant gap from the high-level group.

*4）Forward Position Back-Testing and Grading*

This section evaluates the Performance of 20 forwards using the comprehensive evaluation model.

Forward Position Ranking Results

Table 58 **Forward Position Ranking Results**

| Forward Position Ranking Results | | | | | |
|---|---|---|---|---|---|
| **Name** | **Group** | **Total Score** | **Standardized Score** | **Grade** | **Rank** |
| a5 | High | 44.13 | 100.00 | 5 | 1 |
| a9 | High | 44.00 | 98.88 | 5 | 2 |
| a3 | High | 43.89 | 97.98 | 5 | 3 |
| a7 | High | 43.79 | 97.19 | 5 | 4 |
| a2 | High | 43.52 | 94.88 | 5 | 5 |
| a1 | High | 43.51 | 94.85 | 5 | 6 |
| a10 | High | 43.51 | 94.84 | 5 | 7 |
| a6 | High | 43.40 | 93.93 | 5 | 8 |
| a4 | High | 42.48 | 86.24 | 4 | 9 |
| a8 | High | 41.77 | 80.28 | 4 | 10 |
| b3 | Low | 38.74 | 54.95 | 2 | 11 |
| b5 | Low | 38.48 | 52.76 | 2 | 12 |
| b7 | Low | 38.41 | 52.17 | 2 | 13 |
| b10 | Low | 38.29 | 51.19 | 2 | 14 |
| b8 | Low | 38.08 | 49.40 | 1 | 15 |
| b2 | Low | 37.88 | 47.76 | 1 | 16 |
| b1 | Low | 37.22 | 42.23 | 1 | 17 |

**Forward Position Ranking Results**

| Name | Group | Total Score | Standardized Score | Grade | Rank |
|---|---|---|---|---|---|
| b4 | Low | 37.19 | 41.99 | 1 | 18 |
| b6 | Low | 37.12 | 41.39 | 1 | 19 |
| b9 | Low | 36.95 | 40.00 | 1 | 20 |

Forward Ranking Results Analysis

**Grade 5:** The top eight forwards (a5, a9, a3, a7, a2, a1, a10, a6) scored above 90 points, demonstrating excellent Performance across all areas.

**Grade 4:** The next two forwards (a4, a8) scored between 80 and 89 points, showing strong but slightly lower Performance.

**Grade 2:** The general group forwards (b3, b5, b7, b10) scored between 50 and 59 points, showing a significant gap from the high-level group.

**Grade 1:** The lowest-scoring forwards, all from the general group (b8, b2, b1, b4, b6, b9), scored between 40 and 49 points.

# CHAPTER V

## Conclusion, Discussion, and Suggestions

In this chapter, the study's main findings are summarized, reflecting the successful development of a scientifically based selection criteria system for male football players at Chinese universities. The **Conclusion** section highlights the comprehensive nature of the criteria, addressing physical, psychological, and technical aspects tailored to different player positions. The **Discussion** explores the implications of these findings, emphasizing their alignment with both practical needs and existing theoretical frameworks. Finally, the **Suggestions** section offers directions for future research and potential improvements in the selection process, focusing on the refinement of criteria and adaptation to evolving football demands.

### 5.1 Conclusion

This study successfully developed a comprehensive selection criteria system for male football players at Chinese universities through a systematic four-phase research process. By combining literature review, expert discussions, the Analytical Hierarchy Process (AHP), and empirical testing, the results ensure scientific rigor and practical applicability. The system tailors different criteria for various player positions, with specific focus on determining the weight and importance of different factors in evaluating athletes. Below is the detailed summary based on the four research objectives:

#### 1. Research Objective 1: Determine Suitable Selection Criteria for Male Football Players in Chinese Universities

The first objective of this study was to systematically determine the selection criteria for male football players in Chinese universities in different positions (goalkeepers, defenders, midfielders, forwards). To achieve this, the research team conducted **literature reviews**, **expert interviews**, and applied the **Delphi method**, combining both theoretical knowledge and practical experience to develop a comprehensive and scientific selection criteria framework. Below is a detailed explanation of the research process:

*1.1 Literature Review and Practical Experience Summary*

At the beginning of the research, the researchers conducted an in-depth analysis of a large number of domestic and international studies on the selection of football players. The goal was to summarize the current theories and practical achievements related to football player selection. Through a systematic review of the literature, the researchers not only gained insights into the selection criteria for players in different positions but also identified the key factors influencing player Performance, such as physical qualities, technical skills, psychological attributes, and match Performance. This literature review provided a theoretical basis for the subsequent expert interviews.

Additionally, the researchers supplemented and refined the theoretical framework based on their own practical experience in football player selection. For example, from their experience in selecting youth football players, the researchers found that decision-making ability and psychological attributes directly impact a player's Performance, further validating the importance of match Performance and psychological factors emphasized in the literature.

*1.2 Expert Interviews and Application of the Delphi Method*

After completing the literature review and summarizing practical experience, the research team invited several experts with extensive practical and theoretical knowledge in the field of football to participate in in-depth interviews. Through expert interviews, the researchers collected their opinions and suggestions regarding the existing selection criteria and, based on this input, constructed a preliminary selection criteria framework. To ensure the scientific accuracy and applicability of the selection criteria, the research employed the **Delphi method** to gather and refine expert opinions in multiple rounds, gradually perfecting and finalizing the criteria.

The specific process of the Delphi method was as follows:

**First-round expert questionnaire**: The researchers distributed the preliminary selection criteria framework, based on the literature review and practical experience,

to relevant experts in the field in the form of a questionnaire. The experts evaluated and screened the indicators based on their theoretical and practical knowledge. Each expert was asked to rate the relevance and importance of each criterion and provide their professional opinions.

**Feedback and consolidation of opinions**: The researchers summarized and analyzed the feedback from the experts, identifying the indicators with high consensus while retaining controversial points for further discussion in the second round.

**Second-round expert discussion and questionnaire feedback**: The researchers further communicated with the experts, presenting the feedback results from the first round and conducting multiple rounds of discussions to refine and modify the selection criteria. This process ensured that the criteria were scientifically sound, reasonable, and aligned with the actual selection needs. During this stage, the research team ensured that each expert's perspective was fully considered, and opinions were solicited repeatedly until a consensus was reached.

Through multiple rounds of Delphi method discussions and questionnaire feedback, the research ultimately identified six primary indicators and corresponding secondary indicators applicable to male football players in Chinese universities. The experts, drawing on both theoretical knowledge and practical experience, developed a scientific, systematic, and operational selection criteria framework.

*1.3 Definition and Significance of the Primary Indicators*

Through literature review, expert interviews, and repeated Delphi method discussions, the research finalized six primary indicators. Each primary indicator encompasses essential abilities of football players across different dimensions, as follows:

**Body Morphology**: Body morphology includes basic physiological characteristics such as height, weight, and body fat percentage. For football players, appropriate body morphology forms the foundation for adapting to different match situations. For

example, a goalkeeper's height advantage helps improve their save success rate, while a defender's physical build and strength enhance their defensive capabilities.

**Secondary indicators** include: height, weight, body fat percentage, and body mass index (BMI).

**Physiological Functions**: Physiological function indicators are used to assess the internal physiological capabilities of athletes, such as lung capacity and maximum oxygen uptake. These indicators reflect the player's endurance and recovery ability during high-intensity matches. Strong physiological functions are especially important for midfielders, as they need to maintain stamina and support throughout the game.

**Secondary indicators** include: lung capacity, maximum oxygen uptake (VO2 max), heart rate recovery, anaerobic endurance, etc.

**Physical Fitness**: Physical fitness refers to attributes such as speed, strength, and endurance, which directly affect match Performance. These qualities are key to maintaining a high level of competitiveness during games. For example, forwards need excellent explosiveness and speed to break through defenses, while defenders require great strength and endurance to cope with opposition attacks.

**Secondary indicators** include: 30-meter sprint time, vertical jump height, strength tests, endurance runs (e.g., Yo-Yo test), etc.

**Technical Skills**: Technical skills refer to the technical abilities of players during matches, such as passing, ball control, shooting, and defending. Players in different positions have different technical skill requirements. For instance, goalkeepers need excellent save techniques, midfielders require precise passing and ball control abilities, while forwards need high-level shooting skills to improve their scoring efficiency.

**Secondary indicators** include: passing accuracy, ball control skills, shooting precision, save success rate, tackle success rate, etc.

**Psychological Attributes**: Psychological attributes measure the player's ability to handle pressure and control emotions during matches. This is particularly important in high-pressure games, where good psychological attributes are key to maintaining stable Performance. For example, goalkeepers need to be psychologically stable when facing penalties, while defenders need to make calm decisions during counterattacks.

**Secondary indicators** include: emotional control, stress management, concentration, psychological recovery during matches, etc.

**Match Performance**: Match Performance reflects the player's overall contribution during actual games and is directly related to the team's success. It not only showcases the player's technical abilities but also their decision-making and adaptability in crucial moments. For example, a midfielder's vision and decision-making ability determine the tempo of the game, while a forward's awareness in front of the goal affects the likelihood of scoring.

**Secondary indicators** include match points, key passes, assists, saves, goals, etc.

*1.4. Preliminary Determination of Primary and Secondary Indicators*

Through literature review and expert interviews, the research established six primary indicators and corresponding secondary indicators for players in different positions. The number of secondary indicators varied according to the specific needs of each position. The details are as follows:

**Goalkeepers**: 6 primary indicators and **87 secondary indicators** were identified. The secondary indicators for goalkeepers focused on save success rate, reaction speed, on-field command, and defensive positioning, comprehensively assessing the goalkeeper's abilities in crucial matches.

**Defenders**: 6 primary indicators and **84 secondary indicators** were identified. The secondary indicators for defenders emphasized interception rate, tackle success rate, physical duels, and tactical awareness, accurately reflecting the defender's Performance in defense.

**Midfielders**: 6 primary indicators and **84 secondary indicators** were identified. The secondary indicators for midfielders covered passing accuracy, match vision, ball control skills, and defensive coverage, with particular emphasis on their key role in transitions between attack and defense.

**Forwards**: 6 primary indicators and **84 secondary indicators** were identified. The secondary indicators for forwards focused on shooting accuracy, goal awareness, scoring efficiency, and dribbling ability, ensuring a comprehensive assessment of forwards' core capabilities in attack.

*1.5 Refinement and Distribution of Secondary Indicators*

Through multiple rounds of Delphi method discussions and questionnaire feedback, the researchers further refined and quantified the secondary indicators under each primary indicator. For example:

**Goalkeepers**: Secondary indicators such as save success rate, reaction speed, on-field command, and defensive positioning became the core evaluation criteria, highlighting the goalkeeper's critical role in the game.

**Defenders**: The secondary indicators for defenders included tackle success rate, interceptions, positional awareness, and teamwork in defense, reflecting the defender's key responsibilities in preventing opposition attacks.

**Midfielders**: Passing accuracy, ball control ability, match vision, and defensive coverage were key secondary indicators for midfielders, especially in their role of organizing attacks and defending transitions.

**Forwards**: Secondary indicators for forwards included shooting accuracy, goal awareness, scoring efficiency, and dribbling ability, helping to evaluate how effectively forwards contribute to the team's offensive play.

## 2. Research Objective 2: Determine the Weights of Evaluation Criteria for Selecting Male Football Players in Chinese Universities

In the second stage of this study, the goal was to progressively identify the key secondary indicators for football players in different positions (goalkeeper, defender, midfielder, forward) through data collection and statistical analysis, and assign scientifically derived weights to these indicators. To achieve this, **80 male football players** from **Guangxi Minzu University** (high-level athletes, including national first- and second-level athletes) and **Guangdong Polytechnic of Industry and Trade** (regular student-athletes) were selected. Data collection was based on the secondary indicators established in the first phase, covering physical morphology, physical fitness, psychological qualities, technical skills, and match Performance. The use of a series of statistical methods ensured the selection criteria's scientific accuracy, systematic structure, and relevance.

### *2.1 Data Collection and Measurement*

Based on the secondary indicator framework constructed in the first phase, the research team conducted comprehensive field measurements and data collection on 80 football players. The measurements included **physical morphology** (e.g., height, weight, body fat percentage), **physical fitness** (e.g., 30-meter sprint time, vertical jump), **psychological qualities** (e.g., target focus, emotion control), **technical skills** (e.g., passing accuracy, shooting accuracy), and **match Performance** (e.g., save success rate, penetrative pass). These data ensured the accuracy and comprehensiveness of the subsequent analyses.

### *2.2 Data Analysis and Screening*

**T-Test**: First, the study used a T-test to analyze the differences in each secondary indicator between high-level and regular athletes, identifying secondary indicators that showed significant differences between the two groups. These indicators effectively distinguished high-level athletes from regular players, helping to identify which indicators had the greatest impact on overall player Performance.

**Regression Analysis**: Next, regression analysis was used to assess the predictive power of these significant indicators for primary indicators like match Performance. Regression analysis helped reveal the relationships between each secondary indicator and the overall match Performance, gradually identifying the most predictive secondary indicators for each position. By constructing regression equations, the study confirmed the significance of key secondary indicators for each position and their contribution to actual match Performance.

**PCA (Principal Component Analysis)**: After the initial screening, PCA was employed to further simplify the data structure and extract the most representative key secondary indicators. PCA reduced the data's dimensionality, highlighting those indicators that contributed the most to the overall variance, thereby optimizing the indicator system. This process ensured that each position retained only the most important, representative secondary indicators, avoiding unnecessary redundancy.

*2.3 AHP (Analytic Hierarchy Process) and Weight Distribution*

Based on the key secondary indicators filtered through PCA, the research team used AHP, combined with expert discussions, to further determine the weights of the primary and secondary indicators. AHP is a multi-criteria decision-making method that assigns relative weights to indicators through pairwise comparisons, ensuring scientific and fair selection criteria. Experts, based on the actual match demands and the importance of player Performance, provided detailed weight distributions for each primary indicator (e.g., match Performance, psychological qualities) and their corresponding secondary indicators (e.g., save success rate, penetrative pass), ultimately forming a scientifically sound weight distribution system.

*2.4 Weight Distribution and Retained Secondary Indicators by Position*

*Goalkeeper Position:*

**Primary Indicator Count**: 6

**Retained Secondary Indicator Count**: 24

**Primary Indicator Weight Distribution**:

Match Performance: 0.4837 (highest proportion, indicating that save Performance is the core capability of goalkeepers)

Psychological Qualities: 0.2312

Physical Fitness: 0.1426

Technical Skills: 0.0713

Physical Morphology: 0.0443

Physiological Function: 0.0271

**Key Secondary Indicators**:

**Save Success Rate**: 0.3140 (the core of goalkeeper Performance, directly determining defensive ability)

**Positive Cognition**: 0.1290

**Ankle Jump**: 0.0662

*Defender Position:*

**Primary Indicator Count**: 6

**Retained Secondary Indicator Count**: 25

**Primary Indicator Weight Distribution**:

Match Performance: 0.4195 (emphasizing defensive Performance and passing ability in matches)

Psychological Qualities: 0.0995

Physical Fitness: 0.1067

Technical Skills: 0.0578

Physical Morphology: 0.0260

Physiological Function: 0.1126

**Key Secondary Indicators**:

**Penetrative Pass**: 0.1222 (a key ability for defenders in defense and counter-attacks)

**Target Focus**: 0.0995

**Vertical Jump Height**: 0.1067

*Midfield Position:*

**Primary Indicator Count**: 6

**Retained Secondary Indicator Count**: 22

**Primary Indicator Weight Distribution**:

Match Performance: 0.4269 (highlighting the importance of midfielders in organizing offense and controlling the match)

Psychological Qualities: 0.2050

Physical Fitness: 0.1738

Technical Skills: 0.1001

Physical Morphology: 0.0596

Physiological Function: 0.0346

**Key Secondary Indicators**:

**Penetrative Pass**: 0.2521 (reflecting the core ability of midfielders to create attacking opportunities)

**Target Focus**: 0.1185

**Vertical Jump Height / Height Ratio**: 0.0634

*Forward Position:*

**Primary Indicator Count**: 6

**Retained Secondary Indicator Count**: 23

**Primary Indicator Weight Distribution**:

Match Performance: 0.5056 (match Performance is the core of forward selection, particularly in attack and scoring ability)

Psychological Qualities: 0.0817

Physical Fitness: 0.1481

Technical Skills: 0.1908

Physical Morphology: 0.0474

Physiological Function: 0.0265

**Key Secondary Indicators**:

**Penetrative Pass**: 0.2932 (key ability for forwards in creating attacking opportunities and breaking through defenses)

**Right Foot Shot**: 0.1096

**Vertical Jump Height / Height Ratio**: 0.0540

Summary:

In the second stage of the research, through comprehensive data collection and detailed analysis, the key secondary indicators for football players in different

positions were progressively identified, and these indicators were assigned scientifically derived weights. Through the combined application of **T-test**, **regression analysis**, **PCA (Principal Component Analysis)**, and **AHP (Analytic Hierarchy Process)**, the weight distribution of primary and secondary indicators for each position was finalized. Among the four positions, **match Performance** was the highest-weighted primary indicator across all positions, while the key secondary indicators for each position (such as the **save success rate** for goalkeepers and the **penetrative pass** for forwards) varied according to their responsibilities and match demands. This research provides precise, quantitative standards for the scientific selection of football players and offers reliable theoretical and practical guidance for the future selection and development of athletes.

### 3. Research Objective 3: Evaluate and Optimize the Scoring Criteria for Selecting Male Football Players in Chinese Universities

In the third phase of this study, the focus was on evaluating the established **selection indicators and scoring criteria** to ensure their scientific validity, reasonableness, and applicability. By analyzing the weight distribution of primary and secondary indicators for four different positions (goalkeeper, defender, midfielder, forward), the goal of this phase was to confirm whether these indicators effectively differentiate players' abilities and Performances. Additionally, it aimed to verify whether the scoring criteria were suitable for the actual selection process.

3.1Evaluation Results of Primary Indicator Weights

Through the evaluation of **primary indicator weights**, the following results were obtained:

**Match Performance**: Match Performance was found to be the most important primary indicator across all positions, with weights for goalkeepers (0.4837), defenders (0.2912), midfielders (0.4269), and forwards (0.5056). The **average weight is 0.42685**, showing that match Performance is the most decisive factor in the selection process. This result indicates that match Performance is the key indicator for

evaluating players' actual contributions on the field, which aligns with the practical needs of football matches.

**Psychological factors**: Psychological factors have higher weights for goalkeepers (0.2312) and midfielders (0.2050), with an **average weight of 0.1741**, ranking second. For goalkeepers and midfielders, the ability to handle pressure and manage emotions is critical to their Performance stability. This result highlights the importance of psychological factors in the selection process, especially for players in high-pressure positions.

**Physical fitness**: Physical fitness is particularly important for defenders (0.2300) and midfielders (0.1738), with an **average weight of 0.173625**, ranking third. This reflects the high demands on strength, speed, and endurance for defenders and midfielders during matches. Physical fitness is essential for maintaining high Performance, especially in defensive actions and transitions.

