

EXAMINATION OF HUNGARIAN JUNIOR HANDBALL PLAYERS WITH RESPECT TO POSITIONS AND PERSONALITY

Abstract of PhD Thesis

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1. Introduction

Handball is a very popular sport in Hungary, characterized by numerous registered players and trainers. In professional sports, the goal is to improve performance, which has several components: besides physical, technical and tactical preparedness, players also have to mentally prepare for the particular game or trainings. It is our view that it is crucial for future adult success that the abilities and characteristics of junior players are also assessed by researchers.

2. Aims

Handball players are mostly researched by experts with respect to training theory and physiology, however, the success of sportspeople is also determined by their psychological preparedness (Lénárt, 2012; Gyömbér et al, 2012). In order to achieve a high level of performance, competitors are required to prepare not only physically, but also mentally (Révész et al, 2005; Barrerios et al, 2011; Lénárt, 2012). Preparation for a competition is a long process, which is also influenced by the components of the mental preparation of sportspeople, and these components may become part of their personalities (Williams and Kranek, 2001; Gyömbér et al, 2012). The challenge itself may involve severe anxiety, as established personality traits may influence pre-competition anxiety to the positive or negative directions, thereby influencing performance at the competition (Hajdúné, 2009). In possession of this knowledge, we aimed at surveying junior Hungarian handball players with a view to gain information about their personality backgrounds, coping strategies and anxiety patterns.

The attacking game of handball is built on the skills of the players and their ability to solve problems (Ökrös, 2007). In groups, the performance of players increases (Mérei, 2003), they are able to do more in a cooperation setting than alone (Csepeli, 1997; Aronson, 2002). Therefore, we were curious about how the performance indicators of a game are distributed among the players. Tierney et al (2016) stated that the work of the trainer is greatly helped, if performance at certain games is analyzed individually and for each post. As the overall performance of the team is comprised of individual performances, we wanted to assess how certain posts influence this. Psychological traits influence performance at a game, so were interested is what traits differ among genders, ages and posts.

2.1. Hypotheses pertaining to psychological traits

(H1): Let us assume that we find a difference between psychological traits of players based on gender among junior handball players.

(H1a): Let us assume that we find a difference between personality traits of players based on gender among junior handball players.

(H1b): Let us assume that we find a difference between coping skills of players based on gender among junior handball players.

(H1c): Let us assume that we find a difference between the anxiety of players based on gender among junior handball players.

(H2): Let us assume that we find a difference between psychological traits of players based on age among junior handball players.

(H2a): Let us assume that we find a difference between personality traits of players based on age among junior handball players.

(H2b): Let us assume that we find a difference between coping skills of players based on age among junior handball players.

(H2c): Let us assume that we find a difference between the anxiety of players based on age among junior handball players.

(H3): Let us assume that we find a difference between psychological traits of players based on post among junior handball players.

(H3a): Let us assume that we find a difference between personality traits of players based on post among junior handball players.

(H3b): Let us assume that we find a difference between coping skills of players based on post among junior handball players.

(H3c): Let us assume that we find a difference between the anxiety of players based on post among junior handball players.

2.2. Hypotheses pertaining to game performance

(H4): Let us assume that the individual performances of players on different posts take part in the composition of the overall performance of the adolescent and junior team in different degrees, and the overall performance in attack of the adolescent and junior team is predominantly determined by the performance of left backs.

(H5): Let us assume that the those finished attacks which are executed by players, who are not on their own posts, negatively influence the overall performance of the adolescent and junior team.

3. Methods

3.1. Studied sample

The sample contains the players of first-class junior and adolescent handball teams in the seasons 2016/2017 and 2017/2018 (n=413). Based on gender, 55.4% of the players are male, 44.3% of the players are female. The average age was 16.35 years (SD: 1.4 years), the average training age was 7.47 years (SD: 2.4 years). Based on attack posts, the sample contained the following: 26.6% winger, 22.8% backs, 17.2% pivots and 14.8% goalkeepers. The best results showed that 53.4% belonged to category 2 (places 1–3 of the national championship), 39.8% belonged to category 3 (other), 6.8% belonged to category 1 (places at the European Championship or World Championship).

