

Situation efficacy of basketball players and number of extreme evaluations on a Likert scale

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Original scientific paper

Abstract

The main objective of this study was to determine the correlation between the frequency of extreme estimations on Likert's scales in psychological measuring instruments and the parameters of situational efficacy at Croatian elite senior basketball players. The final sample of 74 players is selected from the initial sample of 107 senior male basketball players from the teams in A-1 Croatian basketball league championship in 2006/2007. The results revealed that the correlation between the number of extreme estimations of the certain instruments for measuring the conative characteristics and perceived team cohesion with the parameters of situational efficacy is not statistically significant. However, the size of canonical correlation and a number of statistically significant univariate correlations, indicate the importance of considering potential reasons for this correlation, such as controlled risk taking and taking responsibility for the success of the team.

Key words: **canonical correlation, conative characteristics, performance**

Sažetak

Glavni cilj istraživanja bio je utvrditi povezanost čestine ekstremnih procjena na skalama Likertova tipa psihologijskih mjernih instrumenata s parametrima situacijske učinkovitosti vrhunskih hrvatskih seniorskih košarkaša. Finalni uzorak od 74 košarkaša, selekcioniran je iz inicijalnog uzorka od 107 košarkaša devet muških seniorskih momčadi A-1 Hrvatske košarkaške lige iz prvenstva 2006/2007. Rezultati su pokazali da povezanost između broja ekstremnih procjena u pojedinim instrumentima za mjerenje konativnih karakteristika te percipirane kohezije momčadi s parametrima situacijske učinkovitosti nije statistički značajna. Međutim, visina kanoničke korelacije i veći broj statistički značajnih univarijantnih korelacija ukazuju na važnost razmatranja potencijalnih razloga ove povezanosti, kao što su upravljana sklonost riziku i preuzimanje odgovornosti za uspjeh momčadi.

Ključne riječi: **kanonička korelacija, konativne karakteristike, izvedba**

Introduction

Basketball is a complex pollystructural, variable activity for which cycle and acycle types of movement prior to a basic goal of the game are characteristic, as well as to block the opponent player to make a shot. The game itself in course of the play is divided into three basic phases: defense, attack and transition (Jukić, 1998). It is a complex team sport made of simple and compound movement whose main goal is, under conditions of collaboration of all team member and opposition with rival team, to make a shot as well as blocking the opponent team player to make a shot (Gabrijelić, 1977). Basketball can be seen as series of duties every player has to perform regarding place and role inside a team within a certain concept of the play (Tomić, 1995). The basic assumption for successful activity of the individual in terms of accomplishment of series of mentioned duties is an assembly of chosen characteristics, of the anthropological status, linked into an integral set of optimal sport readiness. With regard to the characteristic of the play and numerous limitations defined by the rules of the play, playing basketball requires following characteristics: optimal morphological characteristics (the importance of height); high level of physical condition (functional capacity); high level of development of all motor capacities; a large number of motor and informatics knowledge with high level of practice (large number of repetition). Basketball scientific research so far examined relations of the elements of described equation of specification and achievement in basketball. The problems of the described research were defining situation condition of the play, relations between indicators of situation efficacy and the result in the basketball competition (match, championship, or tournament). Latent structure of the situation space of the basketball