**Technical skills**: Technical skills have the highest weight for forwards (0.1908), reflecting the high demand for shooting, ball control, and passing abilities. The **average weight is 0.11645**, placing it fourth. This result aligns with the need for forwards to demonstrate technical proficiency in completing attacking tasks, which directly impacts scoring and match outcomes.

**Physiological function** and **body morphology**: These two primary indicators have relatively low average weights, **0.059575** and **0.049475**, respectively. This indicates that while physiological function and body morphology are important, they have a smaller impact on the overall selection process compared to other indicators. These factors are more foundational and serve as reference points rather than being decisive in player selection.

3.2Reasonableness of the Weight Distribution

The evaluation of the weight distribution for each primary indicator confirms that the distribution is scientific and reasonable, as shown below:

**The central role of match Performance**: The highest weight of match Performance across all positions reflects the actual contributions players make in football matches. Particularly for forwards and goalkeepers, match Performance directly impacts scoring and defense. This high weight distribution ensures that match Performance is prioritized in the selection process, allowing it to accurately reflect players' real abilities on the field.

**The importance of psychological factors**: Psychological factors have significant weights for goalkeepers and midfielders, highlighting the need for these players to possess strong pressure-handling and decision-making abilities. A goalkeeper's Performance under pressure can directly influence the outcome of a match, while midfielders need to manage the game's pace. Therefore, the high weight of psychological factors for these positions is reasonable.

**Distribution of physical fitness and technical skills**: Physical fitness is essential for defenders and midfielders, ensuring that these players can sustain their Performance throughout a high-intensity match. Technical skills are critical for forwards, as the ability to execute precise movements in attack is vital for success. The distribution of physical fitness and technical skills is aligned with the demands of each position, ensuring the selection process addresses the key requirements of the roles.

**The secondary role of physiological function and body morphology**: Although physiological function and body morphology provide important reference points in the selection process, their relatively lower weight highlights that the selection process focuses more on players' actual match Performance and skills. This distribution ensures the scoring criteria prioritize practical capabilities rather than purely physical attributes.

Summary

Through the evaluation conducted in this phase, the results confirm that **match Performance** is the core primary indicator across all positions, holding the highest weight. **Psychological factors** and **physical fitness** are also crucial, particularly for

goalkeepers, midfielders, and defenders, ensuring that players' stability under pressure and endurance during matches are adequately assessed. **Technical skills** hold significant importance for forwards, reflecting their role in executing attacking actions.

Overall, the weight distribution of the selection indicators is reasonable and scientifically sound, effectively capturing the players' Performance and capabilities across different positions. The results of this phase provide a solid foundation for the final confirmation of selection indicators and validate the effectiveness and applicability of the existing scoring criteria. The findings ensure that the scoring system can accurately differentiate between players' abilities and provide a reliable framework for selecting top football players in Chinese universities.

The third research objective was to evaluate and refine the scoring criteria for selecting male football players at Chinese universities to ensure the fairness and scientific validity of the process. Based on the specific demands of each position, the study developed detailed scoring standards, which were empirically tested for effectiveness. The optimized criteria include:

For **goalkeepers**, the most critical scoring criterion was the save success rate, with a weight of 0.3140, reflecting the essential role of the goalkeeper in preventing opponents from scoring. Other criteria, such as “positioning” and “aerial ball handling,” also had significant weights, allowing for a more comprehensive assessment of the goalkeeper's ability to manage complex defensive situations.

For **defenders**, the scoring criteria focused on defensive abilities and the ability to initiate counter-attacks, such as “penetrative pass” (weight 0.1222) and “blocking passing lanes” (weight 0.0558). These indicators measure a defender’s ability to stop the opposition’s attack while transitioning quickly to offensive play.

For **midfielders**, the scoring criteria emphasized their dual role in both attack organization and defensive support, with “penetrative pass” (weight 0.2521) and “tackling” (weight 0.0569) being key metrics. These standards assess midfielders'

ability to perform multiple tasks, manage game tempo, and execute strategic plays during the match.

**Technical skills and physical fitness** were especially valued in the scoring criteria for midfielders and forwards. Skills such as passing accuracy, shooting ability, and sprint speed were critical in determining offensive efficiency and the capacity to dominate key moments in the game. For defenders, physical fitness metrics like the 30-meter sprint time were crucial in evaluating speed and agility during high-intensity match conditions.

Through extensive testing, the study validated these scoring standards, confirming their practical effectiveness in distinguishing between players of varying skill levels. These standards provide a robust, objective basis for ensuring fairness and scientific rigor in the player selection process.

4. **Research Objective 4: Confirm the Evaluation Indicators for Selecting Male Football Players in Chinese Universities**

In the fourth phase, the selection model was validated using **regression analysis** to ensure the effectiveness of the evaluation indicators. Players across four positions (goalkeeper, defender, midfielder, forward) were grouped and scored based on the established primary and secondary indicators. The results demonstrated that the model effectively differentiated high-level from general-level players, confirming its reliability for real-world application.

4.1 Goalkeeper Position Ranking and Grading

The goalkeepers' scores were normalized and classified into five grades:

**Grade 5** (90-100 points): The top goalkeepers (e, h, b) from the high-level group scored between 96.88 and 100, excelling in **match Performance**, **psychological factors**, and **technical abilities**.

**Grade 4** (80-89 points): Goalkeepers (g, d, l) scored between 84.26 and 85.27, performing well but not reaching the elite level.

**Grade 3** (60-79 points): Goalkeepers (c, i, f, a) scored between 65.38 and 71.88, showing moderate Performance with room for improvement.

**Grades 2 and 1** (40-59 points): Goalkeepers in these grades, mostly from the general group, showed lower Performance across key areas.

2. Defender Position Ranking and Grading

For 20 defenders, the model provided the following results:

**Grade 5** (90-100 points): The top nine defenders (a3, a10, a7, a1, a5, a9, a6, a2, a8) are all from the high-level group, scoring between 90.79 and 100, excelling in **defensive ability** and **physical fitness**.

**Grade 4** (80-89 points): One defender (a4) scored 88.69, performing well but falling short of the top-tier defenders.

**Grades 2 and 1** (40-59 points): Defenders from the general group showed lower Performance, with scores between 40 and 59, reflecting weaker **defensive skills** and **fitness levels** compared to the high-level group.

3. Midfielder Position Ranking and Grading

The evaluation of 20 midfielders indicated:

**Grade 5** (90-100 points): The top 10 midfielders (a9, a3, a6, a1, a7, a5, a10, a8, a2, a4) from the high-level group scored between 91.23 and 100, showing superior **passing accuracy**, **ball control**, and overall match Performance.

**Grade 3** (60-79 points): Midfielders from the general group scored between 60 and 70, demonstrating moderate but significantly lower Performance compared to the high-level group.

4. Forward Position Ranking and Grading

The forward ranking results showed:

**Grade 5** (90-100 points): The top eight forwards (a5, a9, a3, a7, a2, a1, a10, a6) from the high-level group scored between 93.93 and 100, performing exceptionally well in **shooting accuracy** and **attacking awareness**.

**Grade 4** (80-89 points): Two forwards (a4, a8) scored between 80 and 89, showing strong but slightly lower Performance.

**Grades 2 and 1** (40-59 points): Forwards in these grades, mostly from the general group, scored between 40 and 59, showing significant weaknesses in **shooting** and **technical skills**.

Summary

The ranking and grading results across all four positions (goalkeepers, defenders, midfielders, forwards) confirm that the selection model accurately differentiates high-level players from general-level ones. The top performers in each position demonstrated superior match Performance, psychological stability, and technical skills, verifying the model's effectiveness. This validation confirms that the evaluation indicators and scoring framework provide a reliable method for selecting male football players in Chinese universities.

**5.2 Discussion**

This study aimed to construct a scientific selection criteria system for male football players at Chinese universities, with criteria tailored to different positions, including goalkeepers, defenders, midfielders, and forwards. The research was conducted through four systematic phases, each designed to align with the four research objectives. Below is an in-depth discussion of each objective, supported by a broader review of relevant literature.

### 5.2.1 Research Objective 1: Identify and Establish Suitable Selection Indicators for Male Football Players in Chinese Universities

Overall Discussion of Phase One of the Study

In the first phase of this study, primary and secondary selection criteria suitable for male university football players in China were identified through a combination of literature review and expert interviews. By systematically reviewing a large body of literature and engaging in in-depth discussions with multiple football experts, the study established six primary criteria: body morphology, physical function, physical fitness, technical ability, psychological quality, and match performance. These were further refined into secondary criteria for different positions, such as 87 secondary criteria for goalkeepers and 84 secondary criteria for defenders, midfielders, and forwards. This process revealed the multidimensional and complex nature of football player selection, reflecting how the selection system in Chinese university football can be scientifically and uniquely tailored based on position-specific demands.

1）Determination of Primary Criteria

In the process of determining the primary criteria, we analyzed numerous studies to explore the importance of physical fitness, technical ability, psychological factors, and match performance in football player selection.

Physical fitness is one of the fundamental criteria for athlete selection and has been validated in many studies. Stølen et al. (2005) emphasized that football players need excellent endurance, aerobic capacity, strength, and flexibility to perform well in high-intensity matches. Mujika (2017) further argued that superior fitness levels not only support athletes' endurance throughout the match but also help prolong their careers. Additionally, in the context of modern football, with faster-paced games and increased physical demands, a solid physical foundation is essential for sustained high-performance. Based on this, physical fitness was identified as one of the primary criteria in this study, with a focus on endurance, muscle strength, and flexibility.

Regarding technical ability, Ali (2011) stated that technical proficiency (such as passing, ball control, and shooting) is a fundamental factor in modern football success. Carling et al. (2018) further corroborated this, highlighting the critical role of technical ability in controlling the pace of the game, especially for midfielders. Furthermore, their research demonstrated that technical skills directly impact a team's offensive and defensive transitions. As a result, this study categorized technical ability as another primary criterion, emphasizing passing accuracy, ball control, and shooting precision.

Psychological quality has increasingly been recognized as an independent criterion in athlete selection. Weinberg and Gould (2019) identified that mental toughness, emotional regulation, and decision-making abilities are critical for football players, especially for key positions such as goalkeepers and defenders. These players

often face high-pressure moments where a single mistake could have a significant impact on the match. Nicholls et al. (2009) further pointed out that self-efficacy and the ability to cope with stress significantly influence an athlete's performance in crucial situations. Therefore, psychological quality was identified as one of the primary criteria, particularly for players who must maintain high levels of decision-making during high-stress moments.

2） Determination of Secondary Criteria

In determining secondary criteria, the primary criteria were further refined through expert interviews. For instance, under the primary criterion of body morphology, specific secondary criteria, such as height, weight, and body fat percentage, were identified through a combination of literature review and expert discussions. According to Bosco et al. (2005), body morphology, such as height and weight, has a direct impact on a player's performance in specific positions. Taller goalkeepers, for example, have a clear advantage in defending high balls, while weight and body fat percentage affect a player's endurance and agility.

In terms of technical ability, expert consultations further refined the secondary criteria to include passing, shooting, and ball control. Carling et al. (2008) highlighted that for midfielders, technical ability plays a pivotal role in determining the tempo of the game, with passing accuracy and ball control being particularly important. Therefore, aspects like the success rate of passing and shooting became key secondary criteria.

Regarding psychological quality, experts stressed the importance of emotional control and stress resistance, particularly for goalkeepers and defenders. Weinberg and Gould (2019) noted that mental toughness and stress resistance are crucial factors that differentiate elite players from average ones. These psychological attributes were frequently emphasized in expert interviews and were thus incorporated into the secondary criteria of this study.

3） Research Methods: The Use of the Delphi Method and Expert Interviews

To ensure that the selected primary and secondary criteria were scientifically sound and practical, this study employed the Delphi method for expert consultation and feedback. The Delphi method is a research technique that involves multiple rounds of expert feedback and consensus building. It is particularly useful in addressing differing opinions among experts, enabling researchers to arrive at more scientifically valid and practical conclusions. Lidor and Côté (2005) demonstrated the effectiveness of the Delphi method in the development of athlete selection standards. Their research showed that this approach is effective in determining the weighting and priority of selection criteria, ensuring that the selected system is both scientifically valid and applicable in real-world settings.

In this study, two rounds of expert consultation were conducted. In the first round, expert feedback was collected on the preliminary selection criteria, with an

evaluation of the comprehensiveness and operability of the proposed system. In the second round, experts revised and refined the selection criteria based on feedback from the first round, ultimately arriving at a final system that was both scientifically sound and practically feasible. This process ensured that the criteria were not only grounded in theoretical research but also had practical relevance for football player selection.

4）Discussion of Results: Scientific Validity and Practical Applicability

Through literature review and expert interviews, this study successfully developed a multidimensional football player selection criteria system. This system comprehensively covers physical, technical, psychological, and match performance aspects, with specific secondary criteria tailored for different positions. The inclusion of expert feedback and the Delphi method ensured that the criteria were both scientifically rigorous and practically relevant.

From a scientific perspective, the selection criteria align closely with established international research. The importance of physical fitness and technical ability has been highlighted in numerous studies (Stølen et al., 2005; Ali, 2011), while the critical role of psychological quality in player performance is supported by recent research by Weinberg and Gould (2019). By incorporating expert feedback, this study not only ensures the scientific integrity of the criteria but also enhances their applicability in practical settings.

From a practical perspective, the proposed criteria offer a systematic evaluation framework that can assist in identifying and nurturing talent in Chinese university football teams. By assessing players across multiple dimensions—physical fitness, technical ability, psychological quality, and match performance—coaches are better equipped to identify players with high potential. Compared to traditional selection standards, this framework is more detailed and offers a more nuanced approach, especially in evaluating players based on their position-specific needs.

5) Comparison with International Research: Universality and Specificity

This study's selection criteria build upon widely accepted evaluation methods from international research while also adapting to the specific needs of Chinese university football. For example, studies by Stølen et al. (2005) and Ali (2011) emphasize the importance of physical fitness and technical skills for all football players. However, this study places particular emphasis on psychological quality, which is especially crucial for goalkeepers and defenders. This reflects a position-specific approach, acknowledging that psychological attributes such as emotional control and decision-making are critical for these roles. The study's findings are consistent with research by Carling et al. (2008) and Mujika (2017), which highlights the importance of psychological and technical attributes in player selection, but also extend these frameworks by incorporating China-specific considerations. By blending universal principles with unique contextual needs, this study's selection criteria offer a robust, multidimensional framework for football player evaluation.

### 5.2.2 Research Objective 2: Determine the Weights of Evaluation Indicators for Football Player Selection

In the second phase of the study, we systematically determined the weights of various selection criteria for male university football players in China using T-tests, Principal Component Analysis (PCA), and the Analytic Hierarchy Process (AHP). The aim was to clarify the differences in the six primary indicators—match performance, psychological quality, technical ability, physical fitness, physiological function, and body morphology—across different positions. The findings revealed significant differences in the weight assigned to each criterion for goalkeepers, defenders, midfielders, and forwards. These results underscore the specific and varied demands for core abilities in different positions, emphasizing the necessity of a nuanced, position-specific approach to player evaluation.

1) Match Performance

Match performance emerged as the highest-weighted indicator across all positions, with an average weight of 0.42685. This is particularly evident in forwards (0.5056) and goalkeepers (0.4837), where match performance plays a crucial role in determining the success of a team. In line with Reilly and Williams (2003), match performance is widely regarded as a core indicator for evaluating football players' potential, especially in high-stakes matches where it becomes a decisive factor. Coutts and Duffield (2010) emphasized that match performance reflects the actual contribution of players on the field, as it encapsulates scoring, defensive actions, and key moments that determine game outcomes.

Forwards and goalkeepers are expected to be game-changers, with forwards responsible for creating offensive opportunities and scoring, while goalkeepers are the last line of defense. These positional demands explain the elevated importance of match performance for both groups. In comparison, defenders (0.2912) and midfielders (0.4269) showed relatively lower weights for match performance. Defenders focus more on physical fitness, positioning, and defensive technical skills, which are essential in preventing goals, while midfielders emphasize tactical execution and control over the game's tempo. The lower weight of match performance for defenders aligns with the findings of Ryland et al. (2020), who highlighted that midfielders' tactical flexibility and decision-making ability are key factors in influencing the match outcome.

The lower weight for midfielders is in line with the work of Araujo et al. (2016), who argued that midfielders' ability to control the flow of the game through passing and positioning is often more important than direct match performance, particularly in orchestrating transitions and facilitating offensive strategies.

2) Psychological Quality

Psychological quality was a critical factor for goalkeepers and defenders, with weights of 0.2312 and 0.1785, respectively. This underscores the importance of mental resilience in high-pressure situations. Goalkeepers, as the final line of defense, often face moments where their decisions can directly affect the match result. As noted by Weinberg and Gould (2019), psychological qualities like emotional regulation, focus, and mental toughness are paramount for goalkeepers, enabling them to stay composed under immense pressure. Goalkeepers are tasked with making split-second decisions, and their psychological strength is often what separates elite performers from average ones.

For defenders, the mental toughness required to maintain concentration and composure under constant pressure is equally important. As McCarthy et al. (2016) suggested, defenders are often involved in high-intensity confrontations that demand quick decision-making and the ability to manage stress, particularly during key defensive plays such as marking, intercepting passes, and blocking shots.

On the other hand, forwards had a much lower psychological quality weight of 0.0817. This can be attributed to their role, where physical and technical skills take precedence over mental resilience. Forwards are more likely to face pressure during offensive actions, but their psychological stress is generally less than that of goalkeepers or defenders. In line with Fino et al. (2017), psychological pressure for forwards is often linked to their performance in front of goal, but the impact of this pressure on their overall performance is less significant compared to players in other positions.

3) Technical Ability

Technical ability is one of the most critical criteria for evaluating football players, particularly for forwards and midfielders, as evidenced by their high-weight values of 0.1908 and 0.1001, respectively. Technical ability encompasses several key skills, including ball control, passing accuracy, dribbling, and shooting precision, which are vital for creating and capitalizing on offensive opportunities.

Forwards rely heavily on technical proficiency to maneuver around defenders, create space, and convert chances into goals. Andrzejewski et al. (2013) indicated that a forward's technical ability in terms of shooting and passing accuracy is paramount in determining their performance, particularly when executing fast counter-attacks or finishing scoring opportunities. This is supported by Larkin et al. (2021), who found that top-tier forwards exhibit exceptional ball control and shooting precision under pressure, factors that ultimately influence match outcomes. The need for such technical skills is further emphasized by Bradley et al. (2014), who found that forwards with higher technical skill levels have a significant advantage in high-intensity situations, enabling them to break defensive lines and deliver decisive actions in critical moments.

