Health, Sports & Rehabilitation Medicine
Vol. 24, no. 4, October-December 2023, 196–201

A study regarding the opinion of Romanian athletics specialists on the predictive factors of performance at the secondary selection stage (promotion to advanced groups)

Alina Ionela Predescu, Liliana Mihăilescu
Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica București, University Center of Pitești, Romania

Abstract

Background. The multistage process of sports selection must permanently aim at the development of innate potential of each athlete, in accordance with the characteristics of age and maturation. This process must be conducted through regular testing and assessments and it depends on the decisions made regarding this evaluations. Many studies have shown that the population of top senior athletes appears in the course of repeated selection, deselection and replacements in all age stages rather than developing from those early selected. The main decision-making role in the selection process belongs to coaches.

Aims. This study aimed to investigate the opinion of Romanian athletics' coaches regarding the predictive factors of performance. It also included their selection practices in order to obtain an objective image of the current national context of secondary selection and specialization in athletic events.

Methods. The study was conducted on a number of 35 Romanian athletics coaches involved in the training of athletes specialized in sprinting-hurdling-jumping events, with experience in the competitive activity at national and/or international level. We developed an electronic questionnaire based on 22 questions aimed to collect personal and specific information.

Results. We found discrepancies between the predictive factors considered important for sprinting-hurdling-jumping events specialization and the tests and assessments used in second selection practice.

Conclusions. The opinion of the Romanian athletics specialists is correct from a theoretical point of view, but their practical activity does not always correspond with their opinion, which results in a deficient selection that does not comply with the particularities of the requirements of the athletics events targeted in the research.

Keywords: sports performance, predictive factors, selection.

Introduction

Scientific selection, one of the most important concerns of contemporary sports (Bompa, 2002), represents "a complex, organized system that operates with objective indicators in order to highlight the biological potential that, under the influence of scientific training, leads to the subsequent achievement of superior sports performances" (Drăgan, 2002) and "an organized and repeated process of early detection of the innate abilities of the child, with the help of a complex system of criteria (medical, biological, psycho-sociological and motor) for his subsequent specialization in a sport discipline or event" (Alexe, 1993). From another perspective, Baker et al. (2017) sports selection is "the end result of a complex decision-making process, undertaken by coaches or selectors, in order to determine, from a sample, the athletes who stay and those who are eliminated from the training process" (Baker et al. 2017). The person responsible for carrying out this complex process is first of all the coach, the one who identifies talented children and young people based on the analysis of their potential, manages the entire training process, decides the athletic event for which the athlete presents the greatest chances of success, establishes individual long-term training structures, load dynamics, progress rate, prioritizes training factors, establishes the competitive calendar and main competitions for each individual athlete. The complexity of the selection decision increases when targeting young athletes, under the influence of age-specific physiological, psychological and social factors (Till & Baker, 2020). The elements of performance requirements in elite sport at senior level are fundamentally different from those at younger age levels. Given the changes observed in youth sport over the last few decades, Baker et al. (2022)

Received: 2023, November 9; *Accepted for publication:* 2023, November 19
Address for correspondence: Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica București, University Center of Pitești, Romania
E-mail: ali_predescu@yahoo.com
Corresponding author: Alina Ionela Predescu; ali_predescu@yahoo.com
https://doi.org/10.26659/pm3.2023.24.4.196

hypothesize that selection criteria applied at national and Olympic team level are now used in youth sport (at primary and secondary selection levels). The selection must aim at identifying those qualities necessary to become a champion and not at identifying young people who show the qualities of a champion (Vayens et al., 2009). Ultimately, the effectiveness of sports selection is conditioned by the use of predictive factors that can objectively and realistically identify gifted children leading to their athletic development to elite level (Kok et al., 2005).

Platonov (2018) highlights the fact that the process of identifying gifted children requires a multidisciplinary approach based on anthropometric, physiological, psychological, neuroregulatory and cognitive indicators (Platonov, 2018). An aspect accepted by most specialists is the fact that the correct identification of gifted children and adolescents and their orientation towards specialization in a certain athletic event can be achieved only after puberty and after 4-5 years of general training (Bakeret al., 2017). This recommendation is based on several reasons, among which we mention the difficulty in distinguishing genetic predispositions from those caused by the environment, the lack of a demonstrated linear relationship between the genetic predispositions detected in childhood and their subsequent development, the unpredictable body changes during puberty, the insufficient development of nervous system and the difficulty in predicting essential mental qualities (Platonov, 2018).