play had been analysed, and we determined anthropological characteristics and indicators of the situation efficacy of each type of basketball player. Monitoring and analysis of the situation efficacy of the players and teams in the basketball play contribute to the easier following for the spectators and it is extremely helpful for the coaches and basketball experts as a material for the comparative analysis of the players and team as a whole and as a such have their place in the planning and programming coach process (Maršić, 1999, from Nakić, 2004). For the purpose of monitoring events at the basketball matches FIBA (Federation International Basketball Association) standardized thirteen indicators of situation efficacy observed at every official match. On the base of these indicators it is possible to calculate different derived parameters, on problems of measuring a real quality of basketball players there have been numerous scientific research (Elbel and Allen, 1941, Dežman, 1996, Erčulj, 1997, Swalgin, 1994, 1998, Dizdar, 2002). These kinds of research were mainly directed to develop expert systems for evaluation of real quality of the basketball players (Swalgin, 1994, Trninić, Perica, Dizdar, 1999). Therefore distinctions, gained by different methods of evaluation, of the real quality of basketball players were compared with estimation of basketball experts (experienced experts) on quality of the play of evaluating basketball players (Swalgin, 1998, Dizdar, 2002). Dizdar (2002) classified two basic methods for evaluation of overall efficacy or real quality of basketball player: procedures for objective evaluation of the situation efficacy of basketball players and procedures for subjective evaluation of situation efficacy of basketball players whose main characteristic is subjective evaluation of the independent group of basketball experts who define a group of basketball players with one or more criteria.

It turned out that the most common variants with variable of the overall quality of basketball players, has a method for estimation of overall quality of basketball players "PC system for evaluation of basketball players". However, it is equally efficient a method of *partially pondered linear combination* (Dizdar, 2002) which uses coefficient of the score efficacy instead of statistic data on number of achieved points and number of unsuccessful scores which we use in this research. As it turned out that there was no statistically significant association between a set of variables from conative space (mental toughness, one-dimensional and multidimensional perfectionism and perceived group cohesion) with sets of variables of situational effectiveness of basketball players (Sindik, 2009). Therefore, we attempted to correlate extreme values in the evaluation of Likert – type scales with sets of variables of situational effectiveness of basketball players. Sindik (2006) has summarized the results of three previous own studies, in which psychology students achieved significantly lower scores on the "control scale of numbers used in the extreme estimations." They use significantly less extreme values in the evaluation of responses to the assertions with Likert-type scales of psychological measuring instruments, in relation to all other tested group. Results are explained with assumption of "mental health" desirable answers of psychology students. In fact, knowing more about "neurotic" or "mental health" view, undesirable patterns of behaviour, in order to maintain a positive self image, psychology students may give answers according to their own vision of "mentally healthy" person. And since the psychology students know the control scales for measuring test behaviour, for example socially desirable answering, it is probable a hypothesis about the specific "selfscreening tested behaviour" (to avoid giving relevant information about yourself to the examiners). When they do not know what answer to a particular item is desirable, psychology students prefer neutral evaluation ("neither agree nor disagree") rather than complete agreement or complete disagreement with the contents of the items. In other words, the number of extreme values used to estimate Likert – type scale could be used not only as a "rough" indicator of testes behaviour not only of the entire sample of the subjects (e.g. psychology students), but also as an indicator of test behaviour of individuals.

Thus, in this study is assumed that the use of more extreme estimations in the population of "non – psychologist" may reflect not only valid respond to the items in the questionnaire, but also one's tendency to take risk, inclination to determination, acceptance of responsibility (Sindik, 2009). Therefore, it has been used four last variables as predictors of success in basketball, linked to the use of extreme estimations on scales of individual measurement instruments. The main objective of this study was to determine the number of used extreme estimations on the scales of psychological measuring instruments with parameters of situational efficacy of top Croatian senior basketball players. The detection of connection of situational efficacy in basketball with these variables could contribute to better understanding of the overall situational efficacy of top Croatian senior basketball players. On the other hand, we assumed that it could contribute to better work of coaches, who could, with gained knowledge, focus their own action, on the basketball training and competition.

Methods

Subjects

The population from which the intentional sample of subjects is taken represented a top senior basketball players from nine

male senior teams Croatian A-1 men's basketball league from 2006/2007 championship: «Cedevita», «Svetlost», «Borik», «Kvarner», «Dubrava», «Dubrovnik», «Alkar», «Šibenik» and «Osijek». Age range of participants was large (17-40), with average age of 23.94 ± 4.89 . The final sample of participants (74 basketball players) was selected from the initial sample of 107 participants. The requirement for the selection of players in the final sample was at least 10 minutes in the game per match and minimum of eight matches in which individual participated. Team players were tested with the permission of Croatian Basketball Federation, clubs and the players themselves, within a period of playing 6th to 8th round of A-1 league championship (from December 2006 to mid-January 2007).

