FACTA UNIVERSITATIS
Series: **Physical Education and Sport** Vol. 8, No 1, 2010, pp. 21 - 30

Original empirical article

THE LATENT STRUCTURE OF CONATIVE DIMENSIONS OF ELITE SENIOR AND JUNIOR BASKETBALL PLAYERS

UDC 796.323.3:159.9

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Abstract. *The aim of the study was to investigate the conative dimensions of both senior and junior elite basketball players. In the sample of 80 senior and 80 junior basketball players, members of the best basketball senior and junior teams of Serbia, the following questionnaires related to the assessment of conative dimensions were administered: Cattell's 16 PF questionnaire (16 variables were obtained), Spielberg State Anxiety Trait – STAI (one variable was obtained), and the Havelka and Lazarević questionnaire of sports achievement– MSP (three variables were obtained). Standard descriptive statistics and factorial analysis, the main components method, were applied in data processing. In both groups of subjects, a latent structure of conative dimensions was expressed in seven factors, which in seniors encompass 64.594 % of the overall variance, and in juniors 67.672% of the overall variance. The factors were interpreted based on the highest projections of certain variables on the main components and based on the inspection of arithmetic means values. In the case of seniors, these factors can be interpreted as: orientation to achievement, extraversion, upbringing, emotional stability, self-reliance, imaginativeness and rationality. In the case of juniors the factors are interpreted as: emotional reactions, orientation to competition, sensitivity, reliance, apprehension, independence and orientation to achievement. The correlation between these factors within the latent structure of conative dimensions in both groups of subjects is not significant, meaning that these factors represent independent wholes.*

Key words: *basketball, psychology, questionnaires,/ players*

Received January 14, 2010 / Accepted May 10, 2010
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INTRODUCTION

Basketball is a very dynamic team sport with worldwide popularity (Hoffman & Maresh, 2000), and it is especially popular in Serbia. It is well known that basketball is a complex and poly-structural sport game in which success depends of many factors. Basketball has complex demands that require a combination of individual skills, team plays, tactics, and motivational aspects (Trninic & Dizdar, 2000). During basketball game, a lot of constant changes of typical and atypical game situations take place, and a »critical« situation with great emotional pressure. So, basketball makes demands for specific energy mobilization, cooperation between players, and responsibility in critical game situations etc. The players must quickly perceive, analyze and adequately act or react in the given situations. Certainly, success in basketball depends mostly on the levels of specific basketball motor abilities and skills, but also on the particular psychological factors, like cognitive abilities and conative dimensions (Becker, 1981; Svoboda, 1993; Karalejic, & Jakovljevic, 2008). Conative dimensions are manifest and latent structures which make a construct of human personality and are responsible for human behavior, they help to explain how knowledge and emotions are translated into behavior in human beings.

Coaches and sport psychologists discus the specific psychological structure of an athlete's personality. It may be a special combination of personality dispositions which should represent good conditions for successful work, especially in the process of selection. One of the most important approaches in basketball training is the relationship between coaches and players. A coach has to be a very good psychologist (Wooden, 1998). Studies of psychological profiles and the personalities of athletes is present in many sports (Junge et al. 2000, Han, 1996) and then in basketball as well (Svoboda 1993, Maddi & Hess, 1992). Svoboda (1993) has indicated a significant difference in personality characteristics between excellent (stars) and poor quality (feeble) basketball players. Maddi & Hess (1992) refer to the relation between personality hardiness and basketball performance. Conative dimensions play a significant part in a basketball player's actions/ reactions (Becker, 1981; Evans, & Quarterman**,** 1983; Craighead & Vallianos, 1986; Karalejic, 1996, Horga & Milanovic 1983, Horga & Bujanovic – Pastuovic, 1987). These studies show the importance of conative dimensions for a basketball player's performance and successes.

The aim of this study was to investigate the latent structure of conative dimensions of Serbian elite senior and junior basketball players.

METHOD

Participants

The participants were 80 senior basketball players (22 – 34 yrs. old), members of the 8 best Serbian basketball clubs and 80 junior basketball players (17 – 18 yrs old), and members of the 8 best Serbian junior teams. Each participant had to be involved for at least 5 yrs, in organized basketball practice. There were 20 senior actual or former national team players, and 10 actual junior national team players.