3.2. Applied methods

We combined quantitative and qualitative methods in our study, following methodological triangulation. Questionnaire-based survey was performed among junior handball players (players aged 14–19) and game analysis was also applied. In the quantitative study validated questionnaires were used (n=413), the qualitative part contained the analyses of 20 games, selected from the teams participating in the study.

3.2.1. Study of the psychological components:

- *Big Five Questionnaire* (BFQ) and *Big Five Questionnaire Children* (BFQ-C) (Barbaranelli, G.V. Caprara, A. Rabasca, 1993.): Measures the basic emotional, interpersonal and motivational features of the person along different dimensions: Energy, Agreeableness, Conscientiousness, Neuroticism, Openness.
- *Athletic Coping Skills Inventory* *Athletic Coping Skills Inventory*; *ACSI-28*, Smith et al, 1995): suitable to measure coping strategies of sports people; Coping With Adversity, Peaking Under Pressure, Goal Setting Mental Preparation, Concentration, Freedom From Worry, Confidence and Achievement Motivation, Coachability.

- *Competitive State Anxiety Inventory* (Competitive State Anxiety Inventory-2; hereinafter CSAI-2, Martens et al 1990.): Suitable to survey the competitive confidence scale and the current cognitive and somatic anxiety scale of sportspeople.

3.2.2. Game analysis

The games were analyzed by post-game observation using MATCHmeeting System, which is a game analysis and training system. The aspects of observation were the following:

- On what post the player finished the attack: left winger (LW), left back (LB), playmaker (PM), right back (RB), right winger (RW) or goalkeeper (GK).
- From which area the player shot. The field was divided into 8 parts (A–H) based on Burger et al (2013), see Figure 1.

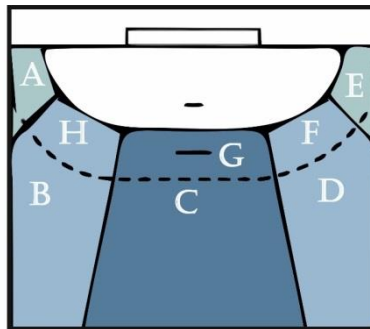


Figure 1:

Division of a handball field based on attack zones.

- To which area of the goal the player shot the ball. The goal was divided into 9 equal parts based on Oscar and Pascual (2011), see Figure 2. Drawn shots and throws are marked by the number 10.

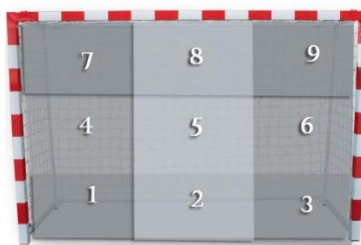


Figure 2:

Division of the areas of the goal

- The player shot at their own post (left winger: A, H; left back: B, H; playmaker: C, G; right back: D, F; right winger: E, F; pivot: H, G, F).
- The goalkeeper saved the shot.
- The attack was against an organized or disorganized defense and at what number.
- Analysis of game elements by player: goal, goal pass, reaching penalty, reaching temporary time-out, number of technical faults.
- Saving efficiency of the goalkeeper: how many shots on target by the attacking team were saved by the goalkeeper (by a body part), preventing the ball to get into the goal.

3.3. Data processing

The questionnaires and the results of the games were entered in database and were subjected to statistical analyses using SPSS 15.0 software. The data were analyzed by descriptive statistics, correlation analysis, Post Hoc test and linear regression analysis.

4. Results

4.1. Assessment of personality and psychological traits

Variables measuring psychological traits were studied in the next step. The reliability of the three measurement tools used in the study proved acceptable in the current sample. The value of Cronbach alpha for BFQ was $\alpha=0.667$, for ACSI-28 $\alpha=0.829$, and the reliability indicator of CSAI-2 was $\alpha=0.773$.

4.1.1. Results for BFQ

Significant differences can be experienced in all dimensions of BFQ ($p<0.05$). For *Energy* ($t=-2.32$ $p<0.05$), *Consciousness* ($t=-2.49$ $p<0.05$) and *Openness* ($t=-3.91$ $p<0.001$) dimension females reached significantly higher average value; for *Agreeableness* ($t=3.06$ $p<0.05$) and *Neuroticism* ($t=3.34$ $p<0.001$) dimensions, man reached higher values.

