THE LATENT STRUCTURE OF VARIABLES OF SPORTS PREPARATION AND ATHLETIC PREPAREDNESS BASED ON PHYSICAL CONDITIONING CONTENTS IN BASKETBALL

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Original scientific paper
UDC 796.015.132:796.323.2

Abstract:

The research was conducted to determine the latent structure of the variables of characteristics of the sports preparation process and preparedness of basketball players of both sexes. The system for data collection was based on an expert assessment of the influence of the classes of conditioning preparation contents on certain characteristics of both the preparation process and the status of preparedness. The sample of entities (127) consisted of training contents aimed at the development of the motor, physiological and morphological characteristics of athletes, whereas the sample of variables (49) involved the characteristics of the preparation process. Eight factors were extracted by means of the factor analysis of attributes or variables under the G-K criterion. The factors exhausted 85.5 % of the total variance of the manifest space. The isolated latent dimensions (factors) were named as *the factor of speed-related attributes of basketball, the factor of multilateral preparation of basketball players, the factor of an aerobic regimen of work and exertion of maximal force, the factor of basic preparation of basketball players, the factor of improving the soft tissues of basketball players, the uninterpretable factor, the factor of specific explosive strength of a vertical jumping ability type, and the factor of ball control.*

Key words: *basketball, sports preparation, athletic preparedness, factor analysis*

LATENTE STRUKTUR VON VARIABLEN DES SPORTLICHEN TRAININGS UND DER SPORTLICHEN FORM AUFGRUND DER KONDITIONSTRAININGSINHALTE IM BASKETBALL

Zusammenfassung:

Die Untersuchung wurde vorgenommen, um die latente Struktur von Variablen des sportlichen Trainings und der sportlichen Form sowohl von Basketballspielern als auch von Basketballspielerinnen zu bestimmen. Das System der Datensammlung liegt einer fachkundigen Einschätzung zugrunde, die den Einfluss von Klasseninhalten des Konditionstrainings auf bestimmte Eigenschaften des sportartspezifischen Trainings und der sportlichen Form von Basketballspielern bestimmt. Untersuchungseinheiten (127) in dieser Untersuchung waren die Trainingsinhalte zur Entwicklung der motorischen, physiologischen und morphologischen Merkmale. Die Variablen (49) in dieser Untersuchung waren die Prozesseigenschaften zur Vorbereitung der Basketballspieler. Mittels der Faktorenanalyse von Attributen oder Variablen und der Anwendung des G-K Kriteriums wurden acht Faktoren isoliert, die 85,5 % der gesamten Varianz des manifesten Raums ausmachen. Die isolierten latenten Dimensionen (Faktoren) wurden mit folgenden Namen betitelt: Faktor der Geschwindigkeitsmerkmale des Basketballspiels, Faktor der vielseitigen Vorbereitung der Basketballspieler, Faktor der aeroben Arbeitsweise und der maximalen Kraftausübung, Faktor des Grundtrainings der Basketballspieler, Faktor der Steigerung der weichen Gewebe der Basketballspieler, der nicht-interpretierbare Faktor, Faktor der spezifischen vertikalen Sprungkraft und Faktor der Ballkontrolle.

Schlüsselwörter: *Basketball, sportliches Training, sportliche Form, Faktorenanalyse*

Introduction

With the purpose of optimizing the process of sports preparation, sports scientists or kinesiologists and other experts in sports analyse perpetually a particular sporting activity to collect as much information as possible about it and about the structure of the required advantageous anthropological attributes of athletes. Such analyses may be of various forms - basketball as a sporting activity may be observed from the aspects of its structure (Trninić, 1995), physiological function (Janeira & Maia, 1998), the anatomy of players, biomechanics of basketball specific movements, or any other approach (Trninić, Perica, & Dizdar, 1999; Trninić, Marković, & Heimer, 2001; Jukić, Milanović, & Vuleta, 1999). Consequently, basketball can be denoted (modified according to Gabrijelić, 1977) as a complex ball game, a team sport which is compounded of composites of complex and simple movements executed by team-mates under the conditions of cooperation and of confrontation with the opponents in a game.

It is also very important to obtain an insight into the developmental status of the motor and physiological abilities, morphological characteristics, health status and psycho-social attributes of athletes because they all constitute the foundation of sports preparedness (Gabrijelić, 1977). The focus in this work was on physical conditioning which can be defined as a process of improving the motor and physiological abilities, morphological characteristics and health status of athletes, as well as a process of mastering the motor skills that are necessary for physical conditioning implementation (Jukić, 2003). The complexity of the game of basketball imposes high demands on all the listed anthropological characteristics. Besides the determination of the contribution of each characteristic separately to athletic preparedness, it is important to establish the optimal interrelations among these characteristics, from which the information about integral preparedness can be obtained.

A sports preparation system consists of a training system, a competition system and a system of ergogenic aids and supplementary procedures (Zhelyaskov, 2001; Matveev, 2000). The entire basketball preparation system is aimed at the development and maintenance of abilities, characteristics and knowledge being responsible for success in competitions. The aim of the present research was to determine the latent structure of the characteristics of basketball sports preparation and the features of athletic preparedness by means of an expert assessment. The experts assessed the influence that the classes of conditioning preparation contents had on certain characteristics of both the preparation process and the status of preparedness.

Methods

The assessment of experts was used to collect data concerning the influence of the classes of conditioning preparation contents on certain characteristics of both the preparation process and of the status of preparedness of basketball players. Thirteen selected experts met one of the following basic criteria: must be (a) a conditioning trainer (either a former or a current one) to a national team that had won a medal at either the Olympic Games, the World, or the European championships, or in a team competing in either the domestic elite championship (A-1 league), or in one of the European cups, or (b) a university professor of the subjects closely related to the topic of the investigation with experience in conditioning work with basketball players.

The experts used a five-point scale (grades 1-5; 1 meaning a content had no influence on the criterion variable, and 5 meaning a content had an extremely large influence on the criterion variable) to express their value judgement on the influence of every typical class of the conditioning training contents on certain variables describing the process of sports preparation and the status of preparedness of basketball players.