This study carried out among Romanian athletics specialists aimed at identifying the determining factors of performance on the basis of which they make their decisions on promoting young athletes in performance groups and orient them towards certain athletic events. This stage of achieving specialization coincides with the secondary stage of selection; it applies to athletes already included in organized training, 3-5 years after the primary selection stage (Alexe, 1993) and is considered as the true selection for performance sports because it aims to create the biological micromodel of the athletics event performer.

Sports performances achieved at this age stage do not represent objective indicators for predicting future success. Specialized studies estimate that 1 in 1000 young people becomes a top international senior, the accuracy of talent identification tests is 70%, and the probability that an identified talent will confirm at the international level is 0.2% (Güllich, quoted by Tan, 2016). Many studies emphasize the importance of multisport practice during childhood and of late specialization mentioning that international elite athletes are characterized by a higher juvenile training volume only in other disciplines than in the individual's current main sport and correspondingly by a higher age of debut in training and in competing in their specific main sport (Güllich & Emrich, 2006). The main objective of the secondary selection must therefore be the evaluation of the progress in relation to the biological maturation and the particularities of the training to which the athlete has been subjected. Priority is given to children and adolescents who have made significant progress based on a low or normal maturation, in the context of versatile training (Platonov, 2018). The experience of the trainer associated with the subjective method of observation are not sufficient to achieve an objective secondary selection (Zerf et al., 2017) and for this reason, the participation of competent specialists (doctors, biologists, psychologists) in issuing decisions is required.

Hypothesis

If we identify the determining factors of performance on the basis of which Romanian specialists promote the athletes in the advanced groups and direct them to sprinting-hurdling-jumping events, we will be able to analyze whether they correspond, or not, to the requirements of those events.

Material and methods

Research protocol

a) Period and place of the research

The research was conducted in January-March 2023 through an electronic questionnaire survey followed by statistical-mathematical interpretation of the quantitative collected data.

b) Subjects and groups

The subjects were 35 Romanian athletics coaches involved in the training of athletes specialized in sprinting-hurdling-jumping events, with experience in competitive activity at national and/or international level. The selection of the subjects was carried out through preliminary analysis of the national 2022 ranking in sprinting-hurdling-jumping events; we identified the sports clubs and the coaches of the first 10 athletes in the above mentioned events. The questionnaire was sent to a number of 41 coaches; 35 responses were recorded.

c) Applied tests

In order to collect data from the field, the authors developed an electronic questionnaire named *Promotion in advanced groups and specialization in sprint-hurdling-jumping events*.

It contained two sections, one that requested personal information (occupation classification, coaching experience, main category of trained athletes) and the other dedicated to specific information. The entire questionnaire included 22 questions (both with single or multiple answers/closed questions, but also with free answer/open questions); the specific section involved 19 questions regarding main selection method used by respondents, optimal specialization age in their opinion, predictive factors (anthropometric, psychomotor, psychological) for each category of athletics events, selection criteria (tests and assessments) used for each category of athletics events (Table I). The questionnaire was developed in Google Forms program and it was sent through whatsapp application and by e-mail. The respondents were assured of the confidentiality of the answer.

Table I
Specific section of the electronic questionnaire.

Nr. crt.	Specific items
1	What is the main initial selection method used by you in your athletics coaching?
2	If using the scientific method, which of the following assessments and tests did you apply in your initial selection practice?
3	In your opinion, what is the optimal age to specialize in athletics events (secondary selection)?
4	What are the main factors you consider in the promotion stage of young athletes to advanced groups?
5-7	What anthropometric characteristics do you consider for the specialization of young athletes in sprinting/hurdling/jumping events?
8-10	What psychomotor characteristics do you consider for the specialization of young athletes in sprinting/hurdling/jumping events?
11-13	What psychological characteristics do you have in mind for the specialization of young athletes in sprinting/hurdling/jumping events?
14-16	Which assessments and tests do you consider relevant for specialization in sprinting/hurdling/jumping events?
17-19	Which assessments and tests do you use for specialization in sprinting/hurdling/jumping events, others than the ones we offered as options of response?

d) Statistical processing

The analysis and processing of the data consisted in structuring and centralizing it in frequency tables and graphs in order to identify the subjects' behaviors regarding the sports selection activity and their attitudes towards the optimal age of selection and specialization, the favoring factors of performance and the selection criteria proposed in the questionnaire.