Based on age, we can state that all dimension of BFQ except for *Consciousness* displayed significant differences among below-average and above-average age groups. *Energy* ($t=-3.26$ $p<0.05$) and *Neuroticism* ($t=-5.29$ $p<0.001$) displayed significantly higher values in older persons above the average age; the *Agreeableness* ($t=1.96$ $p<0.05$) and *Openness* ($t=3.15$ $p<0.05$) dimensions displayed significantly higher values in persons below the average age.

The analysis based on the three age groups also supported these. *Energy* ($F=9.18$ $p<0.001$) and *Neuroticism* ($F=20.25$ $p<0.001$) values increased in a linear fashion with the increase of age. *Consciousness* ($F=15.10$ $p<0.001$) and *Openness* ($F=44.10$ $p<0.001$) was the lowest in the player under the age of 15.

We performed the variance analysis based on attacking posts. The analysis showed that there was a significant difference in case of Agreeableness ($F=2.36$ $p\leq 0.05$) and *Consciousness* ($F=3.18$ $p<0.05$) dimensions. The dimension of *Openness* was also close to significance ($F=2.14$ $p=0.075$). If we examine the average values for the dimensions, it is well-visible that playmakers reached the highest values except for *Neuroticism* on BFQ dimensions. *Neuroticism* showed the highest value for pivots. The lowest values were reached by goalkeepers and backs.

4.1.2. ACSI-28 results

Differences by gender were indicated in five cases from the seven scales of ACSI-28 by the independent, two-sample T-test in Table 11. Besides *Coping With Adversity*, *Goal Setting Mental Preparation*, *Freedom From Worry*, *Confidence and Achievement Motivation* and *Coachability* displayed significant differences between males and females. The *Goal Setting Mental Preparation* and *Coachability* displayed significantly higher values for females. On other scales of ACSI-28, males displayed higher average values.

The analysis of the age groups was performed again with dichotomous (below-average age vs above-average age), later with a 3-category variable. On variables based on dichotomous age groups, only one scale displays significant difference. In line with correlation analysis, the *Goal Setting Mental Preparation* scale displayed higher average value in the below-average age group ($t=2.298$ $p<0.05$). If we apply 3-category age variable, the variance analysis displays significant difference at multiple places among the 3 age groups. The *Goal Setting Mental Preparation* ($F=3.56$ $p<0.05$) and *Coachability* ($F=8.85$ $p<0.001$) dimensions displayed the highest group average for players under 15. The *Freedom From Worry* ($F=7.14$ $p<0.001$) dimension was most characteristic for the player over the age of 18.

Based on posts, the following scales displayed significant difference on the test: *Coping With Adversity* ($F=3.276$ $p<0.05$), *Confidence and Achievement Motivation C* ($F=2.85$ $p<0.05$), *Coachability* ($F=2.766$ $p<0.05$). Besides these *Concentration* ($F=2.304$ $p=0.058$) and

Freedom From Worry ($F=2.268$ $p=0.061$) reached values near the significance limits. Analyzing the posts, we can conclude that playmakers achieved the highest results in the sample on all ACSI-28 scales except for *Freedom From Worry*. *Freedom From Worry* was most frequent for pivots. The lowest average values were usually reached by goalkeepers, except for *Freedom From Worry*, whereby backs reached the lowest average values.

As per *Freedom From Worry*, one factor was flagged by the analysis, that significant difference also appeared for the best place. The highest *Freedom From Worry* value was observed for the players in category 1 ($F=5.304$ $p<0.05$).

4.1.3. CSAI-2 results

The assessment of CSAI-2 scales based on gender showed that *Cognitive* ($t=-5.028$ $p<0.001$) and *Somatic anxiety* ($t=-3.005$ $p<0.05$) are also higher for females compared to males, whereas *Self-confidence* ($t=3.866$ $p<0.001$) is higher for male players (see: Table 14).