In this investigation the sample of entities (127) consisted of various training contents aimed at the development of the motor, physiological and morphological characteristics of basketball players. Due to the almost infinite number of individual exercises and their combinations in physical conditioning of athletes, the authors took the liberty of constructing a system of classes or blocks of the training contents interconnected by logical, conceptual, structural, biomechanical, anatomical, physiological, and motor links. To determine the classes of training contents the following criteria were used: inclusion of a training content in all the relevant fields of physical conditioning (development of motor and physiological abilities, morphological characteristics and health status) and in all the relevant movement structures (walking, running, jumping, throwing, weightlifting, changes of movement directions, balancing), different types of resistance, different magnitudes of resistance, structural complexity of contents, and different media. The sample of entities was defined on a wide basis of previous expert and scientific insights into the training contents which are components of the versatile (multilateral) and basic physical conditioning preparation in basketball (Brittenham, 1996; Chu, 1996; Joch, 1997; Fleck & Kraemer, 1997; Siff & Verkhoshansky, 1998; Bompa & Cornachia, 1999; Beachle & Earle, 2000). If a modus of performance (duration, number of repetitions, intensity) had not been defined in the description of particular entities, the experts were supposed to observe them as being performed optimally in order to influence a particular variable of basketball preparation.

The sample of entities (127)

Walking and running (33)

1. Fundamentals of running ("running school ")
2. Low and internediate intensity running combined with various tasks
3. Walking combined with various tasks
4. Cross-country long-duration walking (hiking) over an uneven terrain
5. Stadium stairs – walking up and down the steps
6. Cross-country long-duration running (over 5 min) of a low and moderate intensity over an uneven terrain
7. Stadium stairs - low and moderate intensity running up and down the steps (duration >1')
8. Stadium stairs - high intensity running up and down the steps (<1')
9. Rhythmic clearance of hurdles
10. Moderate and high intensity running over closely placed mini-hurdles
11. Obstacle course
12. Saltin's fartlek
13. Astrand's fartlek
14. Gerschler's fartlek
15. Hill fartlek
16. Whistle fartlek
17. Sprints (up to 30m) over a flat surface (floor, grass, track)
18. Sprints (up to 30m) uphill, downhill, on sand, in knee- or hip-deep water, against resistance
19. Sprints (30-100m) over a flat surface (floor, grass, track)
20. Sprints (30-100m) uphill, downhill, on sand, in knee- or hip-deep water, against resistance
21. Sprints (100-200m) over a flat surface (floor, grass, track)
22. Sprints (100-200m) uphill, downhill, on sand, in knee- or hip-deep water, against resistance
23. Handicapped sprints (up to 100m)
24. Running over a flat surface distances of 200-600m at various paces
25. Running over distances of 200-600m uphill, downhill, on sand, in knee- or hip-deep water, against resistance
26. Running over a flat surface distances of 600-1,500m at various paces
27. Running over flat surface distances of 1,500-3,000m at various paces
28. Running over distances over 3,000m at various paces
29. Relay runs over distances up to 30m
30. Relay runs over distances up to 100m
31. Relay runs over distances up to 400m
32. Reactive jumping, sprinting, throwing, cutting, etc. on a visual, audible, or tactile sign
33. Starting from various positions and start acceleration up to 30m

Jumps (7)

34. Hops in the concentric-eccentric regimen of work
35. Hops in the concentric regimen of work
36. Standing jumps in the concentric-eccentric regimen of work
37. Standing jumps in the concentric regimen of work
38. Depth jumps followed by the concentric-eccentric regimen of work
39. Depth jumps in the concentric regimen of work
40. Depth jumps (no continuation)

Throws (4)

41. Shot put and put of her heavy objects (variable weights)
42. Medicine ball put (variable weights)
43. Putting and catching the medicine ball in concentric-eccentric regimen of work
44. Medicine ball leg throws

Stretching methods and yoga (6)

45. Static active stretching
46. Static passive stretching
47. Dynamic stretching
48. PNF
49. Various joints circumduction
50. Yoga-originated techniques of stretching, breathing, mental relaxation and concentration

Resistance training contents (40)

51. Body-weight isotonic contents at a steady pace (1-5 s each movement phase); 6-12 repetitions
52. Body-weight isotonic contents at a steady pace (1-5 s each movement phase); more than 12 repetitions
53. Body-weight isotonic contents performed explosively (the concentric movement phase); 4-12 repetitions
54. Body-weight isotonic contents performed explosively (both the concentric and excentric movement phase); 4-12 repetitions
55. Self-resisted isotonic contents at a steady pace performed explosively (the concentric movement phase); 6-12 repetitions
56. Isotonic contents of a conscious contraction type at a steady pace (the concentric movement phase 5 s and more); 6-12 repetitions
57. Isotonic contents on typical machines at a steady pace (1-5 s each movement phase); 6-12 repetitions
58. Isotonic contents on typical machines at a steady pace (1-5 s each movement phase); more than 12 repetitions
59. Isotonic contents on typical machines performed explosively (the concentric phase only); 4-12 repetitions
60. Isotonic contents on typical machines performed explosively (both the concentric and excentric phase); 4-12 repetitions
61. Isotonic contents on typical machines performed against maximal loads; 1-3 repetitions
62. Free-weight isotonic contents at a steady pace (1-5 s each movement phase); 6-12 repetitions
63. Free-weight isotonic contents at a steady pace (1-5 s each movement phase); 12 repetitions and more
64. Free-weight isotonic contents performed explosively (the concentric phase only); 4-12 repetitions
65. Free-weight isotonic contents performed explosively (both the concentric and excentric phase); 4-12 repetitions
66. Free-weight isotonic contents performed against maximal loads; 1-3 repetitions
67. Isotonic contents at a steady pace (1-5 s each movement phase) with various apparatuses (medicine balls, elastic ribbons, weight-vests, sand bags, etc.); 6-12 repetitions
68. Isotonic contents at a steady pace (1-5 s each movement phase) with various apparatuses (medicine balls, elastic ribbons, weight-vests, sand bags, etc.); 12 repetitions and more
69. Isotonic contents performed explosively (the concentric phase only) with various apparatuses (medicine balls, elastic ribbons, weight-vests, sand bags, etc.); 4-12 repetitions
70. Isotonic contents performed explosively (both the concentric and excentric phase) with various apparatuses (medicine balls, elastic ribbons, weight-vests, sand bags, etc.); 4-12 repetitions
71. Isotonic contents against resistance of a partner at a steady pace; 6-12 repetitions
72. Isotonic contents against resistance of a partner at a steady pace; 12 repetitions and more
73. Aqua isotonic contents at a steady pace (1-5 s each movement phase); 6-12 repetitions
74. Aqua isotonic contents at a steady pace (1-5 s each movement phase); 12 repetitions and more
75. Aqua isotonic contents performed explosively (the concentric phase only); 4-12 repetitions
76. Aqua isotonic contents performed explosively (both the concentric and excentric phase); 4-12 repetitions
77. Body-weight isometric contents

