

EXAMINING THE EFFICIENCY OF COLLECTIVE TASK SOLVING

Professional-methodological aspects of volleyball player training and competition

Dissertation

Koltai Miklós

Semmelweis University, Faculty of Physical Education and Sport Sciences (TF)

School of PhD Studies

Sport, Educational- and Social Sciences Programme



Supervisor: Dr. Rigler Endre Professor, CSc

Dr. Bognár József, Associate Professor, PhD

Opponents: Dr. habil. Fülöp Márta, Senior Research Fellow, CSc

Dr. Sterbenz Tamás, Assistant Professor, PhD

President of the Examination Committee: Dr. Kertész István, Professor, DSc

Members of the Examination Committee: Dr. Bognár József, Associate Professor, PhD

Dr. Reigl Mariann, Associate Professor, PhD

Dr. Rétsági Erzsébet, Associate Professor, CSc

Budapest

2009

INTRODUCTION

Successful *collective task solving* is a prerequisite for good team performance. The individual and the team structure is a cooperative system based upon causality. Applying an approach based upon the novel interpretation of the relationship between cooperation and competition can lead us closer in shaping a more consciously-planned training programme.

In studying the paradox of cooperation and competition, various international and national analyses were developed by university professionals in some fields of economic competition. In the area of sport and team sport – where the co-existence of the two phenomena is obvious and can be a definite factor – no surveys have been conducted thus far.

Volleyball is a team sport with a specific system of relations. Due to the special hit rule (Minh et al. 1977) there is no effective *possession of the ball* - only the players can make adjustments during the game. Accordingly, there is a continuous, special kind of *time-pressure* to be observed. To achieve team success, collective task solving is predicated on a high level of *perception-motor* control (Istvánfi, 1986), efficient *anticipation* and *communication* (Griffin, 2001; Shaw, 1954; Davis and coll., 1985), rapid *decision-making* (Sterbenz, 2006; Zoltainé, 2002; Eysenck and coll., 2003) and a *game theoretical* way of thinking (Neumann és Morgenstern, 1947; Mérő, 1996; Filep, 1985). The symbiosis of cooperation and competition during training and games arise from the character of the game. During collective task solving there is an opportunity to carry out rapid, *improvised* solutions, which is predicated on a rich technical-tactical repertoire and demand-heuristic decisions (Sterbenz, 2006; Schmidt, 1996; Konczak, 1996). Competition is for *finite* and *infinite* resources which can only be reached through close cooperation with teammates. Earlier approaches viewed *competition* as both the cause of conflicts and the least convenient way of handling them and also competition was considered derogative phenomena in social relationships (Deutsch 1949, Sherif and coll. 1961). The relationship between the two behaviours is assumed to have an inverse nature (McClintock, 1976). Some schools aimed to abolish competition altogether for the reason that it ruins team atmosphere (Johnson és Johnson, 1992).

According to the new interpretation, competition improves team performance and individual efficiency (Erev and coll., 1993; Charlesworth, 1996; Van de Vliert, 1999). The

expression *coopetition* is a new notion which is the essence of a new business strategy (Brandenburger and coll., 1998). *Cooperation* and *competition* are neither only excluding nor complementary factors, they are elements which are predicated on and defined by each other (Fülöp, 2000). Applying cooperation and competition simultaneously as a mixed strategy is evolutionary the most stable and effective solution according to the game theory. A *Hypercompetitive* attitude is based on the *extreme* individualism of Horney (1937) which states that hypercompetitiveness is an indiscriminate need of the individual to compete and win or to avoid defeat at any cost. Hypercompetitiveness shows a close relationship with *narcissism* and *machiavellism* (Ryckman and coll., 1990). A *Personal developing competitive* attitude originates from the *collective* individualism of Sampson (1988). These people reach their goals in a never-ending cohabitational process. The result is not most important, but the joy of carrying out the task and discovering and developing themselves is. The formation of different competitive attitudes can lead back to different types of socialization (Horney, 1937; Kitayama and Markus, 1991; Fülöp, 2002).

From a competitive forms perspective, four different competitive character types are differentiated based on combinations of the two competitive attitudes mentioned above.