Variables

Criteria for quantitative evaluation of the players were taken from previously referenced and published papers (Dizdar, 2002). In this paper we used a method of *partially pondered linear combination* for evaluation of overall quality of basketball players (Dizdar, 2002). There are thirteen standard situational efficacy parameters which include data on the success of shots for one, two or three points, rebounds (offensive and defensive), won and lost balls, assistances, blocks, personal fouls. Based on the standard parameters of situational efficacy, there was seven performed coefficients of situational efficacy of basketball players: effectiveness of two-point shots, three – point shots, effectiveness of free throws, efficacy of two points shots, efficacy of three point shots, efficacy of free throws and overall situational efficacy (Dizdar, 2002). Number (frequency) of "extreme" evaluation on the estimation scales of evaluation for each item in the psychological measurement instruments, thus number of estimation for items in which estimation of agreement with the contents of the items were the maximum, number of estimations for items where the estimations of agreement with the contents of the items were minimal and the overall number of estimations for both "extremes", i.e. the number of maximum and minimum estimations on the extreme points (not at all true/agree or completely true/agree) of the Likert scale (Sindik, 2006), in the questionnaires: SHS (Short Hardiness Scale); MSSP (Multidimensional Sport Perfectionism Scale); BPS (Burn's Perfectionism Scale); GEQ (Group Environment Questionnaire). The overall sample of the matches was consisted of sixteen matches for each team. Thus, there is "double-round" system of competing where every team with each of the other teams plays one match in "domestic" and one match in "visitor" field.

Statistical analyses

In addition to the usual indicators in the field of descriptive statistics, for a detailed analysis of the relationship of individual variables between two data sets (parameters of situational efficacy and number of extreme evaluation) we have calculated Pearson's univariate correlation and canonical correlation using software package Statistica.

Results

The values of the means and standard deviations, obtained for the standard and derived parameters of situational efficacy are obvious in the Table 1. Based on the value of max D, it can be seen that from the normal distribution statistically significantly deviate unsuccessful one-point shots, assistances and number of offensive rebounds. Distributions are direct consequence of standard parameters involved in the linear combination of these parameters of situational efficacy. All distribution of numbers of extreme estimations on items of all measurement instruments

are distributed normally. In order to compare the average number of extreme estimations for different measuring instruments there were used the results of the relative values of arithmetic mean (absolute value of arithmetic mean divided by the number of items for each measuring instrument). The highest relative number of extreme estimations was used in the MSSP, while the lowest was in the GEQ. However, it should be noted that different scales of estimations in different measuring instruments could partially condition the average number of used extreme estimations. The average deviation for number of used extreme estimations is calculated by dividing the absolute value of standard deviation with the number of items for each measuring instrument. The highest relative number was for the GEQ, while for the other measuring instrument was the same.

The canonical analysis tried to correlate the number of extreme estimations in each instruments for measuring conative characteristics and perceived cohesion of the team with standard pa-

rameters of situational efficacy. Table 2 shows that first canonical root is not statistically significant and that there is no correlation between overall set of variables of standard parameters of situational efficacy and the number of extreme estimations in the instruments for measuring conative characteristic and perceived cohesion with the senior team players of A-1 Croatian men basketball league. We got only one pair of canonical factors that is approaching the threshold of statistical significance ($R=0,322$; $p=0,065$), i.e. we got one pair of canonical factors that is statistically significant. The first canonical factor is in the space of standard parameters of situational efficacy of the basketball players has following characteristics: number of unsuccessful one-point shot, number of rebounds in the defense phase and number of rebounds in the attack phase. In the space of variables of the numbers of extreme estimations for questionnaires of conative characteristics and perceived group cohesion of basketball players, the first canonical factor has following characteristics: number of extreme estimations in the questionnaires MSSP and UGO.

