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Relationship between identification levels of fans that support Turkish Super League's three big football clubs with their teams and their consumer behavior intentions

Utku Isik[1], Arslan Kalkavan[2] and Seydi Karakus[1]

[1] Dumlupınar University, Kutahya, Turkey.
[2] Recep Tayyip Erdoğan University, Rize, Turkey.

utkuisik87@gmail.com

Abstract

This study aimed to reveal the sports consumption behavior and intentions of fans of three big football teams competing in Turkish Super League and investigate how these intentions varied based on levels of identification with their teams. In addition, the study also attempted to detect whether there were any differences in the consumption behaviors of the fans of these three big teams (Fenerbahçe, Galatasaray and Besiktaş) and to present related reasons, if any. Fans of the sports clubs competing in Turkish Super League -Fenerbahçe, Galatasaray and Beşiktaş- participated in the study on voluntary basis. A total of 548 sports fans participated in the study: 32.30% (N=177) of these fans supported Besiktaş, 34.30% (N=188) supported Galatasaray and 33.40% (N=183) supported Fenerbahçe. In the framework of the study, Sports Consumption Behavior Scale, developed by Kim et al. (2011), whose validity and reliability of the Turkish version was tested by Kiremitci et al. (2014) was used along with Sport Spectator Identification Scale, developed by Wann and Branscombe (1993) whose validity and reliability of the Turkish version was tested by Günay and Tiryaki (2003) in order to realize the purpose. In conclusion, a positive and significant relationship was found between the consumption behavior intentions of the fans that support the three big teams in the Turkish Super League and their identification levels with their teams. In addition to this, Fenerbahçe supporters were found to display more identification with their teams compared to Galatasaray and Beşiktaş fans and Galatasaray fans were observed to have statistically more significant and higher means both in attendance and media consumption intentions compared to the fans of the two other big teams ($p<0,05$).

Keywords: Sport spectator identification, Turkish super league, sports consumption behavior

INTRODUCTION

In recent years, sports have started to occupy an important place in our daily lives. The number of individuals who actively do sports to be healthier and to benefit from various advantages of sports has increased. Sports fandom has also gained a new dimension in the modern world and this concept is investigated by several disciplines. What affects sports fandom and the fans' sports related consumption is a crucial dynamics that needs to be comprehended by sports administrators.

In recent years, various sports marketing studies have focused on sports consumption behaviors and intentions. These studies have presented many factors that affect intentions and behaviors. Motivation is known to be one of the major effects (Fink et. al., 2002; Funk et. al., 2002; Wann et. al., 1999). Parallel to this, value associated with the team has significant impact on sports consumption behaviors (Dalakas and Kropp, 2002; Madrigal, 2001; Schwartz, 1992; Shao, 2002). Individuals who display different behaviors in sports competitions may attach importance to different values; individuals who pay per view and watch sports competitions at home and individuals who watch sport competitions from the tribunes similarly have different emphasis for different values.

Identifying with the team or forming psychological ties with it is one of most commonly investigated topics by the researchers (Fink et. al., 2002; Jones, 1997; Wann and Branscombe, 1993; Wann and Dolan, 1994; Wann and Schrader, 1997). Fan endeavors for identification with their teams display strong evidence that presents various fan behaviors. It is known that individuals who identify with their teams more spend more time on TV, go to football matches more and spend more money (Pease and Zhang, 1996; Wakefield, 1995; Wann and Branscombe, 1993; Wann et. al., 1999). They also have more positive views about the future successes of their teams (Wann & Branscombe, 1993) and find watching football matches more enjoyable (Madrigal, 1995; Wann & Schrader, 1997; Greenwood et. al., 2006).

Quoted from Fairley et al. (2015); consumption becomes an opportunity to symbolize or reinforce the identification (Giddens, 1991; McCracken, 1986). Consequently, identification with a sport, team, or leisure subculture is associated with elevated consumption of goods that have symbolic value in the subculture (Algesheimer et al., 2005; Green, 2001; Kwon & Armstrong, 2002, 2006; Schouten & McAlexander, 1995). In the case of professional sport, fans who identify with a team invest larger amounts of time and money on team paraphernalia and watching the team play (Fisher & Wakefield, 1998; Laverie & Arnett, 2000; Matsuoka et al., 2003). Further, this higher level of identification could potentially lead to traveling to follow one's favorite team or travel to a sport event (Fairley, 2003; Green & Jones, 2005).

While observing a sportive event accompanies the fact that the event will be forgotten in a short time period, fans or fandom that involves significant commitment includes showing long term interest towards the sportive event, sportsmen and the team; committing a rather lengthy time frame in one's life to the team and regarding fandom as a part of one's life. According to Mullin et. al. (2007), consumer behaviors, feelings and sentiments are affected by sport fans' thoughts, sports products and services. Therefore, studies point to relationships between consumer behaviors and sport fans' identification (Laverie and Arnett, 2000; Madrigal, 1995; Wakefield, 1995; Wann and Branscombe, 1993).

In addition to many factors such as level of identification with the team, impact of peer groups, commitment to the team, the atmosphere of the store, pleasure from shopping, quality of the licensed product and its value for the consumer, sportive achievements of the team also affects the behaviors

that motivate fans to purchase products (Kwon and Kwak, 2014; Torlak et. al., 2014). This concept examined in the literature as core service quality is interested in values such as general performance of the team, the number of victories or defeats, position of the team in the league, existence of a star player in the team, general quality of the team and the image and charisma of the coach (Byon et. al., 2013).

Comprehension of fans' consumption behaviors and identifying their marketing strategies based on this comprehension by the sports clubs and companies that produce licensed products is crucial for the future of the clubs. Considering the fact that increases in club income will result in success and increases in success will result in club income, it becomes evident that these two variables should be well managed. If the view stating that fans identifying with their teams consume more sports products can be proven, the dynamics of identification with the team may be explored and the road to bringing more income to the team can be paved. In this context, this study intended to present sports consumption behavior and intentions of fans of three big football teams competing in Turkish Super League, to identify whether there were any relationships between these intentions and identifications with their teams and to clarify the reasons behind the differences.

METHODS

Participants

Fans of the sports clubs competing in Turkish Super League participated in the study on voluntary basis. A total of 548 sports fans participated in the study: 32.30% (N=177) of these fans supported Besiktaş, 34.30% (N=188) supported Galatasaray and 33.40% (N=183) supported Fenerbahçe. Mean age of the participants was as follows: M_{age} = 26.21 +/-7.34. Convenience sampling technique was used in the study.

Data Collection Tools

Sports Consumption Behavior Scale: The scale developed by Kim et. al. (2011) whose validity and reliability of the Turkish version was tested by Kiremitci et al. (2014) is composed of three sub dimensions. These sub dimensions are Attendance Intention, Media Consumption Intention and Licensed Merchandise Consumption Intention. The scale is a 5-pioint Likert type scale.

Sport Spectator Identification Scale: Sport Spectator Identification Scale, developed by Wann and Branscombe (1993), whose validity and reliability of the Turkish version was tested by Günay and Tiryaki (2003) was used in the study to measure spectator identification levels. Günay and Tiryaki's (2003) study presented the Cronbach Alpha value of the scale as 0.87. The scale has 7 items.

Procedure

Participants that took part in the study were selected via convenience sampling method. Researchers administered the scales to the participants before the matches of participants' own teams at the entrances of stadiums where participants were requested to correctly fill in the forms. 12 students attending the School of Physical Education and Sports assisted the researchers. A total of 548 fans correctly filled the scales. The scales were administered to the fans of all three teams during the home match of the second half of 2014-2015 Turkish Super League Season. The scales were filled by the fans of Fenerbahçe Club in front of Fenerbahçe Şükrü Saraçoğlu Stadium on 20.04.2015, by fans of Galatasaray Club in front of Ali Sami Yen Türk Telekom Arena Stadium on26.04.2015 and by fans of Beşiktaş Club in front of Osmanlı Stadium in Ankara on 27.04.2015.

Data Analysis

SPSS 21.0 package program was used to analyze the data obtained from the study. Descriptive analysis method (frequencies and percentages) was utilized to analyze the participants' general demographical information. Shapiro-Wilk and Lilliefors corrected Kolmogorov–Smirnov test was adopted for use in order to determine whether the sub dimensions of the scale showed normal distribution. Based on the test, it was found that not all sub dimensions revealed normal distribution ($p<0,05$). At this point, Spearman Correlation analysis was used to identify linear relationships of the scales, Mann Whitney-U test was utilized for pairwise groups and Kruskal Wallis test was adopted for variables with three of more groups.

RESULTS

Table 1. Distribution of Personal Information for the Working Group

FACTOR	VARIABLE	F	%
Gender	Female	185	33.8
	Male	363	66.2
	Total	548	100.0
Age	22 and younger	186	33.9
	23-25	146	26.6
	26-28	74	13.5
	29-31	46	8.4
	31 and higher	94	17.2
	Total	548	100.0
Team	Fenerbahçe	183	33.4
	Galatasaray	188	34.3
	Beşiktaş	177	32.3
	Total	548	100.0
Level of Education	Primary	53	9.7
	Secondary	94	17.2
	High School	121	22.1
	University	236	43.1
	Graduate	44	8.0
	Total	548	100.0

Table 1 presents the distribution of personal information regarding the participants. According to the data, 66,2% of the participants in the sample were males (N=363), 33,8% were females (N=185). Five different age ranges were used in the study. When the age categories included in the samople group were taken into consideration, it was seen that fans in the age range of "22 years and younger" were more common with a rate of 33.9% (N=186) whereas fans in the age range of "31 years and older" showed the least amount of participation with 15,1% ratio. 43,10% of the participants (N=236) were university graduates.

Table 2. Normalcy Test

	Kolmogorof-Smirnov			Shapiro-Wilks		
	Statistical Value	df	p	Statistical Value	df	p
Attendance Intention	0,194	547	,000	0,864	547	,000
Media Consumption Intention	0,176	547	,000	0,883	547	,000
Licensed Merchandise Consumption Intention	0,154	547	,000	0,893	547	,000
Identification	0,127	547	,000	0,932	547	,000

Examination of Table 2 displays that all sub dimensions and trends of identification with the team did not show normal distribution (p<0,05).

Table 3. Consumer Behavior Intentions and Level of Identification with the Team According to Gender Variable

	Gender	N	Mean Rank	U	Z	p
Identification with the Team	Female	185	302,73	23329,00	-5,852	,000*
	Male	363	219,10			
Attendance Intention	Female	185	248,64	28793,00	-2,765	,006*
	Male	363	287,68			
Media Consumption Intention	Female	185	228,37	24999,50	-4,863	,000*
	Male	363	297,13			
Licensed Merchandise Consumption Intention	Female	185	245,11	28140,00	-3,132	,002*
	Male	363	289,48			

*p<0,05

Examination of Table 3 shows significant differences based on Man-Whitney-U analysis in levels of identification with the team for male and female fans (z=-5,852; p<0,05); in Attendance Intention sub dimension (z=-2,765; p<0,05); in Media Consumption Intention sub dimension (z=-4,863; p<0,05) and Licensed Merchandise Consumption Intention sub dimension (z=-3,132; p<0,05). Mean ranks show that male participants had higher scores in all sub dimensions compared to female participants.

Table 4. Spearman Correlation Analysis for Consumer Behavior Intentions and Level of Identification with the Team

		X	SD	Identification with the Team	Attendance Intention	Media Consumption Intention	Licensed Merchandise Consumption Intention	p
Fenerbahçe	Identification with the Team	42,25	9,45		,540**	,566**	,596**	0,00
	Attendance Intention	2,45	,48	,540**		,749**	,688**	0,00
	Media Consumption Intention	2,42	,49	,566**	,749**		,705**	0,00
	Licensed Merchandise Consumption Intention	2,38	,50	,569**	,688**	,705**		0,00
Galatasaray	Identification with the Team	41,79	8,97		,390**	,518**	,432**	0,00
	Attendance Intention	2,49	,48	,390**		,477**	,556**	0,00
	Media Consumption Intention	2,52	,46	,518**	,477**		,506**	0,00
	Licensed Merchandise Consumption Intention	2,43	,54	,432**	,556**	,506**		0,00
Beşiktaş	Identification with the Team	39,85	9,84		,591**	,519**	,550**	0,00
	Attendance Intention	2,35	,56	,591**		,777**	,714*	0,00
	Media Consumption Intention	2,31	,57	,519**	,777**		,668**	0,00
	Licensed Merchandise Consumption Intention	2,32	,58	,550**	,714**	,668**		0,00

**p<0,01

Table 4 points to positive and significant relationships between the consumer behavior intentions and identification with their teams for the fans of all teams (p<0,05). In other words, Attendance Intention, Media Consumption Intention and Licensed Merchandise Consumption Intention increase in all teams when identification with the team increases. Linear relationships were found between sub dimensions in all teams (p<0,01).

Table 5. Kruskal Wallis Test Results for Participants' Identification and Consumer Intentions based on their Teams

Dimensions	Teams	N	Mean Rank	df	X^2	P
Identification with the Team	Fenerbahçe	183	294,47	2	8.270	.016*
	Galatasaray	188	280,34			
	Beşiktaş	177	247,65			
Attendance Intention	Fenerbahçe	183	273,38	2	6.091	.048*
	Galatasaray	188	294,63			
	Beşiktaş	177	254,28			
Media Consumption Intention	Fenerbahçe	183	269,06	2	12.874	.002*
	Galatasaray	188	304,63			
	Beşiktaş	177	246,54			
Licensed Merchandise Consumption Intention	Fenerbahçe	183	268,66	2	3.819	.148
	Galatasaray	188	292,20			
	Beşiktaş	177	261,75			

*p<0,05

Table 5 presents Kruskal-Wallis test results for identification and consumer intention sub dimensions for the teams. Based on analysis results, there are meaningful differences between identification with the team ($X^2(3)=8.270$; $p<0.05$), attendance intention ($X^2(3)=6.091$; $p<0.05$) and media consumption intention ($X^2(3)=12.874$; $p<0.05$) based on the teams they support. Mean rank for the teams show that Fenerbahçe fans have more identification with their teams compared to Galatasaray and Beşiktaş fans. In addition, Galatasaray fans have higher means both in attendance intention and media consumption intention compared to both Fenerbahçe and Beşiktaş fans. In other words, while Fenerbahçe fans have more identification with their teams, Galatasaray fans attend more matches and want to follow their teams from the media in higher ratios.

DISCUSSION and RESULT

According to Trail and James's (2001) studies, spectator behaviors are based on psychological and social needs. Comprehending the importance of motivation to attend a sportive activity is related to understanding the forms of sportive consumption; sports spectators and fans display different trends based on their characters. These various diversities have created different types of sports consumption (attending sportive events, watching matches on TV or buying sportive merchandise). The most significant part of fan motivation in a sportive activity is closely related to the success of the team and high performance presentation during the match.

This study examined the levels of relationship between Attendance Intention, Media Consumption Intention and Licensed Merchandise Consumption Intention and the team identification levels for the spectators of three big teams that compete in Turkish Football Super League. Results show that higher identification levels point to higher purchasing behavior. In their study, Torlak et. al. (2014) found that spectator identification levels have significant effects on both the quality perceptions of licensed merchandise and licensed merchandise consumption intention. The study conducted by Greenwood et. al. (2006) on the fans of medium level professional sportsmen revealed that fans that identify with their teams set aside larger budgets to buy tickets for their teams. This study and similar studies in the literature (Harolle et. al., 2010; Tsiotsou, 2006) have parallel findings with the current study. Also Fairley et al. (2015) mentioned about relationship between consumption and identification on sport field.

Another result of the current study thought to contribute to literature is the finding that the position of the teams in the league affects the level of fan identification and their consumption intentions. Previous literature studies (Kwon and Kwak, 2014; Kim SK, 2013; Kim JW, 2013) reported that sports consumption intention of the spectators did not change much according to losing or winning a match and was more related to the level of identification with the team and various value judgments related to the team. Unlike Karakus (2014) study offers the following result based on the data obtained in this scope: Intention of a spectator to attend future games decreases, at a statistically significant level, particularly after a lost game. This study's statistical analyses show that Fenerbahçe fans have higher identification levels with their teams compared to the fans of other teams. When scale implementation locations and dates were considered, the last league competition prior to the date of scale implementation for Fenerbahçe fans (20.04.2015) was Çaykur Rize Spor match played on 04.04.2015. There was an armed assault on the team bus following this match and the bus driver was injured. These type of social impact and events are known to affect fan identification sentiments (Trail and James, 2001). These social cases can be said to increase fans' drive to protect their teams. As a matter of fact, fans showed more interest to the match following this incident compared to all the other matches of the season (www.milliyet.com, Access date: 01.06.2015). The reason why Beşiktaş football spectators have statistically lower identification and consumption intentions compared to the fans of other teams may be related to the fact that the specific match included in the study was played in another city and in the stadium of another club. The spectators who came to watch the team that had to play football in a different province since the construction of Beşiktaş stadium was still ongoing were not the regular Beşiktaş fans who watched each and every game from the tribunes but the Beşiktaş fans residing in Ankara who transformed this event into an opportunity. This can be interpreted as a result that affects team identification and consumption behavior. Baller and Cornelissen (2013)'s study mentioned that the relationship between quality of the sport facility and consumption. Relationship between supporter's identification and sports facilities is reflected even in their cheering.

Future studies may contribute to the study by including comparisons of sports fans' identification and consumption behaviors for sports teams in various sports branches. Also, studies on fans' brand awareness for their teams, team identification as a result of considering the sports event as a merchandise and fans' perceptions towards their teams' merchandise will contribute to literature and researchers.

Results of this study can be interpreted to mean that several decisions that generate important income for sports clubs such as decisions to attend sportive events, decisions to follow teams via media and decisions to purchase licensed merchandise are made based on emotional ties developed between the fans and the sports clubs rather than based on the type and variety of the products/merchandise. It is believed that in order to generate more income, managers of sports clubs should implement marketing strategies that will develop emotional ties with the fans instead of ensuring the existence of higher quality licensed products. Also, managing the social events inside the country may indirectly contribute to the teams. It can also be stated that not having an individual stadium in which matches can be played will result in decreases in commitment to the team which will in turn affect the income for the team.

References

Algesheimer, R., Dholakia, U. M., & Hermann, A. (2005). The social influence of brand community: Evidence from European car clubs. Journal of Marketing, 69(3), 19–34.

Baller, S., & Cornellisen S. (2013). Introduction: Sport, Leisure and Consumption in Africa The International Journal of the History of Sport, 30(16), 1867-1876.

Byon K.K, Zhang , J.J., & Baker, T. A. "Impact of core and peripheral service quality on consumption behavior of professional team sport spectators as mediated by perceived value" European Sport Management Quarterly. 13(2). pp. 232-263, 2013.

Dalakas, V., & Kropp, F. "Attitudes of youth toward purchasing from sponsors: A crosscultural perspective" Journal of Euro marketing. 12(1). pp. 19-39, 2002.

Fairley, S. (2003). In search of relived social experience: Group-based nostalgia sport tourism. Journal of Sport Management, 17, 284–304.

Fairley, s., Green B.C.& Chalip, L. (2015) The effects of commitment and identification on consumption. Journal of Sport & Tourism. Vol. 19, No. 1, 55–78.

Fink, J. S., Trail, G. T., & Anderson, D. F. An examination of team identification: which motives are most salient to the existence? International Sports Journal, 6(2), 195_207,2002.

Fisher, R. J., & Wakefield, K. (1998). Factors leading to group identification: A field study of winners and losers. Psychology & Marketing, 15, 23–40.

Funk, D. C., Mahony, D. F., & Ridinger, L. L. Characterizing consumer motivation as individual difference factors: Augmenting the sport interest inventory (SII) to explain level of spectator support,2002

Giddens, A. (1991). Modernity and self-identity. Cambridge: Polity.

Green, B. C. (2001). Leveraging subculture and identity to promote sport events. Sport Management Review, 4, 1–19.

Green, B. C., & Jones, I. (2005). Serious leisure, social identity, and sport tourism. Sport in Society, 8(2), 164–181.

Greenwood, P. B., Kanter M. A. & Casper, J.M. Sport Fan Team Identification Formation in Mid Level Professional Sport. European Sport Management Quarterly, 6:3, 253-265, 2006.

Günay, N. ve Tiryaki, Ş. "Spor Taraftarı Özdeşleşme Ölçeğinin (STÖÖ) Geçerlik ve Güvenirlik Çalışması" Hacettepe University Spor Bilimleri Dergisi 1:14-26, 2003

Harolle, M., Trail, G., Rodriguez, A. ve Jordan, J. "Conative Loyalty of Latino and Non-Latino Professional Baseball Fans" Journal of Sport Management, 24:456-471, 2010.

http://www.milliyet.com.tr/fenerbahce-bursaspor-maci-saat-kact---2046903-skorerhaber/ (Erişim Tarihi: 01.06.2015)

Jones, I. A further examination of the factors influencing current identification with a sports team, a response to Wann et al. (1996). Perceptual and Motor Skills , 85, 257_258, 1997

Kim, Y.K., Trail, G.T., & Ko, Y.J. "The influence of relationship quality on sport consumption behaviors: An empirical examination of the relationship quality framework" Journal of Sport Management.25 (6). pp.576-592, 2011.

Kim SK, Byon KK, Yu JG, Zhang JJ, Kim C. Social Motivations And Consumption Behavior Of Spectators Attending A Formula One Motor-Racıng Event Social Behavior And Personality 2013; 41(8):1359-1378.

Kim JW, James JD, Kim YU. A model of the relationship among sport consumer motives, spectator commitment, and behavioral intentions Sport Management Review. 2013; 16:173-185.

Kiremitci O., Demiray, E., Gencer, R.T., & Aycan, A. "Assessıng The Valıdıty And Relıabılıty Of The Sport Consumptıon Behavıor Scale On Turkısh Football Spectators" Pamukkale Journal of Sport Sciences. 5(2). pp.11-20, 2014.