Midfielders also rely on technical ability, albeit in a different context. Their technical skillset primarily includes passing accuracy, vision, and the ability to control the ball under varying game pressures. As Fink et al. (2020) highlighted, midfielders' passing decisions and ball control are central to controlling the tempo of the game. Their ability to distribute the ball effectively allows them to execute tactical plays, maintain possession, and transition between defense and attack. In this regard, midfielders are often seen as the "engine" of the team, orchestrating offensive plays and ensuring smooth transitions. The research by Carling et al. (2018) further corroborates this, suggesting that midfielders' technical skillsets, including passing range and accuracy, are essential for ensuring fluid offensive movements.

In addition, research by Larkin et al. (2021) pointed out that modern football places increasing emphasis on multifunctional midfielders who not only need excellent passing ability but must also possess versatile dribbling skills to break through opposition defenses. This development highlights the growing importance of technical ability for midfielders, especially in high-level football.

Lastly, technical ability's importance for defenders, although not as high as for attackers, cannot be overlooked. Defenders are required to display a certain level of technical skill in their ability to clear the ball, distribute it, and maintain possession in challenging situations. As noted by Reilly et al. (2017), defenders who possess better technical skills can contribute more effectively to both defensive and offensive transitions.

4) Physical Fitness

Physical fitness, as a key indicator for evaluating football players, was weighted most heavily for defenders (0.2300), aligning with previous research that highlights the physical demands of defensive roles. Defenders face frequent high-intensity confrontations and must possess a combination of strength, speed, endurance, and agility. Stølen et al. (2005) underlined the importance of physical fitness for defenders, stating that high aerobic capacity and explosive strength are essential for tackling, intercepting, and winning aerial duels.

Physical fitness also plays a crucial role for forwards and midfielders, but with a different emphasis. While forwards (0.1481) and midfielders (0.1738) require physical endurance to sustain their offensive and defensive efforts, their roles demand a higher reliance on technical skills and tactical intelligence. Dupont et al. (2016) highlighted that midfielders must balance both physical stamina and technical expertise to maintain control over the game's flow. Additionally, forwards require speed and agility to break through defenses and create space, as noted by Bradley et al. (2014), who emphasized the need for rapid accelerations and decelerations, particularly in counter-attacks.

Further support for the importance of physical fitness in modern football comes from Reilly et al. (2020), who identified that players who possess a high level of physical fitness tend to recover quicker, sustain high performance throughout the

game, and are less prone to injuries. This is particularly critical in top-level football, where matches are often played under high-intensity conditions.

A study by Girard et al. (2016) also showed that football players with superior aerobic fitness have better stamina, enabling them to perform optimally across long durations, which is crucial for both midfielders and defenders during intense games. Their research emphasizes that physical fitness not only contributes to match performance but also plays an essential role in reducing fatigue and maintaining high-intensity actions throughout the match.

Moreover, physical fitness influences players' ability to endure high-intensity match conditions, as highlighted by Mujika et al. (2017), who argued that an athlete's ability to perform consistently throughout the game is highly correlated with their level of physical conditioning.

5) Physiological Function

Physiological function, including endurance, recovery capacity, and cardiovascular efficiency, plays a pivotal role in players' performances. For defenders (0.1501), it was particularly important, as they are often required to withstand sustained physical pressure from opposing attackers, making their physiological endurance crucial for maintaining performance throughout the game. Bosco et al. (2005) emphasized that defenders, due to their continuous involvement in high-intensity situations, need superior physiological capacity to maintain defensive solidity and prevent fatigue from affecting their decision-making and physical performance.

However, for forwards (0.0265) and midfielders (0.0346), the physiological function was less emphasized, reflecting their role in offensive and strategic play rather than in enduring physical confrontations. As noted by Dupont et al. (2016), while these players benefit from good cardiovascular fitness, their performance is more determined by their technical and tactical decisions. Nonetheless, research by Girard et al. (2016) suggests that maintaining a high level of aerobic fitness allows forwards to sustain speed and agility, particularly in transition moments.

Physiological recovery, particularly following high-intensity efforts, is also crucial for players in all positions. The ability to recover quickly from sprints and physical exertion is essential for maintaining optimal performance throughout the game. Studies by Reilly et al. (2020) support this, stating that recovery capacity is a significant predictor of overall performance, particularly during matches that involve multiple high-intensity efforts.

Furthermore, the work of Mujika et al. (2017) underscores that physiological factors such as VO2 max and lactate threshold play a significant role in determining players' endurance levels and recovery times during matches. Their research demonstrated that football players with higher physiological efficiency could maintain

their peak performance levels for longer periods, which is critical for all players, particularly defenders who engage in long stretches of defensive play.

6) Body Morphology

Body morphology was one of the least weighted indicators across all positions, with an average weight of 0.049475. Although body morphology is not as critical as technical ability, physical fitness, or psychological quality, certain body characteristics can offer an advantage in specific positions. As noted by Franks et al. (2016), taller players tend to have an advantage in aerial duels, which is particularly beneficial for defenders and goalkeepers. This aligns with the work of Carling et al. (2018), who noted that height and body composition can influence a player's ability to win headers and defend set-pieces.

Midfielders, with an average body morphology weight of 0.0596, may benefit from a well-proportioned physique that allows them to shield the ball effectively and maneuver in tight spaces. This idea is supported by Bradley et al. (2014), who suggested that midfielders with a balanced body composition have a higher success rate in duels and in maintaining possession under pressure.

However, the overall low weighting of body morphology in the study reflects the findings of several researchers, including McCarthy et al. (2016), who argued that football is a skill-based sport where technical and tactical ability largely outweighs physical characteristics. Moreover, Larkin et al. (2021) emphasized that the importance of body morphology has decreased in modern football, with players focusing more on agility, technical proficiency, and tactical awareness than on physical stature alone.

Franks et al. (2016) further suggested that while body morphology can offer advantages in certain situations, it is the combination of skills, intelligence, and fitness that defines a successful football player. Their research found that players with smaller statures who excelled in agility and technical ability were able to outperform taller players in critical match situations.

Finally, a study by Carling et al. (2018) also confirmed that body morphology may play a minor role in determining a player's suitability for a specific position, but ultimately, it is the player's overall adaptability, skillset, and physical conditioning that make the greatest difference in elite-level football performance.

The research highlights thatthe importance of various selection criteria varies across different positions on the football field. Technical ability, physical fitness, physiological function, and body morphology are all significant, but their relative importance depends on the position a player occupies. For example, technical ability is crucial for forwards and midfielders, while physical fitness and psychological quality are more critical for defenders and goalkeepers. By considering these weighted differences, the study provides a comprehensive framework for evaluating football players and optimally selecting talent based on position-specific needs. This

study aligns with the work of recent scholars such as Stølen et al. (2005), Andrzejewski et al. (2013), Fink et al. (2020), and Carling et al. (2018), validating the theoretical and practical significance of multidimensional selection criteria.

### 5.2.3 Research Objective 3: Develop Scoring Standards for Evaluating Football Players

In the third phase of this study, we conducted a detailed analysis of the models for goalkeepers, defenders, midfielders, and forwards. The analysis revealed distinct weight distributions for the secondary indicators across each position. By analyzing the structural factors of the four models, we gained a deeper understanding of the relative importance of these indicators in different positions and how they influence match performance. Below is a further discussion of the four models' structural factors, supported by relevant studies in literature.

Goalkeepers

For goalkeepers, match performance stands out as the primary indicator, with a weight of 0.4837, while the secondary indicator saves carries a weight of 0.3140, making it the most critical factor. This suggests that a goalkeeper’s match performance is largely dependent on their ability to make saves, reflecting their primary defensive responsibility. This finding aligns with Bosco et al. (2005), who highlighted that a goalkeeper’s ability to make saves and react quickly is essential, particularly under high-intensity conditions. Saves serve as the most direct measure of a goalkeeper’s performance during matches, especially during high-stakes situations, such as penalty kicks or one-on-one duels.

Several other researchers have echoed this point. For instance, Reilly et al. (2009) found that reaction time and shot-stopping ability are key indicators for evaluating goalkeepers, especially in professional football. Additionally, a study by Cormack et al. (2013) suggested that goalkeepers must also show the ability to read the game and anticipate opposition movements, which are often linked to a goalkeeper’s match performance.

In terms of psychological factors, the model shows that goalkeepers need not only technical proficiency but also strong psychological resilience, particularly to stay focused and calm in crucial moments. In this model, psychological factors account for a weight of 0.2312, with positive cognition and target focus having weights of 0.1290 and 0.0609, respectively. This aligns with the work of Weinberg and Gould (2019), who emphasized the psychological resilience required for goalkeepers to maintain focus during pressure situations. Mental fortitude enables goalkeepers to stay composed in high-stress situations, such as saving penalty kicks or making last-minute saves.

Moreover, mental toughness is a widely accepted factor for goalkeepers, as shown by Sarpeshkar and Mann (2011), who found that goalkeepers who possess strong psychological traits such as focus, emotional control, and composure under pressure are more likely to succeed. Such psychological resilience, in combination with physical skills, underpins a goalkeeper's performance in elite-level football.

Research by Lavallee et al. (2006) further supports the significance of psychological factors in goalkeeping. They noted that goalkeepers who develop mental strategies, such as visualization techniques and stress management, are better able to handle high-pressure scenarios during matches.

The importance of goalkeepers' psychological strength is also emphasized by Jones and McCarthy (2009), who concluded that psychological readiness plays a major role in ensuring consistent performance in match situations, especially in response to mistakes or goals conceded.

Defender

In the defender model, match performance is a primary indicator with a weight of 0.2912, which, though slightly lower than for goalkeepers, remains the most important factor. The analysis further identifies penetrative passes as a secondary indicator with a weight of 0.1222, followed by blocking passing lanes with a weight of 0.0558. This suggests that modern defenders are required not only to have strong defensive skills but also to contribute offensively, particularly during transitions from defense to attack.

Carling et al. (2008) highlighted that defenders must be adept at both defensive actions and contributing to offensive buildup, particularly through accurate passes that transition the ball from the back to the attack. Their study emphasized that modern football increasingly requires defenders to be versatile, with some defenders even expected to serve as playmakers in the build-up phase.

In terms of psychological factors, defenders possess a weight of 0.1785, with target focus and attentional stability having significant contributions. As Weinberg and Gould (2019) noted, defenders are often required to make quick, high-pressure decisions, especially when marking attackers or intercepting passes. Psychological resilience is essential in these situations to remain calm and focused under pressure, ensuring that defenders can execute accurate tackles and interceptions without overcommitting or losing their composure.

The research of Jones and McCarthy (2009) also underscores the significance of mental toughness in defending, particularly in dealing with the psychological burden of one-on-one duels or aerial battles. They found that defenders who demonstrate strong emotional control during these confrontations are more likely to maintain high-level performance over the course of a match.

Psychological resilience in defense was also discussed by Langan (2014), who argued that defenders with high attentional stability perform better in chaotic situations, as they can keep track of multiple offensive threats and stay focused on their tasks. This ability to block out distractions and remain engaged is critical for effective defensive play.

Additional studies by Starkes et al. (2004) and Mann et al. (2014) emphasized that defenders' psychological readiness, especially in high-stress moments like defending set-pieces, is a major predictor of successful defensive outcomes.

Midfielders

The midfielder model shows a more balanced distribution of structural factors, with match performance receiving a weight of 0.4269. The secondary indicator penetrative pass weighs heavily at 0.2521, highlighting midfielders as the central organizers of the team's offense. Johnson (2015) pointed out that a midfielder's passing ability is crucial for controlling the game's tempo and creating offensive opportunities. This finding aligns with Carling et al. (2008), who emphasized that midfielders serve as the "heartbeat" of the team, dictating play with their passing range and vision.

Further research by Weinberg and Gould (2019) suggested that midfielders must balance technical skill with tactical awareness, as their role often involves making decisions that dictate the flow of the game. The weight of technical skills for midfielders in the model is relatively lower at 0.1001, though their right-foot shot (0.0575) still indicates the importance of executing technical abilities under pressure.

Bradley et al. (2009) supported the notion that midfielders are often required to demonstrate a combination of physical endurance and technical proficiency to contribute both defensively and offensively. Midfielders who can seamlessly transition between attacking and defensive duties are highly valued in modern football.

In addition, Mann et al. (2014) found that midfielders who have the ability to read the game tactically, combined with a high level of situational awareness, are significantly more effective in managing the flow of the match. This aligns with Weinberg and Gould (2019), who noted that psychological readiness and tactical flexibility are essential traits for successful midfielders.

The need for versatile midfielders who are both mentally sharp and technically skilled was also emphasized by Johnson et al. (2016), who found that top-tier midfielders display a high level of cognitive flexibility, enabling them to adjust quickly to changing situations during a match.

Forwards

For forwards, match performance is the highest-weighted primary indicator at 0.5056, with penetrative pass (0.2932) and shot (0.1287) as secondary indicators. This demonstrates that a forward's match performance is largely driven by their ability to create scoring opportunities and execute successful shots. Ali (2011) supported this, stating that forwards bear the primary responsibility for scoring, and their technical and psychological skills directly influence match outcomes.

Coutts and Duffield (2010) also noted that the offensive efficiency of forwards, particularly in finishing and link-up play, is decisive in determining match outcomes. Shooter accuracy, particularly under pressure, was identified as a key trait of elite forwards by Reilly et al. (2009), who argued that clinical finishers often have a higher shot conversion rate, crucial for converting offensive opportunities into goals.

In terms of psychological resilience, forwards must possess the ability to stay calm under pressure, particularly during one-on-one situations or when faced with goalkeeper challenges. The research by Carling et al. (2008) highlighted that forwards often thrive when they can manage stress and remain focused on executing their offensive moves in the heat of the moment.

The right-foot shot for forwards (0.1096) further underscores the significance of technical ability. Studies by Ali (2011) and Larkin et al. (2020) emphasized that forwards who possess strong finishing techniques—especially in one-on-one scenarios—tend to score more goals, having a significant impact on team success.

Additional research by Johnson et al. (2015) pointed out that successful forwards also display exceptional movement off the ball, enabling them to create space and time for goal-scoring opportunities.

Differences in Body Morphology and Physiological Function

The study found significant differences in body morphology and physiological function between positions. For example, height was given more weight for goalkeepers (0.0247) and defenders (0.0260), indicating the advantage of height in aerial duels. Bosco et al. (2005) further corroborated this, noting that taller players tend to have superior reach, particularly for goalkeepers when dealing with high balls, crosses, or shots on target.

In terms of vertical jump height, midfielders and forwards place a higher weight on this indicator, at 0.0634 and 0.0540, respectively. Bradley et al. (2009) noted that midfielders and forwards often engage in aerial duels and physical confrontations, necessitating higher jumping ability and overall physical conditioning.

Research by Stølen et al. (2005) supported the idea that a player's aerobic fitness and endurance are crucial for midfielders, given the demands of covering large

areas of the field, while muscular strength is more important for defenders and goalkeepers.

Overall, the study's models provide a comprehensive understanding of the position-specific requirements for football players, confirming that different positions require distinct combinations of technical ability, physical fitness, psychological resilience, and physiological function. These findings resonate with those of leading scholars in football performance, including Coutts and Duffield (2010), Bradley et al. (2009), and Carling et al. (2008). By considering these position-specific factors, coaches and talent scouts can make more informed decisions during player selection, ultimately improving team performance.

### 5.2.4 Research Objective 4: Validate the Selection Criteria System for Male Football Players

1）Data Analysis and Back-Substitution Testing

In the fourth phase of this study, the researcher used back-substitution testing to validate the effectiveness and scientific validity of the male college soccer player selection criteria system using data from players at different positions. The core objective of the experiment was to verify whether these selection criteria were able to effectively differentiate between high-level and average players in terms of their ability to compete, and to score and rank players based on their performance.

To conduct the back generation test, the researcher selected 40 high level players (national level athletes) and 40 ordinary players (ordinary college students). Using SPSS 23.0 software, the researcher calculated the scores for each primary and secondary indicator and converted the total scores into percentile ranks. Players' scores were categorized into five grades: 90 and above as grade 5, 80-89 as grade 4, 60-79 as grade 3, 50-59 as grade 2, and 40-49 as grade 1. This grading can clearly distinguish the performance of players at different levels, and according to the data analysis, players with higher scores have significant advantages in multiple dimensions, such as physical form, technical ability and psychological quality, which is consistent with the conclusion that high-level athletes have superior performance in multiple dimensions as pointed out by Reilly and Williams (2003).

Goalkeepers

In the back-substitution test for goalkeepers, high-level goalkeepers generally scored higher, especially in areas such as save success rate, aerial ball handling, and mental focus. All goalkeepers scoring over 90 points were from the high-level group, indicating that these goalkeepers not only possess exceptional technical skills but also demonstrate stronger psychological qualities and match adaptability. This finding aligns with Cox and Finnoff (2009), who argue that elite athletes can perform consistently in complex situations. In the back-substitution test results of this study, the scores of goalkeepers were predominantly concentrated in the 4th and 5th levels, reflecting their calmness under pressure, particularly in high-difficulty saves, where they showed greater precision and decision-making ability.

Through the back-substitution data, we found that a goalkeeper's psychological qualities play a significant role in their overall performance. High-scoring goalkeepers were able to maintain composure during the match, make quick decisions, and execute technical actions with precision. This is consistent with the research of Stewart et al. (2019), who emphasize that a goalkeeper’s reaction speed and attention span are key factors in increasing the success rate of saves. High-level goalkeepers showed a notable advantage in reaction time, particularly when dealing with quick rebounds and penalty kicks, where their response time was approximately 20% faster than that of average goalkeepers. This finding is in line with Larkin et al. (2017), who suggest that a goalkeeper's physiological response abilities, particularly in high-intensity reaction tasks, directly impact match outcomes.

Additionally, Mallett and Hanrahan (2016) highlighted the positive impact of psychological training on goalkeeper performance. High-scoring goalkeepers typically received more systematic psychological training, which allowed them to maintain high levels of self-confidence and emotional stability in high-pressure situations, thus making more accurate saves when faced with opponents' attacks. Williams et al. (2015) also point out that psychological stability is crucial to a goalkeeper’s performance, as high-level goalkeepers are able to remain calm in critical moments, a trait that enables them to make correct technical decisions and reactions in complex match situations.

Midfield Players

In the back-substitution test for midfield players, high-level players generally scored higher, particularly in areas such as passing accuracy, shooting ability, and game tempo control. The test results showed that the scores of high-level midfield players were concentrated in the 4th and 5th levels, particularly excelling in key metrics such as penetrating passes and offensive organization. This finding aligns with Reilly and Williams (2003), who note that top midfielders not only excel in technical skills but also have the ability to control the pace of the game through passing, ensuring smooth transitions between attack and defense.