Considering the division the certain surveys differ somewhat from each other.

1. *Misfit*, or 'cool customer' type (Fülöp et al., 2007).
2. *Hypercompetitive* type (Fülöp and Berkics, 2007; Cranevale and Probst, 1997; Ryckman, 1990).
3. *Cooperative – competitive* type (Fülöp and Berkics, 2007; Ryckman, 1996).
4. *Competitive type with a mixed strategy* (Mérő, 1996; F Lassú, 2003).

PURPOSE

The aim of the study is to map the *competitive* attitudes of elite adult players in the Hungarian national women's volleyball league and also to define *competitive character types*. We also aim to determine the relationship between certain indicators and efficiencies by considering the unique dimension of structural specialties. In conducting in-depth interviews we wanted to determine what kind of professional, methodological, and pedagogical experience can be drawn in regards to the parallel manifestations of collective task solving (*cooperation and competition*) of first line women volleyball players as they are coached and as they compete.

Questions:

Q1: What fields of application of the symbiosis of cooperation and competition are there in volleyball?

Q2: What main competitive attitudes characterise the common task solving of volleyball players?

Q3: What statements do volleyball players make in regards to competition?

Q4: Do main competitive attitudes of the team members influence the efficiency of the team?

Q5: What effect do age and school qualification have on the changes of main attitudes towards competition?

Q6: Is there a relationship between the HCA and PDCA level of volleyball players and special coaching factors which occur during coaching (player position, quality of players, being nationally selected or not, volleyball age, taking part in serve receiving)?

Q7: How do competitive categories which appear in different teams determine efficient team performance?

Q8: To what extent do competitive indicators of the coach determine efficient team performance?

Q9: What do successful volleyball coaches think of the relationship between collective task solving (cooperation – competition) and efficiency?

Hypotheses:

H1: Successful coaches of the elite Hungarian women's volleyball team are not aware of professional results related to the co-existence of cooperation and competition; their methods applied in their work are based on their experience.

H2: HCA and PDCA levels of players in the sample exceed similar averages measured in other fields.

H3: Opinions of elite Hungarian women volleyball players about competition meet social requirements for athletes (European Sport Charter and the ethical code of sport, 2003).

H4: The HCA and PDCA levels of players of the examined volleyball teams are related to the team's efficiency (place in ranking).

H5: Main competitive attitudes (HCA, PDCA) and age and school qualification are not closely related to each other in the examined sample.

H6: There is a connection between the HCA and PDCA level of players from the sample and the position in the team, being nationally selected (youth, adult), volleyball age and taking part in serve receiving – as special training factors.

H7: The occurrence and frequency of single competitive character types within the team determines successful classification. The number of players competing with a mixed strategy is highest in the most successful teams.

H8: The competitive character types of coaches in the sample influence the efficient performance of their team. The team in which the coach represents a positive competitive sample is more successful.

H9: Successful coaches consider cooperation and competition to be very important factors which serve the goal of efficient team performance.

H10: When selecting players for different positions, physical factors are determinative, while mental features are underestimated; coaches of the elite Hungarian women's volleyball team do not take cooperative and competitive attitudes into consideration.

METHODS

The questionnaire was filled out by the adult teams of the first league Hungarian women's volleyball championship (City Line Woman First League, N=167). The recording of data occurred at official games with a standard form. As a gauge we used the mixed variant of HCA and PDCA tests by Ryckman, the Hungarian adaptation which was developed by Fülöp and colleagues. (1999) and which was also applied by F. Lassú (2003), Torma (2002) and Józai (2004) in Hungary. In compiling the questionnaire, we considered the methodological suggestions of Falus (2000) and Babbie (2003). We processed all survey data with the SPSS 16.0 for Windows statistical programme (Sajtos, 2007; Székelyi and Barna, 2005). Besides paper and pencil tests, in-depth interviews were also conducted with five outstanding and most successful coaches in Hungarian women's volleyball (Kvale, 2005; Seidman, 2003).