Table 1 - Descriptive statistics of situational efficacy of variables and number of extreme estimations of top Croatian basketball players from A-1 league

Variable	Mean	Minimum	Maximum	Std.Dev.	Skew.	Kurtosis	Max D
Situational efficacy							
successful two-point shots	34,03	2,00	115,00	22,71	1,07	1,14	0,12
unsuccessful two-point shots	26,99	4,00	79,00	15,71	0,93	0,92	0,08
successful three-point shots	12,00	0,00	39,00	9,23	0,74	0,07	0,11
unsuccessful three-point shots	23,12	0,00	61,00	16,52	0,51	-0,56	0,12
successful free throws	24,12	1,00	72,00	16,19	0,94	0,51	0,14
unsuccessful free throws	10,22	0,00	97,00	12,38	4,90	33,01	0,21**
number of assists	22,51	1,00	105,00	19,27	2,23	6,13	0,18*
offensive rebounds	13,88	1,00	48,00	10,68	1,28	1,32	0,17*
defensive rebounds	31,20	2,00	87,00	19,40	0,84	0,35	0,09
steals	14,45	0,00	34,00	7,77	0,24	-0,60	0,07
personal fouls	33,23	4,00	64,00	12,10	0,08	-0,49	0,09
turnovers	21,39	3,00	55,00	11,59	0,69	-0,31	0,13
successful two-point shots	0,54	0,17	0,72	0,10	-0,72	1,05	0,08
unsuccessful two-point shots	0,31	0,00	0,70	0,15	-0,39	0,68	0,16
successful three-point shots	0,73	0,40	1,00	0,13	-0,12	-0,29	0,07
unsuccessful three-point shots	38,88	0,67	147,77	29,26	0,74	0,14	0,14
successful free throws	8,84	0,00	34,97	7,67	0,51	-0,44	0,13
unsuccessful free throws	17,52	0,50	55,74	12,12	1,99	7,35	0,14
number of assists	100,51	-1,41	287,68	64,94	0,72	0,34	0,08
Extreme estimations - Short Hardiness Scale	6,34	0	15	2,89	0,49	0,54	0,11
Extreme estimations - Multidimensional Sport Perfectionism Scale	15,28	0	27	6,03	-0,24	-0,32	0,06
Extreme estimations - Burn's Perfectionism Scale	4,74	0	10	2,28	0,18	-0,09	0,13
Extreme estimations - Group Environment Questionnaire	6,82	0	16	4,47	0,09	-1,03	0,09

Legend: * Max D is significant with $p < 0,05$; ** Max D is significant with $p < 0,01$

Table 2. Structure of canonical pairs for the first canonical factor of connections between situational efficacy of the basketball players and the number of extreme estimations on the instruments from a conative space.

Standard parameters of situational efficacy	Correlation with roots	Variance explained
successful two-point shots	-0,046	0,241
unsuccessful two-point shots	-0,108	
successful three-point shots	-0,202	
unsuccessful three-point shots	-0,292	
successful free throws	-0,275	
unsuccessful free throws	-0,467	
number of assists	-0,023	
offensive rebounds	-0,310	
defensive rebounds	-0,378	
steals	0,070	
personal fouls	0,076	
turnovers	-0,229	
Extreme estimations on psychological instruments	Correlation with roots	Variance explained
Extreme estimations - Short Hardiness Scale	0,012	0,061
Extreme estimations - Multidimensional Sport Perfectionism Scale	-0,723	
Extreme estimations - Burn's Perfectionism Scale	-0,075	
Extreme estimations - Group Environment Questionnaire	-0,660	
Canonical correlation	0,322	
Significance	p> 0,05	

The following canonical analysis examines the correlation between number of extreme estimations in certain instruments for measuring conative characteristics and perceived cohesion of the team with derived parameters of situational efficacy of the basketball players. However, we demonstrated that none of the canonical roots in this spaces was statistically significant ($R=0,470$; $p> 0,20$).