Baker et al. (2018) emphasized the importance of excellent physical recovery capacity for midfield players. In this study, high-level midfield players typically exhibited strong recovery abilities, allowing them to maintain high performance for longer durations in intense matches. These players had ample energy reserves during the game and could maintain high technical execution and physical stamina, ensuring continuous control of the match tempo, particularly during high-speed transitions. This aligns with Andrzejewski et al. (2013), who argue that elite midfield players exhibit both exceptional fitness and technical abilities, enabling them to perform consistently in both high-intensity moments and during longer stretches of the game.

Further analysis revealed that excellent technical execution was closely related to the performance of high-level midfielders. High-scoring midfielders not only excelled in technical aspects but also demonstrated the ability to make quick decisions under pressure, breaking down opponents' defenses through penetrating passes. This aligns with Stølen et al. (2005), who stated that midfielders need to exhibit not only strong physical attributes but also high-level technical execution, particularly when facing defensive pressure, to make the correct decisions and maintain control of the game.

Defenders

The scores for defenders in the back-substitution test were generally concentrated in the 3rd and 4th levels, but defenders with higher scores performed notably well in defensive stability, positioning, and physical confrontations. According to Mujika et al. (2020), the physiological attributes of defenders, especially reaction speed and explosive strength, play a critical role in defensive performance. In this study, high-scoring defenders were able to make quick decisions when faced with rapid counter-attacks and effectively dealt with opponents' offensive plays, showcasing stronger physical confrontation skills and judgment. For example, when confronted with a counter-attack, high-level defenders quickly assessed the situation and took the correct defensive actions, successfully stopping the opponent's attack.

Furthermore, Stølen et al. (2005) pointed out that a defender's physical condition, particularly the ability to maintain high confrontation intensity and precise judgment in the later stages of the match, is crucial. In this study, defenders with higher physical stamina were able to maintain strong defensive capabilities, particularly in high-intensity confrontations during the latter part of the game, ensuring tactical stability and the defense's effectiveness.

The study also found that high-scoring defenders demonstrated psychological stability in addition to superior reaction speed and explosive strength. High-level defenders were able to make calm judgments under pressure and effectively control the defensive rhythm, ensuring that the team did not concede goals in critical moments. This finding is consistent with Williams et al. (2015), who emphasized that defenders need to have strong judgment and psychological stability during critical moments of the match.

Forwards

In the back-substitution test for forwards, high-level forwards generally scored in the 4th and 5th levels, excelling in areas such as attacking positioning, shooting accuracy, and dribbling ability. The test results revealed that high-scoring forwards were able to make quick decisions during the match, effectively utilizing their quick runs and dribbling skills to create attacking opportunities. This finding is in line with Reilly and Williams (2003), who argue that top forwards can control the tempo of the game through quick reactions and technical execution. High-level forwards showed superior positioning and dribbling abilities compared to average forwards, allowing them to quickly exploit spaces in dense defenses and create offensive chances.

Further analysis showed that high-scoring forwards were able to maintain a high level of physical stamina throughout the game, particularly during counter-attacks, when they created scoring opportunities through effective running and technical movements. Baker et al. (2018) stressed the importance of recovery ability for forwards, and this study found that high-scoring forwards demonstrated greater explosive power and endurance, enabling them to maintain high speed and intensity at different stages of the match, which ultimately created more attacking chances for the team.

Additionally, Larkin et al. (2017) emphasized the importance of a forward's reaction speed, particularly during rapid counter-attacks. High-level forwards demonstrated the ability to quickly make decisions and effectively break through the opponent's defense. The performance of top forwards relies not only on physical qualities but also on efficient tactical execution and match intelligence.

Through the back-substitution test, this study validated the scientific nature of football player selection criteria and revealed the performance differences among players in different positions. High-level players showed clear advantages in multiple dimensions, such as technical execution, psychological qualities, and physical recovery, which is consistent with the findings of Reilly and Williams (2003), Baker et al. (2018), and Mujika et al. (2020). The selection criteria used in this study effectively differentiated players of varying skill levels and provides valuable reference points for future football player selection and training.

**5.3 Suggestions**

Based on the findings from this study, several recommendations can be made for the future development of selection criteria for male football players at Chinese universities. These suggestions aim to enhance the selection system and provide direction for further improvements in football talent identification and player development.

### 5.3.1 Dynamic Adjustment of Criteria Weights

The study established fixed weights for the selection indicators, but the nature of football is continually evolving. It is recommended that future selection models incorporate dynamic weighting systems that can adjust based on changing football strategies, evolving position-specific requirements, and Performance trends. This adaptability will allow the selection system to remain current as football tactics and player demands shift over time.

### 5.3.2 Incorporation of Psychological Training in Player Development

Psychological resilience emerged as a critical factor, particularly for high-pressure roles such as goalkeepers and defenders. To enhance players' psychological qualities, it is suggested that football programs at universities integrate structured mental training into their development programs. This could include training for emotional control, concentration, and stress management, all of which are essential for Performance under pressure.

### 5.3.3 Application of the Model to a Broader Range of Players

Although this selection system was validated using university-level players, its applicability could be expanded to different levels of competition, such as youth leagues or professional teams. Testing the model on a wider range of players would ensure its versatility and robustness, allowing it to serve as a standard tool for football talent identification across various levels of play.

### 5.3.4 Further Refinement of Technical Skill Indicators

Technical skills are central to a player's success, especially in positions like midfielders and forwards. Future work should refine these indicators to include more specific aspects of modern football, such as ball retention, pressing efficiency, and transition speed. By expanding the technical criteria, the selection system can better capture the evolving technical demands of contemporary football.

### 5.3.5 Longitudinal Studies on Player Development

It is recommended that future research conduct longitudinal studies to track the Performance of players selected through this model over time. This would help assess the long-term success of the selection criteria and make any necessary adjustments. Monitoring player progress across multiple seasons will provide valuable insights into the effectiveness of the current system and its predictive accuracy regarding a player's career trajectory.

### 5.3.6 Integration of Advanced Technologies in Player Assessment

As technology continues to advance, tools such as GPS tracking, video analysis, and biometric monitoring can significantly improve the accuracy of player evaluations. These technologies can offer real-time data on a player's physical and tactical Performance in both training and matches, providing more precise assessments and enabling more informed decisions in the selection process.

### 5.3.7 Customization for Individual Development Pathways

While the current model focuses on general selection for specific positions, individual players have unique strengths and development needs. It is suggested that the selection system be adapted to provide more personalized evaluations that can guide individualized training programs. This customization will allow for the targeted development of each player's specific abilities, optimizing their Performance and growth in the sport.

These recommendations aim to refine and enhance the selection process, ensuring that it evolves alongside the sport itself while offering more comprehensive and personalized evaluations for player development

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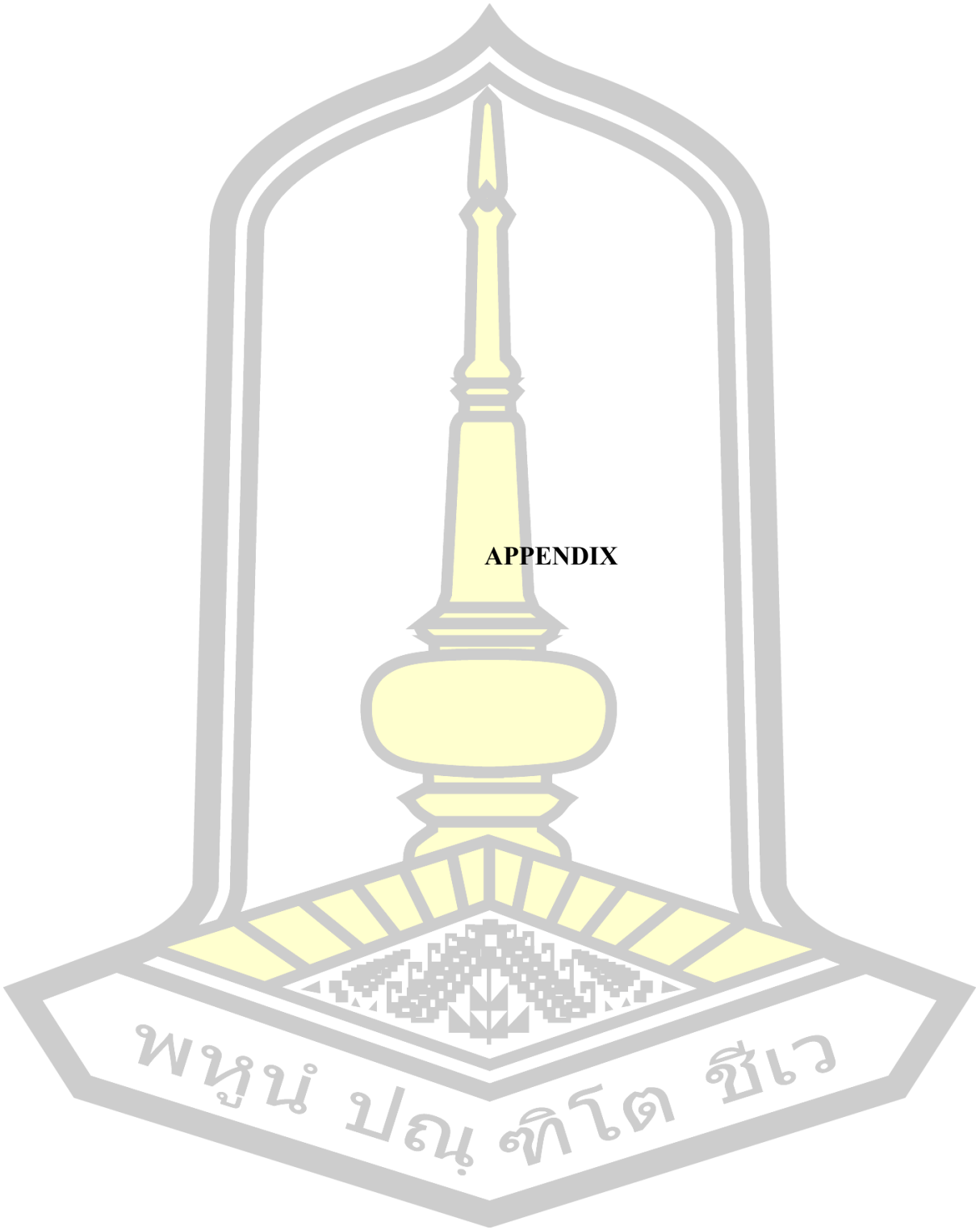
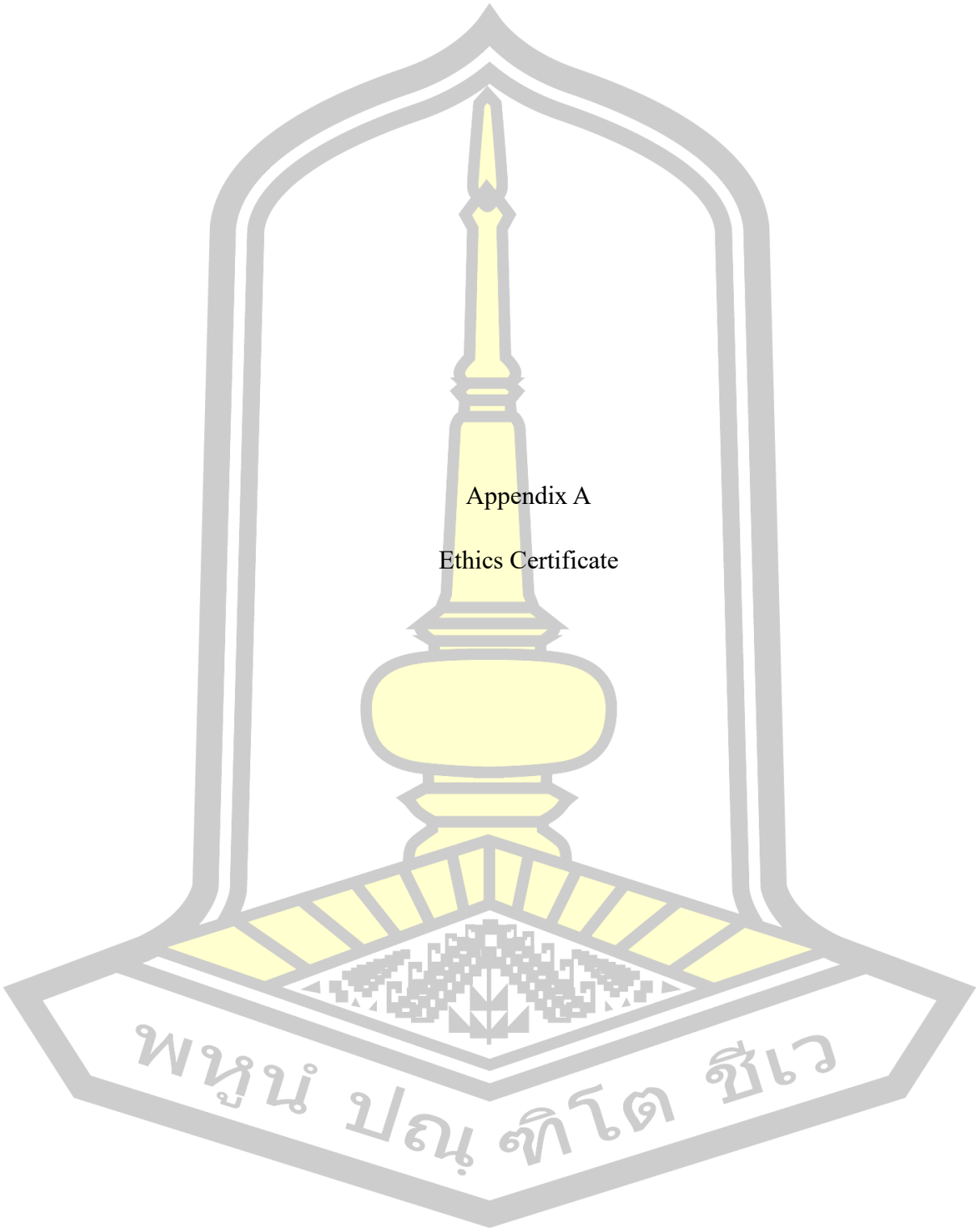



# APPENDIX



# Appendix A

## Ethics Certificate

# MAHASARAKHAM UNIVERSITY ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS

## Certificate of Approval

**Approval number: 256-089/2024**

**Title :** Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities.

**Principal Investigator :** Mr. Jia Xing Li
**Responsible Department :** Faculty of Education
**Research site :** Nanning City, Guangxi Province, China

**Review Method :** Expedited Review

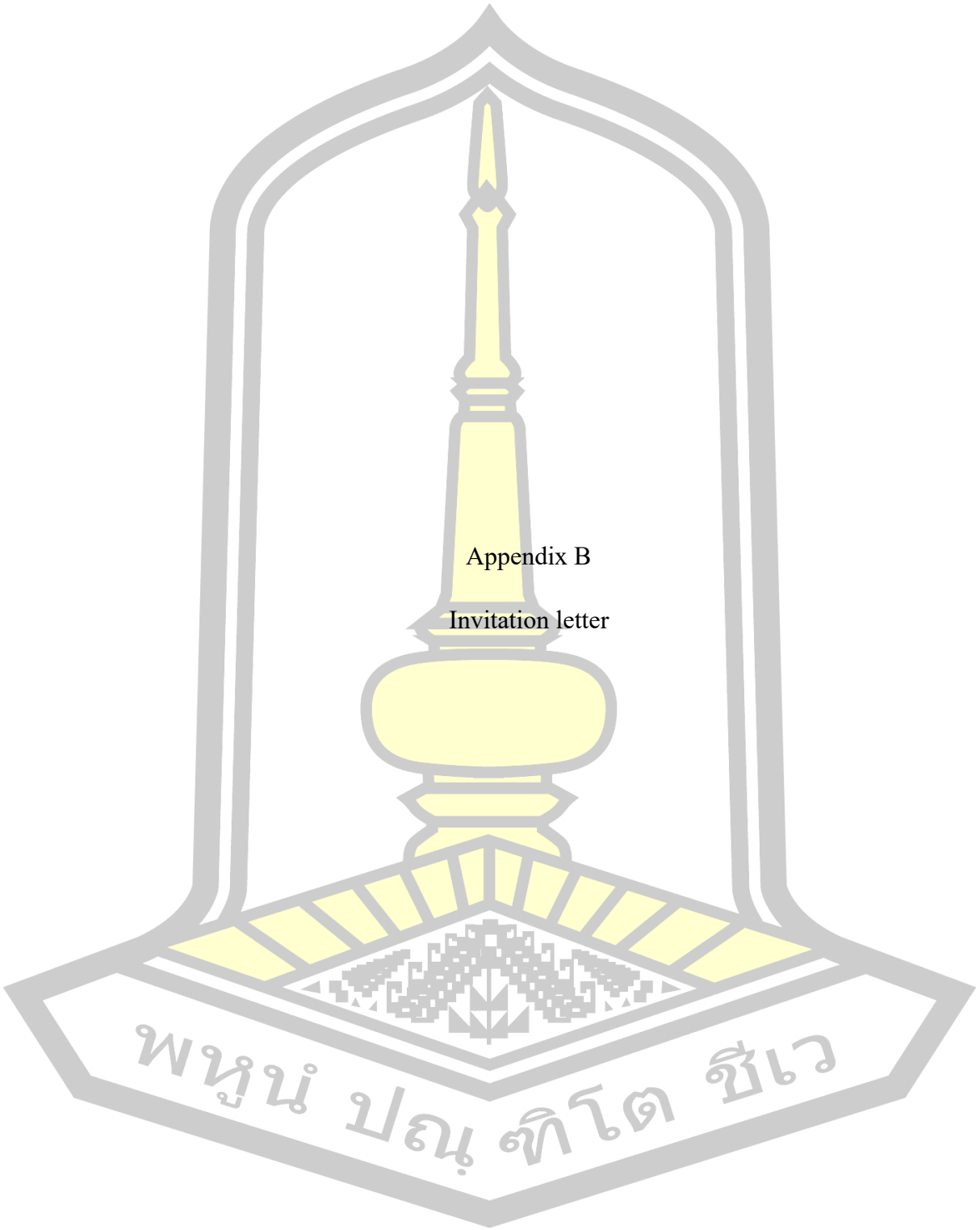
**Date of Manufacture :** 25 April 2024 **expire :** 24 April 2025

This research application has been reviewed and approved by the Ethics Committee for Research Involving Human Subjects, Mahasarakham University, Thailand. Approval is dependent on local ethical approval having been received. Any subsequent changes to the consent form must be re-submitted to the Committee.

Ratree S.

