

Flow Experience And Performance: A Study of Elite Turkish Handball Players

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Abstract:

The aim of this study was to determine the flow states of elite handball players and to examine its effects in terms of several variables. 34 (19 female- 15 male) athletes aged 27.22± 5.44 competing in Turkish Handball Super League participated in the study and as a result of a total of 17 matches (men 10, women 7), 142 participations were included into evaluation. At the end of the matches, the athletes were given Personal Information Forms together with the form on their perceptions of the difficulty levels of the competition and the Dispositional Flow State Scale-2, which was developed by Jackson and Eklund (2004) and adapted into Turkish by Aşçı et al. (2007). As a result of the study, it was found that elite female handball players had higher flow experiences than elite male handball players. Flow experiences of handball players aged 30 and over were found to be significant at a higher level than those of handball players aged 30 and under; it was also concluded that the relationship between perception of difficulty and flow state, duration of game, gender and age are effective determiners.

Key Words: Handball, Flow State, Elite Players, Performance

Introduction

Today, with the agreement upon the fact that various psychological skills influence physical performance, the number of studies carried out in the field is gradually increasing. Knowing the effect of the athletes' flow state on behavior is considered to be important in terms of improving performance. In addition, the assumption that flow state can have a positive effect on performance increases the importance of any research into the issue. Flow State is the optimal mental state coming out of the balance between the skills performed by individuals during physical activity and the perceived state at that time, the individual's concentration on an activity, the requirements or struggle in an environment of sports and physical activity (Aşçı et al.2007; Csikszentmihalyi 1990).

In another definition, on the other hand, flow is an individual getting wholly absorbed in an activity (Bakker et al. 2011), how much individuals are engaged in what they are doing, how well they can concentrate, the enjoyment they have doing that job without any external pressure and a psychological state when the individual feels cognitively capable, motivated and happy at the same time (Özşahin 2005). Schüler and Brunner (2009) define flow state as the "positive" and "motivating force" experienced during an activity, Csikszentmihalyi (1997) expresses that flow can be formed in a peak experience in any activity and Eccles and Wigfield (2002) highlight that flow experience occurs with overcoming challenges or adapting to a given situation. This situation is enjoyed so much by the individual experiencing flow that the individual agrees to bear any kind of challenge just to reach this happiness. The joy doing this and the desire to continue with intrinsic motivation are seen as the reason that flow experience covers the individual completely (Fullagar and Kelloway 2009). In their study, Lutz and Guiry (1994) define flow as the state in which the human mind is deeply engaged in an activity and the individual is so completely absorbed in the event that feels as if time has stopped during this process. In addition, some researchers report that flow occurs in the course of a number of different activities within the sport (Demerouti 2006; Jackson and Csikszentmihalyi 1999).

Many research studies have been carried out on flow state/flow experience in the field of education and sports. Studies regarding education are mainly related with flow state that occurs during preparation for academic examinations and participation in out-of-class activities and academic achievement (Cermakova et al. 2010; Seo 2011).

Studies on flow state/flow experience and sports on the other hand are important since they are related to positive emotional states, skills development, performance improvement, life satisfaction, self-conception,

psychological skills, motivational climates, social objectives, goal orientation, perceived competition, self-confidence and anxiety (Csikszentmihalyi 1990; Cutre et al. 2009; Koehn 2013). On the other hand, many studies have been conducted on the concept of flow in sports in elite athletes and recreational activities (Kimiecik and Stein 1992; Jackson et al. 1998). These studies suggest that elite athletes can experience flow both in training sessions and in matches.

A number of studies on flow in sports focus on individual and team (Jackson 1995; Russell 2001) sports. For instance, the study of Bakker et al. (2011), in which they examined the relationship between flow and performance, included team sports such as football, volleyball, baseball, women baseball and basketball as well as such individual sports as swimming, running, wrestling and triathlon. Still, other studies have shown that flow state has a positive effect on performance in the branches of cycling, golf, athletics and basketball (Lindsay et al. 2005; Judge et al. 2010).