Kwon, H. H., & Armstrong, K. L. (2002). Factors influencing impulse buying of sport licensed merchandise. Sport Marketing Quarterly, 11, 151–163.

Kwon, H. H., & Armstrong, K. L. (2006). Impulse purchase of sport team licensed merchandise: What matters? Journal of Sport Management, 20, 101–119.

Kwon, H.H., & Kwak, D. H. "Revisiting the Team Identification-Value- Purchase Relationship in the Team-Licensed Merchandise Consumption Context: A Multidimensional Consumer Value Approach" Sport Marketing Quarterly. 23.pp.100-114, 2014.

Laverie, D.A., & Arnett, D.B. "Factors affecting fan attendance: The influence of identity salience and satisfaction" Journal of Leisure Research.32(2).pp.225–246, 2000.

Laverie, D. A., & Arnett, D. B. (2000). Factors affecting fan attendance: The influence of identity salience and satisfaction. Journal of Leisure Research, 32, 225–246.

Madrigal, R. (1995). Cognitive and affective determinants of fan satisfaction with sporting event attendance. Journal of Leisure Research, 27, 205_227.

Madrigal, R. "Social identity effects in a belief-attitude-intentions hierarchy: Implications for corporate sponsorship" Psychology and Marketing.18(2).pp.145-165, 1995.

Matsuoka, H., Chelladurai, P., & Harada, M. (2003). Direct and interaction effects of team identification and satisfaction on intention to attend games. Sport Marketing Quarterly, 12(4), 244–253.

McCracken, G. (1986). Culture and consumption: A theoretical account of the structure and movement of the cultural meaning of consumer goods. Journal of Consumer Research, 13, 71–84.

Mullin, B. J., Hardy, S., & Sutton, W. A., Sport marketing (3rd ed.). Champaign, IL: Human Kinetics , 2007.

Pease, D. G., & Zhang, J. J. Differentiation of fan psychology with respect to sociodemographic backgrounds of NBA spectators. Research Quarterly for Exercise and Sport, 67, A100, 1996.

Schouten, J. W., & McAlexander, J. H. (1995). Subcultures of consumption: An ethnography of the new bikers. Journal of Consumer Research, 22, 43–61.

Schwartz, S. H. "Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries" In M. Zanna (Ed.). Advances in Experimental Social Psychology.25. pp. 1-65,1992.

Shao, Y. L. "An exploratory examination of the impact of personal values on sport consumption preferences and behaviors: A cross cultural study" Unpublished doctoral dissertation. Ohio State University, 2002.

Torlak Ö., Özkara B.Y., & Dogan V. "The Effect of Spectators' Level of Identification with Their Favorite Sports Teams on Their Perceived Quality and Purchase Intentions of Team-Licensed Products". Ege Academic Revıew.14(1). pp. 73-81, 2014.

Trail, G.T. & James, J. "The motivation scale for sport consumption: assessment of the scale's psychometric properties" Journal of Sport Behaviour. 24.pp.108-127, 2001.

Tsiotsou, R. "The Role of Perceived Product Quality and Overall Satisfaction on Purchase Intentions" International Journal of Consumer Studies, 30:207-17, 2006.

Wakefield, K. L. The pervasive effects of social influence on sporting event attendance. Journal of Sport & Social Issues, 19, 335_351, 1995.

Wakefield, K.L. "The pervasive effects of social influence on sporting event attendance" Journal of Sport and Social Issues. 19. pp.335–351, 1995.

Wann, D. L., & Branscombe, N. R. Sports fans: Measuring degree of identification with their team. International Journal of Sport Psychology, 24, 1_17,1993

Wann, D. L., & Dolan, T. J. Attributions of highly identified sports spectators. Journal of Social Psychology, 134(6), 783_794,1994.

Wann, D. L., & Schrader, M. P. Team identification and the enjoyment of watching a sportinG event. Perceptual and Motor Skills, 84, 954,1997.

Wann, D. L., Roberts, A., & Tindall, J. The role of team performance, team identification, and self esteem in sport spectators' game preferences. Perceptual and Motor Skills, 89, 945_950, 1999.

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Perceived relationship quality dimensions between basketball fans and clubs: Eskisehir basket example

Durdu Mehmet Savrun[1], Huseyin Kose[1] and Umit Can Buyukakgul[1]

[1] Anadolu University, Faculty of Sport Sciences, Eskisehir, Turkey.

dmsavrun@anadolu.edu.tr

Abstract

In recent years the importance of relationship quality in sport organizations have increasingly emphasized by both researchers and practitioners, because of the general belief about relationship marketing efforts can enhance relationships with sport consumers. Therefore, the researchers aimed to put forth the perceived dimensions of relationship quality between basketball fans and basketball clubs in the current study. The results showed that constructs about relationship quality could be conceptualized and measured as a three-dimensional construct comprising commitment, self-connection and intimacy, relationship satisfaction.

Keywords: Relationship marketing, relationship quality, relationship quality dimensions, sport consumers, basketball fans

INTRODUCTION

In today's world, spectating of sport is a growing interest and the most popular leisure activity for a long time and sport fan segment represents the largest proportion of sport industry (Trail and James, 2001). Sport spectators are very important not only by ticket sales but also for television broadcasting and sponsorship revenues. Also, sport fans attend their teams' games and they purchase licensed merchandise, so they provide direct income to their clubs. In a considerable body of research in the literature has focused on sport fans including; social and psychological features of sport fans (Wann, 1997), demographic and personality characteristics of sport fans (Schurr et al., 1987), team identification of sport fans (Dietz-Uhler and Murrell, 1999), sport fan commitment and attendance to games (Kerstetter and Kovich, 1997; Laverie and Arnett, 2000), fans' physiological connections to sport teams (Trail and James, 2001), perceptions of sport fans (Wann and Dolan, 1994), sex differences in sport fan behavior (Dietz-Uhler et al., 2000) and sport fan loyalty (Madrigal, 1995). In these studies, it has been shown that commitment level of sport fans to the teams is the main predictor of sport fan behavior and this indicates the ascending or descending loyalty levels of sport fans. As in those studies and Kim (2008) stated sport fans are more interested in sport more than other issues (economy, politics etc.) and their loyalty to their teams only participate sport just to have good time.

Sport fans are so important for the clubs because of drawing their strength from fans, by attending games, purchasing licensed merchandise, consuming sport by media. But, sport fans have dreams, hopes and desires from the teams they support and that may depart from the reality of their teams' performance. If the fans' dreams about their teams fall through they will drift away in a rather passive manner, and give supporting their club over (Adamson et al., 2006). By being aware of these challenges sport marketers have recognized the growing importance of customer-oriented approaches. Industry of sports has significant benefits from the success of sport spectating for a long time but the industry is facing with a change in last years. Although the sport organizations income is growing tremendously their costs are also increasing in parallel with this progress. Sport organizations are having some advantages and disadvantages by rapidly changing and evolving technologies. Thus, sport clubs managers and marketers should focus on retaining existing customer rather than acquiring new customers in a competitive and saturated market. Because gaining a new customer is more expensive and difficult than retention of existing customers (Fornell and Wernerfelt, 1987; Reichheld and Sasser, 1990). In order to keep existing customers (fans) as well as gaining new ones sport clubs must focus on modern marketing approaches. Therefore, to keep fans and gain their loyalty sport clubs must get to know fans' wants and needs. To understand to fans' wants and needs and meet them is a key consideration to satisfy them while managing and marketing the sport clubs.

Marketers believe that organizations ultimately achieve success by satisfying customers' needs (Kotler, 1997) and in the marketing concept; all parts of an organization are oriented toward solving problems of customers. There's an integrated and companywide approach in which all the firm's activities are directed toward providing customer satisfaction called customer orientation (Kotler and Amstrong, 1980). Customer orientation improves the satisfaction and value attributed to an exchange to ultimately behavioral outcomes and thus an organization benefits from having a customer orientation. Being customer oriented and thus focusing on customers is an apparent for companies with strong brands as brands clearly provide a key element of corporate strategy for many organizations (Cravens and Guilding, 2000). According to Kohli and Jaworski (1990) customer orientation involves taking actions based on marketing intelligence. They identified market

intelligence as a broad concept including exogenous market factors affecting customer current and future needs and preferences.

In sport, customers (fans) provide income through buying tickets to games and licensed merchandise as well as indirect earnings through sponsors and TV agreements. Sport fans' loyalty levels are assumed to be much greater because of their unique characteristics when compared with traditional customers (Furuholt and Skutle, 2008) and this has led to a belief by most sport organizations that they can take their fans loyalty for granted (Adamson et al., 2006). However, sport fans might drift away if their team loses regularly. They stop attending their teams' games, purchasing licensed merchandise or watching via television. Thus, it is important for sport clubs to manage relationships with their fans for long-term success. Because building good relationships with customers increase their loyalty. However, the characteristics of sport fans need consideration when developing and implementing relationship management techniques. In sport industry, the necessity of having good and long-term relationships between sport clubs and fans, sport managers and sport marketers are focusing fan-oriented approaches. Fan orientation can be defined as the delivery and continue of the service in terms of fans' needs and expectations. The more fans are communicated; sport clubs get the more information about fans' wants and needs. Thus, sport clubs provide a fan-oriented service and affect the perceptions of fans.

An excellent quality of service offered to customers is considered to be the organization could achieve a competitive advantage, increased customer loyalty, corporate image and business performance (Choi and Chu, 2001; Kim and Cha, 2002). Fan-oriented approaches provide sport clubs fan satisfaction, long-term relationships and loyalty. To be qualified as a fan-oriented sport club, the properties of the service delivered by a sport club are very important. For example, whenever a customer interacts with the organization in person or via technology (telephone, e-mail etc.), a service encounter occurs. During the encounters customers receive a snapshot of the organization's quality and each encounter contributes to the customers' overall satisfaction (Bitner, 1995; Kim and Cha, 2002). Hence, the sport clubs' service performance and features establish the basis of the relationship between sport clubs and sport fans.

Regarding the professional sports industry, two sports branches; soccer and basketball are the most popular professional sport branches in Turkey. Researches on sport spectating and sport fans on relationship quality try to develop a model for relationship connections with individuals' experiences with sports or sport teams (Wann et al., 2001; Kim and Cha, 2002). They define sport fan as individuals who are interested in and follow sport, sport team or a sport club. Sport fans are those who actively witness a sport event in person or through on TV, radio or Internet. The fact that sport fans identify themselves with their sport teams; it is an important facet when attempting to understand fan behavior. Thus, the researchers used relationship quality scale developed by Kim (2008) to put forth the perceived relationship quality dimensions between basketball clubs and their fans. The aim of the research is to make contribution to the current literature in a number of ways. Based on previous researches (Kim, 2008; Kim et al. 2009, Kim and Trail, 2011 and Kim et al. 2011) the following five factors can help to understand the value of relationship quality of sport consumer behavior. As the study aims to reveal the dimensions of relationship quality in order to understand the sport consumer-sport club relationship quality and understand the influences on sport consumers' behavior, the results showed that the constructs about relationship quality could be conceptualized and measured as a three-dimensional construct comprising commitment, self-connection and intimacy, relationship satisfaction.

Commitment

Commitment generally defined as an exchange partner believing that an ongoing relationship with another is so important to warrant maximum efforts at maintaining it (Morgan and Hunt, 1999; Kim, 2008). Commitment has been the most commonly accepted component of relationship quality (Dwyer, et al., 1987). Morgan and Hunt (1994) emphasized that commitment had a positive influence on acquiescence and cooperative behavior, but commitment had a negative influence on propensity to leave. Many researchers put forth that strong commitment results in improvement of sales, market share, and profits (Doney and Cannon, 1997; Reynolds and Beatty, 1999). Also, commitment has been highlighted as a key construct to explain the nature of the relationship between sport club and its fans and it plays an important role in consumption decision (Funk and James, 2001; Funk and Pritchard, 2006).

Self-Connection and Intimacy

Self-connection has been frequently recognized as an essential indicator of relationship quality (Smit et al., 2007; Kim, 2009). High levels of self-connection encourage customers to stay in the relationship when they face negative situations (Lydon and Zanna, 1990) because of the protective feelings of uniqueness and dependency that help customers to have good relationships could be activated by a strong self-connection (Drigotas and Rusbult, 1992). Self-connection with a brand is parallel with team identification. Team identification has been widely considered as an important construct to keep the fundamentals of the relationship between sport club and sport fans (Fink et al., 2002; Trail et al., 2005). Many researchers outlined that team identification influence expectancies for event experiences and outcomes, intention to attend games and direct attendance (Trail et al., 2003; Matsuoka et al., 2003; Laverie and Arnett, 2000).

Intimacy one of the revealed factors of the study is identified as a fundamental component of relationship quality (Barnes, 1997; Smit et al., 2007). It has been defined as the degree of familiarity, closeness and openness to relationship partners. Fournier (1998) stated that a successful brand relationship could not be reached without establishing strong intimacy. The concept of intimacy has been admitted as a very important element for building a good relationship with sport customers (Harris and Ogbonna, 2008; McDonald and Milne, 1997).

Relationship Satisfaction

Affective or emotional state toward the relationship with a brand of customers' can be defined as relationship satisfaction (Garbarino and Johnson, 1999; Odekerken-Schoröer et al., 2003; Palmatier et al., 2006; Roberts et al., 2003). Relationship satisfaction is highly critical element for customer loyalty and profitability. Increased relationship satisfaction can lead customers to be more loyal that is one of the most important asset for companies' profitability (Zeithaml, 2000). Customer relationship management as a combination of people, processes and technologies is the key manifest of building and maintaining relationship satisfaction (Catalán-Matamoros, 2012). Developing deeper and more satisfied relationship with customers' requires exact and appropriate implementation of customer relationship management strategies (Constantinescu, 2016: 97) so that customers can feel more integrated with brand, sport club or athlete.

METHODS

As a data collecting tool questionnaire technique is used. The questionnaire consisted of two parts. The first part comprised of 19 scale items related to relationship quality. The scale items were taken

from Kim and Trail (2011) which was adapted to Turkish by Kose (2014) to measure relationship quality between basketball clubs and fans. All items were measured via 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The second section of the questionnaire was designed to collect demographic features of respondents. Questionnaires were distributed and answered at Anadolu University Basketball Facility by basketball fans on a game-day. Three surveyors distributed a self-administrated and research-aided questionnaire. Respondents answered the questionnaires in the researchers' presence. In lower educational groups and for groups of respondents who needed further explanations in filling out the questionnaires, researchers helped the respondents who needed further explanations in filling out the questionnaires; researchers helped the respondents fill out the form to a greater degree than they did for respondents' with higher educational levels. The surveyors first briefly explained the research purpose, and then gave the questionnaires to willing participants. The time to explain the study and complete the questionnaire was approximately 10 minutes.

250 questionnaires were collected by convenience sampling method in this study. Out of 250 distributed questionnaires, 201 usable responses were received, which translate to 80.4 percent response rate. 33 were voided because of incomplete data, while the rest were not returned by the respondents. The population of this study was Eskisehir Basket Basketball Club fans that attend their clubs' games at the club's facility.

For the analysis of the data, the questionnaire was used as the data collection method; SPSS 21.0 was used in the analysis of the data. Frequency, percentage, standard deviation and mean values were used to describe whole data. In order to evaluate and transform the data set in terms of meaningful factors, factor analysis (Principal Component Factor Analysis) was applied.

RESULTS

Demographically, out of 201 participants males are 151 individuals (75,1 %), and females are 50 individuals (24,9 %). Most of the participants (56,2 %) are younger than 26 years, and nearly half of the participants (99 individuals – 49,3 %) are students. Thus, 121 participants (60,2 %) have bachelor's degree. 54,7 % of participants have less than 1500□, 31,3 % of it have between 1501-3000□ and 13,9 % of participants have more than 3001□ for monthly income. 162 participant (80,6 %) spends less than 100□, and 39 participant spends more than 101□ for their favorite team in a month. Also, out of 201 participants 70,1 % (141 individuals) participate 7 or less games in a regular season (See Table 1).

Table 1. Demographics of Respondents

	Frequency	%		Frequency	%
Gender			**Educational Status**		
Male	151	75,1	High School	52	25,9
Female	50	24,9	Bachelor's Degree	121	60.2
			Postgraduate	28	13.9
Occupation					
Student	99	49,3	**Age**		
Employee	57	28,4	25 and <	113	56,2
Other	33	22,4	26-35	43	21,4
			36 and >	45	22.4
Average Household Income*					
1500□ and <	110	54,7	**Expenses for Team**		
1501-3000□	63	31,3	100□ and <	162	80,6
3001□ and >	28	13,9	101□ and >	39	19,4
Participation to Games					
1-3 times/season	87	43,3			
4-7 times/season	54	26,9			
8-11 times/season	30	14,9			
12 and >	30	14,9			

n = 201

*□: Turkish Lira

In this study, Soccer clubs-Soccer fans Relationship Quality Scale which was revised and translate into Turkish by Kose (2014) and has seven dimensions (self-connection and intimacy, love, customization, relationship satisfaction, trust and commitment) was used. To adapt this 7-dimensional construct to basketball clubs and basketball fans confirmatory factor analysis (CFA) was conducted. Based on CFA results, it was revealed that 4-dimensional construct is not appropriate for basketball branch. Therefore, exploratory factor analysis (EFA) was conducted to determine new factor construct for relationship quality between basketball clubs and their fans. According to the principal axis analysis, three factors had an Eigenvalue equal to or greater than 1.0 (Kaiser, 1960), explaining a total of 68.659 percent of the variance, and factors termed 1) commitment, 2) self-connection and intimacy, 3) relationship satisfaction. One item (I love my team) removed from the study because of low factor loading (0.38). Based on exploratory factor analysis results (EFA), 18 items of relationship quality were then subjected to a confirmatory factor analysis (CFA), using SPSS AMOS 21. After CFA, items got cut-off value lower then 0.60 (Meehl, 1990; Chin, 1998) removed from study. Also, there were some modifications that will contribute Chi-square/df value and take place in same factor construct. For the model of relationship quality between basketball clubs and their fans fit statistics constituted a meaningful construct. Relying on GFI, AGFI, CFI, IFI, NFI, NNFI, SRMR, and RMSEA statistics 3-dimensional construct has acceptable values for model fit (See Table 2).

Table 2. Constructs and Items of Relationship Quality

Variables	Factor Loadings			CR	AVE
Commitment (7 items)					
I can count on my team	,680				
I trust my team	,618				
My team is reliable	,674			,906	,582
I am committed to my team	,812				
I am emotionally attached to my team	,852				
I am passionate about my team	,857				
I adore my team	,809				
Self-Connection and Intımacy (5 items)					
I am very close to my team		,811			
My team and I have a lot in common		,874		,896	,635
My team is a part of me		,834			
My team's image and my self-image are similar		,767			
I am very familiar with my team		,686			
Relationship Satisfaction (5 items)					
I am satisfied with my relationship with my team			,826		
My team cares my ideas			,801	,888	,614
I am pleased with the relationship that I have with my team			,814		
My team pays me attention for my expenses			,771		
My team makes me feel that i am special			,698		
Total Scale Reliability			**,949**		

Fit Indices: χ^2/df: 2.173, GFI: 0.88, AGFI: 0.83, NFI: 0.91, NNFI: 0.93, CFI: 0.95, RMR: 0.06, SRMR: 0.05, RMSEA: 0.077

After conducting CFA to establish the measurement model, it can be said that all constructs had higher composite reliability (CR) value than recommended level of 0,70 (Nunnally and Bernstein, 1994; Hair et al., 2009). Besides, average variance extracted (AVE) value helps to determine convergent validity as CR value and recommended level for AVE is 0,50 (Fornell and Larcker, 1981). All constructs in this study had greater AVE value then recommended. Briefly, it can be said all variables are supporting the 3-dimensional construct.

DISCUSSION and CONCLUSION

The current study aimed to put forth the relationship quality dimensions between basketball club and basketball fans. Based on previous researches on relationship quality between sport clubs and fans (Kim and Trail, 2011 and Kose, 2014) relationship quality could be conceptualized and measured in five dimensions including trust, commitment, intimacy, self-connection, reciprocity, love and customization. The present study results showed that relationship quality dimensions between basketball club and fans could be measured in three dimensions including commitment, self-connection and intimacy, relationship satisfaction. Thus, this study provided a different aspect then existing ones despite it was applied in the same country as Kose (2014)'s study. The results showed

that even different samples (football and basketball) in same country could have different expectations from their sport clubs with their relationship. It is obvious that basketball and football fans have different types of relationship perception so that this study found out a new structure to explain relationship quality dimensions between basketball clubs and their fans. Briefly, this study revealed different conclusions comparing with Kose (2014)'s study and provided different aspect to understand the dimension of relationship quality in basketball branch.

Like in all industries, in sport industry satisfaction of customers should be guaranteed in order to keep and make them register or buy the services or the products presented by sport organization. In this manner relationship quality between two parties (fans and the club) is very important as it is indicated in many studies (Hennig-Thurau and Klee, 1997; Park et al., 2002). In parallel with researches (Kim et al., 2009; Kim and Trail, 2011) relationship quality dimensions have positive effects on satisfaction and recommendation behavior. So, sport clubs should first understand wants and needs of their fans and also the dimensions of relationship quality dimensions in order to serve their fans better to keep them and improve their loyalty. Because identifying and understanding relationship quality dimensions and predicting their effects on sport fans consumption behavior is a key consideration for sport club managers and marketers when designing a marketing strategy. Recognizing the importance of fan commitment to the club and to develop strategies to enforce the bonds between both parties will provide some useful insights for managerial applications in sport.

The current study focused on a limited number of number of basketball fans and was limited to those who attend to watch their team's games in a single sport facility in Eskisehir, Turkey. Thus, the results may not represent the whole population in Turkey. Despite questionnaires applied in the study are appropriate for the region, different responds may be observed in different regions. Also, the questionnaires can be applied on different sport branches and their fans.