Results

Professional probity of subjects

The personal information section aimed to certify the value of the opinions of the surveyed coaches. 57.1% of the respondents are teachers-coaches, meaning they work in school institutions; they have access to a large group of children and they have increased possibilities for identifying and developing sports talent. The value of their opinions is certified by a long practice (Fig. 1).

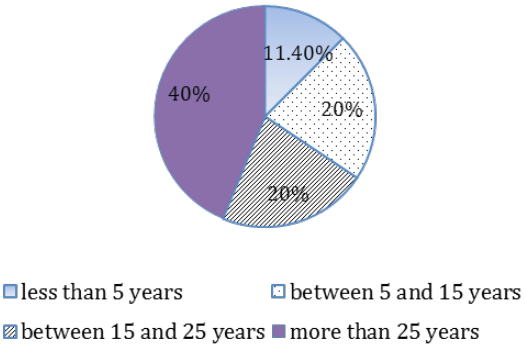

Fig. 1 – Respondents' coaching experience in athletics (no. of years)

A 68.6% of respondents are involved in sports training of athletes for over 15 years, 40% have experience of over 25 years, 20% between 5 and 15 years and only 11.4% have experience of less than 5 years in the field of sprinting-hurling-jumping events. Considering the preponderance of teachers-coaches among the respondents, it explains the high percentage recorded by the category of juniors as the main category of trained athletes (60% of coaches train mainly juniors, 28.6% seniors and youth and 11.4% children). At the end of high school studies, the junior category also ends, with senior athletes having to register with sports clubs.

General context of the selection

The second section of the questionnaire, the one dedicated to specific information, aimed to investigate the sports selection practices carried out in athletics. 48.6% of respondents use a scientific selection based on specific evaluation tests in the activity of identifying sports talent, 20% of them perform the selection based on the results obtained by children in competitions and other sports events, without any specific tests, while 31.4% of coaches still use natural selection in sports practice, based on the voluntary decision of children to practice athletics, influenced by factors such as parents, teachers, friends.

Among the coaches who use scientific selection as the main method of identifying sports talent, speed tests (80%) are most used as selection criteria, followed by those aimed to evaluate coordination and balance (48.6%). No coach reported the use of psychological tests at the initial level of selection (Fig. 2).

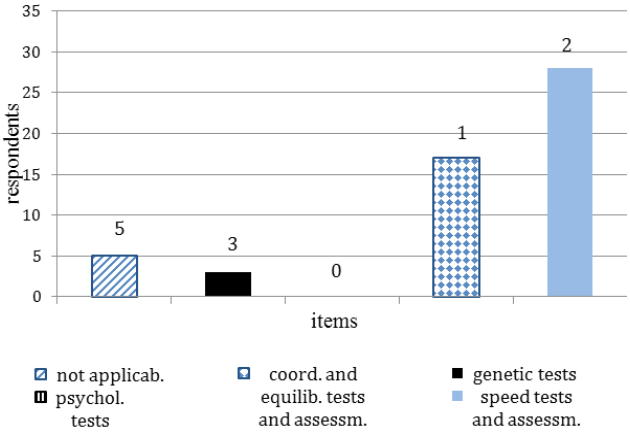

Fig. 2 – Respondents' main criteria used in first stage of selection.

Peculiarities of the secondary selection, the stage of promotion in the advanced groups and of the event specialization

Regarding the optimal age for specializing in different athletics events, 60% of the respondents consider the optimal range between 14 and 15 years, 25.7% between 12 and 13 years, 11.4% over 16 years, while 2.9% mentioned the optimal age of less than 12 years for specialization. For promotion in the advanced groups, 68.6% of coaches rely mainly on psychomotor factors, 28.6% on anthropometric indices, 2.8% on genetic factors and no coach considers psychological factors.

In order to identify the selection criteria used in practice by the respondents, we decided to delimit them into three major categories: anthropometric, psychomotor

and psychological criteria.