Most studies have revealed a strong positive relationship between flow and peak performance in sports (Beal et al. 2005; Jackson and Csikszentmihalyi 1999; Nakamura and Csikszentmihalyi 2002). Engeser and Rheinberg (2008) express the need for two important reasons for the improvement of flow state in flow state. The first one focuses on the fact that individuals improve their performance while in flow state. The second is the desire they have to attain more challenging individual goals in order to reach flow. In addition, since individuals are lost in the event and are extremely concentrated when they are in flow state, it is stated that their performance would improve positively as well (Beal et al. 2005).

Reaching peak performance in sports is one of the most important goals of elite athletes and coaches. Flow state helps and enables them to reach this goal (Jackson and Csikszentmihalyi 1999). In this respect, flow pushes an individual's borders while being a very significant factor for athletes to be the best (Jackson and Roberts 1992). It is seen that flow states of women's and men's handball teams competing at varying levels of difficulty have not been studied so far.

Purpose of Research: The aim of the present study was to examine flow states of elite handball players in terms of the perception of the competition's level of difficulty, duration of the game, age and gender and to determine any differences between them.

Material & methods

Participants

The study was participated voluntarily by 34 female and male (19 female-15 male) elite handball players aged 27.22 ± 5.44 playing for Izmir Metropolitan Municipality, competing in the Turkish Handball Super League and 142 participations were included in the evaluation as a result of the total 17 matches (men 10, women 7) played.

Measures

Together with the personal information form also specifying the duration for which the players performed, the players were give the form on perception of difficulty of the competition (low-moderate-high) and the Dispositional Flow State Scale-2 which was developed by Jackson and Eklund (2004) and adapted into Turkish by Aşçı et al. (2007). Necessary permissions were taken from the athletes and the teams for the study and the players were asked to fill in the DFS scale in the first 30 minutes following the matches in order to have them reflect their feelings about their flow state. The scale took 20 minutes to fill in.

Dispositional Flow State Scale-2

Dispositional Flow State-2 (DFS-2) Scales were developed by Jackson and Eklund (2004) in order to measure the state of flow when participating in a specific physical activity. DFS-2 reflects the optimal performance effect experienced by an individual upon completing an activity. Based on the theoretical grounds of Csikszentmihalyi (1990), DFS consists of 9 subscales. These 9 subscales are Challenge-Skill Balance, Action- Awareness Merging, Clear Goals, Unambiguous Feedback, Total concentration on the task at hand, Sense of Control, Loss of Self-consciousness, Transformation of Time and Autotelic Experience. The scale is a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) and is applied as soon as possible upon completion of the activity. The average high score obtained from both scale forms (4–5 points) shows that the person has achieved the flow state in the activity s/he participated in while low scores mean that the individual has failed to experience flow state.

Statistical Analysis

The SPSS 16.00 version was used for the data analysis. Whether or not the data followed normal distribution was established with the Kolmogorov-Smirnov Test and the Shapiro-Wilk Test and it was observed that not all variables followed a normal distribution. Since variables did not follow normal distributions, the Mann-Whitney U test was used for pair-wise comparisons and the Kruskal-Wallis Test was used for multi comparisons. Correlations between the scales and subscales were analyzed with correlation analysis and Multiple Linear Regression analysis was performed. For all analyses, a probability level of $p < 0.01$ and $p < 0.05$ defined statistical significance.

Results**Table 1:** Correlation between Dispositional Flow States of Elite Handball Players (DFS-2)

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age												
2.Experience	.733**											
3.Game.Duration	.277**	.283**										
4.Task.Difficulty	.182*	.196*	.313**									
5.Action	.242**	.283**	.419**	.484**								
6.Clear.Goals	.215*	.171*	.328**	.470**	.649**							
7.Unambiguous.Feedback	.335**	.264**	.479**	.481**	.712**	.766**						
8.Concentration.on.Task		.168*	.185*	.514**	.589**	.706**	.595**					
9.Sense.of.Control	.284**	.247**	.315**	.530**	.750**	.770**	.784**	.698**				
10.Self-consciousness	.288**				.255**	.316**	.317**	.276**	.339**			
11.Transformation.of.time				.246**				.257**		.223**		
12.Autotelic.Experience			.245**	.601**	.346**	.579**	.436**	.708**	.462**		.359**	
13.Grand.Total	.247**	.237**	.325**	.662**	.732**	.834**	.758**	.824**	.812**	.454**	.395**	.691**

***, P* < 0.01 **. P* < 0.05

In the examination of the correlations of elite handball players' Dispositional Flow States (DFS-2) among several variables, significant relations were found between age, experience and participation in game and the Task Difficulty (TD), Action (Ac), Clear Goals (CG), Unambiguous Feedback (UF), Concentration on Task (CoT), Sense of Control (SoC), Self-consciousness (S-C), Transformation of Time (ToT) and Autotelic experience (AE) subscales and the grand total (GT) of the DFS-2; the relations of the DFS- subscales with each other are presented in Table 1.