References

Adamson, G., Jones, W. and Tapp, A. (2006). From CRM to FRM: Applying CRM in the football industry, Journal of Database Marketing and Customer Strategy Management, 13(2), 156-172.

Anderson, E., and Weitz, B. (1989). Determinants of Continuity in Conventional Industrial

Barnes, J. G. (1997). Closeness, strength, and satisfaction: examining the nature of relationships between providers of financial services and their retail customers. Psychology and Marketing, 14(8), 765-790.

Bitner, M.J. (1995). Building service relationships: it's all about promises. Journal of Academy of Marketing Science, 23 (4), 246-251.

Catalán-Matamoros D. (2012). Advances in Customer Relationship Management. InTech Publishing, http://www.intechopen.com/books/editor/advances-in-customer-relationship-management .

Chin, W. W. (1998). Commentary: Issues and Option on Structural Equation Modelling, MIS Quarterly, 20(1), 7-16.

Choi, T.Y. ve Chu, R. (2001). Determinants of hotel guests' satisfaction and repeat patronage in the Hong Kong hotel industry, International Jornal of Hospitality Management, 20 (3), 67 82.

Cravens, K. S., and Guilding, C. (2000). Measuring customer focus: an examination of the relationship between market orientation and brand valuation. Journal of Strategic Marketing, 8(1), 27-45

De Wulf, K., Odekerken-Schröder, and Iacobucci, D. (2001). Investments in consumer relationships: A cross-country and cross-industry exploration. Journal of Marketing, 61, 35-51.

Dietz-Uhler, B. and Murrell, A. (1999). Examining fan reactions to game outcomes: A longitudinal study of social identity, Journal of Sport Behavior, 22(1), 15-27

Dietz-Uhler, B., Harrick, E., End, C., and Jacquemotte, L. (2000). Sex differences in sport fan behavior and reasons for being a sport fan, Journal of Sport Behavior, 23(3), 219-231.

Doney, P. M., and Cannon, J. P. (1997). An examination of the nature of trust in buyer-seller relationships. Journal of Marketing, 61, 35-51.

Drigotas, S.M., and Rusbult, C.E. (1992). Should I Stay or Should I go? A Dependence Model of Breakups. Journal of Personality and Social Psychology, 62, 62–87.

Dwyer, FR., Schurr, PH., and Oh, S. (1987). Developing buyerseller relationships. Journal of Marketing, 51(2), 11-27 dyads Marketing Science, 8, 310–323.

Fink, J.S., Trail, G.T., and Anderson, D.F. (2002). An Examination of Team Identification: Which motives are most salient to its existence? International Sports Journal, 6, 195-207.

Fornell, C. and Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, Journal of Marketing Research, 39-50.

Fornell, C., and Wernerfelt, B. (1987). Defensive marketing strategy by customer complaint management: A theoretical analysis, Journal of Marketing Research, 24, 337-346.

Fournier, S.M. (1998). Consumers and their brands: Developing relationship theory in consumer research. The Journal of Consumer Research, 24, 343–373.

Funk, D.C, and James, J. (2001). The psychological continuum model: A conceptual framework for understanding an individual's psychological connection to sport. Sport Management Review, 4, 119-150

Funk, D.C, and Pritchard, M.P (2006). Sport publicity: Commitment's moderation of message effects. Journal of Business Research, 59, 613-621.

Furuholt, B. and Skutle, N. (2008). Strategic use of customer relationship management (CRM) in sports: The Rosenborg case, Advances in information systems development, 123-133.

Garbarino, E. and Johnson, M. (1999). The different roles of satisfaction, trust, and commitment in customer relationships. Journal of Marketing, 63(2), 70–87.

Hair, J. F., Black, W., Babin, B. and Anderson, R. (2009). Multivariate Data Analysis, Prentice Hall, New Jersey.

Harris, L.C. and Ogbonna, E. (2008). The Dynamics Underlying Service Firm-Customer Relationships: Insights from a Study of English Premier League Soccer Fans. Journal of Service Research, 10, 382–399.

Hennig-Thurau, T. and Klee, A. (1997). The impact of customer satisfaction and relationship quality on customer retention: A critical reassessment and model development. Psychology and Marketing, 14, 737-765.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. Educational and psychological measurement.

Kerstetter, D. and Kovich, G. M. (1997). An involvement profiles of Division I women's basketball spectators, Journal of Sport Management, 2, 234–249.

Kim, S. S., Lee, C.K., and Klenosky, D. B. (2003). The influence push and pull factors at Korean national parks. Tourism Management, 24, 169-180.

Kim, W. G. and Cha, Y. (2002). Antecedents and consequences of relationship quality in hotel industry. Hospitality Management, 21, 321-338.

Kim, Y.K. (2008). Relationship Framework in Sport Management: How Relationship Quality Affects Sport Consumption Behavior, University of Florida, Doctoral Dissertation, Florida.

Kim, Y.K. and Trail, G. T. (2009) A Conceptual Framework for Understanding The Relationship Between a Team and Sports Consumers. Paper Presented at the North American Society of Sport Management conference, Columbia, SC.

Kim, Y.K., and Trail, G.T. (2011). A conceptual framework for understanding relationships between sport consumers and sport organizations: A relationship quality approach. Journal of Sport Management, 25, 57-69.

Kim, Y.K., Trail, G. and Ko, Y.J. (2011) The influence of relationship quality on sport consumption behaviors: An empirical examination of the relationship quality framework. Journal of Sport Management, 25, 576-592.

Kim, Y.K., Trail, G.T., Woo, B. and Zhang, J.J. (2009). Sport consumer-team relationship quality: Development and psychometric evaluation of a scale. Paper presented at the annual conference of Sport Marketing Association, Cleveland, Ohio.

Kohli, A. K. and Javorski, B. J. (1990). Market orientation: The construct, research propositions, and managerial implications. Journal of Marketing, 54(2), 1-18.

Kose H., (2014). Examining the Effects of Perceived Fan Orientation and Relationship Quality on Fan Consumption Behavior, Anadolu University, Doctoral Dissertation, Eskisehir.

Kotler, P., (1997). Marketing Management: Analysis, Planning, Implementation and Control. Prentice Hall international series in marketing.

Kotler, P., and Armstrong, G. (1980). Principles of Marketing Prentice Hall International. Inc, 1(9), 9.

Laverie, D., and Arnett, D. (2000). Factors affecting fan attendance: The influence of identity salience and satisfaction. Journal of Leisure Research, 32(2), 225-246.

Lydon, J., and Zanna, M. (1990). Commitment in The Face of Adversity: A Value-Affirmation Approach. Journal of Personality and Social Psychology, 58, 1040– 1047.

Madrigal, R. (1995). Cognitive and affective determinants of fan satisfaction with sporting event attendance, Journal of Leisure Research, 27, 205-227

Matsuoka, H., Chelladurai, P., and Harada, M. (2003). Direct and interaction effects of team identification and satisfaction on intention to attend games. Sport Marketing Quarterly, 12, 244-253.

Meehl, P. E. (1990). Why Summaries of Research on Psychological Theories Are Often Uninterpretable, Psychological Reports, 66, 195-244.

McDonald, M. A. and Milne, G. R. (1997). A Conceptual Framework for Evaluating Marketing Relationships in Professional Sport Franchises. Sport Marketing Quarterly, 6(2), 27-32.

Morgan, R. M. and Hunt, S. D. (1999). Relationship-Based Competitive Advantage: The Role of Relationship Marketing in Marketing Strategy. Journal of Business Research, 46, 281-290.

Morgan, R.M. and Hunt, S.D. (1994). The commitment-trust theory of relationship marketing. Journal of Marketing, 58(3), 20–58.

Nunnally, J. C. and Bernstein, I. (1995). Psychometric Theory, McGraw Hill New York.

Odekerken-Schoröer, G., Wulf, K. D., and Schumacher, P. (2003). Strengthening outcomes of retailer-consumer relationships. The dual impact of relationship marketing tactics and consumer personality. Journal of Business Research, 56, 177-190.

Park, J., Kim, K., and Kim, J. (2002). Acceptance of brand extensions: Interactive influence of product category similarity, typicality of claimed benefits, and brand relationship quality. Advances in Consumer Research. Associationfor Consumer Research, 29, 190-198.

Palmatier, R. W., Dant, R. P., Grewal, D. and Evans, K. (2006). Factors influencing the effectiveness of relationship marketing: A meta-analysis. Journal of Marketing, 70, 136-153.

Reichheld, F. F. and Sasser, W. E. (1990). Zero defections: Quality comes to services. HarvardBusiness Review, 68, 105–111

Reynolds, K. E. and Beatty, S. E. (1999). Customer benefits and company consequences of customer-salesperson relationships in retailing, Journal of Retailing, 75 (1), 11-32.

Roberts, K., Varki, S., and Brodie, R. (2003). Measuring the quality of relationships in consumer services: An empirical study. European Journal of Marketing, 37, 160-196.

Schurr, K., Wittig, A., Ruble, V., and Ellen, A. (1987). Demographic and personality characteristics associated with persistent, occasional, and nonattendance of university male basketball games by college students, Journal of Sport Behaviour, 11, 3-17.

Smit, E., Bronner, F., and Tolboom, M. (2007). Brand Relationship Quality and its Value for Personal Contact. Journal of Business Research, 60, 627–633.

Trail, G. T., and James, J. D. (2001). The motivation scale for sport consumption: Assessment of the scale's psychometric properties, Journal of Sport Behavior, 24(1), 108-127.

Trail, G. T., Fink, J.S. and Anderson, D.F. (2003) Sport spectator consumption behavior, Sport Marketing Quarterly, 12(1), 8-17.

Trail, G.T., Anderson, D.F., and Fink, J.S. (2005). Consumer satisfaction and identity theory: A model of sport spectator cognative loyalty. Sport Marketing Quarterly, 14, 98-112.

Wann, D. L., and Dolan, T. (1994). Attributions of highly identified sports spectators. Journal of Social Psychology, 134, 783-792.

Wann, D.L., (1997). Sport psychology, NJ: Prentice Hall, Upper Saddle River.

Wann, D. L., Melnick, M. J., Russell, G. W. and Pease, D. G. (2001). Sport fans: The Psychology and Social Impact of Spectators, Routledge, New York.

Zeithaml, V. A. (2000). Service Quality, Profitability, and the Economic Worth of Customers: What We Know and What We Need to Learn. Journal of the Academy of Marketing Science, 28(1), 67–85.

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The effects of extracurricular sport activities on the alienation of the students

Mehmet Yanik[1]

[1] Balikesir University, School of Physical Education and Sports, Balikesir, Turkey

mehmettyanik@gmail.com

Abstract

This study aims to determine the effects of extracurricular sport activities which are carried out in the secondary schools to the alienation of the students. This study in which it is used relational screening model has been carried out with 640 students who are selected by random sampling method. As the data collection tool, it is used "Student Alienation Scale" which was develop by Mau (1992) and was adapted into Turkish by Sanberk (2003), to understand the student alienation level from the schools with the "Personal Information Form" which is prepared by the researcher. The scale's Cronbach Alpha reliability coefficient is 0,79. In the process of analyzing the data, frequency and percentage distribution, arithmetic average and standard deviation and unpaired t-test are utilized. In the comparison process of more than two groups, one-way analysis of variance (oneway ANOVA) and Post Hoc tests values are used. According to the findings from the research the student's alienation point averages are found as 3.12±0.56. Judging from the variables used in the research, in terms of gender the males, in terms of the school type the students who study at a public school, the students who find the extracurricular activity levels as insufficient and the students that never participate to the extracurricular sport activities at school have a higher point of alienation level. Alienation from the school which is an unwanted situation in education can be prevented only if the sense of belonging to the school can be gained. And the sense of belonging to the school can be gained by increasing the extracurricular sport activities in schools and promoting the participation to these activities. In accordance with this purpose, participation of the school teams into contests should be encouraged more.

Keywords: Alienation, dropout, extracurricular sport activities, physical training and sports

INTRODUCTION

Moving away from each other in social life and opting for leading a more individual life escalate the emotional state of loneliness in individuals. This state brings along some psycho-social problems and leads to the alienation of people to their environment. Alienation causes psychological breakdowns on the social relations and personality structures of individuals. This is known to lead attributions as hopelessness, desperation, social exclusion and loss of values to individuals (Çelik, 2005).

Known as disconnection in social relations (Case, 2008), alienation is described as moving away of the individual from himself/herself and the society resulting from the insecurity towards other people and society and lack of communication with them (Seeman 1959). According to Marx (2000), alienation is "an act whereby the person is made to feel foreign to the products of his own labor, the productive activity itself, nature he lives in, his essential being, his humanity and other people".

The duty of schools throughout the education process is raising students to meet the requirements of the time and expectations of the society. The school is an important factor in maintaining academic, social and personal developments of students. (Alaca, 2011; Alpkaya, 2010). However, the school which is the most effective institution for shaping the future of the society is also the environment where the alienation is experienced the most. The teacher's keen attention to students, especially with a high academic achievement, creates a negative influence on students with low academic achievement. This situation causes those students to alienate from school and drop out. (Çiftçi, 2009, Sanberk, 2003).

Human, as a free being by nature, desires to realize himself and be productive using his skills. The individual who cannot utilize his productivity enough and realize himself will think that he is restrained (Fromm, 1996) and stray from the environment he is in. Alienation, occurring as an introvert attitude resulting from the inability of meeting the personal requirements of the individual, is an undesirable student behavior in educational organizations. Schools should be able to offer the opportunities to the individuals to realize themselves in order to prevent this situation. Activities presented to students at school will positively affect their perception levels (Sarı, 2007). Participation in such activities will have a positive impact on individuals, both in their achievement at school and their personal development (Uzun, İmamoğlu, Yamaner, Deryahanoğlu & Yamaner, 2017). Foremost among those activities come sports, that will help the youth at the age of secondary school; make use of their spare time, relieve their stress, prevent them from acquiring bad habits and contribute to their development (Akgül, Göral, Demirel, & Üstün,2015).

Dropping out of school, an undesired student behavior in every society is a result of the moving away of the individual from the educational environment because of a loss of commitment to school relating to the alienation problem in education (Arastaman, 2006; Finn and Voelkl, 1993). In order to prevent this result, firstly the attitude levels of the students to school should be enhanced (Çelik and Ceyhan, 2009). It is known that positive attitude to school, active participation to the extracurricular activities at school and academic motivation impacts much educational process. (Thompson, 2005; Murdock, Hale and Weber, 2001). To achieve positive attitude levels of students in school environment is primarily the responsibility of the education directors. To meet their responsibilities, the directors can make use of extracurricular sport activities that meet the interests and necessities of the students and make the school environment warmer. It has been indicated that the students who attend extracurricular sport activities at schools have higher academicals performances compared to the students who does not attend such activities (Özdemir and Kalaycı, 2013). It is known that the level of

alienation of students who do not participate in the such activities is higher (Şimşek and Akdemir,2015)

When the related literature is reviewed, no studies on the impact of sport activities at schools related to the student alienation in educational organization was found. For this purpose, determination of the impact of extracurricular sport activities at schools on the undesired student alienation at educational organizations will be the first step towards the solution of this problem.

As a result, this research may help preventing the alienation of individuals in the educational process from school emphasizing the importance of sport activities conducted at schools against the alienation.

METHODS

The study aims to examine the alienation of middle school students in terms of gender, type of school, their views on the sufficiency of the extracurricular activities of their school and their attendance to the extracurricular sport activities at their school.

This is a descriptive research conducted with relational screening model. Because the relational screening model is used for research models aiming to determine the existence or degree of mutual change between two or more variables, it is deemed suitable for this type of researches (Karasar, 2006).

Study group

The research was conducted in 2015-2016 academic year fall semester with a total of 640 students studying in public and private middle schools and chosen by random sampling model.

The numerical distribution of the subjects of our research in relation to the variables is as follows:

Table 1. Demographical Properties of Participants

Variable		Number (n)	Percentage (%)
Gender	Female	194	30.3
	Male	446	69.7
Type of School	Public School	520	81.3
	Private School	120	18.8
Are extracurricular sport activities sufficient?	No, not sufficient	217	33.9
	Partly sufficient	265	41.4
	Sufficient	112	17.5
	Quite Sufficient	46	7.2
Have you participated in the extracurricular sport activities?	No, I have never attended	418	65.3
	I have attended for 1-2 years	151	23.6
	I have attended for 3-4 years	45	7.0
	I have attended for 5 years or more	26	4.1

Table 1 shows the frequency and percentage distributions of the students participated in the research in terms of gender, type of school, their views on the sufficiency of the extracurricular activities of their school and their attendance to the extracurricular sport activities at their school.

Data Collection Tools

Personal Information Form: The form designed by the researcher is composed of questions aiming to gather some demographic features regarding the gender of the participants, the type of school they study at, their views on the sufficiency of the extracurricular activities at their school and their participation to the extracurricular sport activities at their school.

Student Alienation Scale (SAS): The scale developed by Mau (1992) and adapted to Turkish by Sanberk (2003) aiming to determine the alienation levels of the students in the current conditions of the school is composed of 17 items. The scale has sub-dimensions as powerlessness, meaninglessness, normlessness and social isolation. In this research, the alienation levels of students to the school were measured using the total points of SAS. The lowest point to be obtained from SAS, which is a five-point likert type self-assessment scale varying from "strongly disagree (1)" and "strongly agree (5)" and used to measure the alienation of the middle school students from school, is 17 and the highest point is 85. When the means are used, the lowest point is 1 and the highest point is 5. Of which those who are between 1- 3 are positive, those who are between 3- 5 are negative status indicators. The higher points indicate that the individuals experience a higher level of alienation. The Cronbach Alpha reliability factor of the scale is 0.79 and the analysis for the research shows that Cronbach Alpha reliability factor of the study is 0.79.

Data Collection

Firstly, the permit to use the data collection tool for the research was granted from Sanberk (2003) who adapted the tool to Turkish. Also, the permit for implementation of the research in middle schools chosen by simple random sampling method was granted from Provincial Directorate for National Education. After discussing the directors of the chosen middle schools pursuant to the permits, the researcher conducted the research on determined days and hours. The researcher informed the students about the objective and the significance of the research before the implementation. Thus, we aimed to assure the reliability of the information gathered from the students. It was observed that the students completed the data collection tools in 15-20 minutes.

Data Analysis

The statistical analysis of the data collected in this research was conducted using IBM-SPSS package program. When determining the suitable analysis type for the data, number of subjects (n=640), whether the data is distributed normally and whether it has a homogenous structure were considered. According to the result of the analysis for detection of normal data distribution (Test of Normality), it was determined that Skewness and Kurtosis values are in the range of +1.5 and -1.5 (Skewness 0.06-Kurtosis 1.02). As a result of all findings it was decided that parametric analysis methods would be used for the research (Tabachnik and Fidell 2013; George 2010).

In the data analysis process, frequency and percentage distribution, arithmetic average and standard deviation and unpaired t-test were utilized. In the comparison process of more than two groups, one-way analysis of variance (oneway ANOVA) was used. In order to show the group causing the difference in the case that the difference between variable groups is significant in the analysis of variance, Post Hoc test values were used in order to show the multiple comparisons of the average points.

The significance level in the research is taken as the level of p>0.05.

RESULTS

In this section, the comments related to the findings obtained from the student alienation scale used on the students and the results of the statistical analysis of data collected pursuant to the research objectives are given in tables-figures and explained.

The average point of alienation scale used on the students participating in the research (n:640) was determined as 3.12±0.56.

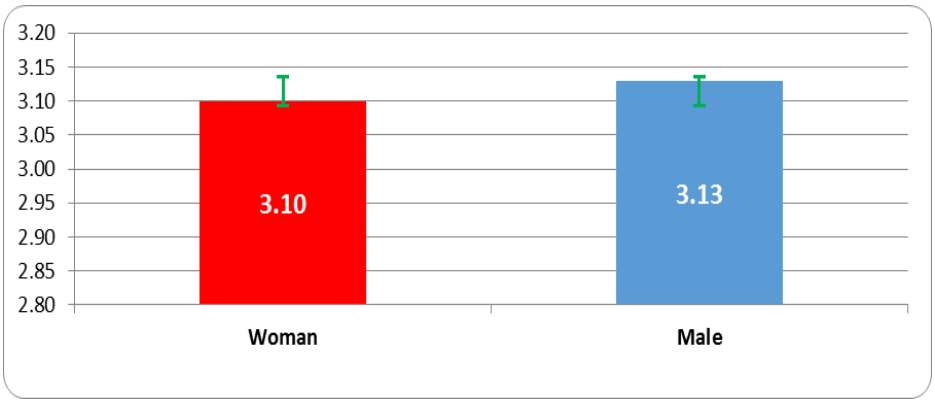

Figure 1. Alienation level according to gender

It was seen that there is no statistically significant difference between the average points of female (3.10±062) and male (3.13±0.53) students according to the result of the analysis conducted to determine the school alienation levels of students in terms of gender variable (p>0.05).

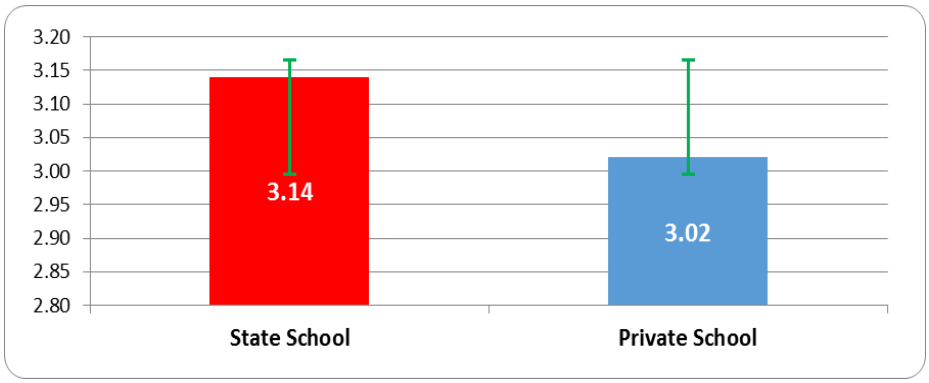

Figure 2. Alienation level according to type of school

It was determined that the alienation average point of students studying at public schools is 3.14±0.55 according to the result of the analysis in terms of the type of school variable. However, the alienation average point of students studying at private schools is 3.02±0.60 and it was determined that the difference between the alienation average points of these two groups are statistically significant (p<0.05).