Based on dichotomous age groups, *Cognitive anxiety* displayed significant differences, in line with correlation-analysis: in the below-average, young age group players reported higher levels of anxiety ($t=2.286$ $p<0.05$). We performed the variance analysis with a variable divided into 3 age groups, the result of which shows that their age-specific differences in all the three CSAI-2 scales. *Cognitive* ($F=8.76$ $p<0.001$) and *Somatic anxiety* ($F=4.817$ $p<0.05$) reached the highest values in the middle age group, so players between ages 16–17 had the highest anxiety levels, while players over 18 were found to have the lowest anxiety levels. Furthermore, *Self-confidence* was characteristic of the group over the age of 18 ($F=4.577$ $p<0.05$).

Based on the best result, it is well-visible in Table 14 that *Cognitive* ($F=3.039$ $p<0.05$) and *Somatic anxiety* ($F=3.74$ $p<0.05$) was the highest in category 2, and *Self-confidence* was also the lowest for them ($F=2.887$ $p=0.057$). In line with this, *Cognitive* and *Somatic anxiety* the lowest in category 1, and *Self-confidence* was the highest for them.

4.2. Game performance analysis

Following the performance of the one-category variance analysis, we can state that there was a significant difference between the average numbers of shots per game and the number of goals. The Post Hoc tests revealed that players on the left back post shoot significantly more on target (11.5 ± 3.25) per game than players on other posts, while pivots shoot the least (4.15 ± 3.0), and the latter significantly differ from the number of shots on target for players on internal posts (left and right backs and playmaker). The most goals per game are scored by left backs (5.75 ± 2.04), which significantly differ from the number of goals scored by left wingers (3.23 ± 2.13), right backs (3.88 ± 1.98), right wingers (3.88 ± 1.98) and pivots (2.93 ± 2.37). Shooting efficiency displayed a significant difference only between right backs (48.69 ± 19.51) and pivots (64.95 ± 30.68).

In case of the shots analyzed, left backs scored a goal 224 times (24.2% of all goals scored), playmakers scored a goal 167 times (18.1% of all goals scored), right backs scored a goal 156 times (16.9% of all goals scored), right wingers scored a goal 138 times (14.9% of all goals scored), left wingers scored a goal 132 times (14.3% of all goals scored) and pivots scored a goal 107 times (11.6% of all goals scored).

Based on the analysis of the shooting zones it can be stated that attacking players scored a goal in the largest percentage rate (32.9%) from zone G. The number of goals scored from the following zones are also high: C (18.4%), F (17.4%) and H (13.1%), but the number of goals scored from own half of the playing field (2) and from the center line (1) is insignificant. Other the latter, few goals were scored from the following zones: A (4%), B (2.6%), D (4.1%) and E (6.6%).

Based on the division of the goal, it can be stated that the most goals were scored to area 1 of the goal (201, 21.8% of all goals), the second most goals were scored on area 3 of the goal (191, 20.7% of all goals). Attackers scored the fewest goals on area 5 of the goal (21, 2.3% of all goals). Goals scored on other areas of the goal: area two 96 (10.4%), area four 89 (9.6%), area six 83 (29.0%), area seven 84 (9.1%), area eight 50 (5.4%), and area nine 80 (8.7%), while attacks by throwing/drawn shots (area 10) were scored 28 times (3.0%).

When it was analyzed whether players scored goals from their appropriate post areas, it was revealed that only 57.8% was the rate when an attacker scored from their respective post areas (it means 534 goals out of 924).

When observing the finishing of attacks, it was revealed that the largest ratio of attacks (62.3%) are attempted against organized defense, in number equivalence (six attack, six defend from each team), followed by goals scored after rapid counter-attacks in number equivalence (20.5%), while goals are more rarely scored against organized defense in number equivalence (7.8%) or in inferiority (6.3%). The rarest case is rapid counterattack in number superiority (2.3%) and inferiority (0.8%). In sum, 76.4% of goals were scored against disorganized defense, while of 23.6% goals were scored against organized defense.