Table 2: Linear Regression Analysis concerning Dispositional Flow States (DFS-2)

	B	Sd	T	P	
DFS-2	Gender	9.789	3.296	2.970	.004**
	Education	-7.610	5.480	-1.389	.167
	Age	13.003	4.086	3.183	.002**
	Game Duration	4.621	3.435	1.346	.181

P < 0.01**

The Linear Regression Analysis results showed that the relative order of importance of the determining variables on the Dispositional Flow State was as age and gender according to the standardized regression coefficient (β), while the t-test on the significance of the regression coefficient found that variables of gender and age were significant determiners of Dispositional Flow State.

As seen Mann-Whitney U Test Concerning Flow States of Elite Handball Players by Gender, a significant difference was found in favor of Female Handball players in the Clear Goals ($U=1788,500$; $p<0.01$), Concentration on the task ($U=1725,000$; $p<0.01$), Sense of Control ($U=2000,000$; $p<0.05$), Autotelic Experience ($U=1886,000$; $p<0.01$) subscales and grand total ($U=1978,500$; $p<0.05$) of the dispositional flow states of elite handball players (DFS-2) in terms of their gender.

When Dispositional Flow States of elite handball players were examined in terms of their age, a significant difference was found in favor of handball players aged over 30 in the Action ($U=1277,000$; $p<0.05$), Clear Goals ($U=1075,500$; $p<0.01$), Unambiguous Feedback ($U= 821.000$; $p<0.01$), Concentration on the Task ($U= 1266,500$; $p<0.05$) and Sense of Control ($U=1166,500$; $p<0.01$), Self-consciousness ($U=1232,500$; $p<0.01$) subscales and the Grand Total ($U=1078,500$; $p<0.01$) of the DFS-2 scale. In accordance with these findings, flow states of handball players aged over 30 were found to be higher than of those aged under 30.

Mann-Whitney U Test concerning the athletes' flow states in terms of game duration is observed that the Dispositional Flow States of elite handball players were higher in players who played in almost the entire duration of the game while it was lower in those who played for 30 minutes or under.

As seen Flow States of Elite Handball Players in terms of their Perceived Level of Difficulty of Competitions, In the analysis of the DFS-2 in terms of subscales, significant differences were found in Task Difficulty ($U=1845,500$; $p<0.01$), Action ($U=1587,500$; $p<0.01$), Clear Goals ($U=1691,000$; $p<0.01$), Unambiguous Feedback ($U= 1304,500$; $p<0.01$), Sense of Control ($U=1741,500$; $p<0.01$), Autotelic Experience ($U=1987,500$; $p<0.05$) and the Grand Total ($U=1808,500$; $p<0.01$) in favor of players who played for 30 minutes or more. According to the results of the Kruskal-Wallis Test of perceived level of difficulty, significant differences were found in the Action ($X^2=12,101$; $p<0.01$), Unambiguous Feedback ($X^2=6,670$; $p<0.05$), Transformation of Time ($X^2=9,876$; $p<0.01$) and Autotelic Experience ($X^2=8,198$; $p<0.01$) subscales of the elite handball players' dispositional flow states (DFS-2). In the Mann-Whitney U test on the reason of the significant differences, significant differences were found between low level perception and moderate level perception ($U= 692,000$; $p<0.01$) and between low level perception and high level perception ($U= 862,500$; $p<0.01$) in the Action subscale in terms of the difficulty levels of competitions.

In addition, while a significant difference was found between low level perception and moderate level perception ($U= 791,500$; $p<0.01$) in the Unambiguous Feedback subscale; significant differences were found between low level perception and moderate level perception ($U= 785,000$; $p<0.01$) and between low and high perception ($U= 807,500$; $p<0.01$) in the Transformation of Time subscale. In the Autotelic Experience subscale,

on the other hand, a significant difference was observed between low and high perceptions ($U= 815,500$; $p<0.01$).