RESULTS

Collective task solving (cooperation and competition) in volleyball

The main finding of our study is that cooperation and competition are important factors to be simultaneously present in volleyball (Brandenburger and coll., 1998; Van de Vliert, 1999; Fülöp, 2000). All of the interviewed coaches consider co-operation among team mates to be extremely important. Increasing cohesion within the team is also emphasized in civil life, which is fostered by organizing common programmes. During training and exercise, coaches establish effective methods to develop cooperation. There were professionals who talked about subordinating individual interest to team interest (Elster, 1997). Competition within a team during training is considered to be advantageous by successful coaches, which is why they often create competitive situations during training sessions. Opinions differ about competition within the team during games. They consider rivalry for positions to be useful and they have created good methods so that it can be useful for all of the competing parties. When talking about the *simultaneous appearance* of the two types of behaviour, most of them consider cooperation to be more important. Sport is becoming a bigger and bigger business, and professional approaches can not ignore academic results (Fülöp, 2006). However, we can not speak about these factors when educating coaches.

Examining HCA and PDCA values of athletes

Women volleyball players in the sample have different competitive attitudes, their HCA (M=3.45; sd=0.48) and PDCA (M=4.67; sd=0.65) averages exceed the values published by other authors (Ryckman, 1990, 1996; F Lassú, 2003; Józszai, 2004). High PDCA values can validate the hypothesis that a high-level cooperational tendency is indispensable in team sports. There is a weak correlation between HCA and PDCA values observed ($r=0.266$; $p<0.01$) in the examined sample which seemingly contradicts the results of Ryckman (1996), in this study athletes have a notable coercion to win.

Statements of players about competition

Statements of players about competition fit the social expectations (European Sport Charter and the ethical code of sport, 2003). The most strongly accepted statements are related to sportsmanship and continuously evaluating and developing ourselves, which reflect the

athletes' fair-play mindedness. The least accepted statements held no importance for the players.

Defining factors influencing efficiency

We judged *efficiency* according to the ranking (form 1-16.) of the championship during 2006/2007. Based on the ranking in the championship we developed four categories: 1 (from places 1-4.), 2 (from places 5-8.), 3 (from places 9-12.) and 4 (from places 13-16.).

With discriminant analysis it can be laid down that HCA and PDCA levels have an insignificant effect on efficiency, and we can notice significance only in the case of PDCA (Wilks' Lambda = 0.942, F=3.323, p=0.021). Variants explained by the curve are in both cases low, which means at the dependent variant 5.8 and 2%. The meaning of the discriminant curve is principally determined by the PDCA value, which is mainly typical for the first group. Accordingly, players in places 1-4 had the best performance in this dimension.

Teams in which there are a lot of nationally selected players ($r = -0,344$) and nationally selected youth players ($r = -0.219$) and which have players who have spent the most time playing volleyball ($r = -0.238$) have the best chance of performing well in the championship ($p < 0.01$). Volleyball age and PDCA values, however, show a smaller than average but significant, positive correlation ($r = 0.221$; $p = 0.004 < 0.01$), which can be traced back to the team-sport nature of volleyball. This is also supported by the opinions of successful coaches.

The effect of training factors on HCA and PDCA values

With a single-aspect variant analysis it can be shown that training factors have no effect on competitive values. This can mean that time spent in a team (5 years as average) in the examined sample was not enough of an environmental factor for changes in competitive attitudes. This also serves as confirmation that one part of the attributes of competitive character types is innate or evolves in the early stages (Freud, 1905; Klein, 1957). These attributes can be influenced (Kohut, 1971; Stern, 1985) by convenient pedagogical methods or as a consequence of social and cultural impacts (Fülöp, 2002). Players with different personal attributes can be useful in different aspects of the team game.

In relation to the harmful competitive manifestation, successful coaches did not mention the *win at all cost* approach (Horney, 1937) derived from the hypercompetitive attitude (Fülöp and Berkics, 2007; Cranevale and Probst, 1997; Ryckman, 1990). The most harmful phenomena were *forming cliques* within the team and the usage of *illegal substances*. To eliminate these they apply pedagogical methods but they do not plan on acting in a more definite manner.

Connections between competitive character types and efficiency

As a result of the analysis it was found that there is a clear relationship between personal character type in connection with competitive attitude and efficiency categories ($\chi^2=17.482$; $df=9$; $p=0.042$); however, based on the values of other indicators, we could conclude efficiency only at a low confidence level in relation to personal character type. This can also be explained by the fact that within a team there are individuals with different competitive attitudes.