When analyzing the field, it was observed that pivots (69.5%), left wingers (63.1%), right wingers (66.3%) and playmakers (52.7%) scored more goals their number of unsuccessful shots on target (saved by goalkeeper or the goal was not hit). Against these, goalkeepers saved 27.3% of the shots of left backs, 23.8% did not hit the goal, while in case of right backs, goalkeepers saved 29.4% of their shots and 21.1% did not hit the goal.

Studying the zone-division of shots based on posts, it was revealed that left wingers (*A*: 35, *H*: 44), playmakers (*G*:72, *C*: 41), right backs (*F*: 69), right wingers (*E*: 60, *F*: 44) and pivots (*G*: 77) scored the most goals from their respective post areas. While left backs scored the most goals from an area different from their posts (but still internal) (*C*: 85, *G*: 66).

Observing shooting efficiency, left wingers, from zone *F* scored 73.3% of their chances, and 70.8% from zone *G*. Left backs (75%), playmakers (78.3%) and right backs (84.2%) shot the goal most efficiently from zone *G*, while right wingers did so from zones *C* and *D* (50–50%), pivots did so from zone *F* (79.2%).

There is no significant difference in attacking game elements, but by observing the averages, it is revealed that left backs give the most goal passes per game (2.37), but they also make the most technical faults (3.43). Right backs reach the most penalties (0.88/game), while playmakers reach the most time-outs (0.87/game). We would like to note that goalkeepers are not only supposed to perform defensive tasks during a game, but they actively take part in attacks at the throw-offs, although this is number is quite low (0.41/game).

Analyzing saving efficiency of goalkeepers, it was revealed that shot coming from zone *B* are the most efficiently saved (52%), followed by *C* (47.53%), *D* (39.68%), *A* (35.09), *H* (33.52%), *E* (27.31%), *F* (26.48%) and the lowest percentage of shots is saved from zone *G* (16.25%). Based on the division of the area of the goal, the saving efficiency was the following: Shots coming from area 5 were saved with 72% efficiency, shots coming from area 8 were saved with 47.37% efficiency, shots coming from area 6 were saved with 45.4%

efficiency, shots coming from area 4 were saved with 42.6% efficiency, shots coming from area 2 were saved with 36.42% efficiency, shots coming from area 1 were saved with 23.3% efficiency, shots coming from area 9 were saved with 19.19% efficiency, shots coming from area 7 were saved with 18.45% efficiency, shots coming from area 3 were saved with 16.23% efficiency and throws/drawn shots were saved with 3.45% efficiency.

5. Conclusion

We give the following answers to our hypotheses:

(H1): We find a difference between psychological traits of players based on gender among players.

(H1a): In case of BFQ scales, we have found a difference between psychological traits of players based on gender, so this **hypothesis has been proved**.

(H1b): In case of ACSI-28 scales, we have found a difference between coping strategies of players based on gender, so this **hypothesis has been proved**.

(H1c): In case of CSAI-2 scales, we have found a difference between coping stresses of players based on gender, so this **hypothesis has been proved**.

(H2): Let us assume that we find a difference between psychological traits of players based on age among junior handball players.

(H2a): In case of BFQ scales, we have found a difference between personality traits of players based on age, so this **hypothesis has been proved**.

(H2b): In case of ACSI-28 scales, we have found some difference between coping strategies of players based on age, so this **hypothesis has been partly proved**.

(H2c): In case of CSAI-2 scales, we have found a difference between stresses of players based on age, so this **hypothesis has been proved**.

(H3): Let us assume that we find a difference between psychological traits of players based on post among junior handball players.

(H3a): In case of BFQ scales, we have found a difference between personality traits of players based on post, so this **hypothesis has been proved.**

(H3b): In case of ACSI-28 scales, we have found a difference between coping strategies of players based on post, so this **hypothesis has been proved.**

H(3c): The results of the CSAI-2 scales did not display significant differences, so this **hypothesis has not been proved.**

(H4): Individual performances of players take part in the composition of the overall performance of the team in different degrees. The number of shots and shooting efficiency of left backs stand out from all other posts, so this **hypothesis has been proved.**

(H5): The success of attackers was not influenced by the fact if they shot from respective post area or from another area, so this **hypothesis has not been proved.**

The research clearly demonstrates the trainers should pay extra attention to differences of handball players on different posts. Players on different posts can be characterized by different features, and they are exposed different levels of stress during games. We would consider it important that differentiation is performed during training, players should receive adequate physical and psychological training, and stress tailored to their post from the trainer or expert, through which post-specific adaptation may be realized.