1) Anthropometric characteristics pursued in order to promote athletes to the advanced level

The answers offered for this particular item were developed following the study of specialized articles presenting the opinions of world athletics specialists regarding the predictive factors of performance in the targeted athletic events. The respondent's most considered anthropometric criteria for specializing their young athletes in events of sprint, hurdles or jumps is the length of the lower limbs. This criterion influences the coach's decision in a proportion of 71.4% in jumping events, 77.1% in hurdling events and 82.9% in sprinting events. The next criterion in respondents' decisions is the height, especially for hurdlers (74.3%) and jumpers (68.6%) and to a lesser extent for sprinters (57.1%). A significant importance in the specialization for jumping events is given to robust joints. Little importance is given to the peculiarities of the foot, the circumference of the thighs and calves and to the bitrochanterian and biacromial diameters. Body mass lower than height -100 influences the specialization decision in a greater proportion for sprinting events (42.9%) compared to hurdling (37.1%) and jumping (22.9%) events.

2) Psychomotor and psychological characteristics pursued in order to promote athletes to the advanced level

If from an anthropometric point of view the criteria considered for specialization are largely the same for all three categories of athletic events, from a psychomotor and psychological point of view they vary according to the particularities and demands of the events. For sprinting events, coaches primarily evaluate reaction and repetition speed (88.6%), followed by explosive power (71.4%) and acceleration ability (65.7%). From a psychological point of view, in the opinion of the responding coaches, the ability to concentrate (85.7%) and motivation (65.7%) are indispensable for practicing sprinting events, closely followed by emotional stability. For the specialization in hurdling events, the coaches base their decisions primarily on the evaluation of the level of segmental coordination (91.4%), followed equally by the evaluation of the indices of manifestation of speed, but also of the level of mobility and suppleness (77.1%). Hurdlers must first of all have the ability to concentrate (80%) and also they must have courage (77.1%). The main psychomotor criterion used in order to specialize in jumping events is the ability to jump, a criterion reported by 91.4% of the respondents, followed by dynamic balance and segmental coordination (74.3%). The psychological assessment primarily focuses on motor intelligence (91.4%) and the ability to automate the approach of the jump (82.9%).

3) Tests and assessments used by Romanian athletics specialists in order to promote athletes to the advanced level

Following the investigation of the opinions regarding the criteria considered for the specialization in sprinting-hurdling-jumping events, we wanted to find out which tests are considered by the respondents to be relevant for this matter. The answers given for this item were well explained, but due to graphics and framing reasons, the legend in Fig. 3 is simplified. Thus, the speed tests and assessments included 30/100/150/300 m run; the acceleration assessments involved 10/20/30/50 m fly and the explosive strength assessments involved successive one-leg and alternating hops (bounding) on short distance. The "Sit and Reach" test, which in the field of physical therapy in Romania is found under the name of *finger-ground index*, evaluates the flexibility of lower back and hamstring muscles; The Wingate test for assessing anaerobic capacity is performed by pedaling an ergo metric bicycle for 30 seconds.

For specialization in sprint events, 77.1% of respondents consider acceleration tests relevant, 68.6% give importance to speed tests and standing long jump. The Wingate test (11.4%), the Sit and Reach test (2.9%), and the backward (14.3%) and forward (22.9%)

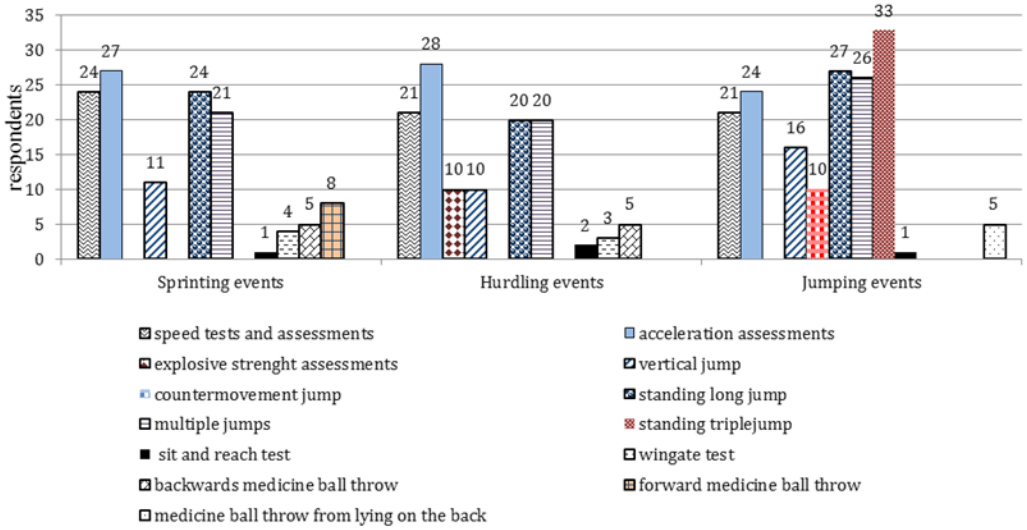

Fig. 3 – Comparative analysis of the tests and the assessments used in secondary selection in order to specialize in sprinting-hurdling-jumping events.