78. Attempted movement isometric contents
79. Isometric contents on machines
80. Free-weight isometric contents
81. Isometric contents with various apparatuses (medicine balls, elastic ribbons, weight-vests, sand bags, etc.)
82. Isometric contents against resistance of a partner
83. Contents on isokinetic machines
84. Combined isometric and isotonic contents
85. Contents with isolated excentric phase of a movement performed at a steady pace; 4-12 repetitions
86. Contents with isolated excentric phase of a movement performed against maximal loads; 1-3 repetitions
87. Contents with isolated concentric phase of a movement performed at a steady pace (1-5 s concentric phase); 4-12 repetitions
88. Contents with isolated concentric phase of a movement performed against maximal loads; 1-3 repetitions
89. Contents with isolated concentric phase of a movement performed explosively; 4-12 repetitions
90. Muscle electrostimulation

Continuous contents of diverse complexity (5)
91. Aerobics – classic (basic, step, slide, new body, aqua-aerobics)
92. Aerobics – aesthetic (all types of dance aerobics – latino, afro, funky)
93. Aerobics – sport-related (sport-specific movement structure simulations)
94. Simulators of cyclic movements (cycle-ergometers, treadmill, rowing ergometer, step-machine, etc.); work over 5 minutes.
95. Cyclic movements of duration over 5 minutes (cycling, roller skating, ice skating, rowing, cross-country skiing)

Aquatraining contents (4)
96. Swimming – basic and additional techniques (over 5 minutes)
97. Contents of running in deep water (no supportr; overhead depth)
98. Contents of running (over 5 min) in shallow, ankle- and knee-deep water at a low and moderate pace
99. Contents of running over 10-50m distance in hip- and knee-deep water straight and with cuts at a high pace

Contents of the multilateral/versatile preparation (9)
100. Elementary team games
101. Elementary relay games
102. Elementary games – running, tag, racing
103. Elementary games (in pairs) – pulling, pushing and resisting each other
104. Elementary games – dexterity
105. Elementary games – aiming at targets
106. Fundamentals of floor gymnastics
107. Combat sport contents
108. Rope-skipping

Contents with high frequency of alternate movements (3)
109. Various types of high-frequency steps
110. High-frequency frontsteps, sidesteps, backsteps, straddle jumpstep, bringing-together jumpstep in intervals 5-30''
111. High-frequency front arms raises, lateral arms raises, backward arms raises, upward arms raises, holding arms downwards in interval 5-30''

Complex motor tasks (8)
112. Maintaining balanced body positions in various stances and situations
113. Contents of coordinating space-related and time-related parameters of movements
114. Contents of manipulating two and more balls simultaneously
115. Contents of linking motorically two or more diverse motor tasks
116. Contents of fast and efficacious learning of new motor skills
117. Contents of problem-solving in motor situations
118. Contents requiring perception of details and space relations
119. Contents of rhythmic performance of various movement structures

Contents with changes of movement direction (8)
120. Forward-backward and left-right changes of direction (cuts) performed by various ways of moving
121. Forward-backward and left-right changes of direction (cuts) performed by the same movement structure
122. Contents of sharp changes of direction
123. Semicircular and circular changes of direction (forward, backward)
124. Horizontal-vertical changes of direction (sprint – jump, jump – sprint, jump – sport stance, stance – jump) with continuation of moving in multiple directions
125. Changing direction by twists (180°at least)
126. Contents combined of stopping and starting in various modes of moving (sprint, positioning, steps, etc.)
127. Changing direction by jumps (while moving through space by various types of jumping, changing direction of moving.)

The sample of variables (49) represents in this research the following characteristics of sports preparation and athletic preparedness of basketball players: parameters of overall playing performance (13), periodization of training within an annual macrocycle (2), types of sports preparation (2), motor and physiological abilities and morphological characteristics (22), health-related aspects of physical conditioning (2), phases of the long-term sports preparation in terms of age categories (5), and parts of individual training sessions (3).

The sample of variables (49)

Parameters of overall playing performance (Trninić, Perica, Dizdar, 1999)
1. Level of defensive pressure – **(DEFPRESS)**
2. Defensive help – **(DEFHELP)**
3. Blocking the shots – **(BLKS)**
4. The ball possession gained – **(STLS)**
5. Defensive rebounding efficiency – **(DEFREB)**
6. Transition defense efficiency – **(TRANDEF)**
7. Passing skills – **(PASS)**
8. Ball control – **(BALLCTRL)**
9. Dribble penetration – **(DRIBBPEN)**
10. Efficiency of screening – **(SCREEN)**
11. No-ball offense – **(NOBALLOFF)**
12. Offense rebounding efficiency – **(OREB)**
13. Transition offense efficiency – **(TRANOFF)**

Periodization of training in an annual macrocycle
14. Preparatory period – **(PREPPER)**
15. Competition period – **(COMPPER)**

Types of sports preparation
16. Basic preparation – **(BASPREP)**
17. Specific preparation – **(SPECPREP)**

Motor and physiological abilities
18. Explosive strength of a throwing type – **(EXPSTRTHROW)**
19. Explosive strength of a jumping type – **(EXPSTRJUMP)**
20. Strength endurance of a dynamic type – **(STRENGTHEND)**
21. Isometric force – **(ISOFORCE)**
22. Elastic power – **(ELASTPOW)**

23. Maximal strength – **(MAXSTRNGHT)**
24. Speed endurance – **(SPEEDEND)**
25. Reaction time – **(REACTIME)**
26. Movement frequency – **(FREQ)**
27. Single movement speed – **(SMOVSPEED)**
28. Flexibility – **(FLEXI)**
29. Balance – **(BALANCE)**
30. Agility – **(AGIL)**
31. Timing – **(TIMING)**
32. Coordination in rhythm – **(RYTHCOORD)**
33. Speed coordination – **(COORDSPEED)**
34. Anaerobic alactic (ATP-PCr) capacity – **(ANATP-PCR)**
35. Anaerobic lactic acid capacity – **(ANGLYC)**
36. Mixed anaerobic-aerobic capacity – **(AERANAER)**
37. Aerobic capacity – **(AERCAP)**

Morphological characteristics

38. Subcutaneous fatty tissue reduction – **(REDFAT)**
39. Muscular hyperthropy – **(HPTRF)**

Health-related aspects of conditioning

40. Injury prevention – **(INJURPREV)**
41. Injury rehabilitation – **(REHAB)**

Phases of long-term sports preparation

42. Age 9-12 yrs (school of basketball) – **(9 - 12)**
43. Age13-14 yrs (younger cadets) – **(13 - 14)**
44. Age 15-16 yrs (cadets) – **(15 - 16)**
45. Age 17-18 yrs (juniors) – **(17 - 18)**
46. Age 19 yrs and above (seniors) – **(19 & ABOVE)**

Parts of an individual training session

47. Introductory-preparatory part of a training session – **(INTPREP)**
48. Main part of a training session – **(MAIN)**
49. Closing part of a training session – **(CLOSSESS)**

The experts' assesements (expressed in numerical values from 1-5) were condensed by the principal component analysis (PCA) in order to obtain the first principal component. Cronbach's alpha coefficient was calculated as a measure of reliability of the experts' assessments (Table 1).