From the cross-table values, it is conspicuous that among the first four places of the table there are the least *misfits* (Fülöp and coll., 2007), the most *cooperative - competitiveness* (Fülöp and Berkics, 2007; Ryckman, 1996), and the most players competing with a mixed strategy (Méró, 1996; F Lassú, 2003).

Additionally, it is typical at the highest levels of women's volleyball championship teams that the level of knowledge of the first four teams significantly exceeds the level of the other teams'. It can be laid down that those standing at the top of the table have studiously balanced competitive samples and that there are few misfit and hypercompetitive players among them. Phi, Cramer's V and contingency coefficient values (0,324, 0,187 and 0,308; $p=0,042$) show that there is a lower than the mean but significant relation between the two variants.

The creed of coaches connected to cooperation and competition and correlations of team's efficiency

Balanced factors dominate the competitive samples of coaches who filled out the questionnaire. Since the sample is completely heterogeneous, we do not take further analyses into consideration. In connection with the topic we considered opinions from in-depth interviews made with volleyball coaches to be normative. For victory it is not

enough that a team is physically, technically, and tactically on top. For efficiency we need other factors. There is also a need for adaptability within the team, accepting and helping each other, and an outstanding level of cooperation.

Different references of the position within the team regarding co-operative and competitive samples

Exercises defines the team's performance (Steiner, 1972) and demands diverse personal attributes to be successful (Belbin, 1981). Different player attributes/character types are needed to fill the various volleyball position types. For each *position* there are more personal alternatives(?) within the team. Successful coaches apply effective methods for selecting players and having them compete for the given posts so that the performance of all players progress.

When coaches discussed what mental attributes players must possess for each position, there were no attributes mentioned related to cooperation and competition; however, these were declared to be important at the early stage of the interviews. This means that coaches do not consider these factors to be important when selecting players for certain positions.

This also validates the result of the questionnaire survey, according to which there is no significant relationship between competitive character types and position within a team. Accordingly, for each position there are players of different mixed competitive attitudes. Based on this it is not surprising that we did not find a significant correlation in the sample when examining the relationship. The analysis shows a significant correlation only from the perspective of the competitive character type and taking part in receiving the serve ($\chi^2=15,546$; $df=3$; $p=0,001$). This also confirms that this game element is one of the most important factors of efficiency, as its successful fulfillment requires outstanding concentration and other positive mental abilities. This also corresponds with the opinions of successful coaches because efficiency in different offensive variations can be traced back to good passing.

CONCLUSIONS

Verifying the hypotheses

1. Based on the in-depth interviews, the following conclusion can be drawn: Volleyball coaches did not meet academic results related to cooperation and competition during their studies. This validates our *first* hypothesis as true.
2. The HCA and PDCA values of women volleyball players exceed values published by other authors in all cases. So we can accept our *second* hypothesis.
3. The statements of the athletes reflect social expectations (European Sport Charter and the ethical code of sport, 2003), which makes the validity of our *third* hypothesis probable.
4. The discriminant analysis of HCA, PDCA, and the efficiency categories only partly validates our *fourth* hypothesis.
5. Age and school qualification do not have an effect on the changes of HCA and PDCA values in the examined sample, which validates our *fifth* hypothesis.
6. It can be stated about all so-called special training factors (position in the team, quality of players, being nationally selected or not, volleyball age, and taking part in receiving the serve) that they do not effect HCA and PDCA values in our sample. In considering this, we must reject our *sixth* hypothesis entirely.
7. From the results of the analysis we can conclude that there is a relationship between personal character type and competitive attitude and efficiency. We could not verify our *seventh* hypothesis because among players in the first four places of the table, most of the athletes were cooperative – competitive. The mixed sample is pushed to the second place.
8. The competitive attitudes of coaches dominate balanced factors. Since the sample containing the data is completely heterogeneous, all of its indicators deviate from the average, and we did not succeed in validating our *eighth* hypothesis.
9. Successful coaches consider co-operation and wholesome competition to be an important factor from the perspective of team efficiency. They prefer cooperation during games so our *ninth* hypothesis is validated.
10. When selecting volleyball players for certain positions, physical factors dominate. Successful coaches disregard competitive attitudes. This is also supported by the result of the questionnaire survey according to which there is no significant relationship between competitive character type and position played in the team. Based on this, it is not surprising that we did not find a significant correlation in the sample in examining the

relationship between efficiency and competitive character type. We consider our *tenth* hypothesis to be validated in regards to this question.