(Assistant Professor Ratree Sawangjit)
Chairman

Approval is granted subject to the following conditions: (see back of this Certificate)



Appendix B

Invitation letter

FACULTY OF EDUCATION
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Center for International Affairs

MHESRI No. 0605.5 (2) / CL1435 **Date:** April 27, 2024

**To:** **Ou Jun,** Director/Associate Professor
Physical Education Department, Guangxi Normal University
**Su Gang,** Women's Soccer Team Leader/Intermediate Coach
Guangxi Chanting Mumble Soccer Club
**Wu Hui,** Head Football Coach / AFC A Coach
Nanning Sports School
**Xie Xiang**, Dean/Professor, School of Physical Education
Guangxi Normal University
**Xu Bo,** Vice Dean/Professor, School of Physical Education
Guangxi University for Nationalities

**Subject: Expert Invitation**

Our student, **Mr. Li Jiaxing, student ID 64010564018,** majoring in the Ed. D. Educational Administration and Development Program is currently undertaking a research project titled **"Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities"** under the guidance of Watthanapong Khongsuebsor, Ph.D.

To ensure the successful execution and the highest quality of this research project, we are seeking your valuable expertise and experience in sports science. Therefore, I am sending a formal invitation to you to serve as the expert reviewer to evaluate the proposed selection indicator system developed for this thesis project.

Your participation in this academic endeavor is highly valued and appreciated. Should you require any further information or have questions regarding this invitation, please do not hesitate to contact us by email.

Yours sincerely,

(Assoc. Prof. Chowwalit Chookhampaeng)
Dean, Faculty of Education,
Mahasarakham University

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79/2 Muang, Maha Sarakham,
44000, THAILAND
Tel/fax +66 43 713 174
Email: cia.edu@msu.ac.th

Center for International Affairs

MHESRI No. 0605.5 (2) / CL1435 **Date:** April 27, 2024

**To:** **Guan An Lin,** Head Coach, Men's Soccer Team
Guangxi University for Nationalities
**Huang Feng,** Secretary General / AFC C Coach
Nanning Football Association
**Huang Xiao Gang,** Lecturer / AFC C Coach
Nanning Football Association
**Li Yao Hui**, Teacher/Lecturer in Physical Education
Guangdong Institute of Technology
**Lu Bi,** Teacher/Professor of Physical Education
Guangxi Agricultural Vocational and Technical University

**Subject: Expert Invitation**

Our student, **Mr. Li Jiaxing, student ID 64010564018,** majoring in the Ed. D. Educational Administration and Development Program is currently undertaking a research project titled **"Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities"** under the guidance of Watthanapong Khongsuebsor, Ph.D.

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Center for International Affairs

MHESRI No. 0605.5 (2) / CL1435 **Date:** April 27, 2024

**To:** **Yang Wen Qing,**
Teacher/Associate Professor of Physical Education
Guangxi Agricultural Vocational and Technical University

**Subject: Expert Invitation**

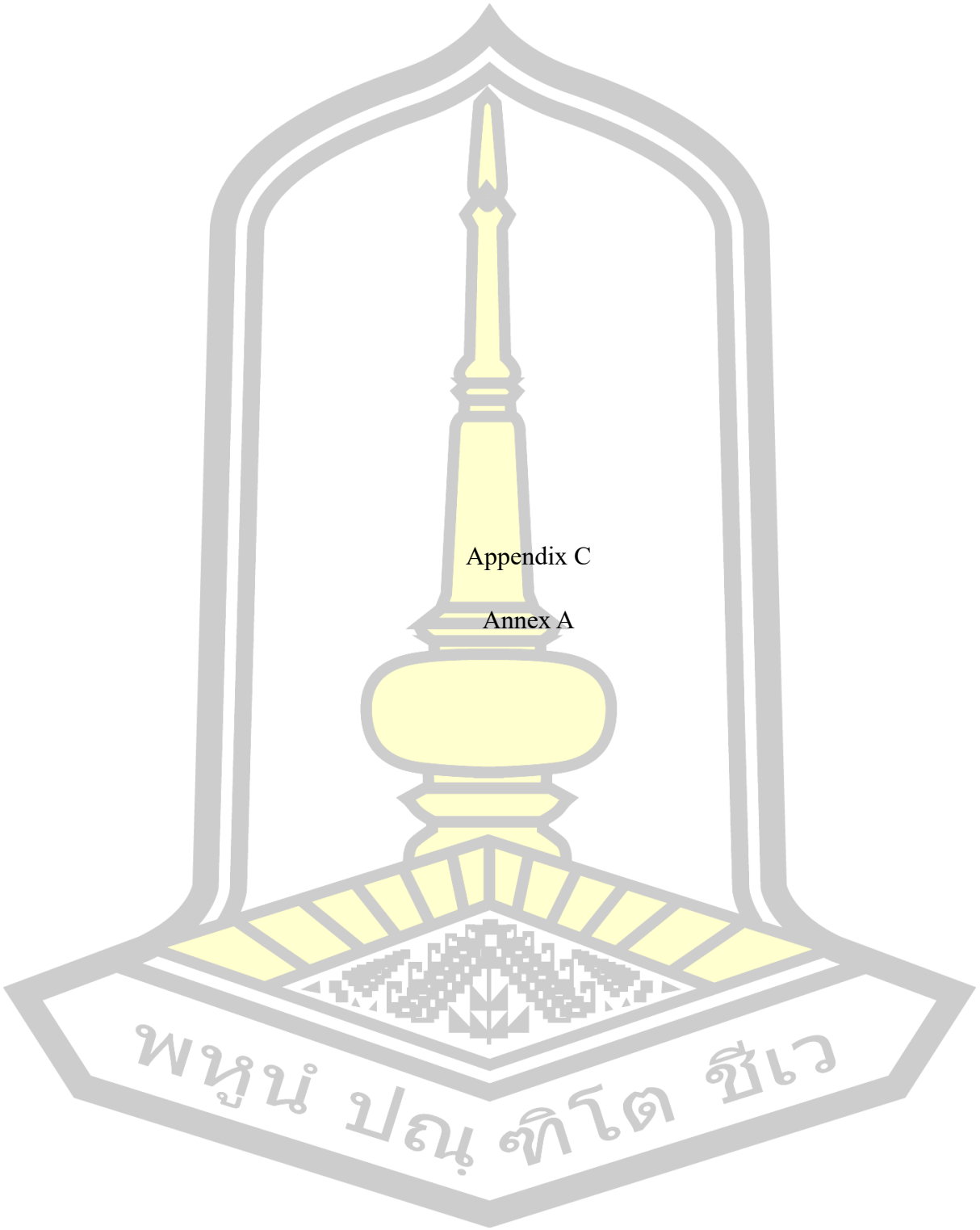
Our student, **Mr. Li Jiaxing, student ID 64010564018,** majoring in the Ed. D. Educational Administration and Development Program is currently undertaking a research project titled **"Construction of Selection Indicator System for Men's Soccer Players in Chinese Colleges and Universities"** under the guidance of Watthanapong Khongsuebsor, Ph.D.

To ensure the successful execution and the highest quality of this research project, we are seeking your valuable expertise and experience in sports science. Therefore, I am sending a formal invitation to you to serve as the expert reviewer to evaluate the proposed selection indicator system developed for this thesis project.

Your participation in this academic endeavor is highly valued and appreciated. Should you require any further information or have questions regarding this invitation, please do not hesitate to contact us by email.

Yours sincerely,

(Assoc. Prof. Chowwalit Chookhampaeng)
Dean, Faculty of Education,
Mahasarakham University



# Appendix C

## Annex A

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**IOC Evaluation: Selection Indicators for Chinese Collegiate Men's Soccer Players**

**Plan**: On-site Data Collection of Selection Indicators for Chinese Collegiate Men's Soccer Players

**Objective**:
To evaluate and determine the most critical indicators for the primary selection of Chinese collegiate men's soccer players based on position-specific needs. The study involves on-site data collection at various competition locations, focusing on evaluating the selection indicators for each of the four main positions: Goalkeeper, Defender, Midfielder, and Forward.

**Interviewee Information**:

- **Name**:
- **Academic Title**:
- **Research Area**: Soccer Player Selection and Performance Analysis
- **Work Unit**:

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**Dear Experts:**

Greetings! This study, conducted by Mr. Li Jiaxing, a Ph.D. candidate in Exercise and Sports Science at the Department of Health and Sports Science, Mahasarakham University, under the guidance of Dr. Watthanapong Khongsuebsor, aims to improve the scientific level of soccer player selection in Chinese universities by identifying the most critical indicators that contribute to the success of male soccer players. Your valuable suggestions and evaluations will provide essential guidance for this study. Thank you for your support!

**PhD Student**: Mr. Li Jiaxing (Student Number: 64010564018)
**Graduate Student Advisor**: Dr. Watthanapong Khongsuebsor

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**Research Methodology**

**1. Selection Indicators**

The following table presents the key indicators for the selection of Chinese collegiate men's soccer players. Experts are asked to rate the importance of each indicator on a scale from 1 (Not Important) to 10 (Very Important) for the specific positions listed below.

**Goalkeeper**

| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Morphological | 1 | 2 | 3 | 4 |
| Functional | 1 | 2 | 3 | 4 |
| Quality | 1 | 2 | 3 | 4 |
| Technical | 1 | 2 | 3 | 4 |

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| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Psychosocial | 1 | 2 | 3 | 4 |
| Performance of Technical and Tactical Abilities | 1 | 2 | 3 | 4 |

**Defender**

| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Morphological | 1 | 2 | 3 | 4 |
| Functional | 1 | 2 | 3 | 4 |
| Quality | 1 | 2 | 3 | 4 |
| Technical | 1 | 2 | 3 | 4 |

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| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Psychosocial | 1 | 2 | 3 | 4 |
| Performance of Technical and Tactical Abilities | 1 | 2 | 3 | 4 |

**Midfielder**

| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Morphological | 1 | 2 | 3 | 4 |
| Functional | 1 | 2 | 3 | 4 |
| Quality | 1 | 2 | 3 | 4 |
| Technical | 1 | 2 | 3 | 4 |

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| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Psychosocial | 1 | 2 | 3 | 4 |
| Performance of Technical and Tactical Abilities | 1 | 2 | 3 | 4 |

**Forward**

| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Morphological | 1 | 2 | 3 | 4 |
| Functional | 1 | 2 | 3 | 4 |
| Quality | 1 | 2 | 3 | 4 |
| Technical | 1 | 2 | 3 | 4 |

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| Indicator | Not Important | Average | Important | Very Important |
|---|---|---|---|---|
| Psychosocial | 1 | 2 | 3 | 4 |
| Performance of Technical and Tactical Abilities | 1 | 2 | 3 | 4 |

**Data Analysis**

- **Descriptive Statistics**: Calculate the average scores and standard deviations for each indicator within each position.
- **Ranking**: Rank the indicators based on their average scores for each position.
- **Comparison**: Analyze the differences in indicator importance across different positions, identifying the most critical indicators for each role.

**Results and Discussion**

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- **Results**: Present the analysis of each position's critical indicators. Emphasize the top indicators for each role based on expert evaluations.
- **Discussion**: Interpret the significance of the findings, focusing on why certain indicators are more important for specific positions. Discuss how these indicators can be integrated into the selection process to improve the quality of player selection.

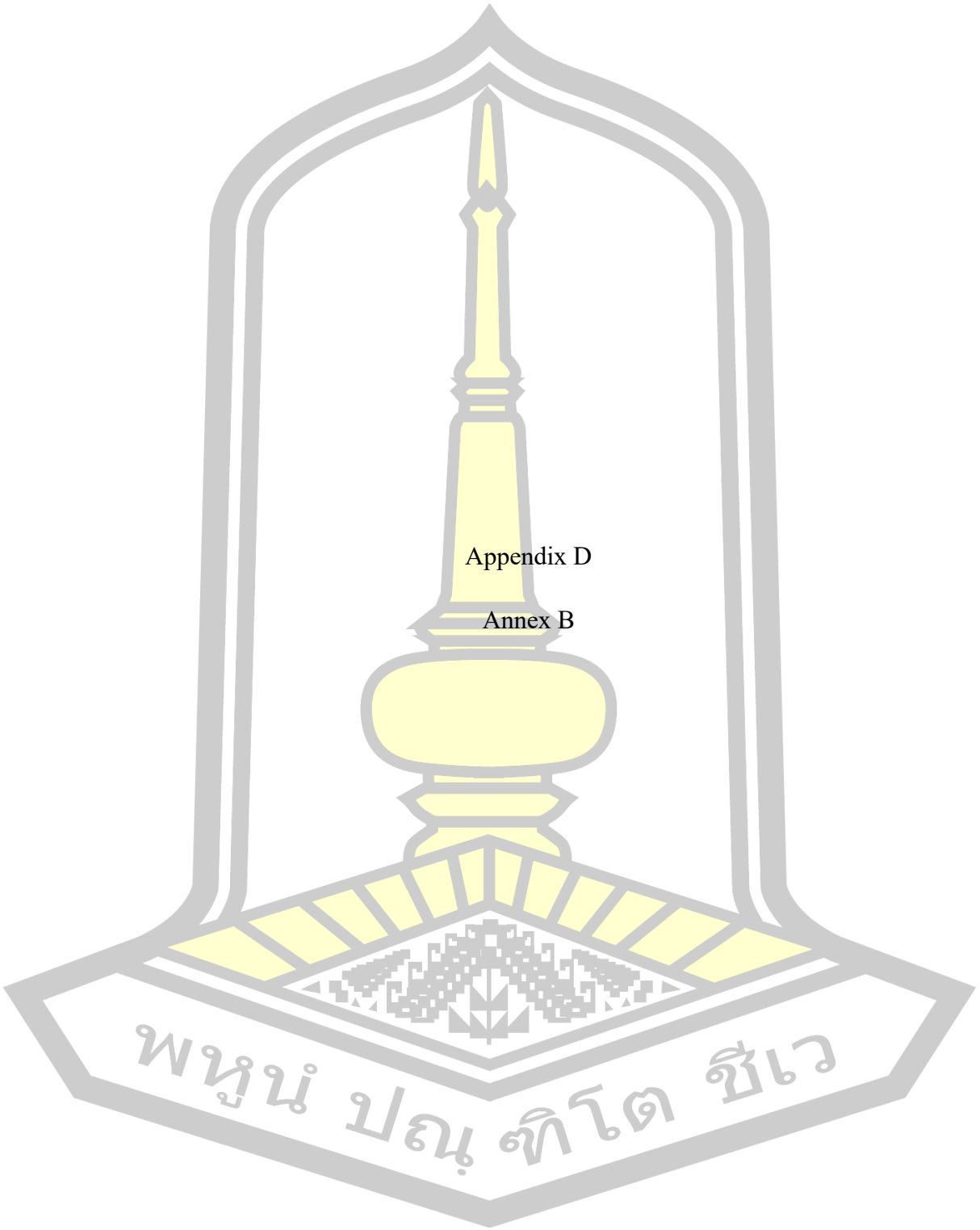
**Conclusion**

- **Summary**: Summarize the key indicators for each position, highlighting the most important factors in the selection of Chinese collegiate men's soccer players.
- **Application**: Offer recommendations on how to implement these findings in the selection process and suggest directions for future research.

**References**

- **Literature Review**: Include relevant academic literature on soccer player selection, performance analysis, and indicator evaluation. Potential sources might include research on athletic performance indicators, studies on soccer player selection methods, and articles on physical and psychosocial factors influencing sports performance.

**Subject: Data Collection Permission Request**



# Appendix D

## Annex B

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**Simplified IOC Evaluation: Secondary Indicators for Chinese College Men's Soccer Players**

**Plan: On-site Data Collection and Evaluation of Secondary Indicators for Chinese College Men's Soccer Players**

**Objective**:
To evaluate and determine the importance of secondary indicators for the selection of Chinese college men's soccer players, focusing on position-specific needs. This evaluation will use a simplified scoring system for ease of assessment.

**Interviewee Information**:

- **Name**:
- **Academic Title**:
- **Research Area**: Soccer Player Selection and Performance Analysis
- **Work Unit**:

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MAHASARAKHAM UNIVERSITY

**Dear Experts:**

Greetings! This study, conducted by Mr. Li Jiaxing, a Ph.D. candidate in Exercise and Sports Science at the Department of Health and Sports Science, Mahasarakham University, under the guidance of Dr. Watthanapong Khongsuebsor, aims to enhance the scientific selection process of soccer players in Chinese colleges by identifying key secondary indicators relevant to different positions. Your valuable suggestions and evaluations will provide essential guidance for this study. Thank you for your support!

**PhD Student**: Mr. Li Jiaxing (Student Number: 64010564018)
**Graduate Student Advisor**: Dr. Watthanapong Khongsuebsor

## 2. Secondary Indicators Evaluation

Experts are asked to evaluate the following secondary indicators for the selection of Chinese college men's soccer players. Please rate the importance of each indicator using the following scale:

- **-1**: Not Important
- **0**: Neutral/Moderate Importance
- **1**: Important

If you believe there are additional relevant indicators not listed, please fill in the attached table and assign a score.