The correlation matrix of variables was processed by PCA to determine the latent structure of the characteristics of the basketball sports preparation process and features of preparedness of basketball players of both sexes. The Guttman – Kaiser (G-K) criterion was used to determine the number of significant principal components along with the oblimin oblique rotation for the transformation of the initial coordinate system.

Results

Cronbach's alpha was calculated as a measure of reliability of the experts' assessments for each variable (Table 1). The values of Cronbach's alpha coefficients varied between 0.75 and 0.94. According to those values it can be concluded that the experts reached a satisfactory concordance degree in each variable.

By means of the principal component analysis and the G-K criterion eight principal components were extracted. They exhausted 85.5 % of the total variance of the manifest space (Table 2).

Table 1. Cronbach's alpha and communalities of variables

Cronbach's alpha		Communalities of variables	
13-14	0.91	13-14	.81
15-16	0.85	15-16	.81
17-18	0.78	17-18	.80
19&ABOVE	0.82	19&ABOVE	.80
9-12	0,93	9-12	.78
AGIL	0.88	AGIL	.89
BASPREP	0.75	BASPREP	.75
BLKS	0.88	BLKS	.89
FREQ	0.88	FREQ	.81
COORDSPEED	0.92	COORDSPEED	.90
SMOVSPEED	0.84	SMOVSPEED	.85
REACTIME	0.86	REACTIME	.88
SPEEDEND	0.88	SPEEDEND	.93
PASS	0.87	PASS	.93
ELASTPOW	0.88	ELASTPOW	.89
EXPSTRTHROW	0.92	EXPSTRTHROW	.88
EXEXPSTRJUMP	0.91	EXEXPSTRJUMP	.93
FLEXI	0.94	FLEXI	.76
MAIN	0.87	MAIN	.86
HPTRF	0.88	HPTRF	.88
AERCAP	0.94	AERCAP	.86
AERANAER	0.90	AERANAER	.85
ANATP-PCR	0.87	ANATP-PCR	.89
ANGLYC	0.87	ANGLYC	.79
ISOFORCE	0.89	ISOFORCE	.79
BALLCTRL	0.84	BALLCTRL	.88
MAXSTRNGTH	0.89	MAXSTRNGTH	.89
NOBALLOFF	0.86	NOBALLOFF	.88
COMPPER	0.88	COMPPER	.80
STLS	0.87	STLS	.92
DEFHELP	0.87	DEFHELP	.92
SCREEN	0.79	SCREEN	.79
INJURPREV	0.90	INJURPREV	.91
PREPPER	0.77	PREPPER	.73
DEFPRESS	0.86	DEFPRESS	.90
DRIBBPEN	0.84	DRIBBPEN	.86
BALANCE	0.91	BALANCE	.73
REDFAT	0.92	REDFAT	.88
REHAB	0.93	REHAB	.91
STRNGTHEND	0.88	STRNGTHEND	.85
RHYTHCOORD	0.92	RHYTHCOORD	.82
OREB	0.90	OREB	.94
DEFREB	0.91	DEFREB	.95
SPECPREP	0.90	SPECPREP	.80
TIMING	0.93	TIMING	.92
TRANOFF	0.86	TRANOFF	.90
TRANDEF	0.84	TRANDEF	.90
INTPREP	0.86	INTPREP	.84
CLOSSESS	0.88	CLOSSESS	.76

By far the greatest amount of the total variance was explained by the first principal component (34%). Then come, in a descending order of accounting for the total variability, the second (17.7%) and the third component (13.1 %). The first three components explained together 64.9 % of the total variance. With the following components the percentage of the explained variance diminished considerably: 6.6 %, 4.2%, 3.7%, 3.4% and 2.6 % for the fourth, fifth, sixth, seventh and eighth components, respectively (Table 2). The last five components explained together 20.6% of the total variance in the space of attributes of the basketball preparation process.

Table 2. Eigenvalues, percentage of total variance, and cumulative percentage of the total variance of the extracted latent dimensions

	EIGENVALUES	% OF TOTAL VARIANCE	CUMMULATIVE % OF TOTAL VARIANCE
1	16.68	34.0	34.0
2	8.68	17.7	51.8
3	6.43	13.1	64.9
4	3.26	6.6	71.5
5	2.06	4.2	75.7
6	1.79	3.7	79.4
7	1.68	3.4	82.8
8	1.30	2.6	85.5

In Table 1 communalities of the basic variables are presented which were assessed on the basis of the extracted factors. The communalities are of relatively high values, ranging from 0.73 to 0.95, which indicates very high common variances of the manifest variables with the extracted factors.

The largest communalities (from .90 to .95) were obtained for the following variables: *defensive rebounding efficiency* (DEFREB) .95, *offensive rebounding efficiency* (OREB) .94, *speed endurance* (SPEEDEND) .93, *explosive strength of a jumping type* (EXPSTRJUMP) .93, *passing skills* (PASS) .93, *the ball possession gained* (STLS) .92, *defensive help* (DEFHELP) .92, *timing* (TIMING) .92, *injury prevention* (INJURPREV) .91, *injury rehabilitation* (REHAB) .91, l*evel of defensive pressure* (DEFPRESS) .90, *transition offense efficiency* (TRANSOFF) .90, *and transition defense efficiency* (TRANDEF) .90.

On the basis of the high values of the established communalities it could be said that we are dealing with a rich system of variables that have contributed considerably to the later explanation of the latent structure of variables of the basketball preparation process and preparedness of players.

The factor analysis resulted in two fundamental matrices which allowed the latent structure of the basketball preparation process variables to be interpreted: the matrix of orthogonal projections of variables with oblimin factors and the matrix of parallel projections of variables with oblimin factors. Values from the matrix of parallel projections of variables with oblimin factors have a greater contribution to the final definition of the latent dimension (Table 3).

The greatest parallel projections on the first latent dimension were recorded for the following variables: *anaerobic lactic acid capacity* (ANGLYC) .95, *frequency of movements* (FREQ) .91, *transition defense efficiency* (TRANDEF) .85, *anaerobic ATP-PCr capacity* (ANATP-PCR) .80, *transition offense efficiency* (TRANOFF) .79, *no-ball offense* (NOBALLOFF) .79, *speed endurance* (SPEEDEND) .75, *level of defensive pressure* (DEFPRESS) .73, *dribble penetration* (DRIBBPEN) .70, *reaction time* (REACTIME) .58, *defensive help* (DEFHELP) .58, *coordination in speed* (COORDSPEED) .49, *agility* (AGIL) .48.