Discussion

In the present study carried out to examine elite handball players' flow states in terms of perceived level of difficulty of the competition, duration of the game, age and gender and to determine any differences between them, analysis carried out in terms of gender showed that male and female handball players' flow states varied in terms of the Clear Goals, Concentration of Task, Sense of Control and Autotelic Experience subscales and the grand total of the Dispositional Flow State and that females had higher scores. Different from the findings of the present study, Bakirtzoglou and Ioannou (2011) found no difference between the overall flow states of female and male students. Similarly, in the studies carried out by Russell (2001), Stavrou et al. (2007), Sharp et al. (2007) and Aşçı et al. (2010), no difference was found in the context of gender. These findings show that male and female exercise participants or athletes had similar perceptions of achievement on the physical activity they do; both groups had the belief that they could do the tasks automatically without thinking and that they had similar levels of intrinsic joy by concentration on the activity; however, in the present study females were found to be more engaged in flow in comparison to males.

It has been found that female handball players can keep themselves within the flow better than male handball players under all circumstances without perceiving match difficulty. It could be considered that they would concentrate on the task at hand to reach their own goals even if the task difficulty is higher than their skills and they could sustain their sense of control by assigning different tasks to themselves. In short, it could be understood that female handball players can perceive many new states to be learnt even when they lose. It could also be assumed that they can stay in the flow by employing new technical or tactical variables to improve themselves when they encounter a weak opponent. In the study carried out by Ersöz (2011), males were found to have higher averages of flow state than females. Likewise, Murcia et al. (2009) suggest that males have higher flow state scores than females. Additionally, Welch (2008) concluded that males had higher flow states than females in the subscales of Task Difficulty/skill balance and Sense of Control. Some studies, on the other hand, have reported that flow states of male and female participants do not differ (Koehn 2007; Russell 2001). In addition, Erkmén et al. (2010) stated that flow states of individuals exercising for more than six months did not vary by gender. This could be associated with the fact that athletes are from different age groups and different cultures.

When elite handball players were examined in terms of their age, players aged over 30 were found to have higher Dispositional Flow States than those under 30 in the action clear goals, unambiguous feedback, concentration on the task, sense of control, self-consciousness subscales and the grand total. In accordance with these findings, flow states of handball players aged over 30 were found to be higher than those aged under 30. This finding shows that handball players aged over 30 perceive flow experience positively in all cases (win-loss-draw-the match being easy or difficult). According to Aşçı et al. (2010), players who participated in exercise for more than 5 years have higher scores on unambiguous feedback and sense of control subscales than those who exercised for five years and less. However, they reported that players who participated in exercise for 5 years and less had higher scores on the "Transformation of Time" subscale.

In addition, the Linear Regression Analysis results showed that the relative order of importance of the determining variables on the Dispositional Flow State was as age and gender according to the standardized regression coefficient (β); the t-test on the significance of the regression coefficient found that variables of gender and age were significant determiners of Dispositional Flow State. With this research finding, it was determined that particularly females concentrated on the match better and that flow was experienced more deeply as age got higher. It was observed that the Dispositional Flow States of elite handball players were higher in players who played for almost the entire duration of the game while it was lower in those who played for less than 30 minutes. Examining in terms of the DFS-2 subscales, significant differences were found in Task Difficulty, Action, Clear Goals, Unambiguous Feedback, Sense of Control, Autotelic Experience subscales and the grand total in favor of players who play for 30 minutes and longer. Flow experience was found to be positively related with the time spent on time in the study carried out by Lee et al. (2012). They stated that participants who spared more time for the game were engaged more in the flow. This study supports the findings of our study. It is a known fact that if handball players want to be more successful, it is important for them to increase their playing time. However, it is not possible to allow enough time for each player constantly in compliance with the match conditions. This can both be eliminated by designing special competitions and by increasing the awareness of players under 30 in order for them to improve their performance by keeping in the flow through motivating them to contribute more to themselves and the team during the time they spend in the game.