Table 2. The Analysis of the Alienation Levels of the Participants in terms of "Are the Activities Sufficient" Variable

	f, $\overline{x}$ and ss			ANOVA					
Group	n	$\overline{x}$	ss		**Ss**	**df**	**Ms**	**F**	**P**
Group 1	217	3.22	0.56	Between Group	10.26	3	3.42	11.12	0.00
Group 2	265	3.16	0.52	Within Group	195.63	636	0.30		
Group 3	112	2.91	0.49	Total	205.90	640			
Group 4	46	2.87	0.78						

Group 1; No, not sufficient- Group 2; Partly sufficient
Group 3; Sufficient Group 4; Quite Sufficient

When the results of the variance analysis (Anova) regarding the determination of the differences of the school alienation levels of the students participated in our research in terms of the sufficiency of the school activities were assessed, a difference on the statistical level of $p<0.01$ was detected between the groups [$F(3,636) = 11.12$, $p<0.05$].

According to the assessment of the multiple comparison test (Post Hoc-Tukey) values conducted regarding the determination of the source of the difference detected, it was determined that there is a significant difference on the level of $p<0.01$ between group 1 and group 4 and 3; group 2 and group 3 and 4; group 3 and group 1 and 2; group 4 and group 2 and 3.

Table 3. The Analysis of the Alienation Levels of the Participants in terms of "Participation to the Extracurricular Sport Activities" Variable

	f, $\overline{x}$ and ss			ANOVA					
Group	n	$\overline{x}$	ss		**Ss**	**df**	**Ms**	**F**	**P**
Group 1	418	3.16	0.57	Between Group	7.18	3	2.39	7.66	0.00
Group 2	151	3.11	0.48	Within Group	198.72	636	0.31		
Group 3	45	3.07	0.67	Total	205.90	640			
Group 4	26	2.62	0.48						

Group 1; I have never attended- Group 2; I have attended for 2 years
Group 3; I have attended for 3-4 years Group 4; 5 years and above

When the results of the variance analysis (Anova) regarding the determination of the differences of the school alienation levels of the students participated in our research in terms of the participation to the extracurricular sport activities variable were assessed (Table 2), a difference on the statistical level of $p<0.01$ was detected between the groups [$F(3,636) = 7.66$, $p<0.05$].

According to the assessment of the multiple comparison test (Post Hoc-Tukey) values conducted regarding the determination of the source of the difference detected, it was determined that there is a significant difference on the level of $p<0.01$ between group 4 and group 1, 2 and 3.

According to the correlation analysis, there's a negative relation between the participation in school sports activities and the alienation of students. Accordingly, as level of participation increases, alienation declines ($r = -0.155$, $P < 0.05$).

DISCUSSION and CONCLUSION

Student alienation which is seen as one of the biggest problems of today's educational institutions is a research topic that concerns the whole society with its impacts. In this research aiming to determine the alienation levels of middle school students and reveal the impacts of extracurricular sport activities in schools on student alienation, the alienation scale average point of the students participated in the research (n:640) was determined above midlevel with 3.12±0.56. The result obtained is partially parallel to the other research results. Çiftçi (2009) indicated on his research in which he examined the alienation status of primary school students that the students experience midlevel alienation. Coşkun and Altay (2009) indicated that the alienation levels on their research conducted with high school students were close to midlevel. Similarly, Çağlar (2013) determined the alienation perceptions of college students as midlevel on his research. According to the indicated research results, it can be said that students in various educational levels generally experience midlevel alienation. Indicates that the main reasons of alienation in education are administrative structure in schools, shifting curriculum, crowded classrooms, information loads not relating to daily life and exclusion of students and teacher from the educational decision-making processes (Sidorkin,2004).

Occurring as straying and drawing away from the environment, alienation might cause a student that lost his sense of belonging to drop out of school as a result of the loss of commitment to the school. In the research the alienation average points on gender basis were found as 3.10±0.62 for females and 3.13±0.53 for males and no statistically significant difference between them was determined ($p>0.05$). The findings obtained from the research have similarities to the results of the researches conducted by Şimşek and Akdemir (2015), Brown et. (2003), Sanberk (2003), Trent (2001) and Lane (1999). Also, Arastaman (2006) who examined the school commitment of high school students determined that there are differences on commitment status of students in terms of gender. Similarly, Yiğit (2010) detected differences in terms of gender on his study with primary school students.

All kinds of course equipment, primarily the facilities of the school are effective on student alienation. Today, it is thought that private educational institutions offer more opportunities in terms of school type. In the research, the average alienation levels of middle school students in terms of school type (private school-public school) variable were determined as 3.02±0.60 for private schools and 3.14±0.55 for public schools. According to this result, it was determined that there is a significant difference on alienation levels of students in terms of school type variable ($p<0.05$).

It is an expected result to see alienation in educational organizations that lack of activities that will increase the student's commitment to school, develop positive attitude towards school and develop sense of belonging to school. Because commitment to school will diminish alienation to school, students' commitment levels to school must be increased first. In this regard Mengi (2011) made the following description: "commitment to school is to have positive attitude towards school, to have positive associations about education, the sense of belonging to school environment, to continue going to school, attending extracurricular social activities, to spend extra time for studies related to school and to determine one's own learning objectives." On commitment to school Cemalcılar (2010) indicates that "the students with higher commitment to school levels have lower levels of anxiety, loneliness and absence; higher levels of autonomy, positive social behavior, inner motivation and academic success". In the research, it was determined that there is a difference of student alienation levels between groups in terms of the views of students relating to the sufficiency of school activities (Table 2). While the average of group indicating, the activities are insufficient is 3.22±0.56, the average of group indicating the activities are sufficient is 2.87±0.78. A difference on the level of

p<0.01 was determined between the groups. In the research conducted by Archambault and colleagues (2009) the students with high risk of dropping out of school are also the ones with lower commitment levels to school.

The extracurricular sport activities at schools increase the school commitment levels of students. In the research, the assessment made to determine the differences in terms of the attendance status of students to extracurricular sport activities (Table 3) shows that there is a difference on the level of p<0.01 between groups. While the average of group attending the extracurricular sport activities for 5 years and more was found 2.62±0.48, that of the group never attending the activities was found 3.16±0.57.

Alienation, an important matter in social life, is also an important issue in terms of education. In order to make education more productive and reach the country's target level, this problem has to be solved. Aiming to addressing this issue in a broad sense, this study has the objective to determine the effect of school sports activities on students' alienation. According to the results obtained, the alienation level diminishes as the number of years of attendance to the extracurricular activities increases. This result emphasizes the importance of attendance to the extracurricular sport activities in diminishing the school alienation and increasing the commitment to school one more time.

A number of suggestions have been developed in line with the results obtained from the research. According to this:

1. This type of researches to determine the school alienation levels of students may contribute to the studies for preventing the alienation of students to school and education. For this purpose, there should be more research conducted on this field.

2. Considering the insufficiency of extracurricular sport activities among the variables in the study, it is thought that increasing the number of this type of activities would also increase the sense of belonging and commitment levels to schools. That's why the number of extracurricular sport activities should be increased.

3. Because increasing participation levels of extracurricular sport activities, one of the variables in the research, would increase communication and interaction of students with each other and their teachers, it is considered as a factor attaching students to school. That's why the necessary measures to ensure the participation to this type of activities should be taken.

References

Akgül, S., Göral, M., Demirel, M., & Üstün, Ü. D. (2015). An investigation of primary school students participation and not participation reasons of extracurricular sport activities, Dumlupınar University, Journal of Social Sciences, 32(32).

Alaca, F. (2011). The relationship between perceptions of quality of school life and sense of school belonging among bilingual and monolingual students, Unpublished Master Thesis. Çukurova University, Institution of Social Sciences, Adana

Alpkaya, G. (2010). Effect of feminine masculine traits of school administrators on the quality of school life, Unpublished Master Thesis. Uşak University, Institution of Social Sciences, Uşak.

Arastaman, G. (2006). The opinions of students, teachers and administrators in Ankara province in relation to freshman high school students' school engagement, Unpublished Master Thesis. Ankara University, Institution of Educational Sciences, Ankara.

Archambault, I., Janosz, M., Morizot, J. & Pagani, L. (2009). Adolescent Behavioral, effective, and Cognitive Engagement in School: Relationship to Dropout. Journal of School Health, 79. 408- 415.

Brown, M. R., Higgins, K., Pierce, T., Hong, E.&Thoma, C. (2003). Secondary students' perceptions of school life with regard to alienation: The effects of disability, gender and race. Learning Disability, 26, 227-238

Case, J.M. (2008). Alienation and engagement: development of an alternative theoretical framework for understanding student learning. High Educ. 55, 321–332, DOI 10.1007.

Cemalciler, Z. (2010). Schools as socialization contexts: Understanding the impact of school climate factors on students' sense of school belonging. Applied Psychology, 59, 243.

Coşkun, Y., Altay, C.A. (2009). A Study on Relation of Self Perception and Alienation on High School Students. Marmara University Journal of Educational Sciences. Volume: 29, p. 41-56

Çağlar, Ç. (2013). The Relationship between the Levels of Alienation of the Education Faculty Students and Their Attitudes towards the Teaching Profession. Educational Sciences: Theory & Practice - 13(3) .1507-1513

Çelik, F. (2005). The study of school alienation level of high school students in terms of some variables, Unpublished Master Thesis. Çukurova University, Institution of Social Sciences, Adana

Çelik, H. C., Ceyhan, H. (2009). The Comparison of High School Students' Mathematics and Computer Attitudes According to Various Variables. Pamukkale University Journal of Education, 26, 92-101.

Çiftçi, G. (2009). The relationship between the bureaucracy level of Elementary schools and student alienation, Unpublished Master Thesis. Pamukkale University, Institution of Social Sciences, Denizli.

Finn, J.D., Voelkl, K.E. (1993). School characteristic related to school engagement. Journal of Negro Education: p.249-268

Fromm, E. (1996). Healthy Society. İstanbul: Payel Publishing

George, D., Mallery, M. (2010). SPSS for Windows Step by Step: A Simple Guide and Reference, 17.0 update, Pearson, Boston, 2010, s:10

Karasar, N. (2006). Scientific Research Method. Ankara: Nobel Publishing and Delivery.s.80,82

Lane, E.J. (1999). "Correlates of Social Alienation Among High Students." http://www.findarticles.com/cf_0/m0FCR/1_33/62894047/print.jhtm

Marx, K. (2000). Alienation (Ed: Barış Erdost). İstanbul: Sol Publishing

Mau, R.Y. (1992). The validity and devolution of a concept: Student alienation. Adolescence, 1992(27-107); p: 731-741

Mengi, S. (2011). Relations for the Social Support and Self Efficacy with School Bonding of the Secondary Education 10th and 11th Classes Students, Unpublished Master Thesis. Sakarya University, Institution of Social Sciences. Sakarya.

Murdock, T. B., Hale, N. M. &Weber, M. J. (2001). Predictors of cheating among early adolescents: Academic and social motivations. Contemporary Educational Psychology, 26(1), 96-115

Özdemir, M., Kalaycı, H. (2013). An Examination on School Engagement and Metaphorical School Perception: Case of Province of Çankırı. Educational Sciences: Theory & Practice - 13(4). 2134-2137

Sanberk, İ., (2003), Student alienation scale (a validity and reliability study), Unpublished Master Thesis. Çukurova University, Institution of Social Sciences. Adana

Sarı, M. (2007). The Effect of hidden curriculum on gaining democratic values: a qualitative study in two elementary schools having low and high quality of school life, Unpublished Doctoral Dissertation. Çukurova University, Institution of Social Sciences. Adana

Seeman, M. (1959), On personal consequences of alienation in work, American Sociological Review, 31, ss.98

Sidorkin, A. M. (2004). In the event of learning: alienation and participative thinking in education. Educational Theory, 54, 3, 251-262.

Şimsek, H., Atas. Akdemir, Ö. (2015). School Alienation of University Students. Current Research in Education, 1(1) · 1-12

Tabachnik, B.G., Fidell, L.S. (2013). Using Multivariate Statistics. Pearson, Boston; p:6

Thompson, S. (2005). Engaging students with school life. Youth Studies Australia, 4,1.

Trent, F. (2001). "Aliens in the Classroom?", Biennial Meeting of the Society for Research in Child Development, 10-15, Washington, ERIC: ED245153

Uzun, M., İmamoğlu, O., Yamaner, F., Deryahanoğlu, G., & Yamaner, G. (2017). Examination of the factors which prevent to participate the recreative activities: Example of girls high school. Journal of Human Sciences, 14(1), 950-962.

Yiğit, S. (2010). An Investigation into School Alienation Levels of 5th,6th,7th and 8th Grade Pupils in terms of various variables, Unpublished Master Thesis. Zonguldak Karaelmas University, Institution of Social Sciences, Zonguldak.

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A study on soccer coaches' anxiety, problem solving, social self-sufficiency, and social proficiency expectations

Kursad Han Donmez[1]

[1] Giresun University, Faculty of Sport Sciences, Giresun, Turkey.

kursad.han.donmez@giresun.edu.tr

Abstract

This study aims to examine the state anxiety, trait anxiety, problem solving skills, social self-sufficiency skills, and social proficiency expectations of coaches participating in the "Giresun Soccer Coaches Improvement Program", which is a program organized in collaboration between the Giresun Province Branch of Soccer Coaches Association (TÜFAD) and Giresun University's Faculty of Education Physical Education and Sports. The study group includes 65 coaches all of whom are members of the Soccer Coaches Association (TÜFAD) in the province of Giresun. Over a four-moth period, the coaches were given training twice a month in sports psychology, athlete health, choice of talent, and sports injury, as well as various subjects within education. The State and Trait Anxiety Inventory, Problem Solving Inventory, Social Self-Sufficiency Scale, and Social Proficiency Expectation Scale were used for the purpose of data collection. Data analysis conducted by computer using IBM SPSS Statistics 17.00. Upon completion of the study, it was established that coaches experienced a significant increase in their state and trait anxiety levels, problem solving skills, social self-sufficiency, and social proficiency expectations. This study important in that it pioneers research in this field, opening the door to further more detailed studies on this subject.

Keywords: Problem solving, social proficiency, anxiety, social self sufficiency, education, sports

INTRODUCTION

Human beings are social creatures. They carry on with their lives by occupying different positions within a given society, and through assuming different roles (Dönmez, 2010). Nowadays, it seems that people have difficulty in recognizing and understanding both themselves as well as others. Ensuring that individuals get to know and perceive themselves and others in a correct manner, and thereby realizing their own potential, adapting to the society efficiently, and being happy over the course of this journey is regarded as one of the fundamental goals of contemporary societies. This is because individuals are socially adapted to society, and are able to develop social attitudes alongside gain satisfaction from their behaviors. It is possible for us to get along well with other people, and therefore lead happier and fulfilling lives in so far as how we perceive ourselves and others (Kat, 2009).

Sports scientists go to great lengths in order to improve sportive performance. They are constantly on the lookout for new training principles and ways to improve the performance levels of their players. Self-sufficiency is influential over academic motivation, learning, and overall success (Schunk ve Pajares, 2001). Self sufficiency is about people's individual judgments as to how well they could manage to do what is necessary in order to deal with all possible situations (Bandura, 1982). According to Haycock et. al (1998), the existence of a sufficient level of motivation and skills will help individuals to start working and maintaining a given task by revealing their self-sufficiency (Aydoğan and Özbay, 2012). The level of anxiety occupies a significant place in education.

Anxiety is a state whereby stimuli that would otherwise induce no sense of fear under normal circumstances triggers a set of reactions (Tavacıoğlu, 1999). This is further divided into two categories: state anxiety and trait anxiety. Trait anxiety is the tendency of an individual to have longer-term and more severe anxiety. It could also be described as the individual's tendency to perceive and interpret nearly every situation he encounters as being stressful. It could also described as a sense of unhappiness and discontent induced upon the individual as a result of perceiving objectively neutral situations as being potentially dangerous and self threatening. Individuals with a high level of trait anxiety experience state anxiety more frequently and intensely than others (Öner, 1996). State anxiety is a sense of subjective fear experienced by an individual due to the stressful circumstances that he/she finds him/herself in. Such anxiety is usually dependent on temporary situations that every individual usually experiences. The severity of the state anxiety as well as the degree of perceived threat is associated with the permanence of the individual's interpretation of the dangerous situation in question. State anxiety passes once the situation triggering the said tension and anxiety within the individual vanishes. State anxiety increases in times of extreme stress; whilst it decreases when such stress disappears Individuals who are adept at coping with their anxiety levels will generally also deal with any issue and problem they encounters with relative ease.

Problem solving is the level of attainment of the rules that leads a person to the solution, and incorporating those rules in such that they can be used to solve problems (Bilen, 1999). Saygılı (2000) has divided the factors instrumental in problem solving into two groups. The first of these two groups includes individual factors. Individual factors include intelligence, motivation, level of readiness, and functionality. The second group on the other hand includes social factors. Social factors include socio-economic and socio-cultural levels, an individual's social development, parental attitude, and individual's level of education. In order for a person to achieve success, he has to recognize himself as being better.

According to Korkmaz (2009) proficiency expectation is being aware of oneself. The individual makes a comparison between his own capacity and the performance he is expected to deliver and acts accordingly. Proficiency expectation the self- reliance on the part of the individual in terms of how successful they will be in the face of the challenges they encounter. Short proficiency expectation is being aware of one's own capabilities. What makes this study thus important is the fact that it will be a pioneering study in this field, in that it involves determining the state and trait anxiety levels, problem solving skills, social self sufficiency skills, and social proficiency expectations of Giresun soccer choaches, and will thus lead the way for future studies to be conducted on this subject.

METHODS

As a result of the literature review, it has been established that no training program is currently being pursued that covers the issues such as training intended for soccer coaches, the diets of athletes', sports injuries, talent selection, or sports psychology. In using such deficiencies as a starting reference point, this study has been conducted for the purpose of nurturing coaches who have improved themselves in terms of socialization, culture, and well-being. The data analysis of this experimental study was done on computer using the IBM SPSS Statistics 17.00 computer program. Data was collected over two sessions. Prior to distributing the surveys, the rules and regulations for filling out the survey was read by the researcher, and it was made clear that participation was to be voluntary. Moreover, as part of the confidentiality clause, it was ensured that the personal participants was to be used, and thus was not collected.

Study Group

This study aims to examine the state anxiety, trait anxiety levels, problem solving skills, social self sufficiency skills, and social proficiency expectations of the coaches participating in the "Giresun Soccer Coaches Improvement Program" organized in collaboration between the Giresun Province Branch of Turkish Soccer Coaches Association (TÜFAD) and Giresun University's Faculty of Education Physical Education and Sports. The study was conducted involving 65 soccer coaches. In this respect, a study program consisting of 8 subjects was implemented twice a month over a four month period. Candidates were asked to fill out surveys before and after the study program on the survey focused on the relationship between the coaches' levels of education (18 primary school, 32 secondary school, and 15 university graduates), the number of years of experience in coaching (16 people with 0-5 years, 19 people with 6-10 years, 19 people with 1115 years, and 11 people with 16 plus years of experience), and at what level they coached (29 upper level and 36 lower level coaches).

Table 1. Study program

Module	Contents	Objectives	Method and Procedure	Duration
Training management and learning motivation	- A general description of training - A general description of management and learning - Description of Motivation - Place and importance of motivation in sports	- Improving a coach's management and teaching quality - Emphasizing the importance of motivation in management and learning	- PowerPoint presentation - Face to Face lecturing - Q&A Method	2*45=90'
Talent selection in sports	- Athlete scouting and recognition methods - Criteria to be taken into consideration during talent selection	- Teaching the ways to find talented players	- PowerPoint presentation - Face to Face lecturing - Q&A Method	2*45=90'
General nourishment and diet of athletes	- Regular nourishment and health - Athletes' diets	- Raising healthy and strong athletes	- PowerPoint - Face-to-face lecturing - Q&A Method	2*45=90'
Sports Injuries and First Aid	- Protection against on the pitch injuries - Protection against off the pitch injuries - First aid for injuries and wounding - General first aid issues	- Improving upon first aid knowledge in on the pitch and off the pitch injuries and wounding	- PowerPoint presentation - Face to-face lecturing - Q&A Method	2*45=90'
A current look at amateur and professional Soccer	- Nice and bad examples in today's soccer - Presenting examples of successful athletes - Analyzing sports in developed countries	- Improving general soccer culture	- PowerPoint presentation - Faceto-face lecturing - Q&A Method	2*45=90'
Relationship among coaches, athletes and spectators	- Ways in which to improve the quality of communication between the coach and the athlete - Methods for identifying the athletes' relationship with spectators	- Ensuring the establishment of sound communication between the coach, athletes and spectators	- PowerPoint presentation - Faceto-face lecturing - Q&A Method	2*45=90'
Self disclosure	- Importance of coach's ability to express herself to the athletes	- Raising coaches who are able to express themselves clearly to the society, athletes and executives	- PowerPoint presentation - Face to-face lecturing - Q&A Method	2*45=90'
Emotion Management	- Management of emotions expressed by coach in the event of defeat or win	- Raising coaches successfully dealing with emotion management	- PowerPoint Presentation - Face-to-face lecturing - Q&A Method	2*45=90'

Data Collection

State and Trait Anxiety Inventory (STCAI) was localized into Turkish by Le Compte and Öner (1976). Öner (1977) conducted the reliability and validity studies of the scales (Özgüven, 1998). It was determined that reliability was between 0.83 and 0.87 for the "Trait Anxiety Scale"; whilst it was between 0.94 and 0.96 for the "State Anxiety Scale". There are ten inverse expressions on the state anxiety scale, and are listed as being 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20. There are seven inverse

expressions on the trait anxiety scale and are listed as being 21, 26, 27, 30, 33, 36 and 39. For scoring, the total weighted score of inverse expressions are deducted from the total weighted score of the direct expressions. The total score varies between 20 and 80. Higher scores demonstrate a higher level of anxiety, whereas lower scores demonstrate a lower level of anxiety (Öner and Le Compte, 1985). The original version of problem solving skills scale was developed by Heppner and Petersen, and localized into Turkish by Şahin and Heppner in 1993. Depending on the answers given, scores are thus awarded on a scale of between 1 and 6. In scoring, the items 9, 22 and 29 are kept out of the scoring. Scoring is done based on 32 items. These items include 1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30 and 34, and are scored inversely. The internal consistency (Cronbach Alfa) reliability coefficient was found to be 0.88 (Dönmez, 2010). The original version of social self-sufficiency scale was developed by Smith-Betz (2000), and was later adapted into Turkish by Palancı (2002). The degree of social self sufficiency perception is determined as per higher points scored from the Liker type scale, which ranges from "I can not feel secure at all under these circumstances" to "I feel totally safe, and sits within a spectrum of 1 to 5. The reliability coefficient of the study conducted by Palancı was found as .89 through internal consistency (Cronbach Alfa) method (Dönmez, 2010). The Social Proficiency Expectation Scale was developed by Bilgin in 1999. The internal consistency coefficient for the Social Proficiency Expectation Scale Adolescent Form was found to be 0.93 by using Cronbach Alpha equation. The reliability coefficient of the scale found by going halfway through the test was identified as being 0.86. The total item score correlations of the scale was calculated, and it was established that the articles presented varying degrees of correlations ranging from 0.43 to 0.56 (Bilgin, 1999).