The second latent dimension (Table 3) was defined by the positive projections of the following variables: *the introductory-preparatory period of a training session* (INTPREP) .86, *age 13-14 years* (13-14) .86, *age 15-16 years* (15-16) .84, *age 9-12 years* (9-12) .78, *closing part of a training session* (CLOSSESS) .67, *flexibility* (FLEXI) .62, *balance* (BALANCE) .59, *injury prevention* (INJURPREV) .55, *coordination in rhythm* (RHYTHCOORD) .54, and *timing* (TIMING) .48.

The third latent dimension was of a bipolar structure. The following variables had the greatest negative projections on the third latent dimension: *subcutaneous fatty tissue reduction* (REDFAT) -.83, *aerobic capacity* (AERCAP) -.78, and *aerobic-anaerobic capacity* (AERANAER) -.67, whereas the greatest positive projections were obtained for the variables: *isometric force* (ISOFORCE) .60 and *maximal strength* (MAXSTRNGTH) .47.

The variables with the highest projections on the fourth latent dimension were as follows: *basic preparation* (BASPREP) .78, *age 19 yrs and above* (19&ABOVE) .77, *age 17-18 years* (17-18) .76, *preparation period* (PREPPER) .71, *main part of a training session* (MAIN) .45, and *competition period* (COMPPER) .45.

The fifth dimension (Table 3) was of a relatively simple structure. The greatest projections on the fifth dimension had the variables: *strength endurance* (STRNGTHEND) .94, and *muscular hypertrophy* (HPTRF) .65.

The sixth latent dimension (Table 3) was characterized by the greatest projections of the variables: *flexibility* (FLEXI) .54, *elastic power* (ELASTPOW) .44, and a variable with the negative sign - *efficiency of screening* (SCREEN) -.41.

Table 3. Matrix of parallel projections of variables with oblimin factors (matrix of pattern)

	1	2	3	4	5	6	7	8
13-14	.07	**.86**	-.04	-.06	.01	-.13	-.11	.08
15-16	.16	**.84**	-.09	.14	-.02	-.12	-.13	.14
17-18	.13	.39	.01	**.76**	-.09	-.15	.04	.09
19&ABOVE	.23	-.09	.14	**.77**	.07	-.03	.05	.03
9-12	.11	.78	.10	-.15	-.13	-.06	.05	.04
AGIL	**.48**	.38	.05	-.18	-.05	-.03	.46	.05
BASPREP	.07	-.18	-.11	**.78**	-.03	.11	.06	.09
BLKS	-.02	-.07	.03	.11	-.04	-.15	**.81**	.19
FREQ	**.91**	.14	.06	-.03	-.01	.21	-.15	.14
COORDSPEED	**.49**	.44	.02	-.23	-.20	.04	.26	.15
SMOVSPEED	.28	-.03	.16	-.06	-.07	.39	.37	.40
REACTIME	**.58**	.24	.28	-.00	-.18	.20	.14	.23
SPEEDPOW	.75	-.10	.21	.22	.07	.35	.11	.05
PASS	-.19	-.03	.02	.08	.17	.01	-.10	**.99**
ELASTPOW	.05	-.00	.12	.21	.05	**.44**	**.67**	.05
POWTHROW	-.10	-.24	.19	.13	.35	.33	.04	**.62**
EXPOWJUMP	.01	-.11	.16	.14	.25	.26	**.78**	-.03
FLEXI	-.01	**.62**	.18	.17	-.08	**.54**	-.05	-.12
MAIN	.13	-.35	.04	**.45**	-.24	-.25	.38	.19
HPTRF	.21	-.42	.17	.06	**.65**	.02	.14	.13
AERCAP	-.12	.02	**-.78**	.00	.01	-.06	-.10	-.21
AERANAER	.45	-.07	**-.67**	.07	.04	-.01	-.22	-.23
ANATP-PCR	**.80**	-.09	.24	.03	.06	.20	.17	.03
ANGLYC	**.95**	-.11	-.17	.00	.06	.05	-.21	-.11
ISOFORCE	-.02	-.10	**.60**	-.13	.57	-.10	.01	-.14
BALLCTRL	.04	.35	.06	-.06	-.13	-.23	-.10	**.76**
MAXSTRNGTH	-.01	-.33	.47	.08	.41	.14	.31	.09
NOBALLOFF	.79	.02	-.08	.12	-.01	-.26	.11	-.05
COMPPER	.08	-.39	.36	**.45**	-.05	-.04	.19	.25
STLS	.35	.21	.05	.07	-.13	-.26	.44	.26
DEFHELP	**.58**	.22	-.01	.08	-.03	-.32	.33	.07
SCREEN	.26	-.01	.27	-.14	.54	**-.41**	.23	.24
INJURPREV	-.36	**.55**	.13	.26	.54	.05	-.16	-.26
PREPPER	.06	-.02	-.31	**.71**	.10	.23	.23	-.07
DEFPRESS	**.73**	.04	-.12	.12	-.02	-.31	.19	-.07
DRIBBPEN	**.70**	.03	.05	.11	-.10	-.18	.12	.17
BALANCE	.10	**.59**	-.03	-.32	-.13	.03	.46	-.08
REDFAT	-.04	-.01	**-.83**	.05	.28	-.08	-.13	-.09
REHAB	-.41	.42	.14	.06	.48	.01	-.30	-.24
STRNGTHEND	.02	.06	-.35	.00	**.94**	.04	.09	.14
RHYTHCOORD	.22	**.54**	-.30	-.31	-.16	.14	.33	.13
OREB	-.06	-.10	.12	.13	.06	-.09	**.92**	-.03
DEFREB	-.08	-.07	.14	.11	.05	-.06	**.93**	.01
SPECPRIP	.17	.34	.22	.39	-.10	-.04	.29	.27
TIMING	.15	**.48**	-.12	-.33	-.24	-.04	.43	.23
TRANOFF	**.79**	-.08	-.10	.18	-.06	-.27	.06	-.06
TRANDEF	**.85**	-.00	-.03	.22	-.04	-.19	.00	-.11
INTPREP	-.24	**.86**	-.11	-.01	-.01	.16	-.03	.06
CLOSSESS	-.27	**.67**	.16	.00	.03	.11	-.37	.05

The greatest projections on the seventh variable were obtained for the following variables: *defensive rebounding efficiency* (DEFREB) .93, *offensive rebounding efficiency* (OREB) .92, *blocking the shots* (BLKS) .81, *explosive strength of a jumping type* (EXPSTRJUMP) .78, and *elastic power* (ELASTPOW) .67.