Instruments and procedures

For the purposes of this study, senior and junior basketball players were asked to complete the Cattell 16 PF questionnaire, STAI – Spilberger Trait Anxiety Inventory (anxiety level), and MSP – a questionnaire for sport achievement motivation were used to measure conative dimensions (Havelka and Lazarevic).

Variables from Cattell's 16 PF Questionnaire are: CCA – warmth, CCB – reasoning, CCC - emotional stability, CCE – dominance, CCF – liveliness, CCG – rule-consciousness, CCH – social boldness, CCI – sensitivity, CCL – vigilance, CCM – abstraction, CCN – privacy, CCO – apprehension, CCQ1 – openness to change, CCQ2 – self-reliance, CCQ3 – perfectionism, CCQ4 – tension.

Variable CSTAI – the disposition for anxiety is derived from the STAI test, and three variables are derived from the MSP test: the motive behind achievement in sport – CSPP, positive emotional engagement – CSPFP, in situations of sports achievement which is recognized as a sign of self-control, and CSPFM – negative emotional reactions which are recognized as fear of failure or escape from achievement in sports situations.

Participants were recruited through contact with their coaches. The coaches were instructed to tell their players that participation was voluntary and that all the information reported in their questionnaire was confidential. Participants completed the questionnaire individually.

Statistical analysis

Standard descriptive statistics were applied: mean (M), standard deviation (SD), minimal (Min) and maximal (Max) values. To evaluate the latent structure of conative dimensions, a factor analysis was used. Data processing was done in the statistical program SPSS16.

RESULTS

Table 1 shows the descriptive parameters of the results in the used questionnaire and the tests for the evaluation of conative dimensions of senior basketball players. Basically, the distributions of the results are not different from the normal values. The mean values of particular variables are slightly different, compared with the results of the population of top athletes (Havelka and Lazarević, 1981.) The means of some of the variables of basketball players (CSPP, CCG, CCH, and CCF) are higher, by 1 to 2.5 units, then the same as those for top athletes, and also, the means of some of the variables of the basketball players (CSTAI, CSPFM, CCC, CCI, CCM, and CCO) are lower, by 1 to 2.5 units, then the same as those for top athletes (Table 2).

Tables 3 and 4 show the latent structure of the conative dimensions of senior basketball players. The analysis of the main components gave seven factors which explain 64.594 % of the total variance.

Table 1. Descriptives parameters of conative variables of senior basketball players

	M	SD	Min.	Max.
CSTAI	33.61	6.90	4	60
CSPP	18.32	4.28	5	25
CSPFP	9.51	1.96	4	12
CSPFM	2.13	2.04	0	10
CCA	11.58	2.67	6	17
CCB	8.25	2.02	1	12
CCC	16.18	2.71	10	21
CCE	15.28	3.15	8	22
CCF	15.88	3.62	7	24
CCG	15.06	2.73	8	20
CCH	15.48	4.35	2	24
CCI	6.61	2.68	0	13
CCL	10.90	2.79	4	18
CCM	10.88	2.73	4	17
CCN	10.46	2.49	6	15
CCO	9.37	3.83	1	18
CCQ1	9.23	2.43	3	16
CCQ2	10.17	2.41	3	16
CCQ3	12.63	2.61	5	18
CCQ4	11.47	3.65	2	20

Table 2. Means of particular variables for basketball players and top athletes

	Basketball players	Top athletes
CSPP	18.32	16.72
CCG	15.06	14.09
CCH	15.48	13.11
CCF	15.88	15.18
CSTAI	33.61	35.06
CSPFM	2.13	3.37
CCC	16.18	16.98
CCI	6.61	7.75
CCM	10.88	12.14
CCO	9.37	10.20

Table 3. Explained total variance (seniors)

Component	Total	% Variance	Cumulative %
1	3.309	19.544	19.544
2	2.118	10.589	30.132
3	1.633	8.167	38.299
4	1.572	7.861	46.160
5	1.379	6.896	53.056
6	1.199	5.994	59.051
7	1.109	5.543	64.593
8	.977	4.887	69.481
9	.892	4.458	73.939
10	.829	4.144	78.083
11	.698	3.490	81.573
12	.641	3.206	84.779
13	.575	2.875	87.654
14	.476	2.381	90.035
15	.455	2.274	92.309
16	.392	1.959	94.268
17	.346	1.732	96.000
18	.297	1.486	97.486
19	.282	1.410	98.896
20	.221	1.104	100.000

Table 5 shows the descriptive parameters of the results in the used questionnaire and the tests for the evaluation of conative dimensions of junior basketball players. Tables 6 and 7 show the latent structure of the conative dimensions of junior basketball players. The analysis of the main components gave seven factors which explain 67.672 % of the total variance.