RESULTS

Table 2. t- Test results of the state anxiety (SA) pre-test and post-test average scores

SA	N	X	S	sd	t	p
Pretest	65	48.98	8.56	64	-9.50	.000*
Posttest	65	52.82	8.29			

*P<0.05

It was established that there was a significant increase in coaches' state anxiety levels following the group study (t_{64}= -9.50, p<.01). While the coaches' pre-study state anxiety score average was X = 48.98, at the end of study it was found to be X = 52. Such a finding reveals that the practice of the group study has plays an important role in increasing athletes' level of state anxiety.

Table 3. t- Test results of the trait anxiety (CA) pre-test and post-test average scores

CA	N	X	S	sd	t	p
Pretest	65	48.22	6.36	64	-15.87	.000*
Posttest	65	54.91	6.17			

*P<0.05

It was established that there was a significant increase in coaches' trait anxiety levels following the group study (t_{64}= -15.87, p<.01). While the coaches' pre-study trait anxiety score average was X = 48.22, at the end of the group study it had increased to X = 54.91. Such a finding goes to show that the practice of group study has a significant impact upon athletes in terms of its raising their trait anxiety levels.

Table 4. t- Test results of the problem solving (ps) pre-test and post-test average scores

PS	N	X	S	sd	t	p
Pretest	65	97.18	22.49	64	-14.75	.000*
Posttest	65	102.62	23.19			

*P<0.05

It was established that there was a significant increase in coaches' problem solving abilities following the group study (t_{64}= -14.75, p<.01). Their pre-study problem solving score average was X = 97.18, whilst their post-study score had increased slightly to X = 102.62. Such a finding shows us that the practice of group study has a significant impact in terms of increasing athletes' problem solving skills.

Table 5. t- Test results of the social self sufficiency (sss) pretest and post-test average scores

SSS	N	X	S	sd	t	p
Pretest	65	74.45	26.84	64	-9.94	.000*
Posttest	65	77.62	26.41			

*P<0.05

It was established that there was a significant increase in coaches' social self-sufficiency levels following the group study (t_{64}= -9.94, p<.01). Before the study, social self-sufficiency score average was X = 74.45. Following the study, it was X = 77.62. This appears to indicate that practice of group study positively impacts athletes' sense of social self-sufficiency.

Table 6. t- Test results of the social proficiency (sp) pre-test and post-test average scores

SP	N	X	S	sd	t	p
Pretest	65	86.66	25.46	64	-3.75	.000*
Posttest	65	90.43	21.54			

*P<0.05

Here too it was established that there was a significant increase in coaches' social proficiency levels following the group study (t_{64}= -3.75, p<.01). The pre-study social proficiency score average was X = 86.66. The post-study score had increased to X = 90.43. This finding reveals that show that the practice of group study appears to increase athletes' level of social proficiency.

DISCUSSION

It was established that there was a significant increase in coaches' state anxiety levels following the group study. Such a finding shows that that the practice of group study increases coaches' state anxiety levels. It is believed that when coaches receive planned and informed training, their perspective on games, life, and events change, and their state anxiety increases accordingly. Çelik's (2010) study seems to support such this finding. Çelik had compared the pre-match state anxiety scores of both male and female athletes to one another, and had found that, the state anxiety scores of the male subjects were lower than those of the female subjects. When the test results were examined, it was established that there was a statistically significant difference between the state anxiety scores of the male and female subjects. The studies conducted by Dönmez (2002), Bedir (2008), Başaran (2008),

and Atasoy (2012) also support the findings of this study. Amen's study (2008), however, does not support this study's finding.

It was found that there was a significant increase in coaches' trait anxiety levels following the group study. This finding points out that the practice of group study has a significant effect in increasing coaches' overall trait anxiety. The results of the studies conducted by Engür (2002), Bilge and Pektaş (2004), Civan (2001), Yücel (2003), Erbaş (2005) seem to support the findings of our study. The findings presented in the studies conducted by Aktaş (2009), Dişçi et. al. (1989), Akgün, Gönen and Aydın (2007), Karahan and Eplikoç (2007), Karaman (2009), Develi (2006), Ekşi (2006) and Tekkoyun (2008) are, to the contrary, not consistent with those of our study.

This study also determined that that there was a significant increase in coaches' problem solving skills following the group study. The correlation seen here is that that the practice of group study increases coaches' problem solving skills. A study conducted by Akpınar (2010) seems to support the finding of this study which established that the personnel participating in the study had had mid-level problem solving skills as based on the total scores. The studies conducted by Çağlayan (2007), D'Zurilla et. al. (2003), Hackney (2010), Kat (2009), Türkçapar (2007), Canan and Ataoğlu (2010), and Kiremitçi and Doğan (2010) appear to support the findings of this study. The studies conducted by Ferah (2000), Kiremitci (2012), Gökbüzoğlu (2008), Polat (2008), Kesgin (2006) and Çağlayan (2007), do not support the findings of this study.

A significant increase in coaches' social self sufficiency following the group study was revealed by this study, indicating that that the practice of group study has a positive effect in terms of increasing coaches' social self sufficiency. The studies conducted by Çubukçu and Girmen (2007), Dönmez (2010) and Aydıner (2011) support the findings of this study. The studies conducted by McKenzie (1999), İkiz and Yörük (2013) appear not to, support our findings.

Once more it was recognized that there was a noteworthy increase in coaches' social proficiency following the group study, proving that practicing group study has a positive impact on raising coaches' overall level of social proficiency. In one study involving 277 university students, Rovniak and others (2002) had examined the relationship between physical activity and social support, proficiency expectation, result expectation, and self-regulation capacity. The results of their research had established that the proficiency expectation was the most effective variable in relation to a given physical activity. The studies conducted by Öztürk and Şahin (2007), Matsushima and Shiomi (2003), Efe (2007), Bilgin (1997), Çelikkaleli (2004), Akkapulu (2005), Payne and Jahoda (2004), Kashdan and Roberts (2004), Torres and Solberg (2001), Murris (2002), Bezjak and Lee (1990), and Dekovic and Meeus (1997) support the findings of this study on this specific aspect. The studies conducted by Connly (1989), Innes and Thomas (1989), Fırıncıoğlu (2005), Karahan and others (2006), Çakıcı, (2010) and İşleroğlu (2012), do not, on the other hand, support these findings.

References

Akgün, A., Gönen S., & Aydın, M. (2007). A Multifactoral Study on the Anxiety Levels of Students of Primary Science and Math Education Students, Electronic Journal of Social Sciences, 20, 283-299.

Akkapulu, E. (2005). Certain Factors Predicting The Social Competence Expectations Of Teenagers – Unpublished Graduate Studies Thesis, Çukurova University Social Sciences Institute, Adana.

Aktaş, S. (2009). Identifying The Correlation Between Marital Harmony And A Spouse's Level of Anxiety – Unpublished Graduate Thesis, Maltepe University Social Sciences Institute, İstanbul.

Alemdağ, S. (2013). A Study Examining The Relationship Between Student Teachers' Participation In Physical Activity, Social Anxiety, and Self-Efficacy – Unpublished Doctoral Thesis, Karadeniz Technical University Educational Sciences Institute, Trabzon.

Akpınar, S. (2010). A Study On Social Competence, Job Satisfaction, And Problem Solving Skills In Sports Federations – Unpublished Doctoral Thesis, Gazi University Health Sciences Institute, Ankara.

Amen, M. H. (2008). A Comparative Study On Pre-Game Anxiety Levels In Soccer And Certain Factors That Influence It – Unpublished Graduate Thesis, Gazi University Health Sciences Institute, Ankara.

Atasoy, S. (2012). A Study Comparing the State Anxiety Levels Of Different Age Groups During Exam Preparation At Exam Centres And Their Perspectives About The Future – Unpublished Graduate Thesis, Maltepe University Social Sciences Institute, İstanbul.

Aydıner, B. B. (2011). A Study On The Sub-Dimensions Of University Students' Life Goals In Terms Of Overall Self-Satisfaction, Life Satisfaction, and Various Other Variables – Unpublished Graduate Thesis, Sakarya University Educational Sciences Institute, Sakarya.

Aydoğan, D., & Özbay, Y. (2012). A Study Comparing The Relationship Between Academic Suspension Behaviours And Held Beliefs About Self-Respect, State Anxiety, and Self-Efficacy- Pegem Education and Training Journal, 2 (3), 1-9.

Bandura, A. (1982). Self-efficacy mechanism in human agency, American Psychologist, 37(2), 122-147.

Başaran, M. E. (2008). [A Study On The State and Trait Anxiety Levels Of Athletes Based On Several Factors, Selçuk University Health Sciences Institute, Konya.

Bedir, R.(2000). How The State Anxiety Levels Of The Athletes Of Turkey's National Taekwondo Team Impacts Their Success – Unpublished Graduate Thesis, Selçuk University Health Sciences Institute, Konya.

Bezjak, J. E., &Lee, J. W. (1990). Relationship of self- efficacy and locus of control constructs in predicting college students physical, fitness behavior, Perceptual and Motor Skills, 71 (2), 499- 508.

Bilen, M. (1999). Plan-To-Practice Teaching, Ankara: Anı Publishing.

Bilge, A., Pektaş, İ. (2004). A Study On The Socio-Cultural Traits, State-Trait Anxiety Levels, and Coping Skills Of University Students. Ege University Nursing High School Journal,20(1), 47-54.

Bilgin, M. (1997). Determination of Vocational High School Students' Certain Demographic Variables and, Comparison of Families' perception for adolescents's social relations and acceptance level and adolescents' social competence and self-acceptance levels, Çukurova University Faculty of Education Journal, 2 (16), 15-30.

Bilgin, M. (1999). A Study Concerning the Development of the Social Competence Expectancy Scale Directed At 14 – 18 Year-Old Teenagers, Journal of Turkish Psychological Counseling and Guidance, 12,8, 7-15.

Canan. F, Ataoğlu, A. (2010). The Effects Of Regular Physical Activity On A Person's Sense of Anxiety, Depression, and Problem Solving, Anadolu psychiatry Journal, 11, 38–43.

Civan, A. (2001). Comparing The Pre and Post-Game State And Trait Anxiety Levels Of Athletes Involved In Individual and Team Sports – Unpublished Graduate Thesis, Selçuk University Social Sciences Institute, Konya.

Connly, J. (1989). Social self-efficacy in adolescence; relations with self-concept, social adjustment and mental health, Canadian Journal of Behavioral Science Review, 21, 258-269.

Çağlayan, H. S. (2007). Examining The Relationship Between The Learning Styles Of Physical Education and Sports And Their Ability To Solve Problems – Unpublished Doctoral Thesis, Gazi University Educational Sciences Institute, Ankara.

Çakıcı, D. (2010). A Study On The Social Competence And Self-Respect Levels Of Ninth And Tenth Grade Sports Academy And High School Students – Unpublished Graduate Thesis, Mersin University Social Sciences Institute, Mersin.

Çelik, G. (2010). Evaluating The Anxiety Levels Of Upper-Level Judo Wrestlers Before And Following Events – Unpublished Graduate Thesis, Dumlupınar University Health Sciences Institute, Kütahya.

Çelikkaleli, Ö. (2004). The Social Competence Expectations And Psychological Needs Of Secondary School Students – Unpublished Graduate Thesis, Mersin University Social Sciences Institute, Mersin.

Çubukçu, Z., Girmen, P. (2007). Determining The Social Self-Efficacy Perceptions Of Student Teachers, Eskişehir Osman Gazi University social sciences journal, 8(1), 57-74.

Dekovic, M. and Meeus, W. (1997). Peer relations in adolescence: effects of parenting and adolescents self-concept, Journal of Adolescence, 20 (2), 163-176.

Dişçi, R., Güngörmüş, O., Ayman, U. & Minibaş, J. (1989). A Statistical Survey Determining The Relationship Between The Social-Economic Traits Of Istanbul University Literature Students and Their State-Trait Anxiety Levels, Journal of Medical Faculty, 52, 79-86.

Dönmez, K. H. (2002). Comparing the In-Game State Anxiety Of Athletes Involved In Individual Sports (i.e. Judo, Taekwondo, Gymnetics etc.) Vs. Those Involved In Team Sports (Volleyball, Handball, Badminton, etc.) – Unpublished Graduate Thesis, Kırıkkale University Health Sciences Institute, Kırıkkale.

Dönmez, K. H. (2010). Examining The Relationship Between The Social Self-Competence Versus The Problem Solving Skills Of Undergraduate Students of Physical and Sports Education – Unpublished Doctoral Thesis, Gazi University Educational Sciences Institute, Ankara.

D'zurilla, T. J, Chang, E, Sana I. J. (2003). Self-Esteem and social problem solving as predictors of aggression in college students, Journal of Social and Clinical Psychology, 22(4), 424-448.

Efe, M. (2007). The Effect That Sports Exercises Have On The Social Competence Expectations And Drive Of 14 - 16 Year-Old Individuals – Unpublished Doctoral Thesis, Uludağ University Health Sciences Institute, Bursa.

Engür, M. (2002). The Effect That The Motivation To Succeed Has On The State Anxiety Levels Of Elite Athletes – Unpublished Graduate Thesis, Ege University Health Sciences Institute, İzmir.

Erbaş, M., K. (2005). The Relationship Between State Anxiety Levels Versus Performance Among Upper Level Basketball Players – Unpublished Graduate Thesis, Dumlupınar University Social Sciences Institute, Kütahya.

Ferah D. (2000). Examining How The Students Of Kara Harp Military Academy Perceive And Approach Problem Solving According To Variables Such As Gender, Academic Year, Academic Success, And Taking Lead – Unpublished Graduate Thesis, Hacettepe University Social Sciences Institute, Ankara.

Fırıncıoğlu, H. (2005). An Experimental Study On The Effect That Adlerian-Focused Psychological Therapy Sessions Have On Students' Social Competence Expectation Levels – Unpublished Graduate Thesis, Mersin University Social Sciences Institute, Mersin.

Gökbüzoğlu, B. (2008). Examining The Relationship Between Teenagers' Levels Of Aggression In Versus Their Ability To Solve Problems – Unpublished Graduate Thesis, Marmara University Educational Sciences Institute, İstanbul.

Hackney, L. B. (2010). Teacher use and student perceptions of instructional strategies that promote creative problem solving by students of advanced social studies classes at the middle school level, (Walden University), Dissertation Abstracts International, 188, AAT 3397110.

Innes, J. M., Thomas, C. (1989). Attributional style, self-efficacy and social avoidance and inhibition among secondary school students, Personality and Individual Differences, 10 (7), 757-762.

İkiz, F. E., Yörük, C. (2013). Studying The Relationship Between The Self-Efficacy Levels Versus The Family Roles Of Student Teachers. Usak University Journal of Social Sciences, 6,1, Uşak.

İşleroğlu, S. (2012). Predicting High School Students' Respect Towards Themselves In Terms Of Subjective Well-Being According To Their Social Competence Expectations And How They Express Their Feelings – Unpublished Graduate Thesis, Ege University Social Sciences Institute, İzmir.

Karahan, F., Eplikoç H. (2007). Examining How University Students Cope With Stress Within The Context Of Dormitory Life And Perceived Parental Attitudes, Çukurova University Education Journal, 119-130.

Karahan, T. Fikret ve diğerleri (2006). Examining The Social Competency Expectations And Automatic Thoughts Of High School Students In Terms Of Gender And The Social Units Within Which They Live, Turkish Psychological Counseling and Guidance Magazine, 3 (26), 35- 45.

Karaman, S. (2009). The State And Trait Anxiety Levels Of University Students Studying Various Health Sciences Programs – Unpublished Graduate Thesis, Erciyes University Health Sciences Institute, Kayseri.

Kashdan, T. B. ve Roberts, J. E. (2004). Social anxiety's impact on effect, curiosity and social self-efficacy during a high self-focus social threat situation, Cognitive Therapy and Research, 28 (1), 119-141.

Kat, H. (2009). Comparing The Stress Levels And The Problem Solving Skills Of Athletes Involved In Individual Versus Team Sports – Unpublished Graduate Thesis, Erciyes University Health Sciences Institute, Kayseri.

Kesgin, E. (2006). Examing The Relationship Between The Self-Efficacy Levels Of Preschool Teachers Versus Their Approaches To Problem Solving: The Case Of The Province of Denizli – Unpublished Graduate Thesis, Pamukkale University Social Sciences Institute, Denizli.

Kiremitci, O., Doğan, B. (2010). How Peer Learning And Organized Dance Instruction Influences The Development Of Students' Problem Solving Skills, E-Journal of New World Sciences Academy, 5(3), 178-186.

Kiremitci O. (2012). The Effect That Problem Solving-Oriented Organized Physical Education Training Has On Problem Solving Skills and How That Correlates With Advanced Cognitive Awareness Levels – Unpublished Doctoral Thesis, Ege University Health Sciences Institute, İzmir.

Korkmaz, İ. (2009). Educational Psychology, B. Yeşilyaprak (Ed.), Ankara, Pegema Publishing.

Matsushima, R. and Shiomi, K. (2003). Self-efficacy and interpersonal stress in adolescence, Social Behavior and Personality an International Journal, 31 (4), 323-332.

McKenzie, J. K. (1999). Correlatıon between self-efficacy and self-esteem in students. A Research Paper, University of Wisconsin.

Murris, P. (2002). Relationship between self- efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample, Personality and Individual Differences, 32, 337-348.

Öner, N., & Le Compte, A. (1985). Discontinuous / State Anxiety Inventory Handbook, İstanbul: Boğaziçi University Publications.

Öner, N. (1996). Psychological Tests Used In Turkey, (2. Baskı), Research Education Consulting, İstanbul.

Özdemir, Ç. (2011). An Introduction To Educational Science, Ankara, Pegema Publishing.

Özgüven, İ. E. (1998). Psychological Tests, Pdrem Publications, System Offset, Ankara.

Öztürk, F. ve Koparan Ş., Ş. (2007). Comparing The Social Competency Expectancy Points Of 9 - 13 Year Old Individuals Both Involved As Well As Not Involved In Sports, (Bursa Example), Primary Education Online, 6(3),469-479.http://ilkogretim-online.org.tr/vol6say3/v6s3m36.pdf.

Payne, R. ve Jahoda, A. (2004). The Glasgow social self-efficacy scale—a new scale for measuring social self-efficacy in people with intellectual disability, Clinical Psychology and Psychotherapy, 11 (4), 265-274.

Polat, R. H. (2008). Examining The Problem Solving Skills Of Students Of Classroom Teaching According To Certain Socio-Demographic Features And Their Need For Reasoning – Unpublished Graduate Thesis, Çukurova University Social Sciences Institute, Adana.

Rovniak, L.S., Anderson, E.S., Witnett, R.A., Stephens, R.S., and Med, A.B. (2002). Social cognitive determinants of physical activity in young adults: A prospective structural equation analysis, Annals of Behavioral Medicine, 24(2), 149-156.

Saygılı H. (2000). Taking A Look At The Relationship Between Problem Solving Skills And Social And Individual Harmony – Unpublished Graduate Thesis, Atatürk University Social Sciences Institute, Erzurum.

Yücel, O. (2003). The State And Trait Anxiety Levels Of Taekwando Players And How These Effect Their Success During Matches – Unpublished Graduate Thesis, Gazi University Health Sciences Institute, Ankara.

Schunk, D., Pajares, F. (2001). The development of academic self-efficacy. In A.Wigfield & J.Eccles (Eds.). Development of achievement motivation (pp16-31) San Diego, CA: Academic Press.

Tavacıoğlu, L. (1999). Scientific/Scholastic Assessments Within Sports Psychology, Kıralı Printing House, Bağırgan Publisher, Ankara.

Telef, B.B. (2011). Examining Various Psychological Symptoms Among Adolescents When It Comes To Self-Efficacy – Unpublished Doctoral Thesis, Dokuz Eylül University Educational Sciences Institute, İzmir.

Torres, J. B. and Solberg, V. S. (2001). Role of self-efficacy, stress, social integration and family support in Latino college student persistence and health, Journal of Vocational Behavior, 59 (1), 53-63.