medicine ball throws had poor relevance. The opinion of the respondents regarding the tests and assessments relevant for hurdling events specialization reflects the preference for acceleration tests (80%), followed by speed tests (68.6%). Few coaches give importance to tests for explosive strength (28.6%) and mobility (5.7%). Throwing the medicine ball backwards is approved by 14.3%. Among the tests involving jumping, the most reported is the standing long jump, equally with multiple jumps (57.1%), while the vertical jump is approved only by 28.6% of the respondents.

Of the tests used to assess jumping potential, the standing triple jump is approved by 94.3% of responding coaches, followed by standing long jump (74.3%), acceleration tests (68.6%) and those of speed (60%). Poor importance is given to the countermovement vertical jump (28.6%), plyometric tests (20%), medicine ball throw from lying on the back position (14.3%) and the „Sit and Reach" test.

Discussion

The preference of the respondents for the classic motor tests and assessments, namely speed tests and standing long jump is noted. In proportion of 74%, the responding coaches use standing long jump as a criterion for specialization in jumping events, especially for the long jump event. This test highlights the level of explosive force and the reaction speed, but does not reflect rhythmicity, tempo, limb-trunk coordination, amplitude, dynamic and static balance, spatial-temporal orientation, capacities that condition the jumping events. Idrizović & Nićin (2014) even highlight the total irrelevance of this test in signaling the potential for the long jump event, recommending instead the standing triple jump, due to the dynamic structure and single-leg jump that follows the initial jump from standing (Idrizović & Nićin, 2014). The same authors mention vertical jump, standing triple jump, 20 m fly, 30 m standing start and medicine ball throw from lying on the back as the most relevant tests for the long jump event (Idrizović & Nićin, 2014). 60% of the respondents indicated the high importance of mobility and suppleness for specialization in jumping events but in practice only 2.9% of them use the "Sit and Reach" test although this is considered the most valid test compared to others for determining the folding flexibility of the torso (Bağcı & Bayraktar, 2017).

Although the opinion of the responding coaches indicates the importance of segmental coordination in a proportion of 91.4%, followed equally by high speed, mobility and suppleness (77.1%) in order to specialize in hurdles events, in practice very few coaches apply tests to assess explosive strength (28.6% of respondents), mobility and flexibility (5.7% of respondents). Mihăilescu (2005) appreciates that the selection for hurdles events must be made based on the appreciation of speed in all its manifestations, mobility and suppleness, skill and coordination and vertical jump.

The anthropometric criteria most targeted by the responding coaches for the sprinting-hurdling-jumping events are the length of the lower limbs and the height. Watts-Gale et al. (2012) draw attention to the physical peculiarities of the new champions in athletics. In both women and men, elite sprinters tend to be taller and leaner. These features favor a longer running stride supported by an optimal frequency. Lee and Piazza (2009) studied the musculoskeletal structure of some elite sprinters drawing attention to the characteristics of the foot and its influences in the development of movement speed. Thus, the long toes extend contact with the ground, positively influencing the ability to accelerate as a result of the propulsive force of the ground. Also, shorter foot, shorter distance between heel and first metatarsal, higher calf favors sprint runners.

None of the responding coaches indicated the use of psychological tests at the level of initial or secondary selection, although in their opinion, from a psychological point of view, the ability to concentrate (85.7% of respondents) and motivation (65.7% of respondents) are indispensable for the practice of athletic events, closely followed by emotional stability. Numerous studies have shown that the motivation found in a young athlete is more predictive of success than the physical qualities identified at the moment.

Conclusions

1. Analyzing the opinion of Romanian specialists regarding the predictive factors of performance when promoting to the stage of specialized training, we find that this is correct from a theoretical point of view in relation to the particularities of the requirements of sprinting-hurdling-jumping events, but their practical activity does not always correspond to their opinion.