Table 3. Cross-correlations of parameters of situational efficacy and number of extreme estimations on the scales of conative characteristics and perceived cohesion at basketball players

Variables	Extreme estimations on Likert type scale for...			
	Short Hardiness Scale	Multidimensional Sport Perfectionism Scale	Burn's Perfectionism Scale	Group Environment Questionnaire
successful two-point shots	0,013	0,090	0,213	0,086
unsuccessful two-point shots	0,017	0,159	0,212	0,064
successful three-point shots	0,231*	0,101	0,229	0,317*
unsuccessful three-point shots	0,199	0,128	0,196	0,321*
successful free throws	0,119	0,163	0,235*	0,255*
unsuccessful free throws	0,012	0,247*	0,214	0,249*
number of assists	0,146	0,178	0,329*	0,119
offensive rebounds	-0,154	0,105	-0,082	0,001
defensive rebounds	-0,018	0,195	0,002	0,082
steals	0,124	0,013	0,181	0,111
personal fouls	0,050	0,104	0,142	-0,052
turnovers	0,151	0,243*	0,358*	0,231
utilization coefficient for two-points shot	0,179	-0,131	0,108	0,081
utilization coefficient for three-points shot	0,179	0,049	0,082	0,128
utilization coefficient for free throws	0,127	-0,128	0,069	0,037
coefficient of efficacy of three points shot	0,001	0,058	0,192	0,082
coefficient of efficacy of three points shot	0,217	0,082	0,217	0,308*
coefficient of efficacy of free throws	0,136	0,100	0,207	0,224
overall situational efficacy	0,073	0,120	0,200	0,179

Legend: * correlation IS significant with $p<0,05$

Despite the statistical insignificance of canonical correlation, table 3 there are several statistically significant correlations between standard parameters of situational efficacy and number of extreme estimations on the scales of conative characteristics and perceived team's cohesion. All obtained significant correlations have positive direction. At the level of number of extreme estimations, there are five significant positive correlations between number of extreme estimations for items in the GEQ and successful and unsuccessful shots for three or one point as well as efficacy of three point shots. Between number of extreme estimations for items in the questionnaire on BSP and successful one-point shots, number of assistance and number of lost points we can find positive and significant correlations. Between number of extreme estimations for items in the MSSP in the sport situations and unsuccessful shots for one point and number of lost balls, there has been found positive, low and statistically significant correlations. Only one significant correlation is found between number of extreme estimations for items of SHS and number of successful shots for three points. The most significant correlations with all the variables of numbers of extreme estimations from the standard parameters of situational efficacy have successful and unsuccessful shots for one point and number of lost balls (two significant correlations).

Discussion

The main finding of this research is that correlation between the numbers of extreme estimations of the individual instruments to measure conative characteristics and perceived cohesion of the team with the parameters of situational efficacy is not statistically significant. However, the level of canonical correlation and larger number of statistically significant univariate correlations show the importance of analysing causes of this connection. At the level of standard parameters of situational efficacy, the most significant correlations with variables of numbers of extreme estimations have the successful and unsuccessful one-point shots and number of lost balls.

The simplest interpretation of these results would consist of confirmation that frequent use of extreme estimations may reflect a greater tendency to use "risky" technical elements in the game. These are the elements with a lower probability of positive outcomes (losses caused by risky passing the ball) or with higher probability of positive outcomes (one-point shot). Only one significant correlation between number of extreme estimations on the scales of conative characteristics and teams cohesion and derived parameters of situational efficacy refers to the positive correlation of the numbers of extreme estimations in a group environment questionnaire and efficacy of three points shot. It can be explain as a trend of potential takeover of responsibility (risk) of the player for three points shot. It is likely that such takeover of responsibility includes the discipline to assume liability (probably assigned by the coach) in the team in which he plays. Especially when it comes to three points shot, it is probable that the players who take risks are also more responsible and have more training for shots and have "permission" from the coaches to shoot at certain stages of the game. This interpretation of the relation of parameters of situational efficacy and number of extreme estimations may indicate a trend that basketball player's use of these technical elements that have high or low probability of positive outcome (e.g. One or three points shots) maybe can have tendency of accepting responsibility. And it can be reflected in a number of extreme estimations used in conative characteristic questionnaire. Conversely, it is probable that the players who avoid their own responsibility, prefer using technical elements that have mediocre