Türkçapar, Ü. (2007). Comparing How (University) Students Studying Physical Education and Sports Versus Those Studying Education/Classroom Teaching Tackle Stress Through Problem Solving – Unpublished Graduate Thesis, Gazi University Educational Sciences Institute, Ankara.

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A network-science approach: how different are the attacks of football?

Necmi Gursakal[1], Halil Orbay Cobanoglu[2] and Sendi Ipeker Cagliyor[3]

[1] Uludag University, Faculty of Economics and Administrative Sciences, Bursa, Turkey.
[2] MEB, Muzaffer Cil Anadolu High School, Eskisehir, Turkey.
[3] Halic University, Faculty of Business Administration, Istanbul, Turkey.

orbay_79@hotmail.com

Abstract

Network science is an emerging field. The purpose of this study is to investigate soccer attacks by using network science. In this study, by applying network science approach, four Turkish National Football Team's attacks analyzed with an open-source NodeXL program. We have focused on two types of attacks: the attacks that end with goals and the ones that don't. Our main aim is to see whether there is a difference between the network metrics of these two types of attacks? Using network metrics, for attacks in a same match we couldn't find important differences but we have found real differences for networks' metrics when opponent team changes. Our findings also support that micro measures can be used for new line-up's. First of all, it should be mentioned that our study is a case study and the results of this study should not be generalized. However, our findings can be the start point for further researches with larger samples sizes. With the help of network science approach, the most effective players could be found, the most compatible line-up for the future games could be chosen and the opponent team's key players could be analyzed.

Keywords: Network science, network metrics, football, pass data

INTRODUCTION

Football is one of the most popular sports in the world. Especially in the last decades, with the increasing interest towards to it, football has become something more than just a game; it has evolved to an industry. For instance, a professional soccer club in a league from a smaller European country is like a small commercial or medium-sized enterprise (SME) in terms of its turnover and number of employees and has fans and members of extraordinary loyalty (Dolles and Söderman, 2005). Despite to its popularity all around the globe, or to its financial value as an industry, football has not received much attention from the scientific community (Kooij et al., 2009). The need for "scientific approaches to sports both for performance evaluation or predictions has been highlighted by various sources in the literature.

To respond this need, in this study, we suggest using network science to analyze football attacks. Network science is a new field that has been developed at the dawn of the 21st century (Barabasi, 2002). It is a highly interdisciplinary field that is concerned with the study of networks, which can be biological, technological or social. Before network science it hasn't been known that the structure and the evolution of the networks behind each system is driven by a common set of fundamental laws and principles (Barabasi, 2014).

Even though it is not very common, there are examples of networks science applications for sports analytics. For example, the article "Basketball isn't a sport. It's a statistical network" (Mossop, 2012) is about ta research done by researches in Arizona State University, where network science is applied to analyze basketball games. Another example, "Can Complex Network Metrics Predict the Behavior of NBA Teams?" highlights that box score statistics is significant but not sufficient to predict the success of a team. To fulfill this gap, they suggest new models for predicting a team success based on complex network metrics, such as clustering coefficient and node degree.

Based on its structure, where players can be considered as the nodes and passes as the edges of a network, a football team in a match can be seen as a network too (Pena and Touchette, 2012). As a result of the rapid development in network sciences, and due to its dynamic nature, which is more suitable to evaluate sports than the more static analysis methods, analysis of passes network gained interest among researches after millennium.

Using network analysis for evaluation of football teams and matches provide substantial information that could be useful for coaches. For instance, statistics gained by network analysis of previous games can offer supplementary decision tools for coaches to choose the optimal line-up upcoming games. As an example, based on the topological metrics of players in terms of participation, coaches can choose a line-up, where as many players as possible have already played together, if it is assumed that a team becomes better when enough players have played together before (Kooij et al., 2009).

Similarly, network science gives information about the cliques and motifs that dominate the game. For example, with closeness centrality, how well connected a player to the team can be calculated. Out-degree of a football player can be used as a metric to measure the passes he has given. The clustering coefficient can be used as a sign of "possession" in the pass network. And, betweenness, which naturally capture the hubs and essential associations in the distribution of the ball, has crucial importance to analyze network metrics (Cotta et al., 2011).

There are different researches, where network science approach is applied to examine football games. To summarize, first of all it has been found that the power law in degree distribution emerged in passing behavior in the 2006 FIFA World Cup Final and an international "A" match in Japan. In the same research, the exponent value $\gamma \sim 3.1$ has been found similar to the values which occur in many real-world networks. In a different study, the frequencies of passing interactions within the same team in 5-min intervals have been analyzed and found that when a player who touched the ball many times changes the player to whom he was connected by passes and this is called hub-switching behavior (Yamamoto and Yokoyama, 2011). Another research suggests that network in the second half of the game network density decreases, heterogeneity increases and centralization decreases (Clemente et al., 2015). However, we know that if all players have the same centrality, the homogeneity level will be high. Hence, in second half of games that we analyzed, the increase in, heterogeneity shows that all players have different centralities. Beside that, in general centralizations decreased in the second half. Also different centralities lead us to think about "a direct play" rather than "team work".

Also another study shows that, high levels of interaction between teammates (density) led to increased team performance" (Clemente et al., 2015). We have also conflicting relations between density and success, **"**…which eventually leads to victory…" where in our findings the density of the pass network decreases with time (Cotta et al., 2013). Finally, the amount of correlations between degree, betweenness, closeness, and eigenvector indicates that these measures are distinct, yet conceptually related, the only network variable that has positively and significantly associated with correlations between all centrality measures was reciprocity (Valente et al., 2008).

In light of all this information, we can expect that attacks of networks, which end with a goal, should have higher densities. And if increases in network centralization lead to decreased team performance, then we should expect that attacks of networks, which do not end with a goal, should have high centralizations (Grund, 2012).

METHODS

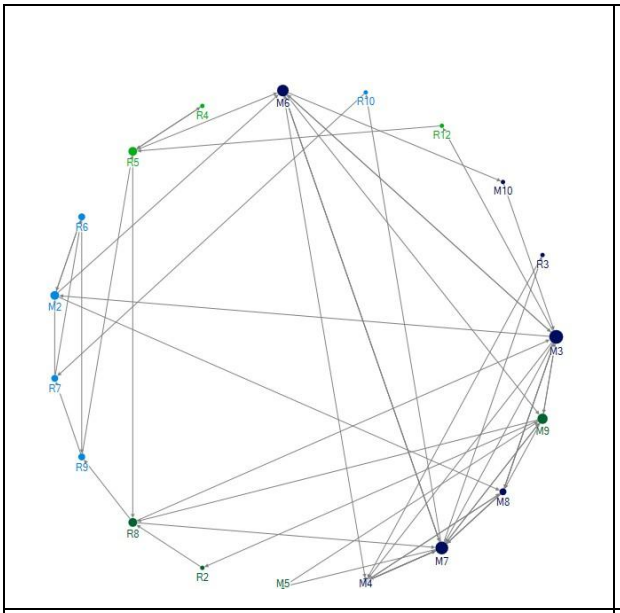
Turkish National Football Team's attack networks and metrics as a case study
In this paper, we focus on analyzing temporal pass data. The data is from a PhD dissertation thesis, which studies Turkish National Football Team's matches for a six sigma application. In this thesis, "e-analysis soccer program"' is used to determine the sequence of the passes (Çobanoğlu, 2015). After we analyzed Turkish National Football Team's attacks with an open-source NodeXL program.

Our sample consists of four attacks from two different matches: a friendly game between Finland and Turkey on 26.05.2012, a Group Elimination game from 2014 World Cup between Hungary and Turkey on 16.10.2012. From Finland match we choose three attacks, where two of them end with goals and one does not. The attack that is chosen from the Hungary game also did not end with a goal.

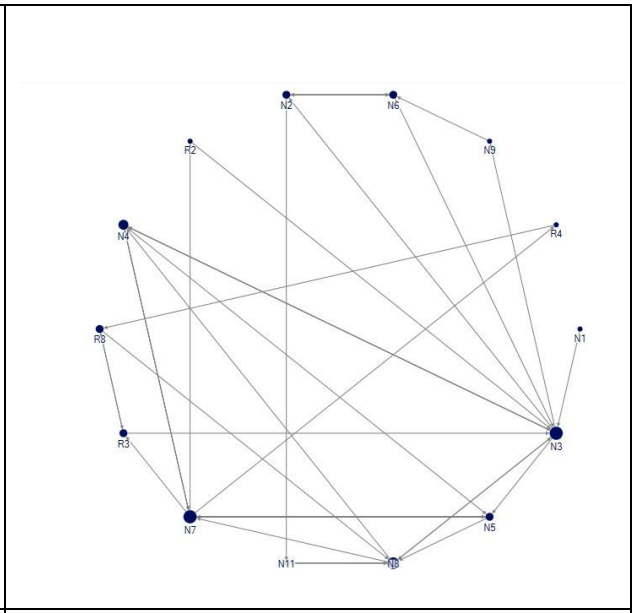
RESULTS

We studied four attacks within the boundaries of macro and micro network measures.

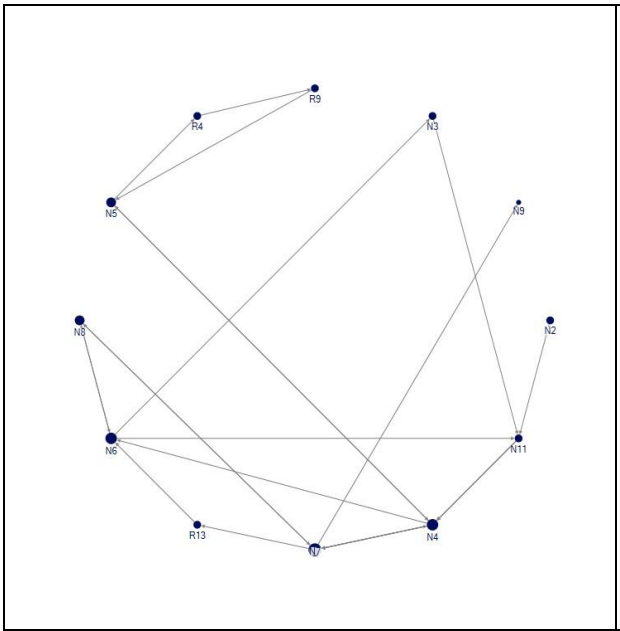
Macro Network Metrics
Macro network metrics are listed in Table 1 and Networks of four attacks are drawn as in Figure 1.



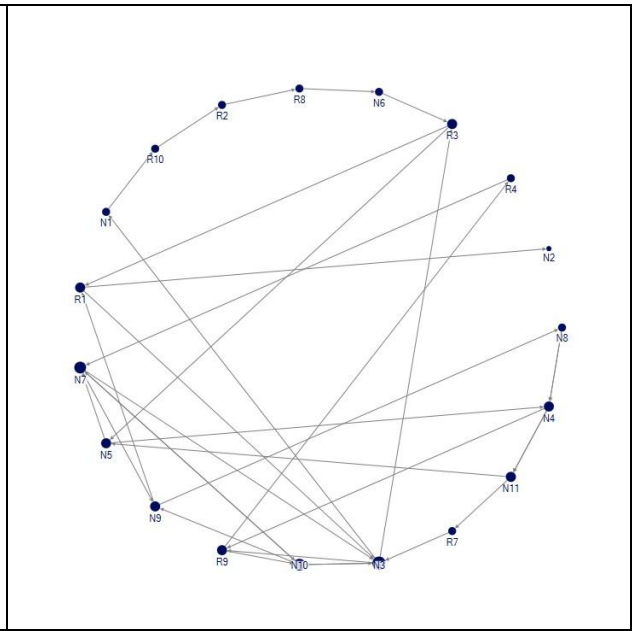
Attack-1, goal scored, 3 groups



Attack-2 , no goal, one group



Attack-3, goal scored, one group



Attack-4, no goal, one group, different opponent team, different network metrics

Figure-1. Networks of four attacks drawn by using out-degrees

*In Table 1 the numbers in the first raw stands for:

1. Is there a goal in the end?
2. Number of vertices
3. Number of edges

4. Diameter: Diameter is the greatest distance between any pair of vertices.
5. Average geodesic distance: It is the mean geodesic (i.e., shortest-path) distance between nodes
6. Density: Actual connections /Potential connections
7. Average in-degree
8. Average out-degree
9. Average Betweenness Centrality: Betweenness centrality is an indicator of a node's centrality in a network. It is equal to the number of shortest paths from all vertices to all others that pass through that node.
10. Average Closeness Centrality: closeness centrality measures how close a vertex is to all other vertices in the graph.
11. Average Eigenvector Centrality: Eigenvector centrality is one method of computing the "centrality", or approximate importance, of each node in a graph.
12. Average PageRank: The underlying assumption is that more important websites are likely to receive more links from other nodes.
13. Average Clustering Coefficient: a clustering coefficient is a measure of the degree to which nodes in a graph tend to cluster together.

Table 1. Macro Network Metrics*

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Attack1 (Finland)	Yes	19	41	4	1,98338	0,140350	2,526	2,526	19,684	0,027	0,053	1	0,317
Attack2 (Finland)	No	14	40	4	1,83673	0,175824	2,286	2,286	12,714	0,040	0,071	1	0,193
Attack3 (Finland)	Yes	12	24	4	2,18055	0,151515	1,667	1,667	15,167	0,040	0,083	1	0,168
Attack4 (Hungary)	No	19	34	6	2,43213	0,093567	1,684	1,684	28,211	0,022	0,053	1	0,070

At the same time, we studied groups and group by motifs for these four attacks using group by motifs (Dunne and Shneiderman, 2013) feature of NodeXL and they are drawn as Table 2.

Table 2. Groups and group by motifs

	Goal	**Group**	**Group by motifs**
Attack1 (Finland)	Yes	3 Groups	Clique (N3,N6,N7,N9)
Attack2 (Finland)	No	1 Group	Clique (N3,N4,N5,N8)
Attack3 (Finland)	Yes	1 Group	2 Connector (N8, R13)
Attack4 (Hungary)	No	1 Group	No motifs

Similarities between these four attacks

Using some R codes we have calculated a similarity matrix of these four attacks:

```
> A1=c( 1.98338, 0.140350, 2.526, 2.526, 19.684, 0.027, 0.053,1, 0.317)

> A2=c( 1.83673, 0.175824, 2.286, 2.286, 12.714, 0.040, 0.071, 1, 0.193)

> A3=c(2.18055, 0.151515, 1.667, 1.667, 15.167, 0.040, 0.083,1, 0.168)

> A4=c(2.43213, 0.093567, 1.684, 1.684, 28.211, 0.022, 0.053, 1, 0.070)

>  A=rbind(A1,A2,A3,A4)

> dist(A)

         A1       A2       A3
A2  6.981027

A3  4.684156  2.627376

A4  8.625095 15.532510 13.046992
```

Results show that similarity measures changes between 2.62 and 6.98 for first three attacks but if Attack-4 (A4) is taken into consideration, we see that measures changes between 8.62 and 15.53.

There are examples suggesting that change in the network measures over time and how opponent team's effectiveness changes everything. For example, after applying network analysis to the champion team of 2010 FIFA World Cup, it has been found that**,** the effectiveness of the opposing team in negating the Spanish game is reflected in the change of several network measures over time (Cotta et al., 2013). Our findings support this statement.

Micro network metrics

The whole team's triadic relations also can be seen in Figure 2 and this table shows us the triadic relationships in a micro basis. Table 3 also gives us the answer of "which player had the most co-players?" Within this context, N3 has got the most co-players in Attack-1 and Attack-2.

Player	Attack-1 (Goal)	Attack-2 (No goal)	Attack-3 (Goal)	Attack-4 (No Goal)
N2				
N3				
N4				
N5				
N6				
N7				
N8				
N9				
N10				
N11				

Figure 2. Turkish National Team's players' triadic relations(Players may change)

In Attack-1 average betweenness centrality is 19.684. So in Turkish team players 4, 5, 8 and 10 have betweenness scores under this level (see Table 3). We can conclude that regarding to the betweenness centrality they are below the average performance level.

Table 3. Micro metrics for attack 1

Label	In-Degree	Out-Degree	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	PageRank	Clustering Coefficient	Reciprocated Vertex Pair Ratio
N2	3	3	29,878	0,029	0,058	1,121	0,250	0,200
N3	5	7	54,544	0,036	0,114	1,896	0,208	0,333
N4	4	2	8,928	0,028	0,076	1,095	0,450	0,200
N5	1	1	0,000	0,023	0,036	0,514	0,500	0,000
N6	4	5	44,967	0,034	0,093	1,505	0,214	0,286
N7	5	6	68,283	0,034	0,110	1,923	0,208	0,222
N8	4	2	8,078	0,029	0,080	1,070	0,400	0,200
N9	4	4	28,578	0,031	0,094	1,506	0,286	0,143
N10	1	1	0,000	0,024	0,037	0,512	1,000	0,000
R2	1	1	0,000	0,023	0,030	0,523	0,500	0,000
R3	1	1	0,000	0,022	0,033	0,518	1,000	0,000
R4	1	1	0,000	0,019	0,007	0,367	0,000	1,000
R5	3	3	44,833	0,029	0,040	1,276	0,050	0,200
R6	2	2	1,400	0,023	0,019	0,762	0,333	0,333
R7	2	2	9,606	0,025	0,022	0,997	0,250	0,000
R8	3	3	44,028	0,033	0,073	1,342	0,200	0,000
R9	2	2	21,328	0,027	0,027	0,985	0,167	0,000
R10	1	1	7,772	0,025	0,023	0,543	0,000	0,000
R12	1	1	1,778	0,025	0,027	0,546	0,000	0,000

In Attack-2 average betweenness centrality is 12.714. So in the Turkish team, excluding the goal keeper, players 2, 4, 5, 6, 9 and 11 (see Table 4) have betweenness scores under this level and we may conclude that regarding to the betweenness centrality they are below the average performance level.

Table 4. Micro metrics for Attack 2

Label	In-Degree	Out-Degree	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	PageRank	Clustering Coefficient	Reciprocated Vertex Pair Ratio
N1	0	1	0,000	0,033	0,031	0,377	0,000	0,000
N2	2	2	6,500	0,037	0,051	0,898	0,167	0,333
N3	6	5	81,689	0,056	0,140	2,408	0,083	0,222
N4	3	3	3,298	0,045	0,105	1,042	0,583	0,500
N5	3	2	3,298	0,045	0,105	1,042	0,667	0,250
N6	2	2	1,667	0,037	0,052	0,901	0,333	0,333
N7	3	5	25,081	0,042	0,108	1,573	0,100	0,333
N8	4	4	31,741	0,050	0,121	1,557	0,267	0,333
N9	1	1	0,000	0,034	0,043	0,633	0,500	0,000
N11	2	1	2,444	0,034	0,038	0,625	0,000	0,500
R2	1	1	3,298	0,038	0,055	0,600	0,000	0,000
R3	2	2	10,797	0,042	0,066	0,848	0,000	0,333
R4	1	1	1,067	0,029	0,035	0,621	0,000	0,000
R8	2	2	7,119	0,036	0,049	0,875	0,000	0,333

In Attack-3 average betweenness centrality is 15.666. So in the Turkish players 2, 3, 8 and 9 (see Table 5) have betweenness scores under this level and we may conclude that regarding to the betweenness centrality they are below the average performance level.

Table 5. Micro metrics for Attack 3

Label	In-Degree	Out-Degree	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	PageRank	Clustering Coefficient	Reciprocated Vertex Pair Ratio
N2	0	1	0,000	0,032	0,042	0,456	0,000	0,000
N3	1	1	0,000	0,036	0,093	0,747	0,500	0,000
N4	3	3	59,333	0,056	0,144	1,387	0,083	0,500
N5	2	2	36,000	0,042	0,061	1,147	0,167	0,333
N6	3	3	28,000	0,050	0,166	1,711	0,100	0,200
N7	2	4	29,000	0,045	0,105	1,482	0,000	0,500
N8	2	2	2,333	0,038	0,083	0,756	0,000	1,000
N9	1	0	0,000	0,031	0,032	0,465	0,000	0,000
N11	3	1	25,000	0,048	0,137	1,441	0,167	0,000
R4	1	1	0,000	0,030	0,027	0,826	0,500	0,000
R9	1	1	0,000	0,030	0,027	0,826	0,500	0,000
R13	1	1	2,333	0,038	0,083	0,756	0,000	0,000

In Attack-4 average betweenness centrality is 28.210. So in the Turkish players 2, 4, 8, 9, 10 and 11 (see Table 6) have betweenness scores under this level and we may conclude that regarding to the betweenness centrality they are below the average performance level.

Table 6. Micro metrics for Attack 4

Label	In-Degree	Out-Degree	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	PageRank	Clustering Coefficient	Reciprocated Vertex Pair Ratio
N1	1	1	46,833	0,023	0,034	0,747	0,000	0,000
N2	1	0	0	0,018	0,018	0,417	0,000	0,000
N3	4	4	125,167	0,031	0,125	1,995	0,095	0,143
N4	2	2	20,833	0,023	0,056	1,179	0,083	0,000
N5	2	2	32,333	0,026	0,068	1,162	0,083	0,000
N6	1	1	37,167	0,021	0,019	0,771	0,000	0,000
N7	3	3	32,333	0,026	0,103	1,394	0,150	0,200
N8	1	1	4,333	0,019	0,033	0,649	0,000	0,000
N9	2	2	24,500	0,023	0,076	1,168	0,167	0,000
N10	3	3	7,667	0,025	0,096	1,122	0,250	0,500
N11	1	2	6,000	0,021	0,041	0,926	0,167	0,000
R1	2	2	48,833	0,026	0,073	1,257	0,083	0,000
R2	1	1	6,000	0,015	0,004	0,864	0,000	0,000
R3	2	2	71,500	0,028	0,071	1,234	0,083	0,000
R4	1	1	0,667	0,019	0,046	0,631	0,000	0,000
R7	1	1	9,667	0,023	0,042	0,654	0,000	0,000
R8	1	1	13,167	0,017	0,006	0,845	0,000	0,000
R9	2	2	26,167	0,026	0,081	1,149	0,167	0,000
R10	1	1	22,833	0,018	0,009	0,835	0,000	0,000

DISCUSSION and CONCLUSION

First of all it should be mentioned that our study is a case study and the results of this study should not be generalized. However our findings can be the start point for further researches with larger samples sizes. With the help of network science approach, the most effective players could be found, the most compatible line-up for the future games could be chosen and the opponent team's key players could be analyzed.