Professional-methodological aspects related to the competing amongst and coaching of volleyball players

In light of the results, it is worth reconsidering some professional – methodological aspects of volleyball player coaching and competition: shaping of the technical – tactical repertoire, the application of efficient means in observing games, different training level exercises, the question of education in volleyball, paradoxes of the game or technology, methods of training of technical and tactical elements, and the dilemma of using general or special training.

The efficiency of collective task solving

Well-constructed facilities and the *extra* level of physical, technical, and tactical abilities of players have become fundamental in recent professional sport. What makes a team to be among the best? This is determined by factors which can compensate, in most cases, for some physical deficiencies. We are convinced that a team can be made much more efficient when coaches increasingly consider the players' personal attributes; among others, their different competitive samples when selecting players for certain positions. If we pay more attention to strengthening constructive and beneficial competitive relations – while applying condensed appropriate situations – during the training of athletes, we can make the training of our players more complete and they can become more capable of achieving greater success. In the recent sample the nearly five-year-time average being spent in a team proves that there are still notable reserves on this field.

During our coaching and educational activities of more than twenty years, and in examining the models of the *system of individual and collective interests*, while analysing results of different sciences, we can draw the final conclusion which holds that the concurrent, high-level presence of *co-operation* and *competition* is indispensable in the collective task solving of volleyball players.

The relinquishing of success is the efficiency of collective task solving.

PUBLICATIONS

International publications:

1. **KOLTAI Miklós**, JÓKAY Zoltán, BOGNÁR József (2009): Cooperative and competitive characters types in elite Hungarian women volleyball players *Kinesiology*. (in press)
2. **KOLTAI Miklós** (2009): Examining the efficiency of collective task-solving. *International Quarterly of Sport Science*, 2009, 2, (in press)
3. GÉCZI Gábor, VINCZE Géza, **KOLTAI Miklós**, BOGNÁR József (2009): Psychometric Measures in Elite Young Teamsports in Hungary *Physical Culture and Sport. Studies and Research*. (in press)

National publications:

1. RIGLER Endre, **KOLTAI Miklós** (2001): *Gyakorlatgyűjtemény a röplabda iskolai oktatásához*. Semmelweis Egyetem Testn. és Sporttud Kar (TF) [jegyzet]. Bp.
2. RIGLER Endre, **KOLTAI Miklós** (2005): *Röplabdázók felmérő és felkészítő eljárásai* Semmelweis Egyetem Testn. és Sporttudományi Kar (TF) [szakkönyv] Bp.
3. **KOLTAI Miklós** (2008): A kétféle versengési attitűd és az együttes feladatmegoldás. A versengési karakterek meghatározása csapatsportokban. *Kalokagathia*. 2008, 1, 74-93.
4. **KOLTAI Miklós**, BOGNÁR József (2008): Játékelméleti szemlélet alkalmazása a röplabdázás döntési mechanizmusában az együttes feladatmegoldás hatékonyságának fokozása érdekében. *Kalokagathia*, 2-3, 107-121.
5. **KOLTAI Miklós**, BOGNÁR József (2009): Az együttműködés és versengés jellegzetességei a magyar női röplabdázásban – a sikeres edzők szemszögéből. *Kalokagathia*. 2009, 1, (megjelenés alatt)
6. BOGNÁR József, GÉCZI Gábor, RÉVÉSZ László, TRZASKOMA-BICSÉRDY Gabriella, **KOLTAI Miklós**, VINCZE Géza (2009): Magyarországi csapatsportok tehetségkiválasztásának összehasonlítása. In: Bognár József (szerk): *Tanulmányok a kiválasztás és a tehetséggondozás köréből*. Magyar Sporttudományi Társaság. Budapest. 237-248.