Table 4. Matrices of components (seniors)

	1	2	3	4	5	6	7
CSTAI	-.301	.310	.151	**-.466**	-.381	.134	-.193
CSPP	**.680**	.336	-.177	.138	-.104	.160	.160
CSPFP	**.757**	.071	-.200	.086	-.010	-.308	-.047
CSPFM	**-.438**	.085	-.045	-.252	-.311	-.051	-.141
CCA	-.127	**.522**	-.092	.315	.398	.160	-.130
CCB	-.510	.228	-.053	.197	.049	-.226	**.451**
CCC	.010	.144	-.065	**.774**	-.061	.096	.061
CCE	.171	.116	**-.698**	-.003	-.016	.127	-.173
CCF	-.006	**.750**	-.037	.056	.004	-.109	.105
CCG	**.455**	.170	.239	-.265	**.469**	.048	.191
CCH	.068	.493	-.357	-.140	**.483**	-.101	-.203
CCI	.098	-.091	.335	**.558**	-.182	-.201	-.437
CCL	.007	-.016	-.141	-.120	-.623	.151	.210
CCM	-.060	-.083	.027	.018	-.181	**.856**	-.122
CCN	.069	-.006	.031	-.015	-.099	-.078	**.806**
CCO	-.049	.048	-.044	.163	**-.741**	.017	-.190
CCQ1	.009	-.153	**-.773**	.054	-.106	-.138	.169
CCQ2	-.128	**-.664**	-.117	.012	.179	.039	-.031
CCQ3	.206	.168	.336	.202	.285	**.376**	.365
CCQ4	.004	.234	.173	-.063	**-.602**	-.444	-.036

Table 5. The descriptive parameters of the conative variables of junior basketball players

	M	SD	Min.	Max.
CSTAI	34.75	6.55	21	52
CSPP	19.53	4.05	9	26
CSPFP	9.50	1.82	6	12
CSPFM	2.73	2.38	0	9
CCA	12.75	2.90	5	19
CCB	7.40	1.85	2	11
CCC	15.95	3.07	9	23
CCE	15.25	3.33	7	22
CCF	16.95	3.57	9	23
CCG	14.02	3.40	4	20
CCH	15.67	4.04	5	25
CCI	6.48	3.42	0	17
CCL	11.25	3.08	4	18
CCM	10.23	2.87	4	17
CCN	10.23	2.31	6	16
CCO	9.52	4.11	0	19
CCQ1	9.05	2.13	4	15
CCQ2	8.92	2.93	4	15
CCQ3	12.32	3.03	2	20
CCQ4	11.68	4.41	2	22

Table 6. Explained total variance (juniors)

Component	Total	% Variance	Cumulative %
1	4.504	22.520	22.520
2	2.231	11.156	33.675
3	1.883	9.416	43.091
4	1.392	6.958	50.049
5	1.304	6.518	56.568
6	1.180	5.900	62.468
7	1.041	5.205	67.672
8	.973	4.866	72.538
9	.815	4.075	76.613
10	.732	3.659	80.272
11	.676	3.379	83.650
12	.660	3.300	86.950
13	.538	2.689	89.639
14	.431	2.153	91.792
15	.372	1.858	93.650
16	.323	1.614	95.264
17	.295	1.476	96.740
18	.266	1.330	98.070
19	.215	1.076	99.146
20	.171	.854	100.000

Table 7. Matrices of components (juniors)