When elite handball players' Dispositional Flow States were examined in terms of their perceptions of difficulty levels of matches significant differences were found in the Action, Unambiguous Feedback, Transformation of Time and Autotelic Experience subscales. In their study, Eccles and Wigfield (2002) reported that before experiencing Flow States, both skills and perceptions of difficulty must be highly correlated.

A significant difference was determined between perceiving competitions at low levels and perceiving them at moderate and high levels in terms of difficulty in the Action subscale. Among elite level handball players, those who perceive low difficulty levels are understood to perform technical and tactical skills automatically by perceiving them better than those having moderate and high perception levels of difficulty.

In the Unambiguous Feedback subscale, players who perceive competition difficulty at low levels can also find the opportunity of correction since they receive feedback on poor performance of their skills. This can be true for a well-performed technique as well. That is, it is possible that players repeat a well-performed technique as they receive sufficient feedback. Those who perceive skill difficulty at low levels receive feedback since they feel how they perform a move. Therefore, they could also be observed to perform the moves well and be engaged in the flow.

A significant difference was found between perceiving competition difficulty at low and moderate levels ($U= 785,000$; $p<0.01$) and between perceiving it at low and high levels ($U= 807,500$; $p<0.01$) in the Transformation of Time subscale. Handball players who perceive competition difficulty at high and moderate levels become wholly absorbed in time doing the activity, get lost in the activity and lose track of time when compared to those perceiving it at low levels. In the Autotelic Experience subscale, a significant difference was determined between perceiving competition difficulty at low levels and at high levels ($U= 815,500$; $p<0.01$). Players who perceive competition difficulty at high levels enjoy the activity more and have higher intrinsic satisfaction than those having perceptions at low levels.

Male and female athletes competing in the Turkish Handball Super League perceived actions better in competitions of low difficulty levels and comprehend certain feedback more clearly, whereas those perceiving competition difficulties at higher levels got lost in the game, lost track of time in the game and enjoyed the game more than those having perceptions at low levels as well. Supporting this finding, the study carried out by Totterdel (2000) with players of cricket teams found a significant correlation between team players' mean happy moods and the athletes' subjective performances. In addition, it was concluded that athletes being engaged in a happy and shared activity affected their flow experience in a positive direction (Bakker and Xanthopoulou 2009). According to another study carried out with players, it is possible to expect that there is a balance in the match when they are confronted with a team that is approximately equally skilled and the soccer players have to do their utmost to beat the opponent during an exciting game. On the contrary, it is observed that players' seeing the opponent weaker (low challenge in the situation, self high skills), or stronger (high challenge, low skills) than themselves forms the perception of stress and may affect flow experiences in a positive/negative way (Bakker et al. 2011).

In the players of two teams (women-men) competing in the Handball Super League, those who perceive competitions at low difficulty levels experienced flow in the action and unambiguous feedback subscales, while players who perceive competition difficulties at high levels were observed to be in flow in the autotelic experience and getting lost in time subscales. This shows the fact that Handball Super League players perform actions without thinking in competitions they perceive at low levels for themselves they can receive clear information about their performance. In competitions in which they perceive the difficulty at high levels, on the other hand, it is understood that they have more intrinsic satisfaction and get lost in time. This shows us perceptions of different difficulty levels result in flow experiences at different degrees.

Delle Fave and Massimini (2005) address positive effect, arousal and intrinsic motivation as the facilitating factors for the formation of flow related phenomena. On the other hand, some researchers agree that the occurrence of flow is most likely when people perceive a balance between the challenge of a situation and their own skills to deal with this challenge (Fullagar and Kelloway 2009). Therefore, based on the literature (Csikszentmihalyi 1997; Fullagar and Kelloway 2009), they argue that football players experience the highest level of flow when the result of a match is a draw (no win or loss). They note, however, that this experienced flow is independent of the outcome, while, in contrast, it is dependent on the processes that occur within the game.

Conclusion And Recommendations

In conclusion; it has been seen that age and gender are significant determiners of Flow State and that particularly women better concentrate on and experience the match, while players who have more experience due to increased age and who stay in the game for longer during the match experience match-related flow. In this respect, it is necessary that athletes do mental activities and are motivated to increase their flow states and help them immerse themselves in both matches and training exercises. It is considered that adding tests such as personality and locus of control, associating skills and performance states and including participants of different age groups and branches in future studies concerning Flow State would be purposeful.

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