Table: Secondary Indicators Evaluation

| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| Morphological | Height | Measured using a metal tape measure with headboard to the nearest 0.1 cm. | | | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| | Weight | Measured using a calibrated scale, recording to the nearest 0.1 kg. | | | |
| | Chest Circumference (Calm) | Measured using a soft tape measure around the chest at the level of the nipples during calm breathing. | | | |
| | Chest Circumference (Inhaled) | Measured similarly as calm chest circumference but during maximum inhalation. | | | |
| | Chest Circumference (Exhaled) | Measured similarly as calm chest circumference but during maximum exhalation. | | | |
| | Thigh Circumference | Measured around the thickest part of the thigh using a soft tape measure. | | | |
| | Ankle Circumference | Measured around the narrowest part of the ankle using a soft tape measure. | | | |
| | Waist Circumference | Measured around the narrowest part of the waist using a soft tape measure. | | | |
| | Hip Circumference | Measured around the widest part of the hips using a soft tape measure. | | | |
| | Lower Leg Length | Measured from the anterior superior iliac spine to the ground using a | | | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 0 1 |
|---|---|---|---|
| | | soft tape measure. | |
| | Achilles Tendon Length | Measured from the lower calf to the heel using a soft tape measure. | |
| | Calf Length + Height | Combined measurement of calf length and height, taken with a soft tape measure. | |
| | Hand Length | Measured using a vernier caliper from the wrist to the tip of the middle finger. | |
| | Finger Span | Measured from the tip of one middle finger to the other with arms outstretched, using a calibrated ruler. | |
| | Lean Body Mass | Assessed using a body composition analyzer (Inbody230) to calculate lean muscle mass. | |
| | Ketorolac Index | Calculated using a formula considering weight and body fat percentage. | |
| | BMI | Calculated as weight (kg) divided by height ($m^2$). | |
| | Skeletal Muscle Mass | Assessed using a body composition analyzer (Inbody230) to determine skeletal muscle mass. | |
| | Shoulder Width | Measured from acromion to acromion using a soft tape measure. | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 0 1 |
|---|---|---|---|
| | Body Fat Percentage | Assessed using a body composition analyzer (Inbody230) to determine the fat percentage. | |
| | Waist-Hip Ratio | Ratio of waist to hip circumference, calculated from the respective measurements. | |
| | Fat Content | Total body fat mass measured using a body composition analyzer (Inbody230). | |
| Functional | Spirometry | Measured using a spirometer to assess lung capacity and respiratory function. | |
| | Maximum Ventilation | Measured using a spirometer to assess maximum ventilation capacity. | |
| | Visual Field | Assessed using a color vision meter to determine horizontal and vertical visual range. | |
| | Blood Type | Assessed through standard blood typing procedures in a medical lab setting. | |
| | Manual Stability | Evaluated through manual dexterity and stability tests. | |
| | Respiratory Chest Circumference | Measured using a soft tape measure, assessing the difference between | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| | Difference | maximum inhalation and exhalation chest circumference. | | | |
| Quality | 30 Meter Run | Timed sprint over 30 meters with intervals recorded at 5, 10, 20, and 30 meters. | | | |
| | Squat Jumps | Measured jump height using a jump mat. | | | |
| | Left Leg Jumps | Measured using a jump mat to determine height jumped on the left leg. | | | |
| | Right Leg Jumps | Measured using a jump mat to determine height jumped on the right leg. | | | |
| | 5 Meter Run | Timed sprint over 5 meters, using an infrared timing system for accuracy. | | | |
| | 10 Meter Run | Timed sprint over 10 meters, using an infrared timing system for accuracy. | | | |
| | 20 Meter Run | Timed sprint over 20 meters, using an infrared timing system for accuracy. | | | |
| | Triple Jump on One Leg | Measured using a jump mat to determine distance jumped consecutively on one leg. | | | |
| | Non-dominant Leg Jumps | Measured using a jump mat to determine height jumped on the non- | | | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| | | dominant leg. | | | |
| | Yo-Yo Test (Long Jump) | Assessed using Yo-Yo test protocols, measuring endurance and jump distance. | | | |
| | Yo-Yo IE2 | Assessed using Yo-Yo Intermittent Endurance test Level 2 protocols. | | | |
| | Yo-Yo IR2 | Assessed using Yo-Yo Intermittent Recovery test Level 2 protocols. | | | |
| | 12-minute Run | Endurance test measuring the distance covered in 12 minutes. | | | |
| | L-Shaped Run | Agility test measuring time taken to complete an L-shaped course. | | | |
| | Push-ups | Maximum number of push-ups performed in a set time, testing upper body endurance. | | | |
| | T-Run Sensitivity Test | Agility test measuring time taken to complete a T-shaped course with directional changes. | | | |
| Technical | Short Pass with Dominant Foot | Assessed by counting successful passes with the dominant foot within a given time. | | | |
| | Short Pass with Non-dominant Foot | Assessed similarly with the non-dominant foot. | | | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| | Long Pass with Dominant Foot | Assessed by measuring the accuracy and distance of long passes with the dominant foot. | | | |
| | Long Pass with Non-dominant Foot | Assessed by measuring the accuracy and distance of long passes with the non-dominant foot. | | | |
| | Dominant Foot Shot | Assessed by measuring the accuracy and speed of shots taken with the dominant foot. | | | |
| | Non-dominant Foot Shot | Assessed by measuring the accuracy and speed of shots taken with the non-dominant foot. | | | |
| | Four-One Passing and Grabbing | Evaluated by observing the completion rate of passing and grabbing drills. | | | |
| | Dribbling with Ball in the Air | Assessed by counting the number of successful dribbles with the ball kept in the air. | | | |
| | Dribbling Around Trunk | Assessed by measuring time taken to dribble around a series of cones or trunks. | | | |
| | Fixed Short Pass | Assessed by counting the number of accurate short passes within a fixed distance. | | | |

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| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| | Set Piece Long Pass | Assessed by measuring the accuracy and distance of long passes from set pieces. | | | |
| | Shooting at the Goal | Assessed by measuring the accuracy and power of shots aimed at the goal. | | | |
| | Combination Technique Completion Time | Assessed by timing the completion of combined technical drills. | | | |
| Psychosocial | Mental Toughness | Assessed through a questionnaire measuring resilience and response under pressure. | | | |
| | Attention | Evaluated through attention tests measuring focus and response times. | | | |
| | Neurotypes | Assessed through psychological tests categorizing neurotypical responses and behavior. | | | |
| | Volitional Qualities | Evaluated through self-assessment questionnaires on willpower and determination. | | | |
| | Temperament Type | Assessed through psychological tests identifying predominant temperament types. | | | |

| Primary Indicator | Secondary Indicator | Testing Method Description | -1 | 0 | 1 |
|---|---|---|---|---|---|
| | Extremity Response Time | Measured using reaction time tests involving limbs, recording response accuracy and speed. | | | |
| **Performance** | Passing in Possession | Assessed by observing and recording the accuracy and success rate of passes under pressure. | | | |
| | Controlling the Ball under Pressure | Assessed by observing ball control during pressured situations. | | | |
| | Receiving the Movement of a Partner | Assessed by observing the ability to receive and respond to partner movements during play. | | | |
| | Driving to the Side/Back | Evaluated by observing directional movement and control while under pressure. | | | |
| | Defensive Pressure Distance | Assessed by measuring the distance maintained while applying defensive pressure. | | | |
| | Fouls | Counted and analyzed for patterns and types during play. | | | |
| | Avoidable Fouls | Evaluated by identifying and counting fouls that could have been avoided. | | | |

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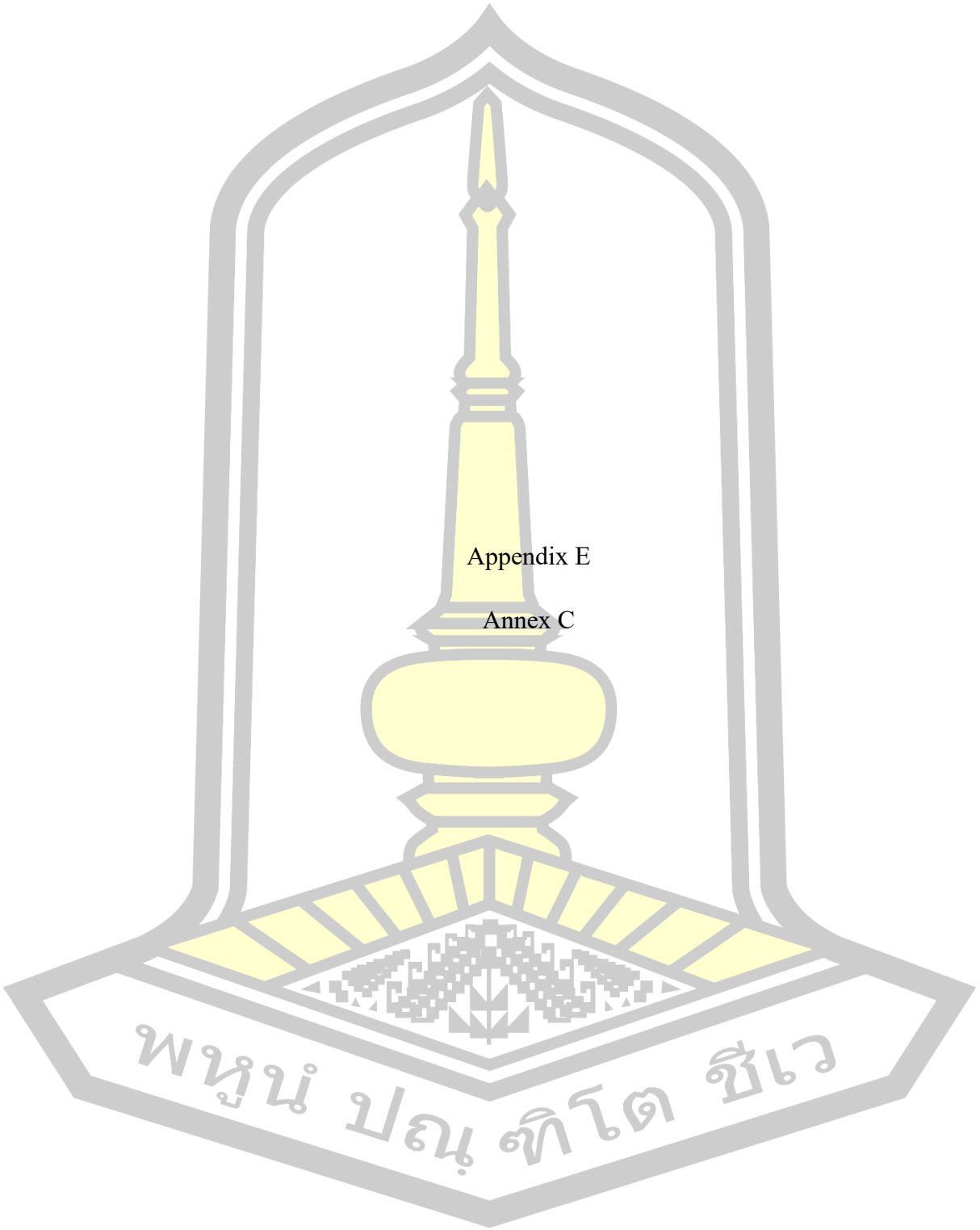

# Appendix E

## Annex C

**Questionnaire for Experts on Selection Indicators of Chinese Collegiate Men's Soccer Players in Primary Selection**

Dear Experts:

Greetings! This study aims to improve the scientific level of selection of soccer players of this age in China by using the data information obtained from a larger-scale field test in order to obtain the characteristics of the competitive ability of excellent male soccer players in Chinese universities, and your valuable suggestions will provide important value to this study! We sincerely thank you for your support of this project!

PhD student： graduate student advisor：

Basic Information for Experts

Name of Expert (Coach)： Title of Specialist (Coach)：

1. How important do you think each of the following position-level indicators is in the intermediate selection of Chinese college men's soccer players, please choose (tick in the selected column). The meaning of the numbers in the table is the degree of importance of the indicator as the content of selection, the larger the score, the higher the degree of importance of the indicator.

Goalie:

| | **Not important** | | **average** | | | **important** | | | **Very important** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| morphological | | | | | | | | | | |
| Functions | | | | | | | | | | |
| quality | | | | | | | | | | |
| Technique | | | | | | | | | | |
| psychosocial | | | | | | | | | | |
| Performance | | | | | | | | | | |

Linebacker：

| | **Not important** | | **average** | | | **important** | | | **very important** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| morphological | | | | | | | | | | |
| Functions | | | | | | | | | | |
| quality | | | | | | | | | | |
| Technique | | | | | | | | | | |
| psychosocial | | | | | | | | | | |
| Performance | | | | | | | | | | |

Center field：

| | Not important | | average | | | important | | | very important | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| morphological | | | | | | | | | | |
| Functions | | | | | | | | | | |
| quality | | | | | | | | | | |
| Technique | | | | | | | | | | |
| psychosocial | | | | | | | | | | |
| Performance | | | | | | | | | | |

Forward：

| | Not important | | average | | | important | | | very important | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| morphological | | | | | | | | | | |
| Functions | | | | | | | | | | |
| quality | | | | | | | | | | |
| Technique | | | | | | | | | | |
| psychosocial | | | | | | | | | | |
| Performance | | | | | | | | | | |

2. How important do you think the following secondary indicators are in the intermediate selection of Chinese college men's soccer players, please choose (tick in the selected column). The meaning of the numbers in the table is the degree of importance of the indicator as the content of selection, the larger the score, the higher the degree of importance of the indicator. If you think there are any other indicators not listed that are relevant to the selection of soccer players for this study, please fill in the attached table and mark the scores.

Goalie：

| Level 1 indicators | Secondary indicators | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle | | | | | | | | | | |
| | Waist | | | | | | | | | | |
| | Upper Hip | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Achilles Tendon Length | | | | | | | | | | |
| | Calf Length + Height | | | | | | | | | | |
| | Hand Length | | | | | | | | | | |
| | Finger Spacing | | | | | | | | | | |
| | Lean body mass | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |
| | BMI | | | | | | | | | | |
| | Skeletal muscle | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | mass | | | | | | | | | | |
| | Shoulder width | | | | | | | | | | |
| | Body Fat Percentage | | | | | | | | | | |
| | Waist-Hip Percentage | | | | | | | | | | |
| | Fat content | | | | | | | | | | |
| function | Spirometry | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| | Blood type | | | | | | | | | | |
| | Manual Stability | | | | | | | | | | |
| | Visual field | | | | | | | | | | |
| | Difference in respiratory chest circumference | | | | | | | | | | |
| quality | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Yuanbao Abdominal Tuck | | | | | | | | | | |
| | Squat Jumps | | | | | | | | | | |
| | Left Leg Jumps | | | | | | | | | | |
| | Right Leg Jumps | | | | | | | | | | |
| | Triple jump on one leg | | | | | | | | | | |
| | Non-winning leg jumps | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Yo-Yo IR2 | | | | | | | | | | |
| | 12-minute run | | | | | | | | | | |
| | L-shaped run | | | | | | | | | | |
| | Push-ups | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Mental Toughness | | | | | | | | | | |
| | Attention | | | | | | | | | | |
| | Neurotypes | | | | | | | | | | |
| | Volitional qualities | | | | | | | | | | |
| | Temperament type | | | | | | | | | | |
| | Extremity response time | | | | | | | | | | |
| Technique | Short passes with dominant foot | | | | | | | | | | |
| | Short pass with non-dominant foot | | | | | | | | | | |
| | Long pass with dominant foot | | | | | | | | | | |
| | Long pass with non-dominant foot | | | | | | | | | | |
| | Dominant Foot Shot | | | | | | | | | | |
| | Non-dominant foot on goal | | | | | | | | | | |
| | Four-One Passing and Grabbing | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dribbling with the ball in the air | | | | | | | | | | |
| | Dribbling around the trunk | | | | | | | | | | |
| | Fixed Short Pass | | | | | | | | | | |
| | Set piece long pass | | | | | | | | | | |
| | Shooting at the goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance of the match | Passing in Possession | | | | | | | | | | |
| | Controlling the ball under pressure | | | | | | | | | | |
| | Receiving the movement of a partner | | | | | | | | | | |
| | Driving to the side/back | | | | | | | | | | |
| | Defensive pressure distance (two arm's length) | | | | | | | | | | |
| | Fouls | | | | | | | | | | |
| | Avoidable Fouls | | | | | | | | | | |
| | 1V1 Defense | | | | | | | | | | |
| | Saving | | | | | | | | | | |
| | Catching the ball in the air | | | | | | | | | | |
| | Attacking | | | | | | | | | | |
| | Positioning | | | | | | | | | | |
| | Handball forward | | | | | | | | | | |
| | Long pass forward | | | | | | | | | | |

Schedule: (Other supplementary indicators)

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
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Linebacker :

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle | | | | | | | | | | |
| | Waist | | | | | | | | | | |
| | Upper Hip | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Achilles Tendon | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | Length | | | | | | | | | | |
| | Calf Length + Height | | | | | | | | | | |
| | Hand Length | | | | | | | | | | |
| | Finger Spacing | | | | | | | | | | |
| | Lean body mass | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |
| | BMI | | | | | | | | | | |
| | Skeletal muscle mass | | | | | | | | | | |
| | Shoulder width | | | | | | | | | | |
| | Body Fat Percentage | | | | | | | | | | |
| | Waist-Hip Percentage | | | | | | | | | | |
| | Fat content | | | | | | | | | | |
| function | Spirometry | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| | Blood type | | | | | | | | | | |
| | Manual Stability | | | | | | | | | | |
| | Visual field | | | | | | | | | | |
| | Difference in respiratory chest circumference | | | | | | | | | | |
| quality | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Yuanbao Abdominal Tuck | | | | | | | | | | |
| | Squat Jumps | | | | | | | | | | |
| | Left Leg Jumps | | | | | | | | | | |
| | Right Leg Jumps | | | | | | | | | | |
| | Triple jump on one leg | | | | | | | | | | |
| | Non-winning leg jumps | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Yo-Yo IR2 | | | | | | | | | | |
| | 12-minute run | | | | | | | | | | |
| | L-shaped run | | | | | | | | | | |
| | Push-ups | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Mental Toughness | | | | | | | | | | |
| | Attention | | | | | | | | | | |
| | Neurotypes | | | | | | | | | | |
| | Volitional qualities | | | | | | | | | | |
| | Temperament type | | | | | | | | | | |
| | Extremity response time | | | | | | | | | | |
| | Short passes with dominant foot | | | | | | | | | | |
| | Short pass with non-dominant foot | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Technique | Long pass with dominant foot | | | | | | | | | | |
| | Long pass with non-dominant foot | | | | | | | | | | |
| | Dominant Foot Shot | | | | | | | | | | |
| | Non-dominant foot on goal | | | | | | | | | | |
| | Four-One Passing and Grabbing | | | | | | | | | | |
| | Dribbling with the ball in the air | | | | | | | | | | |
| | Dribbling around the trunk | | | | | | | | | | |
| | Fixed Short Pass | | | | | | | | | | |
| | Set piece long pass | | | | | | | | | | |
| | Shooting at the goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance of the match | Passing in Possession | | | | | | | | | | |
| | Controlling the ball under pressure | | | | | | | | | | |
| | Receiving the movement of a partner | | | | | | | | | | |
| | Driving to the side/back | | | | | | | | | | |
| | Defensive pressure distance (two arm's length) | | | | | | | | | | |
| | Fouls | | | | | | | | | | |
| | Avoidable Fouls | | | | | | | | | | |
| | 1V1 Defense | | | | | | | | | | |
| | Saving | | | | | | | | | | |
| | Catching the ball in the air | | | | | | | | | | |
| | Attacking | | | | | | | | | | |
| | Positioning | | | | | | | | | | |
| | Handball forward | | | | | | | | | | |
| | Long pass forward | | | | | | | | | | |

Schedule: (Other supplementary indicators)