The eighth latent dimension (Table 3) was related to the basketball-specific motor skills. The greatest projections on the eighth latent dimension were obtained for the following variables: *passing skills* (PASS) - .99, *the ball control* (BALLCTRL) - .76, *explosive strength of a throwing type* (EXPSTRTHROW) - .62.

Table 4. Correlations among factors

	1	2	3	4	5	6	7	8
1	1.00							
2	.05	1.00						
3	-.03	.00	1.00					
4	.18	-.12	.08	1.00				
5	**-.23**	**-.23**	.16	.15	1.00			
6	-.14	.02	.13	.07	.08	1.00		
7	**.44**	-.02	**.28**	.16	-.08	-.02	1.00	
8	.23	.14	**.31**	.07	-.06	-.02	**.38**	1.00

Table 4 represents the correlations between the oblimin factors. The correlations are predominantly low. The highest correlation is registered between the first (the factor of speed-related attributes of basketball) and the seventh (the factor of specific explosive strength of a vertical jumping ability type) factors (.44). The second largest is the relation between the seventh (the factor of specific explosive strength of a vertical jumping ability type) and the eighth (the factor of ball control) factor (.38).

Discussion and conclusions

According to the concordance of the experts (Table 1) in their assessments of the influence of the contents on the variables, it was possible to interpret the given results.

Relations among the variables with high projections on the first dimension are based upon their orientation to the speed-related characteristics and to those segments of basketball in which speed-related characteristics play a distinct role. When types of speed-related abilities are concerned, then we should first mention the abilities responsible for quick, short movements over a relatively small area. These abilities are: frequency of movements, speed endurance, reaction time, speed coordination, and agility. They are manifested in straight-line movements, but equally in changes of direction with and without the ball.

From the aspect of the structure of basketball, these abilities play a crucial role in both the transition and position play on defense and offense (Trninić, 1995). The very projections of typical speed-related attributes of the basketball players on the first latent dimension confirm it.

The energy supply capacity behind these relations is recognized as a prevailance of two subsystems (alactic and lactic anaerobic system) of the anaerobic system in basketball (Platonov, 1984). It could be stated that the mentioned abilities and knowledge can be realized in short-duration (up to 15s) and long-duration (up to 60s) conditions of speed and speed endurance manifestations. Events in a basketball game may occur as motor actions of variable duration. Namely, short defensive or offensive actions of just a few seconds alternate with the continuous series of uninterrupted actions on defense and offense which last so long that the engagement of the glycolitic energy resources becomes indispensable.

Therefore, the first latent dimension can be named as the **factor of speed-related characteristics of basketball** because the largest projections were recorded for the variables that represent any kind of the speed-related quality. Such speed-related qualities have their origin in the motor space, energy supply space and situation-specific space.

The contents of the introductory-preparatory and closing part of a training session have frequently a common base consisting of the contents prevailing in the physical conditioning of young players (Crisfield, 2001). Particularly frequent are the contents aimed at the development of flexibility, balance, and characteristics of coordination, like *coordination in rhythm* and *timing*. Such training contents accentuate the positive kinesiological transformations of the part of the neuro-muscular system which is responsible for the coordination of the locomotor system activities in complex motor situations. Along with the variables of injury prevention they had a very high projection on the second latent dimension.

Injury prevention is a characteristic segment of sports preparation of all age categories (Williams, 1993; Surburg, 2001). It is extraordinarily important in the training of younger players because it prepares them for harder, more strenous demands they are yet to face with in the senior age category or in the phase of high sport achievements.

Therefore, the second latent dimension can be named as the **factor of multilateral preparation of basketball players**. Included in the name are the high corrrelations between the variables pertaining to the space of motor abilities, the structure of one training session, injury prevention, and long-term sport improvement, on the one hand, and the concept and definition of multilateral sports preparation on the other. The aims and tasks of multilateral preparation can be condensed into one tendency: to develop as wide a spectrum of athletic characteristics as possible to produce a solid foundation for subsequent high sport achievements (Bompa, 1994, 2000).

The third latent dimension is bipolar, i.e. it is represented by both the negative and the positive projections of the variables. An aerobic regimen of work is a common feature of the variables with the negative projections. The work regimen of a longer duration and of adjusted moderate intensity is the basic model for a training approach to the development of both the aerobic and anaerobic capacities (Milanović, 1988; Kraemer, 2000). Further, the an aerobic work regimen, combined with other training and supplementary procedures (ergogenic aids), is built into the foundations of the subcutaneous fatty tissue reduction (Hoffman, 2002).

In two variables with positive projections a certain mode of force manifestation is indicative; and when the attempted movement force is in question, as a type of isometric muscular action, then in both cases we are dealing with exertion of maximal force.

As far as the basketball preparation is concerned, the variables from both poles are important. An aerobic work regimen and targeted training procedures related to it provide a basketball player with the optimal physiological conditions for recovery between various intervals of rigorous training and competition loads (Brittenham, 1996; Zhelyaskov & Dasheva, 2001). A well-developed aerobic capacity is a precondition for the development of other physiological capacities. On the other hand, the ability to exert maximal force and to work in an isometric regimen is connected with the many situation-related demands of an actual basketball game.

Consequently, the third (bipolar) dimension can be named as the **factor of an aerobic regimen of work and maximal force exertion**. The position of the mentioned variables on the opposite poles corroborates the real distance between these segments of preparedness in the space of influence of the physical conditioning contents on theose segments.

Most variables with high projections on the fourth latent dimension describe well the important parameters of training work with adult basketball players, i.e. seniors. The authors consider that the junior age group should be included here as well. Namely, it is well known that in the system of a long-term sports prepartion within a career the sports preparation system for juniors has become more similar in many parameters to the senior training than ever (Milanović, Jukić, & Dizdar, 1996).

The target orientation and structure of basketball preparation for adult players is based on the development of those characteristics which make basketball players prepared for the highest personal sport achievements (Platonov, 2004). In the junior age of a sports career the basic preparation plays an especially important role. The current trends in the physical conditioning suggest that individually.oriented basic preparation should be implemented, in various proportions, in all periods of an annual training cycle (Matveev, 2000). This is corroborated by the high projections of the variables *the main part of a training session* (MAIN) .45 and *competition period* (COMPPER) .45. The basic preparation becomes very important in the maximal achievement-maintaining phase, the principal purpose of which is to prolonge a sports career. From the mentioned it can be concluded that the optimal integration of the basic preparation into proportions of all the cycles of basketball preparation is the safest way to accomplish the desired results (Milanović, 1997).