	1	2	3	4	5	6	7
CSTAI	**-.783**	-.132	.001	.206	-.081	.010	-.103
CSPP	.433	.152	.179	-.145	-.149	.178	**.518**
CSPFP	.321	.275	.062	-.162	-.052	.103	**.551**
CSPFM	**-.762**	-.035	-.082	-.119	-.035	.164	-.047
CCA	-.254	.055	-.111	.200	.030	.062	**.833**
CCB	-.086	-.179	.064	**.805**	-.018	-.094	.221
CCC	.113	-.203	-.099	.009	.235	**.439**	.235
CCE	.055	**.774**	.030	-.023	-.037	.149	.034
CCF	-.090	**.592**	-.156	.121	.394	-.255	.094
CCG	.196	-.242	.114	.084	.182	-.097	**.641**
CCH	.106	.338	.082	-.156	**.559**	-.245	.328
CCI	-.172	-.123	**.870**	-.084	.226	.196	-.120
CCL	-.285	.181	-.302	-.021	**-.700**	-.082	.105
CCM	.020	.145	**.707**	.219	-.203	-.171	.095
CCN	-.277	.113	-.197	.051	**.504**	.061	-.092
CCO	-.183	.003	.027	.020	**-.718**	.043	-.186
CCQ1	-.159	.171	.089	.054	-.087	**.846**	.013
CCQ2	-.248	-.301	-.007	**-.703**	-.026	-.221	.090
CCQ3	.334	**-.468**	.069	-.153	.033	.177	.387
CCQ4	**-.763**	.217	.296	-.130	-.136	-.086	.139

DISCUSSION

Compared with the results of the population of top athletes, differences in particular variables can be explained by basketball play characteristics. Basketball, compared to other sport and sports games, is more loaded with the so called psychological factor; it is full of emotions, tense, changeable, full of turnovers and uncertainties. "Dense", uncertain game ends are very frequent and in these cases, as a rule, better psychological fitness is decisive, i.e. composure and emotional stability. Therefore it is understandable that top basketball players are: sports achievement-oriented, exceptionally conscious and responsible, brave and adventurous, light-hearted and full of enthusiasm, less prone to anxious behavioral forms, emotional inhibition and instability, practical, independent and realistic, self-assured and resistant.

In the case of senior basketball players the first factor is most affected by the following variable projections: motive of achievement in sport (CSPP), positive emotional engagement (CSPFP) and negative emotional reactions (CSPFM), i.e. motivational variables from the MSP scale (motive of achievement in sport), so that this factor can be interpreted as a factor of *orientation to achievement*. The second factor is predominantly defined by the following variables: warmth (CCA), liveliness (CCF) and self-reliance (CCQ2). This factor can be interpreted as the *extraversion factor*. These two factors take almost one half of the variance. The third factor is defined to a great extent by the following variables: dominance (CCE) and openness to change (CCQ1). This factor can be interpreted as the *factor of upbringing*, according to Lazarević, 1983. The fourth factor is defined by the projections of the following variables: emotional stability (CCC), sensitivity (CCI) and low anxiety (CSTAI), so that this factor can be interpreted as the factor of *emotional stability*. The fifth factor, or the most expressed variable projections includes: apprehension (CCO), tension (CCQ4) and social boldness (CCH). This factor can be interpreted as the *self-reliance factor*. The sixth factor is defined by the variable projections: abstraction (CCM) and perfectionism (CCQ3), so this factor can be interpreted as the factor of *imaginativeness.* The seventh factor is defined by the variables of: privacy (CCN) and reasoning (CCB). This factor can be interpreted as the *rationality factor.*

In the case of junior basketball players, the first factor is most affected by the following variable projections: disposition of anxiety (CSTAI), low negative emotional engagement (CSPFM) and tension (CCQ4), so that this factor can be interpreted as the factor of *emotional reactions*. The second factor is dominantly defined by the following variables: domination (CCE), liveliness (CCF) and perfectionism (CCQ3). This factor can be interpreted as the factor of *orientation to competition*. The third factor is defined to the greatest extent by the variables: sensitivity (CCI) and abstraction (CCM). This factor can be interpreted as the factor of *sensitivity*, according to Lazarević, 1983. The fourth factor is defined by the following variable projections: self-reliance (CCQ2) and reasoning (CCB), so that this factor can be interpreted as the factor of *reliance*. The fifth factor, or the most expressed variable projections, includes: vigilance (CCL), apprehension (CCO), and social boldness (CCH). This factor can be interpreted as the *apprehension factor*. The sixth factor is defined by the variable projections: openness to change (CCQ1) and emotional stability (CCC), so that this factor can be interpreted as the *independence factor*. The seventh factor is defined by the variables: warmth (CCA), rule-consciousness (CCG), motive of achievement in sport (CSPP) and positive emotional engagement (CSPFP). This factor can be interpreted as the factor of *orientation to achievement*.