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
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Center field：

| Level 1 indicators | Secondary indicators | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle | | | | | | | | | | |
| | Waist | | | | | | | | | | |
| | Upper Hip | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Achilles Tendon Length | | | | | | | | | | |
| | Calf Length + Height | | | | | | | | | | |
| | Hand Length | | | | | | | | | | |
| | Finger Spacing | | | | | | | | | | |
| | Lean body mass | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |
| | BMI | | | | | | | | | | |
| | Skeletal muscle mass | | | | | | | | | | |
| | Shoulder width | | | | | | | | | | |
| | Body Fat Percentage | | | | | | | | | | |
| | Waist-Hip Percentage | | | | | | | | | | |
| | Fat content | | | | | | | | | | |
| function | Spirometry | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| | Blood type | | | | | | | | | | |
| | Manual Stability | | | | | | | | | | |
| | Visual field | | | | | | | | | | |
| | Difference in respiratory chest circumference | | | | | | | | | | |
| quality | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Yuanbao Abdominal Tuck | | | | | | | | | | |
| | Squat Jumps | | | | | | | | | | |
| | Left Leg Jumps | | | | | | | | | | |
| | Right Leg Jumps | | | | | | | | | | |
| | Triple jump on one leg | | | | | | | | | | |
| | Non-winning leg jumps | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Yo-Yo IR2 | | | | | | | | | | |
| | 12-minute run | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | L-shaped run | | | | | | | | | | |
| | Push-ups | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Mental Toughness | | | | | | | | | | |
| | Attention | | | | | | | | | | |
| | Neurotypes | | | | | | | | | | |
| | Volitional qualities | | | | | | | | | | |
| | Temperament type | | | | | | | | | | |
| | Extremity response time | | | | | | | | | | |
| Technique | Short passes with dominant foot | | | | | | | | | | |
| | Short pass with non-dominant foot | | | | | | | | | | |
| | Long pass with dominant foot | | | | | | | | | | |
| | Long pass with non-dominant foot | | | | | | | | | | |
| | Dominant Foot Shot | | | | | | | | | | |
| | Non-dominant foot on goal | | | | | | | | | | |
| | Four-One Passing and Grabbing | | | | | | | | | | |
| | Dribbling with the ball in the air | | | | | | | | | | |
| | Dribbling around the trunk | | | | | | | | | | |
| | Fixed Short Pass | | | | | | | | | | |
| | Set piece long pass | | | | | | | | | | |
| | Shooting at the goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance of the match | Passing in Possession | | | | | | | | | | |
| | Controlling the ball under pressure | | | | | | | | | | |
| | Receiving the movement of a partner | | | | | | | | | | |
| | Driving to the side/back | | | | | | | | | | |
| | Defensive pressure distance (two arm's length) | | | | | | | | | | |
| | Fouls | | | | | | | | | | |
| | Avoidable Fouls | | | | | | | | | | |
| | 1V1 Defense | | | | | | | | | | |
| | Saving | | | | | | | | | | |
| | Catching the ball in the air | | | | | | | | | | |
| | Attacking | | | | | | | | | | |
| | Positioning | | | | | | | | | | |
| | Handball forward | | | | | | | | | | |
| | Long pass forward | | | | | | | | | | |

Schedule: (Other supplementary indicators)

| Level 1 indicators | Secondary indicators | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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forward (sports) :

| Level 1 indicators | Secondary indicators | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle | | | | | | | | | | |
| | Waist | | | | | | | | | | |
| | Upper Hip | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Achilles Tendon Length | | | | | | | | | | |
| | Calf Length + Height | | | | | | | | | | |
| | Hand Length | | | | | | | | | | |
| | Finger Spacing | | | | | | | | | | |
| | Lean body mass | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |
| | BMI | | | | | | | | | | |
| | Skeletal muscle mass | | | | | | | | | | |
| | Shoulder width | | | | | | | | | | |
| | Body Fat Percentage | | | | | | | | | | |
| | Waist-Hip Percentage | | | | | | | | | | |
| | Fat content | | | | | | | | | | |
| function | Spirometry | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| | Blood type | | | | | | | | | | |
| | Manual Stability | | | | | | | | | | |
| | Visual field | | | | | | | | | | |
| | Difference in respiratory chest circumference | | | | | | | | | | |
| | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Yuanbao | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| quality | Abdominal Tuck | | | | | | | | | | |
| | Squat Jumps | | | | | | | | | | |
| | Left Leg Jumps | | | | | | | | | | |
| | Right Leg Jumps | | | | | | | | | | |
| | Triple jump on one leg | | | | | | | | | | |
| | Non-winning leg jumps | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Yo-Yo IR2 | | | | | | | | | | |
| | 12-minute run | | | | | | | | | | |
| | L-shaped run | | | | | | | | | | |
| | Push-ups | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Mental Toughness | | | | | | | | | | |
| | Attention | | | | | | | | | | |
| | Neurotypes | | | | | | | | | | |
| | Volitional qualities | | | | | | | | | | |
| | Temperament type | | | | | | | | | | |
| | Extremity response time | | | | | | | | | | |
| Technique | Short passes with dominant foot | | | | | | | | | | |
| | Short pass with non-dominant foot | | | | | | | | | | |
| | Long pass with dominant foot | | | | | | | | | | |
| | Long pass with non-dominant foot | | | | | | | | | | |
| | Dominant Foot Shot | | | | | | | | | | |
| | Non-dominant foot on goal | | | | | | | | | | |
| | Four-One Passing and Grabbing | | | | | | | | | | |
| | Dribbling with the ball in the air | | | | | | | | | | |
| | Dribbling around the trunk | | | | | | | | | | |
| | Fixed Short Pass | | | | | | | | | | |
| | Set piece long pass | | | | | | | | | | |
| | Shooting at the goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance | Passing in Possession | | | | | | | | | | |
| | Controlling the ball under pressure | | | | | | | | | | |
| | Receiving the movement of a partner | | | | | | | | | | |
| | Driving to the side/back | | | | | | | | | | |
| | Defensive pressure distance (two arm's length) | | | | | | | | | | |
| | Fouls | | | | | | | | | | |
| | Avoidable Fouls | | | | | | | | | | |
| | 1V1 Defense | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| of the match | Saving | | | | | | | | | | |
| | Catching the ball in the air | | | | | | | | | | |
| | Attacking | | | | | | | | | | |
| | Positioning | | | | | | | | | | |
| | Handball forward | | | | | | | | | | |
| | Long pass forward | | | | | | | | | | |

Schedule: (other supplementary indicators)

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
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Appendix F

Annex D

**Weight assignment table of selection indexes for men's soccer players in Chinese colleges and universities**

Dear Experts:

Greetings! The purpose of this study is to improve the scientific level of selection of soccer players of this age in China by using the data information obtained from a larger-scale field test in order to obtain the characteristics of the competitive ability of outstanding male soccer players in Chinese universities, and your valuable suggestions will provide important value to this study! We sincerely thank you for your support!

PhD student： graduate student advisor：

Basic Information of Experts

Name of Expert (Coach)： Title of Specialist (Coach)：

Table of weighting assignment: Objective evaluation of the following selection indicators according to their degree of importance, what do you think is the degree of importance of the following secondary indicators in the intermediate selection of men's soccer players in Chinese colleges and universities, please make your choice (put a "√" in the selected column).

Goalie：

| **Level 1 indicators** | **Secondary indicators** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thigh circumference | | | | | | | | | | |
| | Ketolais Index | | | | | | | | | | |
| | Bust/Height x 100 | | | | | | | | | | |
| | Fat content | | | | | | | | | | |
| | Body fat percentage | | | | | | | | | | |
| | Lean Body Weight／Weight×100 | | | | | | | | | | |
| | BMI | | | | | | | | | | |
| function | spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ventilation/body weight | | | | | | | | | | |
| quality | Non-Winning Foot Long Jump | | | | | | | | | | |
| | Superior Foot Long Jump | | | | | | | | | | |
| | Non-Dominant Foot Long Kick / Body Weight | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| | Push-ups | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Left-handed reaction time | | | | | | | | | | |
| | Number of correct left-handed responses | | | | | | | | | | |
| | Number of correct right hand reactions | | | | | | | | | | |
| | Number of times correctly responding with the left foot | | | | | | | | | | |
| | Temperament type | | | | | | | | | | |
| | Right foot response time | | | | | | | | | | |
| | Number of times right foot responds correctly | | | | | | | | | | |
| | Goal Focus | | | | | | | | | | |
| | Emotional control | | | | | | | | | | |
| | Family Support | | | | | | | | | | |
| | Interpersonal assistance | | | | | | | | | | |
| | Distribution of attention | | | | | | | | | | |
| Technique | Dominant foot long passes | | | | | | | | | | |
| | Total long passes scored | | | | | | | | | | |
| | Non-Dominant Foot Shots on Goal | | | | | | | | | | |
| | Shots on goal | | | | | | | | | | |
| | Handball | | | | | | | | | | |
| Technical and tactical Performance of the match | Passing in possession | | | | | | | | | | |
| | 1V1 Defense | | | | | | | | | | |
| | Saving | | | | | | | | | | |
| | Tackling | | | | | | | | | | |
| | Throwing the ball forward | | | | | | | | | | |
| | Receiving a pass from a partner | | | | | | | | | | |

Linebacker :

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle circumferen | | | | | | | | | | |

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| | ce | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |
| | Lean Body Mass | | | | | | | | | | |
| | Skeletal muscle mass | | | | | | | | | | |
| function | Spirometry | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| quality | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Left leg jump | | | | | | | | | | |
| | Non-winning leg long jump | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Left Leg Jump/Height | | | | | | | | | | |
| | Non-dominant kick/weight | | | | | | | | | | |
| | Dominant kick/weight | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Breadth of attention | | | | | | | | | | |
| | Distribution of attention | | | | | | | | | | |
| | Goal Focus | | | | | | | | | | |
| | Emotional control | | | | | | | | | | |
| | Family support | | | | | | | | | | |
| | Interpersonal assistance | | | | | | | | | | |
| | Number of correct left-handed responses | | | | | | | | | | |
| | When left foot responds | | | | | | | | | | |
| | Number of times left foot | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | responds correctly | | | | | | | | | | |
| | Number of times right foot responds correctly | | | | | | | | | | |
| Technique | Long passes with non-dominant foot | | | | | | | | | | |
| | Long passes with dominant foot | | | | | | | | | | |
| | Total long passes scored | | | | | | | | | | |
| | Non-Dominant Foot Shots on Goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance of the match | Ball control under pressure | | | | | | | | | | |
| | One/two foot passing | | | | | | | | | | |
| | Attacking 1v1 | | | | | | | | | | |
| | Shooting | | | | | | | | | | |
| | Defense 1v1 | | | | | | | | | | |
| | Passing forward after winning the ball | | | | | | | | | | |
| | Losing the ball | | | | | | | | | | |

Center field :

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle circumference | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lean Body Mass | | | | | | | | | | |
| | Skeletal muscle mass | | | | | | | | | | |
| function | Spirometry | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| quality | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Left leg jump | | | | | | | | | | |
| | Non-winning leg long jump | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Left Leg Jump/Height | | | | | | | | | | |
| | Non-dominant kick/weight | | | | | | | | | | |
| | Dominant kick/weight | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Breadth of attention | | | | | | | | | | |
| | Distribution of attention | | | | | | | | | | |
| | Goal Focus | | | | | | | | | | |
| | Emotional control | | | | | | | | | | |
| | Family support | | | | | | | | | | |
| | Interpersonal assistance | | | | | | | | | | |
| | Number of correct left-handed responses | | | | | | | | | | |
| | When left foot responds | | | | | | | | | | |
| | Number of times left foot responds correctly | | | | | | | | | | |
| | Number of times right foot responds correctly | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Technique | Long passes with non-dominant foot | | | | | | | | | | |
| | Long passes with dominant foot | | | | | | | | | | |
| | Total long passes scored | | | | | | | | | | |
| | Non-Dominant Foot Shots on Goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance of the match | Ball control under pressure | | | | | | | | | | |
| | One/two foot passing | | | | | | | | | | |
| | Attacking 1v1 | | | | | | | | | | |
| | Shooting | | | | | | | | | | |
| | Defense 1v1 | | | | | | | | | | |
| | Passing forward after winning the ball | | | | | | | | | | |
| | Losing the ball | | | | | | | | | | |

forward (sports) :

| **Level 1 indicators** | **Secondary indicators** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| morphological | height | | | | | | | | | | |
| | Weight | | | | | | | | | | |
| | Calm Bust | | | | | | | | | | |
| | Inhaled Bust | | | | | | | | | | |
| | Expiratory Bust | | | | | | | | | | |
| | Thighs | | | | | | | | | | |
| | Ankle circumference | | | | | | | | | | |
| | Lower Leg Length | | | | | | | | | | |
| | Ketorolac Index | | | | | | | | | | |
| | Lean Body Mass | | | | | | | | | | |
| | Skeletal muscle mass | | | | | | | | | | |
| | Spirometry | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| function | Spirometry | | | | | | | | | | |
| | Maximum Ventilation | | | | | | | | | | |
| | Maximum ventilation/body weight | | | | | | | | | | |
| quality | 5 meter run | | | | | | | | | | |
| | 10 meter run | | | | | | | | | | |
| | 20 meter run | | | | | | | | | | |
| | 30 meter run | | | | | | | | | | |
| | Left leg jump | | | | | | | | | | |
| | Non-winning leg long jump | | | | | | | | | | |
| | Yo-Yo Long Jump | | | | | | | | | | |
| | Yo-Yo IE2 | | | | | | | | | | |
| | Left Leg Jump/Height | | | | | | | | | | |
| | Non-dominant kick/weight | | | | | | | | | | |
| | Dominant kick/weight | | | | | | | | | | |
| | T-Run Sensitivity Test | | | | | | | | | | |
| psychosocial | Breadth of attention | | | | | | | | | | |
| | Distribution of attention | | | | | | | | | | |
| | Goal Focus | | | | | | | | | | |
| | Emotional control | | | | | | | | | | |
| | Family support | | | | | | | | | | |
| | Interpersonal assistance | | | | | | | | | | |
| | Number of correct left-handed responses | | | | | | | | | | |
| | When left foot responds | | | | | | | | | | |
| | Number of times left foot responds correctly | | | | | | | | | | |
| | Number of times right foot responds correctly | | | | | | | | | | |
| | Long passes with non-dominant foot | | | | | | | | | | |
| | Long passes | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Technique | with dominant foot | | | | | | | | | | |
| | Total long passes scored | | | | | | | | | | |
| | Non-Dominant Foot Shots on Goal | | | | | | | | | | |
| | Combination Technique Completion Time | | | | | | | | | | |
| Technical and tactical Performance of the match | Ball control under pressure | | | | | | | | | | |
| | One/two foot passing | | | | | | | | | | |
| | Attacking 1v1 | | | | | | | | | | |
| | Shooting | | | | | | | | | | |
| | Defense 1v1 | | | | | | | | | | |
| | Passing forward after winning the ball | | | | | | | | | | |
| | Losing the ball | | | | | | | | | | |

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Appendix G

Adolescent Mental Toughness Scale

**Adolescent Mental Toughness Scale**

Many adolescents encounter some setbacks and upsets in their growth. The following 27 sentences describe some situations related to this. Please choose one as accurately as possible according to your actual situation at the time of these setbacks and adversities and the degree of conformity of these sentences, and put a "√" on the corresponding option (Please refer to the examples), there is no right or wrong answer to the questions, thank you for your cooperation!

1 = not at all, 2 = not quite, 3 = can't say, 4 = quite, 5 = perfectly.

**Example question**

I am in a very good mood today. 1 2 3 4 5 Tick 5 if you think it fits perfectly "√" and 1 if you think it doesn't fit at all "√"."

| | **Not at all.** | **falling short** | **unclear** | **fairly consistent** | **fully in line with** |
|---|---|---|---|---|---|
| 1 Failure always discourages me. | 1 | 2 | 3 | 4 | 5 |
| 2 I have a hard time controlling my unpleasant emotions. | 1 | 2 | 3 | 4 | 5 |
| 3 I have a clear purpose for my life. | 1 | 2 | 3 | 4 | 5 |
| 4 I am generally more mature and experienced after experiencing setbacks. | 1 | 2 | 3 | 4 | 5 |
| 5 Failures and setbacks can make me doubt my abilities. | 1 | 2 | 3 | 4 | 5 |
| 6 When I encounter unpleasant things, I can never find the right person to talk to. | 1 | 2 | 3 | 4 | 5 |
| 7 I have a friend my own age to tell him/her about my difficulties. | 1 | 2 | 3 | 4 | 5 |
| 8 My parents are very respectful of my opinion. | 1 | 2 | 3 | 4 | 5 |
| 9 When I am in trouble and need help, I don't know who to go to. | 1 | 2 | 3 | 4 | 5 |
| 10 I think the process of things helps people grow more than the outcome. | 1 | 2 | 3 | 4 | 5 |
| 11 faced with difficulties, I usually set a plan and a solution. | 1 | 2 | 3 | 4 | 5 |
| 12 I'm used to keeping things bottled up inside rather than confiding in someone. | 1 | 2 | 3 | 4 | 5 |
| 13 I think adversity has a motivating effect on people. | 1 | 2 | 3 | 4 | 5 |
| 14 Adversity is sometimes an aid to growth. | 1 | 2 | 3 | 4 | 5 |
| 15 My parents always liked to interfere with my ideas. | 1 | 2 | 3 | 4 | 5 |
| 16 At home, no one always listens to what I say. | 1 | 2 | 3 | 4 | 5 |
| 17 Lack of confidence and moral | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| support from my parents. | | | | | |
| 18 I reach out and talk to people when I'm having a hard time. | 1 | 2 | 3 | 4 | 5 |
| 19 My parents were never harsh on me. | 1 | 2 | 3 | 4 | 5 |
| 20 When faced with difficulties, I will concentrate all my energy | 1 | 2 | 3 | 4 | 5 |
| 21 It usually takes me a long time to forget unpleasant things. | 1 | 2 | 3 | 4 | 5 |
| 22 My parents always encouraged me to give it my all. | 1 | 2 | 3 | 4 | 5 |
| 23 I am able to adjust my emotions very well in a short period of time. | 1 | 2 | 3 | 4 | 5 |
| 24 I will set goals for myself to push myself forward. | 1 | 2 | 3 | 4 | 5 |
| 25 I think there is a positive side to everything. | 1 | 2 | 3 | 4 | 5 |
| 26 not want to tell anyone even if they are in a bad mood. | 1 | 2 | 3 | 4 | 5 |
| 27 I have big mood swings and am prone to ups and downs. | 1 | 2 | 3 | 4 | 5 |

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Appendix H

Attention Test Scale

**Attention Test Scale**

Name: Gender: Sport Specialization:

Age: Team: Years in sport:

**Quiz 1**

Description:This is a simple quiz that measures your ability to find certain specified shapes from many similar shapes. The figure in this quiz consists of two rings of different sizes, both with notches. Since the notches on the rings are in different directions, they form many similar but different shapes.

The task to be accomplished in this quiz is to find two of the specified shapes from among the many similar shapes.

Note that.

1. Draw a tick directly on the two shapes you find.

2. Find both shapes at the same time, not one after the other.

3. The direction of the gaps in both the large and small rings must be exactly the same as the found figures to be considered correct.

4. Please start from the first line of the quiz diagram from left to right, and then check the next line after finishing one line until all the lines are finished or the time is up; and then stop.

5. If there is a wrong tick, please do not correct it and continue to look for it.

I hope you can complete this quiz quickly and accurately, thank you!

If there is anything you do not understand, please ask the moderator to ensure that you fully understand the requirements of the quiz. Do not turn the page until you hear the word "start"!

**Quiz 2**

Instructions: This quiz requires you to find the square with 4 circles from the squares with different numbers of circles, and to put a "√" on the square when you have found it.

Please note: 1. If there are 4 circles in a small square, it belongs to the small square to be found, regardless of the arrangement of the circles.

2. Start from the first line of the quiz from left to right in order to find, check one line and then check the next line, until all the checking is complete.