Another interesting results of our study is that, although most of the sources emphasize the importance of central players in terms of scoring goals, we have shown that for Turkish National Football Team wing players like N6 and center-midfield players like N3 are more critical. To accept it as a tactic and to call it " Turkish style" we need more evidences and more analysis.

References

Barabasi, A.L. (2002). Linked: The New Science of Networks, First Edition Perseus, Cambridge, MA.

Barabasi, A.L. (2014). Network Science, Cambridge University Press.

Clemente, F.M., Silva, F., Martins, F.M.L., Kalamaras, D., Mendes, R.S. (2015). Performance Analysis Tool for Network analysis on team sports: A case study of FIFA Soccer World Cup 2014, Journal of Sports Engineering and Technology, July, 29.

Cotta, C., Mora, A.M., Merelo-Molina, C., Merelo, J.J. (2011). "FIFA World Cup 2010: A Network Analysis of the Champion Team Play", arXiv:1108.0261v1 [cs.SI].

Cotta, C., Mora, A.M., Merelo, J.J, Merelo-Molina, C.,(2013). 'A network analysis of the 2010 FIFA world cup champion team play', Journal of Systems Science and Complexity, 26 (1); 21-42.

Çobanoğlu, H.O, (2015). Organizational Change and Applicability of Six Sigma Management Model in Turkish Football Federation, Unpublished Phd. Thesis, Anatolian University, Physical Education and Sports Department, Institute of Health Science, Eskisehir, Turkey.

Dolles, H., Söderman, S., (2005). 'Ahead of the Game -The Network of Value Captures in Professional Football' Erscheinungsort: Tokyo.

Dunne, C., Shneiderman, B. (2013) 'Motif Simplification: Improving Network Visualization Readability with Fan, Connector, and Clique Glyphs', CHI 2013, April 27–May 2, Paris, France.

Grund, T.U. (2012). "Network structure and team performance: The case of English Premier League soccer teams", Social Networks, 34 (4); 682-690.

Kooij, R., Jamakovic, A., Kesteren F.V., Koning, T.D., Theisler, I., Veldhoven P., (2009). 'The Dutch Soccer Team as a Social Network", International Network for Social Network Analysis, 29 (1); 4-14.

Mossop, B. (2012), 'Basketball isn't a sport. It's a statistical network', Wired, Arizona state Universty Researcher.

Pena, J.L,, Touchette, H., (2012). 'A network theory analysis of football strategies', arXiv:1206.6904v1 [math.CO].

Valente, W.T, Coronges, K., Lakon, C., Costenbader, E., (2008). "How Correlated Are Network Centrality measures?, PMC, Jan 1; 28 (1); 16-26.

Yamamoto, Y., Yokoyama, K. (2011). Common and Unique Network Dynamics in Football Games, PLos One, 6 (12).

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Investigation of joint reaction forces and moments during the countermovement and squat jump

Ahmet Alptekin[1], Serdar Aritan[2] and Erbil Harbili[3]

[1] Pamukkale University, Faculty of Sport Sciences, Denizli, Turkey.
[2] Hacettepe University, Faculty of Sport Sciences, Ankara, Turkey.
[3] Selçuk University, Faculty of Sport Sciences, Konya, Turkey.

aalptekin@pau.edu.tr

Abstract

The purpose of the study is to determine the force and the moments (torques) using the inverse dynamic modelling acting on the joints during countermovement (CMJ) and squat jump (SJ) by using link segment modelling. An elite male volleyball player participated in this study (Height = 1.85 m, Weight = 80 kg). One high-speed cameras operating at 500 frames per second were used to record the player's countermovement and squat jumping (Basler A 602f high speed camera). Captured views were digitized in the SIMI Motion 7.3 (SIMI Reality Motion Systems GmbH-Germany) by tracking 9 anthropometrical markers. Displacement data were filtered with 4th order 8Hz low pass Butterworth filter. Segment's centre of gravity was computed linear velocity and accelerations. Angles were calculated and it used to compute angular velocity and accelerations. Joint reaction forces and moments were computed by applying the inverse dynamic analysis into the calculated kinematic values. As result; the height of jump was higher in CMJ than SJ whereas resultant ground reaction force (GRF) was slightly higher in SJ compared to CMJ (SJ: 1749.8 N, CMJ: 1710.3 N). Furthermore, there were two different GRF peaks during CMJ and SJ. These peaks were occurred due to the backward movement of trunk, upper arm, lower arm and head during from descent to ascent. Meanwhile shank and thigh were moving the downward. In other words, it was observed a preparation phase between the descent phase (or stage or state) and ascent phase both jumps (at CMJ and SJ). Calculated moments in the CMJ jumping were higher than the SJ.

Keywords: Countermovement, squat jump, joint reaction force, moment (torque), inverse dynamic analysis

INTRODUCTION

Vertical movement is a test widely used while defining performance quality in addition to its being an important combination of skill (Feltner et al., 1999) when the concern is recreational activities and many different branches of sport (Vanezis and Less, 2005).

When maximum vertical jump is realized, many athletes use countermovement as a result of the fast extension of same joints following coordinately flexion of hip, knee, and ankle. In many jumps, a fast arm release occurs simultaneously with the movement of leg. Various studies inform that countermovement increased vertical jump highness by making use of stress-contraction circle during contraction and from preloading in lower extremity muscular system (Enoka, 1988; Harman et al., 1990). Studies also inform that countermovement increases the time of body`s having upright positive acceleration (Feltner et al., 1999).

Inner mechanisms that construct required power during vertical jump are muscles. As there is no opportunity to measure the force which muscles apply on tendons with direct methods, while the forces which muscles apply during movement are calculated indirectly (Spagele et al., 1999b) by using static and dynamic optimization, force and moments occurred on joints are calculated by using kinematic and anthropometric data (Winter, 2005).

Squat jump can be divided into three different phases. The first phase of squat jump is the phase starting from passive position of body until its being accelerated toward upright direction. The second one is the flight phase and it starts with takeoff of foot from ground and goes on with upright position of body that reaches to the peak point. And then, it ends with foot`s contact with ground. The third and the last one is the phase of slowdown after landing and provide body balance.

Countermovement, though, can be divided into four different phases on its own. The first step of countermovement is until bringing body to a passive position by fast acceleration of it toward downward while it is standing on foot with upright position. In countermovement, another three steps following the first one may be regarded as these of squat jump (Figure 1) (Spagele et al., 1999a).

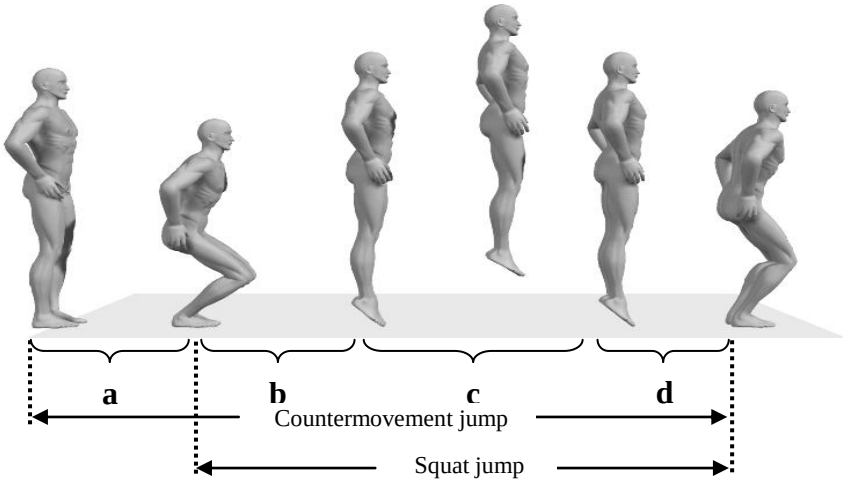

Figure 1. The position of body during countermovement (a, b, c, d) and squat jump (b, c, d) of test subject.

Defining model of vertical movement has been displayed in Figure 2. Height of jump, in other words maximum height of center of body mass (CM), has been explained as the function of center of body mass highness during takeoff and flight.

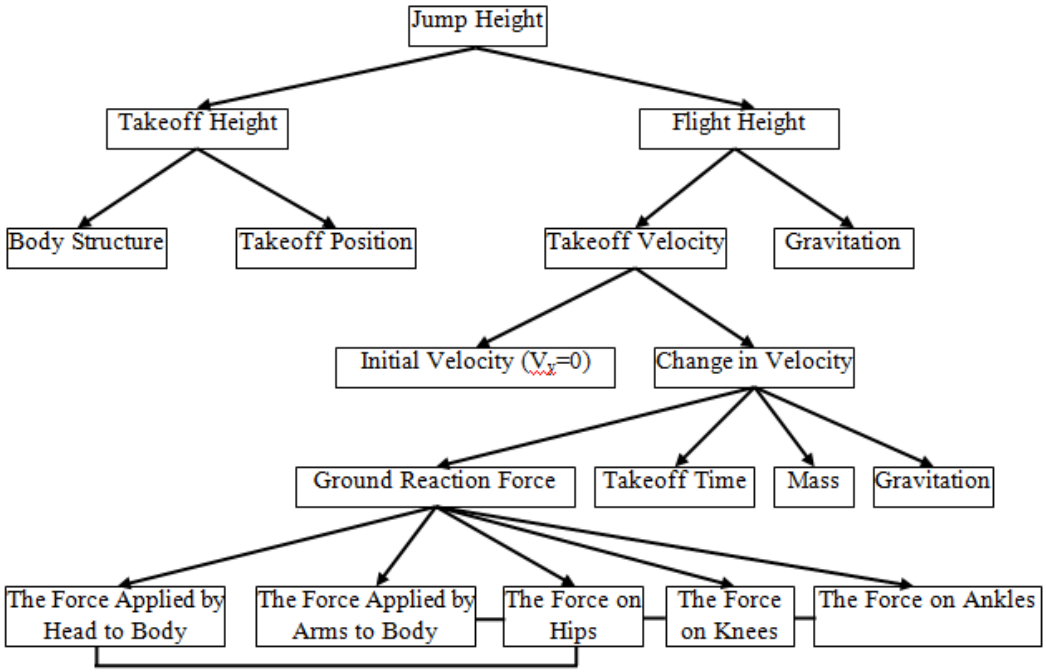

Figure 2. Defining model of vertical jump. It was taken from Feltner et al., 1999.

During the countermovement and squat jump, movement mainly happens on sagittal plane and it is assumed that the left and right body segments behave symmetric (Vanrenterghem et al., 2004).

The changes in the movement control from a small jump to a maximum one and moreover, the changes observed in the movement coordination are stated below:

1) Movement with opposite direction and compulsory that occurred on joints before extension.

2) Higher inertia proximal segments than that of distal segments. Rotation of proximal segments increases together with the increasing jump height.

3) It is the stable remaining of foot`s position on horizontal plane before jump and anatomic position. The fact that ankle is partly tightened during the position of standing at the beginning is an advantageous situation. Hence, flexion, the realization of which is necessary before extension, is less on knee and hip points. According to anatomic position, hip is able to realize hyperextension. However, at this point, it will not help CM to get high. This extension occurred on knee joint is assumed to have important contribution to jump height (Vanrenterghem et al., 2004).

Angular velocity of segments is defining and indispensable for CM`S velocity. In addition, rotation of proximal segments requires higher mechanic energy than that of distal segments. Just because of this, by decreasing rotation of proximal segments while jumping to less high points, ineffective loss of

energy is decreased. As a result, it is assumed that rotation of proximal segments is reduced to minimum level during jumps that are done for low heights (Vanrenterghem et al., 2004).

When lower extremity muscular system is in advantageous position in order to use vertical ground reaction force, upright acceleration of arms (when combined with arm`s release), slowing down the rate of quadriceps and gluteal muscles' contraction (negative acceleration), leads to such force on shoulders and body downwards. According to force-velocity relationship of muscle contraction, slower concentric actions of leg muscles will lead to increase in muscle contraction and will probably be resulted with bigger vertical ground reaction forces (Harman et al., 1990).

In countermovement, changes in the joint rotation resultant force of hip, knee, and ankle; arm movements in the last 2/3 part of accelerating phase have increased the rotation force of hip' extensors by slowing down the extension rate of trunk and has increased resultant force of joint rotation by applying bigger force and by holding hip extensor muscles in slower concentric position (Feltner et al., 1999).

In this study, by using the link segment model and the inverse dynamic method, it has been aimed to determine the two dimensions (2D) of force and moments which occur in joints during countermovement and squat jump.

METHODS

Research Group

An elite male volleyball player participated in this study (Height = 1.85 m, Weight = 80 kg). The study has been planned with two dimensions as it is supposed that left and right body segments act symmetrically in countermovement and squat jump. After warm-up exercises for 20 minutes, the subject had 5 different countermovement and squat jump with rests done. In order for proceeding analysis and calculations, the two best jump performances are evaluated from both of jumps.

Data Collection Instruments

Movement Analysis: In order to the analysis of the subject`s countermovement and squat jump movements, SIMI Motion 7.3 motion analysis system (SIMI Reality Motion Systems GmbH-Germany), high-speed camera integrated with system (Basler A 602f), image capture card (Board Firewire PCI) and reflective markers which were put in joints have been used. Calibration cage which consist of 4 points has been used in order to be define in 2D plane of movement area (0.16 x 1.31m)

Anthropometric Measurements: Body mass has been measured with bascule (Sega, France) with ±0.1 kg sensitiveness. Measurement of height has been measured with stadiotmeter (Holtain Ltd. UK) with ±0.1 kg sensitiveness. Measurement of circumference has been done by using anthropometric measuring tape with sensitiveness of ±0.1 mm (Gullick`s meter). Length and width measurement have been done with anthropometric set (Holtain Ltd. UK).

Data Collection

Movement Analysis: In this study, reflective markers have been placed on 9 anthropometric points to the right part of the subject`s body (metatarsal, knee, ankle, shoulder, elbow, wrist, chin and forehead) (Figure 3). CMJ and SJ images of the subject has been recorded with high-speed camera (500 fps) which is integrated with movement analysis system. The camera was placed in to the right side of

body in the manner it will have 90 degree of angle. The images of CMJ and SJ were captured via firewire connection.

Anthropometric measurements: Anthropometric measurements were taken from foot, lower and upper leg, fore arm, upper arm, trunk and head. One length measurement for each segment, one circumference measurement for the head and one for each circumference measurement from three different section for the other segments, and additional one width measurement three different section for the trunk were taken.

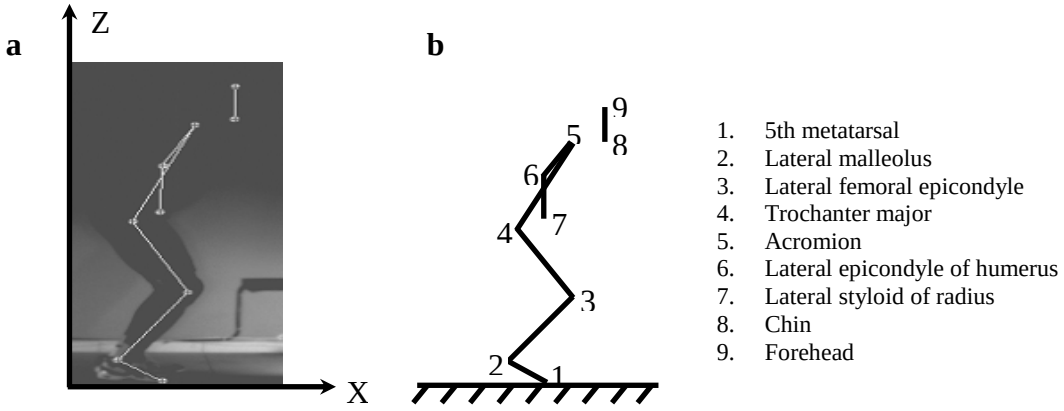

Figure 3. The frame of test subject`s jump (a) and the presentation of stick man (b).

Data Analysis

a) Digitizing and Data Process

Before the start of digitizing, in order to defined the long jump movement on 2 dimensions' plane, known spatial position of calibration cage whose measurements were taken before has been introduced to movement analysis system software. After this operation is completed, reflective markers in each frame have been digitalized with automatic digitizing of movement analysis software. The model used in digitizing is showed in Figure 3. Spatial positions of digitalized points, by using the results of calibration cage, have been calculated by Direct Linear Transformation (DLT) algorisms with 11 parameters. Raw position data was smoothed by using a fourth-order Butterworth low-pass digital filter with cutoff frequency is 8 Hz. All computing was performed Matlab 5.3 software.

b) Determination of segments' inertia parameters

Body segments were accepted as rigid body. Rigid body is defined as substance, the distance between two points of which is accepted as the constant, and whose smallest part reflects the qualifications of the whole substance, is constructed from endless number of substantial point and which does not show any deformation as a result of the externally acting forces (Rızaoğlu and Sünel, 2002). Segments mass, center of body mass positions and inertia parameters have been calculated by using Yeadon and Morlock`s (1989) regression equations which is based on model with 14 segments which Chandler et al. (1975) used in anthropometric measurements. Inertia parameters of trunk have been calculated with the use of Eq.1, Eq.2 and Eq.3 equations.

$$I_x = dwh\left[c_2 w^2 + c_3 h^2\right] \quad \text{Eq.1}$$

$$I_y = dwh\left[c_1 d^2 + c_3 h^2\right] \quad \text{Eq.2}$$

$$I_z = dwh\left[c_1 d^2 + c_2 w^2\right] \quad \text{Eq.3}$$

Where I_x, I_y, I_z are the values of moment of inertia (X, Y, Z); d, w, h are the values of depth, width and length; c_1, c_2, c_3 are the positive constant of trunk density. And it has been calculated with the use of Eq.4, Eq.5 and Eq.6 equations mentioned below.

$$w = \frac{\left(w_1 + 2w_2 + w_3\right)}{4} \quad \text{Eq.4}$$

Where w is measurement of width of trunk.

$$p = \frac{\left(p_1 + 2p_2 + p_3\right)}{4} \quad \text{Eq.5}$$

Where p is measurement of trunk.

$$d = \frac{\left(p - 2w\right)}{\pi - 2} \quad \text{Eq.6}$$

Where d is measurement of depth of trunk. The inertia parameters of head, upper arm, forearm, upper leg, lower leg and foot were calculated by means of Eq.7, Eq.8, Eq.9 and Eq.10.

Eq.7

Where p is circumference measurement of head.

$$p = p_1$$
$$p_i = \frac{\left(p_{1i} + 2p_{2i} + p_{3i}\right)}{4} \quad \text{Eq.8}$$
$$i = 1,2,....,5$$

Where p explains circumference measurement values of upper arm, fore arm, upper leg, lower leg and foot.

Eq.9

$$I_{ti} = \frac{1}{2} I_{zi} + k_{2i} p_i^{\,2} h_i^{\,3}$$

$$I_{zi} = k_{1i} p_i^{\,4} h_i \quad \text{Eq.10}$$
$$i = 1,2,....,6$$

Where I_t, I_z express moment of inertia values of segments in three axes (X, Y, Z). It is assumed that $I_t = I_x = I_y$. While p and h express circumference and length values of segments respectively, k_1 and k_2 are positive constant.

c) Calculation of Center of Body Mass

The position of body mass center was calculated from the center of segment mass which was acquired from Eq.11 and Eq.12 (Winter, 2005).

$$X_{cg} = \frac{\sum_{i}^{n} m_i x_i}{\sum_{i}^{n} m_i} \quad \text{Eq.11}$$

$$Y_{cg} = \frac{\sum_{i}^{n} m_i y_i}{\sum_{i}^{n} m_i} \quad \text{Eq.12}$$

$i = 1,2,....,7$

Where X_{cg} and Y_{cg} are the position of CM in horizontal and vertical axis; x and y are the position of the center of segment mass in horizontal and vertical axis; m is the mass of body segments and i is segment numbers.

d) Invers Dynamic Calculations

From the derivations of dependent on time of the raw position data, linear velocity and acceleration of center of segments mass have been calculated. After that, angles which segments made on plane have been computed. From derivations of dependent on time of angles, angular velocity and acceleration of them have been calculated. By using segment mass and linear acceleration values of CM, forces occurring in joints to which each segment is connected have been calculated with the inverse dynamic analysis method (Eq.13 and Eq.14).

$$\sum F_{yi} = ma_{yi} \Rightarrow F_{ypi} - F_{ydi} - m_i g = m_i a_{yi} \quad \text{Eq.13}$$

$$\sum F_{xi} = ma_{xi} \Rightarrow F_{xpi} - F_{xdi} = m_i a_{xi} \quad \text{Eq.14}$$

Where F_{xi} and F_{yi} are vertical and horizontal joint forces; F_{xpi} and F_{xdi} are horizontal force on segments proximal and distal points; F_{ypi} and F_{ydi} are vertical force on segment's proximal and distal ends; m is segment mass; a_{xi} and a_{yi} are vertical and horizontal acceleration of center of segments mass; g is acceleration of gravity and lastly i is number of segments.