Therefore, the fourth latent dimension can be named as the **factor of basic preparation of basketball players**. The choice of the name is in concordance with the previously mentioned evidence and with the position of the variable with the highest projection (.78) on this latent dimension – *basic preparation* (BASPREP).

The fifth dimension (Table 3) is of a relatively simple structure. The greatest projections on the fifth dimension were recorded for the variables: *strength endurance* (STRNGTHEND) .94, and *muscular hypertrophy* (HPTRF) .65.

Despite the fact that these two variables pertain to different segments of the anthropological status of basketball players (the motor and the morphological space), particular parameters of training methods (number of series, repetitions, load intensity, performance tempo, duration of rest periods between series and individal exercises) originate from a common source (Siff & Verkhoshansky, 1998; Bompa & Cornachia, 1999).

The relatively high projections on the fifth dimension were obtained for the variables which have distributed their variance among two factors: *iso-*

metric force (ISOFORCE) .57, and *injury prevention* (INJURPREV) .54. The variable *injury rehabilitation* (REHAB) .48 can be added here with its moderate projection. The training work system, the target of which is hypertrophy and the development of strength endurance, naturally, with different, adjusted load parameters, is similar to the work applied in the system of injury prevention and rehabilitation. The aim of both systems is to improve the quality of soft tissues in basketball players. Therefore, the variable *isometric force* has occurred here quite logically.

There is a variable of situation-related efficiency that contributes also to the fifth latent dimension – *efficiency of screening* (SCREEN) .54. We can only call it interesting, because we could not find any other sensible explanation for its position.

The fifth latent dimension may be named as the ***factor of improving soft tissues of basketball players***. The term soft tissue is frequently used in current sport science and expert literature (Kent, 1994), and describes the system of muscles, ligaments, tendons, fascia, and skin ensheathing joints. Practical importance of the development of soft tissues adds additional value to this factor because its contribution to the total variance explanation is significant, but low.

The sixth factor may be named as the **factor of dynamic flexibility**. The feature is very important in all sports disciplines, the structure of which is characterized by changes in speed and direction of movements. Basketball is undoubtedly one of them.

The variables of specific explosive strength of a vertical jumping ability type and of other abilities enabling efficient vertical play, describe clearly the seventh latent dimension.

For a deeper insight into the vertical component of basketball one can use also the variables, the variance of which is divided among other factors, but which still have average projections on this factor: *agility* (AGIL) .46, *balance* (BALANCE) .46, *steals* (the ball possession gained) (STLS) .44, *timing* (TIMING) .43. In all the three variables of an overall performance describing the vertical component of basketball, the four mentioned variables play an indirect, but significant role. Therefore, projections of these variables on the seventh latent dimension should be by all means respected.

Consequently, the seventh latent dimension can be named as the **factor of specific explosive strength of a vertical jumping ability type**.

Control over the central object of manipulation in basketball (the ball) is in the foundations of the eighth latent dimension. Efficient ball handling is essential for eventual success in a basketball game. The ball is, in fact, a centre, a basic object of communication. The greater the quality of ball handling, the greater the probability for a favourable outcome. Even when explosive strength of a throwing type is manifested, ball control is also extraordinarily important due to the extreme demands on accuracy in any action with the ball. Therefore, the eighth latent dimension may be called the **ball control factor**.

The correlations among all the eight oblimin factors are predominantly low (Table 4). The highest correlation was recorded between the first (the factor of speed-related attributes of the game of basketball) and the seventh (the factor of specific explosive strength of a vertical jumping ability type) factors (.44). From the aspect of intensity of play, it is quite obvious that the speed-related features, which prevail in the realization of the horizontal movements of basketball players, and the explosive features of a jumping type, which prevail in vertical play, are the fundamental motor resources of efficiency in basketball. That is why this moderate connection is logical.

All vertical movements in basketball are related to various types of contacts with the ball which make the relation of these factors understandable.

In fact, the favourable matrix of intercorrelations among the oblimin factors has been obtained. The experts have obviously separated the areas of basketball preparation with respective common fundamentals.

The mainly low intercorrelation coefficients confirm their high level of independence, which would probably be an advantageous circumstance in the further course of the research.

The obtained results have justified the methodological approach applied in the research of physical conditioning in basketball, especially because it has allowed an insight **into the structure of preparedness of players**, the components of which are essential generators of sport success in the game. On the basis of the expert assessment of the influence of the classes of physical conditioning contets on the characteristics of preparedness and the process of preparation, the eight factors were obtained describing the space of basketball preparedness and preparation. The isolated latent dimensions (factors) are named as follows: the factor of speed-related characteristics of basketball, the factor of multilateral preparation of basketball players, the factor of an aerobic regimen of work and exertion of maximal force, the factor of basic preparation of basketball players, the factor of improving the soft tissues of basketball players, the factor of dynamic flexibility, the factor of specific explosive strength of a vertical jumping ability type, and the ball control factor.

From the names of the obtained factors it is obvious that the study covered most areas of basketball preparation and preparedness that are mostly responsible for success in basketball. The area of physical conditioning and conditioning preparation are particularly well covered. The finding is logical

because the study was based on the entities embracing the classes of physical conditioning contents.

Each and every scientific study opens perspectives and opportunities for new explorations. At the conclusion of the present study, the authors consider it would be useful to launch a series of investigations to define the various models of physical conditioning preparation, with respect to the factors obtained, and to evaluate the effects of the models implemented in different periods of an annual training cycle. The probable usefulness of such a series of research studies may be derived from the fact that in the kinesiology of sport the least number of investigations are oriented towards the methods of training which monitor and evaluate training effects.

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LATENTNA STRUKTURA VARIJABLI PROCESA SPORTSKE PRIPREME I PRIPREMLJENOSTI NA TEMELJU SADRŽAJA KONDICIJSKE PRIPREME U KOŠARCI

Sažetak

Uvod

Radi optimalizacije procesa sportske pripreme sportski znanstvenici i stručnjaci nastoje prikupiti što više informacija o konkretnoj sportskoj aktivnosti te o strukturi zahtijevanih antropoloških obilježja sportaša. Za košarku se može najkraće kazati da je kompleksni sport koji čine kompleksi jednostavnih i složenih gibanja, a izvode ih članovi tima u uvjetima suradnje i suprotstavljanja protivniku tijekom igre.

Iznimno je važno dobiti uvid u stanje motoričkih i funkcionalnih sposobnosti te morfoloških karakteristika, zatim u zdravstveni status te psihosociološka obilježja sportaša. Budući da je košarka iznimno kompleksan sport, postavljaju se znatni zahtjevi na spomenuta antropološka obilježja. Osim utvrđivanja doprinosa svakog od obilježja, jako je važno utvrditi i optimalne odnose među svim obilježjima, čime se dobivaju informacije o integralnoj pripremljenosti.