With the results of our study we would like to call the attention to the fact that trainers, in the course of planning, for the purpose of successful preparation, should take the gender and age of players into consideration when selecting different tools and methods. Moreover, when forming the roles within the team and assigning posts, the personalities of players should be familiarized with, so that the player may receive the most suitable tasks. We would also consider it important that differentiation is performed during training, players should receive adequate training and stress tailored to their post from the trainer or expert, through which post-specific adaptation may be realized.

6. List of publications by the author

Publications related to the topic of the thesis

Ökrös Cs., **Kőnig-Görögh D.**, Gyömbér N. (2020): Coping Strategies of Elite Hungarian Junior Handball Players. *Acta Medicinae et Sociologica*, 11. 30. 1-11.

Kőnig-Görögh D., Ökrös Cs., Gyömbér N. (2019b): Differences in Psychological Characteristics of Elite Junior Handball Players. *Studia Universitatis Babes-Bolyai Educatio Artis Gymnasticae*, 64. 1. 5-20.

Kőnig-Görögh D., Ökrös Cs., Győri T. (2019a): Az elit férfi kézilabdázásban jelentkező szakmai változások tapasztalatai, az elmúlt évek Bajnokok Ligája FINAL 4 mérőzései alapján. *Magyar Sporttudományi Szemle*, 20. 1. 78. S-35-S-40.

Kőnig-Görögh D., Gyömbér N., Ökrös Cs., Tóth-Hosnyánszki, A., Olvasztóné Balogh Zs., Szerdahelyi Z., Laoues N. (2018): Magyar élvonalbeli utánpótláskorú kézilabda játékosok személyiségvonásainak összehasonlító elemzése. *Magyar Sporttudományi Szemle*, 19. 4. 76. 36-41.

Kőnig-Görögh D., Ökrös Cs.: Kézilabda játékosok posztonkénti jellemzése a nemzetközi szakirodalom alapján. In: Bocsi V., Szabó, Gy. (szerk.) *Oktatás - nevelés – társadalom*, Debrecen, Magyarország : Didakt Kiadó, 2018: 179-192.

Kőnig-Görögh D., Gyömbér N., Szerdahelyi Z., Laoues N., Olvasztóné Balogh Zs., Tóth-Hosnyánszki A., Ökrös Cs. (2017): Personality profiles of junior handball players: differences as a function of age, gender, and playing positions. *Cognition Brain Behaviour: An Interdisciplinary Journal*, 21. 4. 237-247.

Publications not related to the topic of the thesis.

Kőnig-Görögh D.: Kimozdulások. Gyermeki mozgásélmények változatai. In: Bujdosóné P. A., Gesztelyi H. (szerk.): A teljesség harmóniája I. A művészettel nevelés értelmezései. Didakt Kft., Hajdúböszörmény, 2020. 193-213.

Kőnig-Görögh D.: A mozgás komplexitása. In: Bujdosóné P. A., Gesztelyi H. (szerk.): A teljesség harmóniája II. A művészettel nevelés kreatív élményei. Didakt Kft., Hajdúböszörmény, 2020. 159-179.

Kőnig-Görögh D., Szerdahelyi Z., Czimbalmos-Laoues N., Olvasztóné Balogh Zs.: 4-6 éves korú magyar óvodások testi fejlődésének és motorikus szintjének összehasonlító elemzése. In: Pálfi S. (szerk.): Kora Gyermekkori Nevelés, Család és Közösségek, Kapitális Kft., Debrecen, 2020: 95-109.

Tóth F., **Kőnig-Görögh D.** (2018): Óvodáskorú gyermekek motoros képességeinek és testösszetételének összehasonlító elemzése. In: Bocsi, Veronika; Szabó, Gyula (szerk.) Oktatás - nevelés – társadalom, Debrecen, Magyarország : Didakt Kiadó, 131-144.