2. We noted that in the practice of our respondents, there is no deselection, allowing the advancement in the training process for subjects who do not comply with the requirements and demands of the athletics events. In very competitive national systems, deselection is very drastic for reasons of economy and efficiency because a reliable system must have as its final goal the permanent supply of the national team with highly promising athletes.

Conflicts of interest

The authors confirm that there are no known conflicts of interests associated with this publication.

Acknowledgment

This research highlights partial results from the doctoral thesis of the first author, ongoing at Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica București, University Center of Pitești, Romania.

References

Alexe N. Modern Training. Ed. EDITIS. București. 1993, 43, 47.

Bağcı E, Bayraktar I. Is there a relationship between flexibility ability and the selected long jump performance components of teenage athletes? Palestrica third Mill. 2017;18(3): 135-138, https://doi.org/10.26659/pm3.2017.18.3.135.

Baker J, Johnston K, Wattie N. Survival Versus Attraction

Advantage and Talent Selection in Sport. Sports Med Open. 2022;8(1):17. doi: 10.1186/s40798-022-00409-y.

Baker J, Schorer J, Wattie N. Compromising Talent: Issues in Identifying and Selecting Talent in Sport. Quest. 2017;70(1):1-16. DOI:10.1080/00336297.2017.1333438.

Bompa TO. Periodization: Theory and Methodology of Training. Ed. EX PONTO. București, 2002, 231.

Drăgan I. Sports Medicine. Ed. Medicală, București 2002, 236.

Güllich A, Emrich E. Evaluation of the support of young athletes in the elite sport system. Eur J Sport Soc. 2006;3(2):85-108. doi: 10.1080/16138171.2006.11687783.

Idrizović KN, Nićin D. The Selective Battery of Motor Tests for a Track and Field Event Long Jump. Sports Sci Health. 2014;4(1):20-32. Available online at: https://www.siz-au.com/sites/default/files/journal/1467-3281-1-sm.pdf.

Lee S, Piazza SJ. Built for speed: musculoskeletal structure and sprinting ability. Journal of Experimental Biology, 2009;212(Pt22):3700-3707. DOI: 10.1242/jeb.031096. doi: 10.1242/jeb.031096.

Mihăilescu LN. Athletics: Hurdles. Ed. Valinex. Chișinău, 2005.

Zerf M, Besultan H, Attouti N, Touati B, Mokkedes MI. Influence of the observation method as a selection procedure in the performance of Algerian goalkeepers. Palestrica third Mill. 2017;18(3):125-129. https://doi.org/10.26659/pm3.2017.18.3.125

Platonov V. Theoretical and methodological background for sports selection and orientation in modern elite sports. Science in Olympic Sports. 2018;3:24-51. DOI:10.32652/olympic2018.3_3. Available. online.at:.https://pdfs.semanticscholar.org/2332/efe4ce6f4649308f06dd52f3bd4cf9b3b440.pdf?_ga=2.76134741.1131997308.1666637662-272588806.1666637662.

Tan K, Siang S, Amri A, Ahmad NI. Determination of a talent identification model for the athletic long jump event. Conference: In 1st Asia Pacific Sports Science Conference Universiti Malaysia Sabah. Kota Kinabalu, SabahAt: Kota Kinabalu, Sabah, Malaysia, 2005:1-38. Available online at: https://www.researchgate.net/publication/282997391_DETERMININATION_OF_A_TALENT_IDENTIFICATION_MODEL_FOR_THE_ATHLETIC_LONG_JUMP_EVENT.

Tan L. Junior success is a poor indicator of long-term senior success. Red Sports. 2016. Available online at: https://www.redsports.sg/2016/12/03/youth-athlete-development-conference/.

Till K, Baker J. Challenges and [possible] solutions to optimizing talent identification and development in sport. Front Psychol. 2020;11(664). doi: 10.3389/fpsyg.2020.00664.

Vaeyens R, Güllich A, Warr CR, Philippaerts R. Talent Identification and promotion programmes of Olympic athletes. J Sp Sci. 2009;27(13):1367-1380. doi: 10.1080/02640410903110974.

Watts-Gale AS, Coleman I, Nevill A. The changing shape characteristics associated with success in world-class sprinters. J Sp Sci. 2012;30(11):1085-1095. doi: 10.1080/02640414.2011.588957.