3. If there is a wrong tick, please do not correct it and continue to look down.

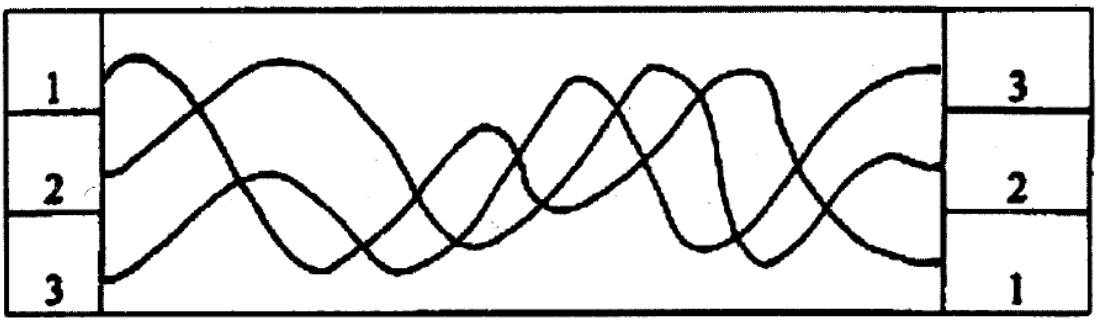
I hope you can complete this quiz quickly and accurately, thank you!

If there is anything else you do not understand, please ask the moderator to ensure that you fully understand the requirements of the quiz.

Please do not turn the page until you hear the word "go".

**Quiz 3**

Instructions: This quiz is a vision tracking quiz. You are asked to trace a curve with your eyes starting from the left and write the serial number at the beginning of the line in the box at the end of the curve on the right. The diagram is shown below.




Please note that.

1. You must trace with your eyes, not with the aid of your fingers or the tip of a pen, or you will be miscalculated:

2. The curves in the graph are generally smooth.

3. Each curve may go up and down, but there is no stopping in the middle; they all start on the left side and end on the right side: 4. Please look for the lines in Figure A first, and then look for the lines in Figure B.

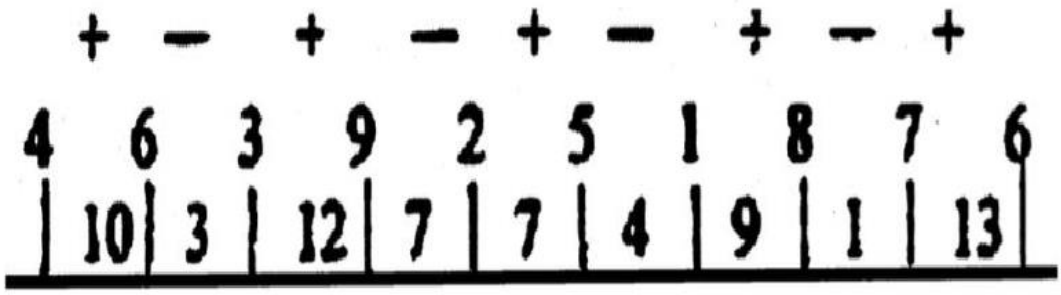
We hope you can complete this quiz quickly and accurately, thank you!

If there is anything else you do not understand, please ask the facilitator to ensure that you fully understand the requirements of the quiz.

Please do not turn the page until you hear "go".

**Quiz 4**

Description: This quiz measures your ability to add and subtract. Please follow the demonstration below, alternately adding and subtracting and writing the result in the middle of the two numbers. As shown in the figure below.



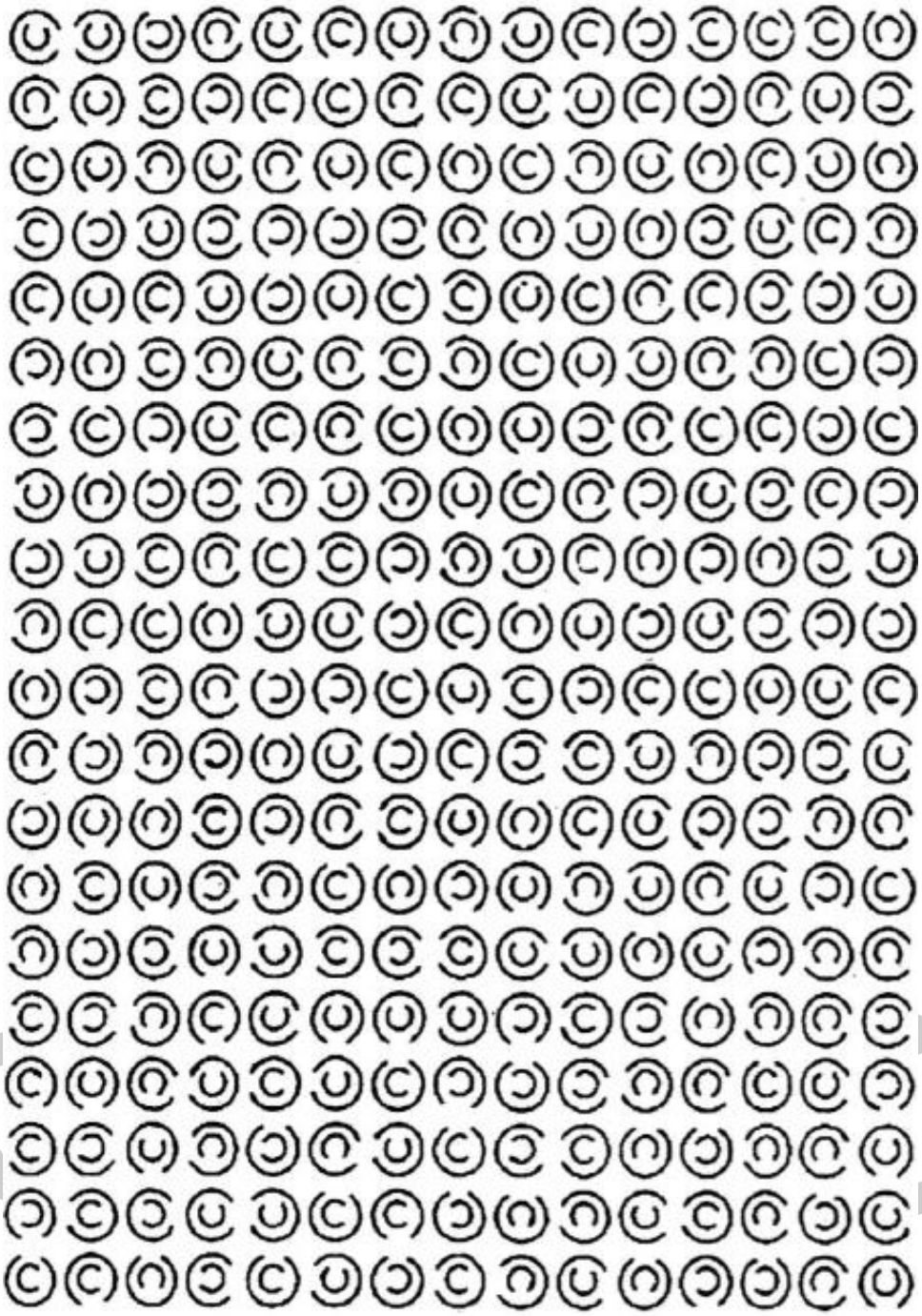

PLEASE NOTE.

Each line goes from left to right in the order of addition and then subtraction. We hope that you will complete this quiz quickly and accurately, thank you! If there is anything else you do not understand, please ask the facilitator to ensure that you fully understand the requirements of the quiz and do not turn the page until you hear the word "start".

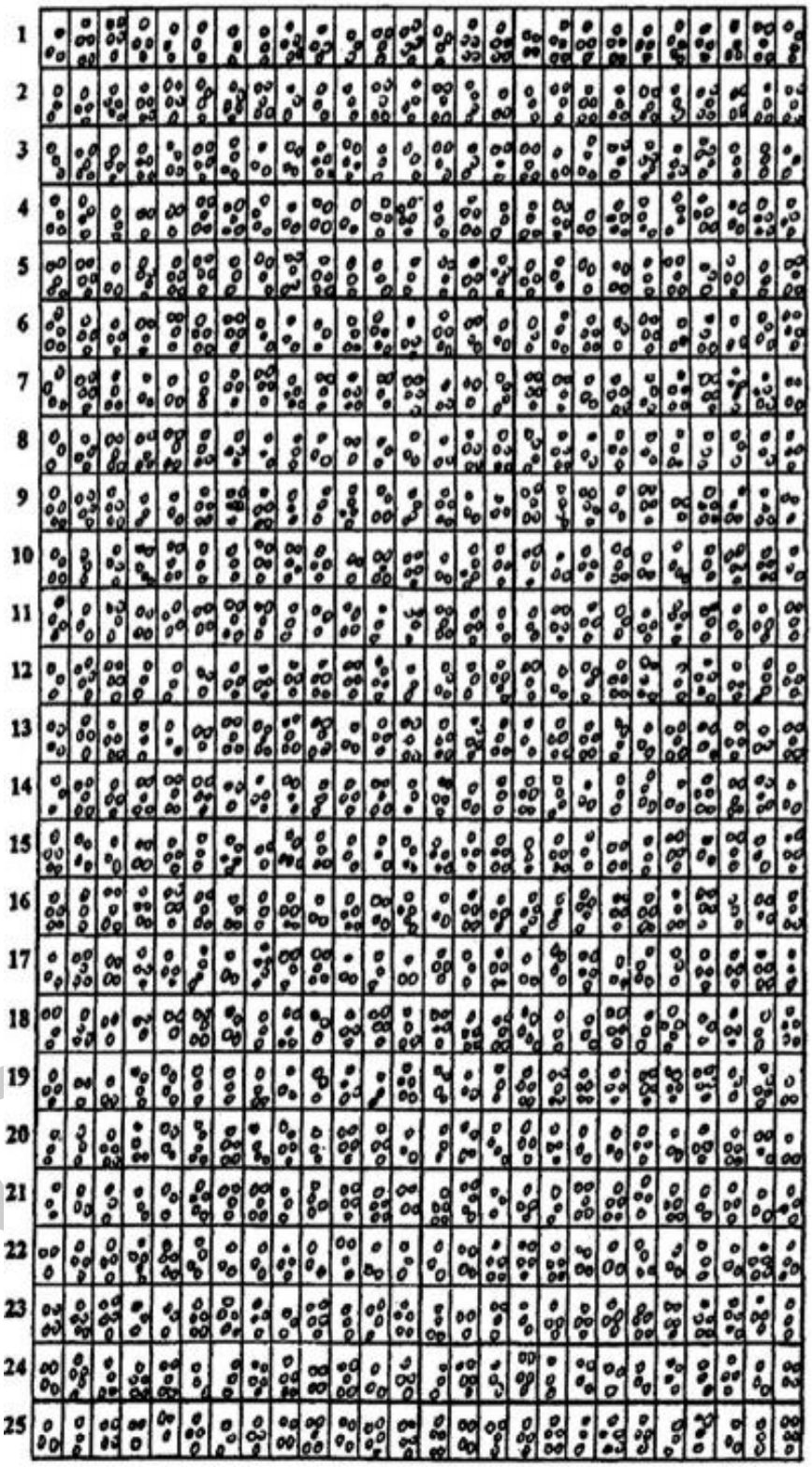
Note: Graphs for each quiz are attached.

**Quiz ---Graphics**

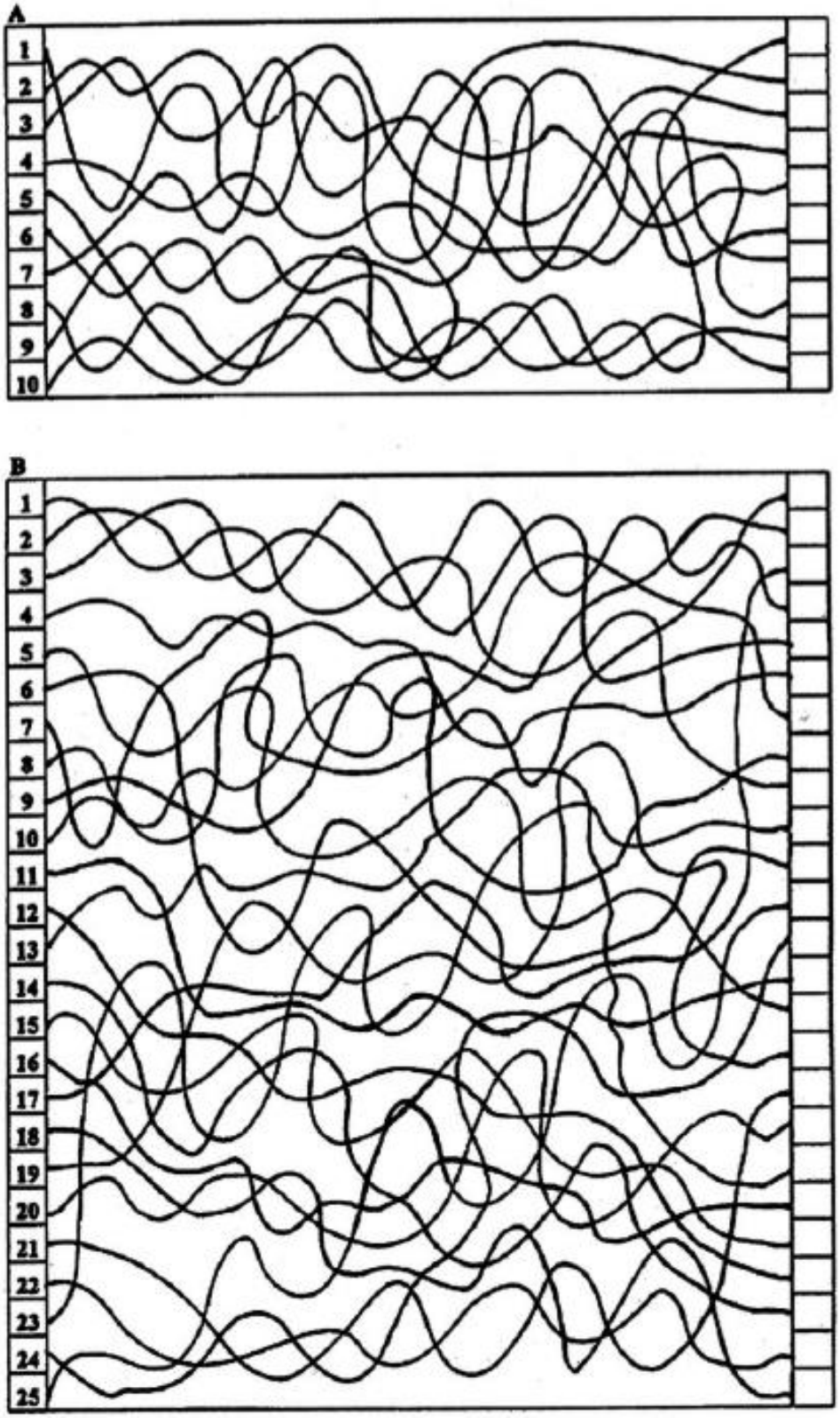
Find out from the following chart and



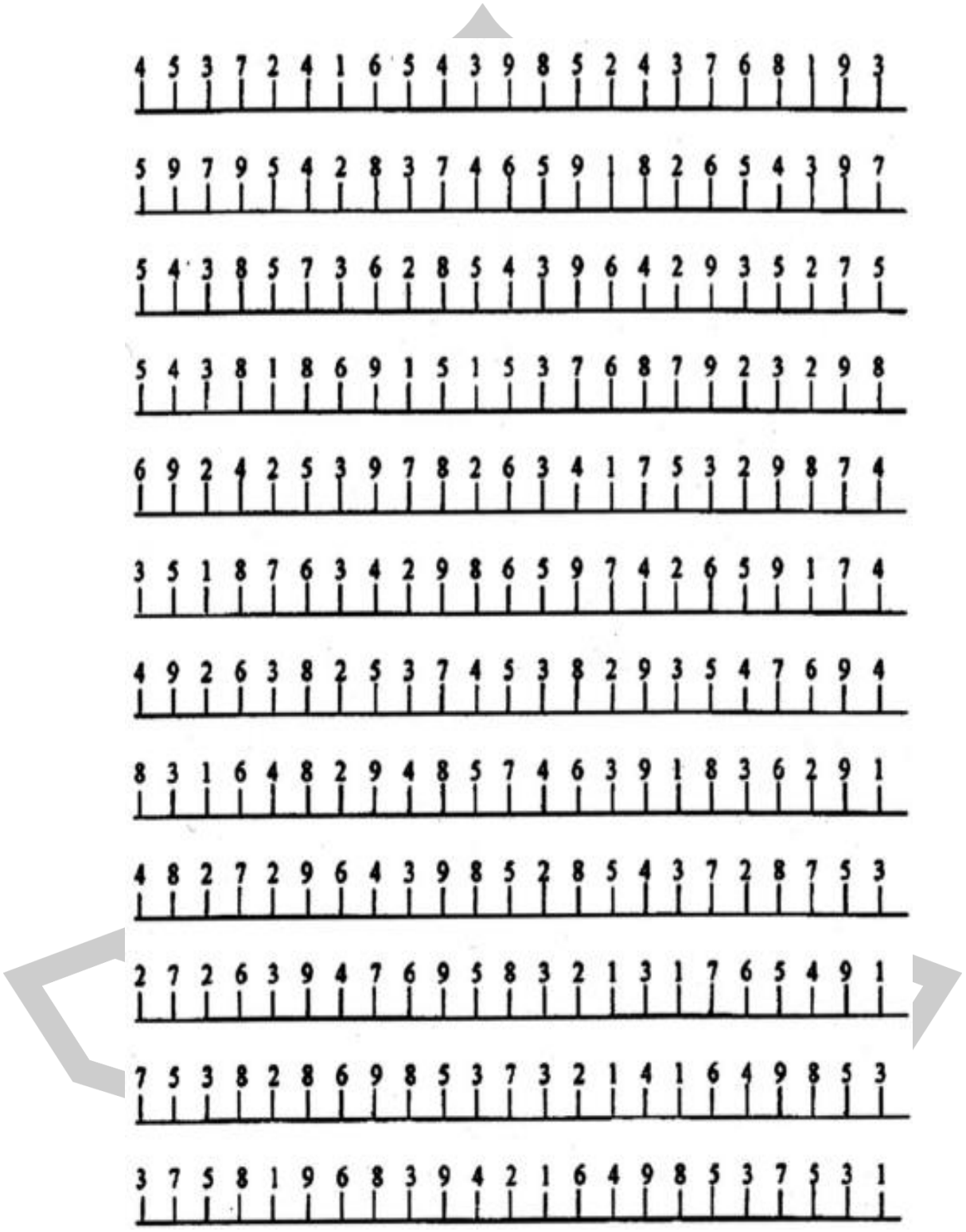
**Quiz 2 Graphics**



**Quiz 3 Graphics**



**Quiz 4 Graphics**



# BIOGRAPHY

| | |
|---|---|
| **NAME** | Mr. Jiaxing Li |
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