Sustav sportske pripreme čine: sustav treninga, sustav natjecanja i sustav dopunskih faktora. Cjelokupni sustav košarkaške pripreme usmjeren je na razvoj i održavanje sposobnosti, osobina i znanja od kojih zavisi uspjeh u natjecateljskim uvjetima. Ovo je istraživanje provedeno radi utvrđivanja latentne strukture varijabli procesa košarkaške pripreme i obilježja pripremljenosti košarkaša/ica.

Metode

Eksperti su ocjenama od 1 do 5 procijenili utjecaj svake tipične klase kondicijskih sadržaja na pojedine varijable koje opisuju proces košarkaške pripreme i obilježja pripremljenosti košarkaša/ica. Pouzdanost ekspertnih ocjena, odnosno objektivnost, utvrđena je statističkim postupkom svođenja na prvu glavnu komponentu. Tako je izračunat koeficijent pouzdanost za svaku pojedinu varijablu (Cronbachova alfa) (tablica 1).

Uzorak entiteta u ovom istraživanju predstavljali su sadržaji (127) za razvoj motoričkih, funkcionalnih i morfoloških obilježja: hodanja i trčanja (33 sadržaja), skokovi (7), bacanja (4), metode istezanja (6), sadržaji treninga s otporom (40), sadržaji kontinuiranog trajanja i različite složenosti (5), sadržaji treninga u vodi (4), sadržaji višestrane pripreme (9), sadržaji s visokom frekvencijom alternativnih pokreta (3), kompleksni motorički zadaci (8) i sadržaji s promjenama smjera (8). Uzorak osnovnih entiteta definiran je na temelju dosadašnjih spoznaja o sadržajima višestrane i bazične kondicijske pripreme košarkaša.

Uzorak varijabli (49) u ovom istraživanju čine karakteristike procesa pripreme košarkaša i obilježja pripremljenosti košarkaša/ica: parametri natjecateljske efikasnosti u košarkaškoj igri (13), periodizacija treninga u godišnjem makrociklusu treninga (3), tipovi sportske pripreme (3), motoričke i funkcionalne sposobnosti te morfološke karakteristike (20), prevencija i rehabilitacija ozljeda (2), faze dugoročne sportske pripreme u odnosu na dob (dobne kategorije) (5) i struktura pojedinačnog treninga (3).

Osnovni podaci obrađeni su metodama i programima za analizu pouzdanosti varijabli i faktorskom analizom za određivanje latentne strukture karakteristika procesa košarkaške pripreme i obilježja pripremljenosti košarkaša/ica. Za određivanje broja značajnih glavnih komponenata korišten je Guttman-Kaiserov kriterij, a za transformaciju inicijalnog koordinatnog sustava oblimin kosokutna rotacija.

Rezultati

Svođenjem na prvu glavnu komponentu za svaku je pojedinu varijablu izračunat koeficijent pouzdanosti Cronbachova alfa. Vrijednosti se kreću u intervalu od 0,75 do 0,94,što upućuje na statistički značajnu pouzdanost rezultata.

Faktorskom je analizom izračunato kako daleko najveću količinu ukupne varijance iscrpljuje prva glavna komponenta (34%). Druga glavna komponenta objašnjava 17,7% ukupne varijance, a treća 13,1 %. Prve tri glavne komponente objašnjavaju ukupno 64,9 % od ukupne varijance, dok četvrta glavna komponenta objašnjava 6,6 %, peta 4,2%, šesta 3,7%, sedma 3,4% i osma 2,6 % od ukupne varijance. Posljednjih pet glavnih komponenata zajedno iscrpljuje 20,6% zajedničke objašnjive varijance u prostoru atributa procesa košarkaške pripreme.

Komunaliteti imaju relativno visoke vrijednosti i kreću se u intervalu od 0,73 do 0,95, što ukazuje na vrlo visoke zajedničke varijance manifestnih atributa ili varijabli s jednim ili više ekstrahiranih faktora. Najveće komunalitete (od .90 do .95) imaju varijable: skok u obrani (DEFREB) .95, skok u napadu (OREB) .94, brzinska snaga (SPEEDPOW) .93, eksplozivna snaga tipa skoka (EXPOWJUMP) .93, dodavanje lopte (PASS) .93, osvojene lopte (STLS) .92, pomaganje u obrani (DEFHELP) .92, *timing* (TIMING) .92, prevencija ozljeda (INJURPREV) .91, rehabilitacija (REHAB) .91, pritisak u obrani (DEFPRESS) .90, tranzicijski napad (TRANOFF) .90 i tranzicijska obrana (TRANDEF) .90.

Vrijednosti matrice paralelnih projekcija otkrivaju prisutnost i pozitivnih i negativnih projekcija, a vrijednosti koeficijenata se kreću od -.83 do .99. Najviše manifestnih varijabli vezano je uz prvu glavnu komponentu.

Rasprava i zaključci

Činjenica da je dobivena relativno jednostavna struktura atributa košarkaške pripreme i pripremljenosti, upućuje na zaključak da je uspješno riješen osnovni metodološki pristup u definiranju dimenzionalnosti toga prostora.

Izolirane latentne dimenzije (faktori) nazvani su sljedećim imenima: faktor brzinskih obilježja košarkaške igre, faktor višestrane pripreme košarkaša, faktor aerobnog režima rada i maksimalnog ispoljavanja sile, faktor bazične pripreme košarkaša, faktor unapređenja mekih tkiva košarkaša, faktor dinamičke gibljivosti, faktor specifične eksplozivne snage tipa vertikalne skočnosti i faktor kontrole košarkaške lopte.

Vidljivo je da je pokriven veći dio područja košarkaške pripreme i košarkaške pripremljenosti od kojih najviše zavisi uspjeh u košarci. Osobito je dobro pokriveno područje kondicijske pripreme i kondicijske pripremljenosti. Ovakav ishod je i logičan budući da su entiteti u ovom istraživanju bile klase sadržaja kondicijske pripreme.

Svaki znanstveni rad otvara nove mogućnosti i daje poticaje za daljnja istraživanja. Stoga bi bilo korisno pokrenuti seriju istraživanja za definiranje različitih modela kondicijske pripreme, uz uvažavanje dobivenih faktora te vrednovanja efekata koji bi se postigli primjenom tako postavljenih modela kondicijske pripreme u različitim dijelovima godišnjeg ciklusa treninga.

Submitted: May 3, 2005
Accepted: November 12, 2005

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