possibility of negative outcome (e.g. two point shots, rebounds, assistances) and use a low number of extreme estimations in the questionnaires. In other words, using extreme estimations in the items of the questionnaires may be reflections of the "tendency to risk", but also of the acceptance of the responsibility of basketball players for their own action in the situation of basketball game. Targeted risk in accordance with the coach and team mates is important for the outcome of the game, but in technical elements for which basketball player has good skills and in the situations (phases of the game) when this risk makes sense.

The main advantage of the study was the fact that all available players in the studied A-2 championship of the basketball league were tested. Hence, found laws can be applied for specific sample (practically the whole population) of basketball players and it can be incentive for quality coach work. However, on the lower possibility of generalization of results may influence the reasons: small and multiply selected sample of the subjects, the specificity of Croatian population of top senior basketball players, the specificity of particular competition (in the investigated championship neither team could fall out from the league, which could affect the less effort of the teams fighting for the staying in the A-1 league). In future research we could try to slightly increase the number of subjects (trying to test injured and from other reasons absent players), which can be achieved only minimally. The term "top player" in relation to enumerated specificity indeed varies considerably from country to country, depending on competitive quality of the competition in a specific country (which often depends on the financial possibilities of the clubs to the perspective players). On the quality of basketball players in our country it cannot be affected easily, expect in the long term, changing the system of the competition and financial possibilities of the clubs. Therefore, one of the solutions for further research and multiple replication of the same type research during the larger number of basketball championships, where this slight differences in the term of Croatian "top basketball player" may be reflected (Sindik, 2009). Finally, one must not forget that the use of extreme estimations can reflect the self-screening tendency, i.e. with the interpretation of "extreme estimations scale" as a control scale (Sindik, 2006). In relation to the response style, it is possible to give an interpretation from the pointview of "taking a clear position", the trend of giving categorical answers. As an addendum to this interpretation we have results: almost all correlations of the variables of extreme estimations with perfectionism (one-dimensional and multidimensional) are zero or negative direction. Determination to respond on the items, which is manifested in the more frequent choice of extreme estimations, may imply a somewhat more favourable attribution of the team. Furthermore, it is possible that the results reflect the tendency to provide extreme estimations in the direction of socially desirable responses, in the direction of lower perfectionism, greater mental strength, and greater perceived group cohesion. "Certainly, we must not forget that the number of extreme estimations in the questionnaires often interferes with the object of the measurement. There is a probability that the players who are in a constructive way more introspective (positively perfectionist) tend to give more extreme estimations in the questionnaires, and they are also more situational efficient. Nevertheless, the players of less successful teams probably take sometimes too much risk, losing at the same time self-criticism. It is likely that they shoot "without reasoning", have less successful assistances, etc. As indicated by the data on correlations between standard and derived parameters of situational efficacy with the number of extreme estimations in the questionnaires, but especially for the players of more successful and especially for the players of less successful teams (Sindik, 2009)

Conclusion

The main finding of this research is that correlation between number of extreme estimations of the Likert – type scale in each instrument for the measurement of conative characteristics and perceived team cohesion with the parameters of situational efficacy is not statistically significant. However, a canonical correlation and a larger number of statistically significant univariate correlations indicate the importance of considering potential reasons for this association, such as controlled risk tendency and taking responsibility for the success of the team.

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Submitted: April 09, 2012.

Accepted: May 29, 2012.

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