Table 8 indicates the factors of conative dimensions of both senior and junior players. All these factors can be linked to the requirements of the game of basketball. It is expected that elite basketball players – seniors are oriented to achievement (always achieve as the best results possible, are as fit as possible), extrovert (openness to cooperation which is necessary in a sport such as basketball), susceptible to formation (obedience of strict norms of basketball training), emotionally stable (basketball carries great emotional charges which often influence success), self-reliant (basketball is full of outplaying and duels), imaginative (basketball is characterized by new, fresh and unusual ideas) and rational (rational behavior especially in uncertain parts of the game). It is also expected that junior basketball players are characterized by similar factors: orientation to achievement, self-assurance and factors whose presence could be explained by the psychological features of that age: emotional reactions (juniors express their emotions more clearly); orientation to competition (it is more pronounced among juniors, they compete in "everything"); sentimentality; self-reliance (juniors are more self-reliant); openness to change (juniors are more tolerant to new unconventional things and relations).

The interconnection between the factors within the latent structure of conative dimensions with both seniors and juniors is very low and even non-existent between some factors. It means that the factors represent really independent wholes.

Table 8. Factors of conative dimensions of senior and junior basketball players

Seniors	Juniors
Orientation to achievement	Emotional reactions
Extraversion	Orientation to competition
Upbringing	Sensitivity
Emotional stability	Reliance
Self-reliance	Apprehension
Imaginativeness	Independence
Rationality	Orientation to achievement

CONCLUSION

The aim of this study was to investigate the conative dimensions of senior and junior basketball players. The obtained mean values of conative dimensions in this study could be included in a database to be eventually used for comparison with other senior and junior basketball players, since no such data were found anywhere else.

The results of the factor analysis show seven factors of conative dimensions of both senior and junior basketball players. **S**enior players are oriented to achievement, extrovert, susceptible to formation. They show emotional stability, self-reliance, imaginativeness and rationality. These results are expected because there are professional basketball players and they want to "do" their job in the best possible way. Junior players are characterized by factors whose presence could be explained by psychological features of that age: emotional reactions, orientation to competition, sentimentality, self-reliance and openness to change. They are not yet professional players, they "do not work at basketball, only play it".

Because of the importance of conative dimensions for a basketball player's actions, performance and success, there is a need for future investigations to apply some other measuring instruments for conative dimensions on more numerous samples.

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LATENTNA STRUKTURA KONATIVNIH DIMENTZIJA VRHUNSKIH KOŠARKAŠA SENIORA I JUNIORA

Saša Jakovljević, Milivoje Karalejić, Ljubiša Lazarević

Cilj studije je bio da se istraže konativne dimenzije elitnih košarkaša seniora i juniora. Na uzorku od 80 košarkaša seniora i 80 košarkaša juniora, članova najboljih košarkaških seniorskih i juniorskih ekipa u Srbiji su primenjeni upitnci za procenu konativnih dimenzija: Katelov 16 PF upitnik (dobijeno 16 varijabli), Spilbergov inventar crta anksioznosti – STAI (dobijena jedna varijabla), i upitnik sportskog postignuća – MSP (dobijene tri varijable) Havelke i Lazarevića. U obradi podataka je primenjena standardana deskriptivna statistika i faktorska analiza, metoda glavnih komponenata. Kod obe grupe ispitanika latentna struktura konativnih dimenzija je izražena u sedam faktora, koji kod seniora obuhvataju 64.594 % ukupne varijanse, a kod juniora 67.672 % ukupne varijanse. Faktori su interpretirani na osnovu najviših projekcija pojedinih varijabli na glavne komponenete i inspekcije vrednosti aritmetičkih sredina. Kod seniora se ovi faktori mogu interpretirati kao:

orjentacija na postignuće, ekstravertnost, vaspitljivost, emocionalna stabilnost, samopouzdanje, maštovitost i racionalnost. Kod juniora faktori se intrepretiraju kao: emocionalne reakcije, orjentacija na takmičenje, osetljivost, pouzdanje, samouverenost, samostalnost, i orjentacija na postignuće. Povezanost između ovih faktora unutar latentne strukture konativnih dimenzija kod obe grupe ispitanika nije značajna, što znači da ovi faktori predstavljaju nezavisne celine.

Ključne reči: *košarka, psihologija, upitnici, igrači*