Moments occurred in the joints have been calculated with the method of inverse dynamic analysis by using segment`s inertia value, segment`s angular acceleration value and by using moment value according to CM of forces acting on the joints to which segment is linked (Eq.15) (Winter, 2005).

$$\sum M_i = -(I_i \alpha_i) - M_{i-1} - (F_{ypi} l_{pxi} - F_{xpi} l_{pyi}) + (F_{ydi} l_{dxi} - F_{xdi} l_{dyi}) \quad \text{Eq.15}$$

$i = 1,2,....,7$

Where M_i is joint moment; I_x is inertia of segment, α is angular acceleration of the segment; F_{ypi}, F_{xpi}, F_{ydi} and F_{xdi} are vertical and horizontal joint forces on proximal and distal ends; l_{pxi}, l_{pyi}, l_{dxi} ve l_{dyi} are vertical and horizontal length from CM of segment to proximal and distal ends and i is the segment`s number.

The calculated moment values were normalized according to body weight of the subject and maximum values were found from Eq.17.

$$M_{norm} = \frac{M}{VA} \qquad \text{Eq.17}$$

The calculations mentioned above were realized by using student version MATLAB 5.3 (The Math Works Inc., MA, and USA).

RESULTS

As a result of anthropometric measurements, length, circumference and width values of head, trunk, upper arm, fore arm, upper leg, lower leg and foot were given in Table 1.

Table 1. Anthropometric data of subject (length, circumference and width values).

Segments	Length (m)	Circumference (m)			Width (m)		
		1. section	2. section	3. section	1. section	2. section	3. section
Head	0.19	0.57					
Trunk	0.55	0.94	0.79	0.94	0.27	0.25	0.30
Upper arm	0.33	0.33	0.35	0.27			
Fore arm	0.27	0.27	0.27	0.17			
Upper leg	0.40	0.56	0.53	0.40			
Lower leg	0.42	0.40	0.39	0.24			
Foot	0.28	0.24	0.27	0.24			

As a result of kinematic analysis, the trajectory of body`s CM during countermovement and squat jump was displayed in Figure 4. Maximum vertical jump distance of the hip is presented in Table 2.

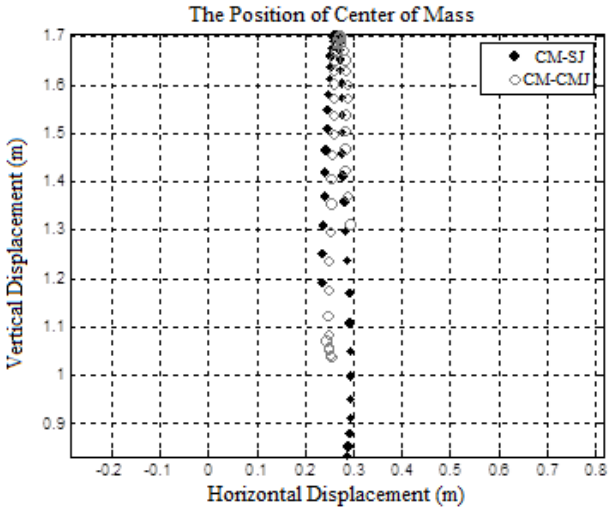

Figure 4. The position of mass of center during squat (CM-SJ) and countermovement jump (CM-CMJ).

Table 2. Starting, minimum and maximum vertical jump distance values of center of mass during the countermovement and squat jump.

	Countermovement Jump			Squat Jump		
	Start	**Min.**	**Max.**	**Start**	**Min.**	**Max**
Vertical Distance (m)	0.98	0.6	1.5	0.71	0.66	1.48

The horizontal and vertical forces on the hip, the knee and the ankle joints during the countermovement and squat jump when the resultant force applied to ground is maximum were given in Table 3 and the point of movement when the maximum resultant ground reaction force occurred was shown in Figure 5.

Table 3. The horizontal and vertical forces on the hip, the knee and the ankle joints when the resultant force applied to ground is maximum.

	Countermovement Jump			Squat Jump		
Maximum Force (N)	**Horizontal**	**Vertical**	**Resultant**	**Horizontal**	**Vertical**	**Resultant**
Hip	52.54	-1506.4	1507.3	148.16	-1485.8	1493.1
Knee	31.44	-1662.4	1662.7	148.16	-1681.6	1688.1
Ankle	30.14	-1699.7	1700	155.61	-1732.5	1739.5
Ground Reaction Force	29.72	1710.1	1710.3	156.02	1742.8	1749.8

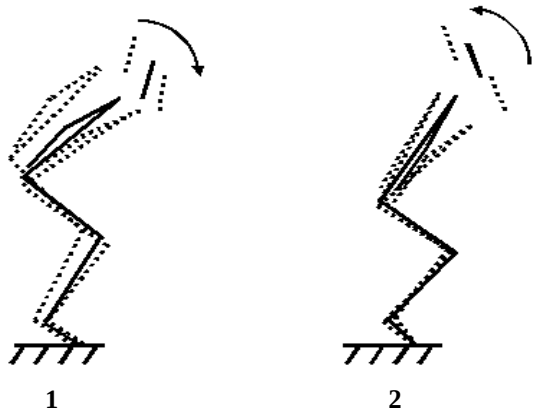

Figure 5. The moment of movement when the maximum resultant ground reaction force occurred during countermovement (1) and squat jump (2).

The computed ground reaction forces were given in Figure 6.

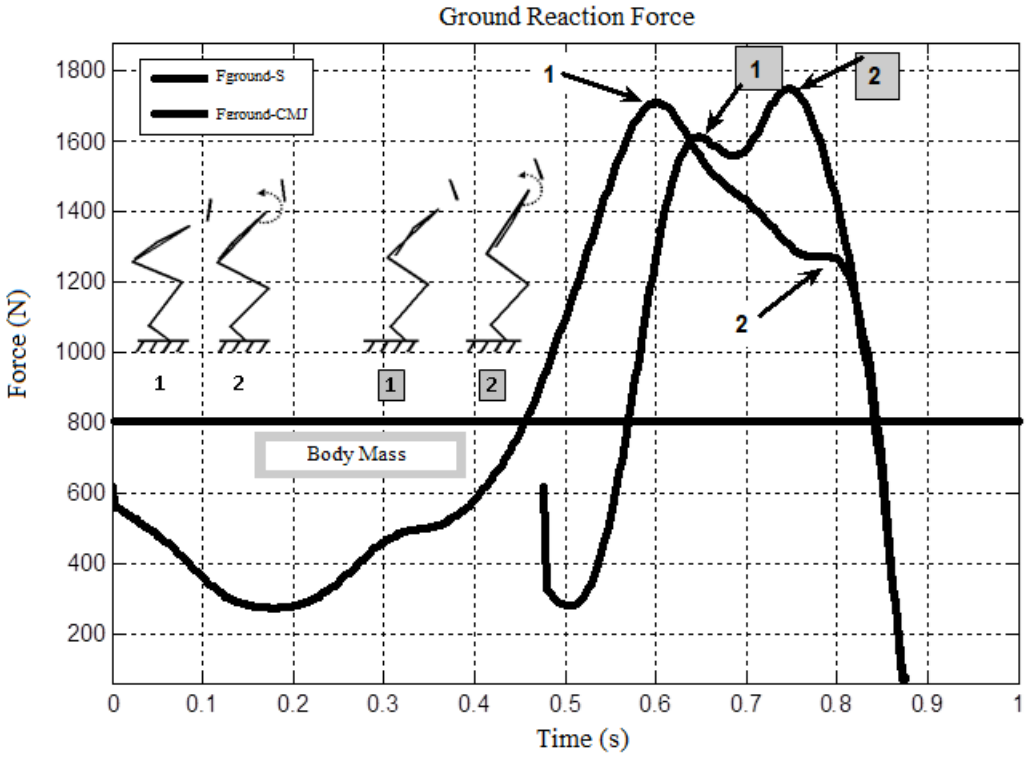

Figure 6. Ground reaction force (N) calculated during squat jump (F_{ground}-SJ) and countermovement (F_{ground}-CMJ).

Maximum relative moments (according to the body weight) that occurred on the hip, knee and ankle joints in countermovement and passive jump are given in Table 4. Moment (torque) from the 5th metatarsal was shown in Figure 7 when the foot is in contact with the ground.

Table 4. Maximum moment values occurred on hip, knee and ankle during countermovement and squat jump.

Maximum Moment (Nm/kg)	Countermovement Jump	Squat Jump
Hip	0.466	0.659
Knee	3.305	3.525
Ankle	0.364	0.306

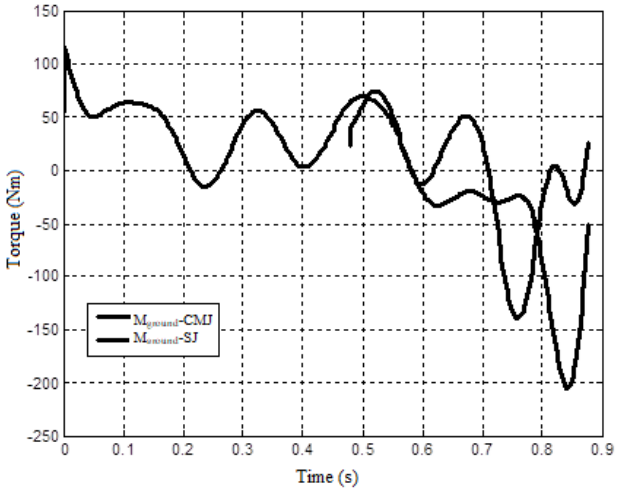

Figure 7. Moment (torque) from the 5th metatarsal when the foot is in contact with the ground in countermovement (M_{ground}-CMJ) and Squat jump (M_{ground}-SJ).

DISCUSSION

In countermovement and squat jump, the study of reliability of ground reaction forces calculated with inverse dynamic method has been made convenient to similar studies (Harbili and Arıtan, 2006). In countermovement and squat jump, maximum jump height values were found similar. In nature of the movement of countermovement jump, while initial position of hip on vertical axis are more than from squat jump; minimum value that hip reached on vertical axis during the countermovement jump is lower than from the squat jump (Table 2). As countermovement jump starts in a standing position, with the transfer of gained velocity to other phases, takeoff and drop velocity accordingly linear and angular acceleration of segments increase. This fact leads to increase of velocity while rising from ground and so causes to the increase of jump height.

Bobbert et al. (1996) notified that while the position of body is same at the start of pushing in countermovement and squat jump, jump height is approximately 3.4 cm more during countermovement jump. There is an emphasis on the probability of the fact that this difference originates from coordination defect during squat jump. However, there is no evidence in order to support this probability. Moreover, during squat jump, like that of countermovement, takeoff has been executed on fingertip. It may be said that because the subject reaches to greatest joint moments in the takeoff position of countermovement jump, he has got greater jumping height. In order to joint moments during countermovement jump to produce more works than that of squat jump, they become bigger during the first part of joint extension wideness.

Maximum highness of CM during vertical jump is increased with the lower extremities and strong arm swinging before takeoff. Arm swinging increases the highness of CM of body and vertical velocity of it (Feltner et al. 1999; Feltner et al., 2004, Harman et al., 1990). Vertical jumping realized with arm swinging generates a greater impulse in the pushing phase of jump. When arm swinging jump is compared with jump without swinging, CM of body has got bigger velocity during takeoff. Its reason may probably be the tendency of pushing phase time to increase as a result of wideness of a vertical movement of CM, not because of greater ground reaction force (Feltner et al., 2004). In Figure 3, trajectory of CM is observed to move forward during both countermovement and squat jump according to start position (respectively 0.088 m and 0.041 m). The fact that forward body CM movement is more

during countermovement, jump may be because of the fact that wideness of CM movement is more than that of squat jump.

The horizontal and vertical forces on the hip, the knee and the ankle joints during the countermovement and squat jump when the resultant force applied to ground is maximum were showed in Table 3. In each three joints estimations of horizontal, vertical, resultant and ground reaction force were found to be close to each other. Vertical and resultant values of ground reaction force during countermovement and squat jump similar to both each other and in themselves. The fact that the force values similar to each other except minor differences may be said that the knee, ankle and hip joints are equally sharing the applied force in spite of small differences.

During squat jump, while the subject is expected to act opposite direction towards acceleration of gravity from the starting of his movement, descend downward is observed. In squat jump, the resultant force applied to ground is a bit more than that of countermovement jump (Squat: 1749.8 N, Countermovement: 1710.3 N). In squat jump, it is aimed both to have higher acceleration than that of gravitational acceleration and have maximum height of body mass. Because of this, it is thought that force values of movement in squat jump may be higher. On the other hand, in countermovement, while descending is happening from standing position, the direction of movement is the same with acceleration of gravity (Figure 6). Countermovement, when compared to squat jump, has got an extra phase (Figure 1). It means that, the duration of movement until the moment of takeoff is longer in countermovement jump from squat jump. As observed in Figure 6, although there is a phase difference between each jump, it shows similar behaviors. In both jumps, there are two different peaks. However, it is observed that, in countermovement, there is longer duration between two peaks (0.198 s) and 1^{st} peak has got higher force value than the 2^{nd} one (1710.3 N; 1273 N). In squat jump, though, in contrast to countermovement, it is observed that there is a shorter duration between two peaks (0.100 s) and the 1^{st} peak has got lower force values than the 2^{nd} one (1612 N; 1750 N).

The reason why there are two peaks in both jumps stems from the fact that lower and upper part of leg move to downward vertical axis while it is passing from drop to takeoff during jump, and that trunk, upper arm, fore arm and head start to act back. It means that it is possible to mention about preparation process between drop phase and takeoff phase in both jumps. The 1^{st} peak value is higher than that of 2^{nd} one in countermovement jump may stem from the deceleration of vertical acceleration since the starting of movement towards down and its being turned upward. In squat jump, like countermovement, while passing from dropping to takeoff during jump, downward movement of upper and lower leg in vertical axis contributes to trunk, upper arm, fore arm and head to act upward. Hence (that preparation phase happens in a shorter time) it is thought that the 2^{nd} peak values is higher than that of first peak values.

The horizontal and vertical forces on the hip, the knee and the ankle joints during the countermovement and squat jump when the resultant force applied to ground is maximum were given in Table 3 and the point of movement when the maximum resultant ground reaction force occurred was shown in Figure 5. Calculated resultant force values in all of hip, knee, and ankle joints and ground reaction force are at their maximum point like 0.600 s in countermovement jump and 0.270 s in squat jump. At that time, all body and body segments, during countermovement, act towards direction of gravitational acceleration and its linear acceleration has reached to its maximum point. Trunk which has the biggest part as a mass in body with its maximum linear speed 0.600 s may be thought to cause occurrence of maximum jointing force values in joints and ground reaction force. But

in squat jump, body acts opposite of gravitational acceleration in 0.270 s and as mentioned above, soon after preparation phase, lower segments start to contribute upper segments movement upwards. In this way, in joints and ground reaction force, maximum jointing force values were observed. During countermovement jump, moment values that segments have created on joints to which they are linked were found to be high when compared with squat jump. The fact that moment values are high in countermovement jump may be because of high segment angular acceleration values (Figure 7).

Athletes whose better vertical jump ability have got greater joint moments in their hip, knee and ankle, furthermore have got greater power and work values. In addition to this jumping performance was better in arm swinging and without arm swinging jumps. Rather than technique, this is about bigger muscle capacities related with lower extremities` force and force developing rates. While muscle force qualities of lower extremity segments are the major determiner of vertical jump, technique plays small amount of role (Vaneziz and Less, 2005).

Fukashiro and Komi (1987) have applied three different vertical tests (squat jump, countermovement jump and repetitive submaximal jump) in order to determine joint moments and mechanic force happened in lower extremity joints during vertical jump. They have found that the maximum moment values of countermovement jump are greater than squat jump. However, in both jumps, hip moment value was greater than knee, and knee moment values was greater than ankle.

Relative moment values of countermovement and squat jump resemble to moment values of knee joints informed by studies of Vaneziz and Less (2005) (Table 4). Vaneziz and Less (2005) have done biomechanical analysis of good and bad vertical jump, and they have notified that relative moment values for hip is 3.50 ± 0.75 Nm/kg, for knee 3.40 ± 0.81 Nm/kg and 3.08 ± 0.44 Nm/kg for ankle. Differences between moment values calculated as a result of studies with literature are thought to stem from the three dimensional analysis results or from differences of anthropometric measurements and the subjects` body weight.

Consequently, height of CM of body during countermovement has been found more than that of squat jump. The resultant force applied to ground during squat jump is a little more when compared with countermovement (Squat: 1749.8 N, Countermovement: 1710.3 N). Two different peaks have been found in force values applied to ground during countermovement and squat jump. The reason why there are two peaks in both jumps stems from the fact that lower and upper part of leg move to downward vertical axis while it is passing from drop to takeoff during jump, and that trunk, upper arm, fore arm and head start to act back. It means that it is possible to mention about preparation process between drop phase and takeoff phase in both jumps. In countermovement jump, the moment values of the joints in which the segments are linked were found to be higher when compared with the squat jump.

References

Bobbert, M.F., Gerritsen, K.G.M., Litjens, M.C.A., Van Soest, A.J. (1996). Why is countermovement jump height greater than squat jump height? *Medicine and Science in Sports and Exercise*, 28(11), 1402-1412.

Chandler, R. F., Clauser, C. E., McConville, J. T., Reynolds, H. M., Young, J. W. (1975). Investigation of inertial properties of the human body. *AMRL Technical Report*. Dayton, OH: Wright-Patterson Air Force Base.74-137.

Enoka, R.M. (1988). *Neuromechanical basis of kinesiology*. Champaign, IL: Human Kinetics.

Feltner, M.E., Elijah, J.B., Cassandra, M.P. (2004). Segmental and kinetic contributions in vertical jumps performed with and without an arm swing. *Research Quarterly for Exercise and Sport*, 75(3), 216-230.

Feltner, M.E., Fraschetti, D.J., Crisp R.J. (1999). Upper extremity augmentation of lower extremity kinetics during countermovement vertical jumps. *Journal of Sports Science*, 17, 449-466.

Fukashiro, S., Komi, P.V. (1987). Joint moment and mechanical power flow of the lower limb during vertical jump. *International Journal of Sports Medicine*, 8(Suppl.1), 15-21.

Harbili, E., Arıtan S. (2006). Koparma tekniğinin biyomekaniği. *Spor Bilimleri Dergisi*, 17(3), 124-142.

Harman, E.A., Rosenstein, M.T., Frykman, P.N., Rosenstein, R.M. (1990). The effects of arms and countermovement on vertical jumping. *Medicine and Science in Sports and Exercise*, 22, 825-833.

Rızaoğlu, E., Sünel, N. (2002). *Klasik mekanik*. Ankara: Ankara Ofset.

Spagele, T., Kistner, A., Gollhofer, A. (1999a). A multi-phase optimal control technique for the simulation of a human vertical jump. *Journal of Biomechanics*. 32, 87-91.

Spagele, T., Kistner, A., Gollhofer, A. (1999b). Modelling, simulation and optimization of a human vertical jump. *Journal of Biomechanics*, 32, 521-530.

Vanezis, V., Lees, A. (2005). A biomechanical analysis of good and poor performers of the vertical jump. *Ergonomics*, 48(11), 1594-1603.

Vanrenterghem, J., Lees, A., Lenoir, M., Aerts, P., De Clercq, D. (2004). Performing the vertical jump: Movement adaptations for submaximal jumping. *Human Movement Science*, 22, 713-727.

Winter, D. (2005). *Biomechanics and motor control of human movement*. New Jersey: John Wiley & Sons.

Yeadon, M. R., Morlock, M. (1989). The appropriate use of regression equations for the estimation of segmental inertia parameters. *Journal of Biomechanics*, 22(6/7), 683-689.

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Kinematics of the snatch in elite male weightlifters

Erbil Harbili[1], Sultan Harbili[1] and Ahmet Alptekin[2]

[1] Selçuk University, Faculty of Sport Sciences, Konya, Turkey.
[2] Pamukkale University, Faculty of Sport Sciences, Denizli, Turkey.

eharbili@selcuk.edu.tr

Abstract

The purpose of the study was to analyze the kinematical differences between the first and the second pull of the snatch technique in elite male weightlifters. The heaviest successful snatch lifts of seven male weightlifters who won gold medals at the 2010 Men's World Weightlifting Championship were analyzed. The snatch lifts were recorded using 2 S-VHS cameras (50 fields/s), and points on the body and the barbell were manually digitized using the Ariel Performance Analysis System. The results revealed that the maximum vertical velocity of the barbell was significantly greater in the second pull than that of the first pull ($p<0.05$). While the mechanical work produced in the first pull was significantly greater, the power output was significantly greater in the second pull ($p<0.05$). As a result, it was revealed that the second pull phase was faster and more powerful than the first pull, and that the kinematics of the barbell during the second pull had a decisive role for a successful lift.

Keywords: The first pull, the second pull, work, power output

INTRODUCTION

Weightlifting performance is strongly dependent on technique, explosive strength, and flexibility (Gourgoulis et al., 2002). The primary factors that affect the performance of weightlifters are the explosive power output required to lift a heavy weight and the skill required to lift the barbell efficiently (Ikeda et al., 2008). Thus, the snatch is one of the most technical competitions (Gourgoulis et al., 2009).

The snatch technique requires the barbell to be lifted from the floor to straight-arm overhead erect standing position in one continuous movement (Burdett, 1982). In the snatch, the total pull, which generates high power, refers to the initial portion of the lift in which the barbell is displaced from the floor to waist height (Enoka, 1979; Baumann et al., 1988). The total pull is done very rapidly in the snatch, with propulsion of the barbell against gravity occupying less than 1 s (Isaka et al., 1996). The total pull is divided into two parts as the first and second pull. The first pull of the total pull is slow and depends on strength, while the second pull is faster and depends on more power oriented (Garhammer, 1991). The average power output generated during a snatch lift ranges from 1300 to 4000 W in elite male weightlifters (Garhammer 1991; Gourgoulis et al., 2000). On the other hands, the linear kinematics of the barbell is important to reveal the intricacies of the snatch. The purpose of the study was to compare the kinematical differences of the barbell between the first and the second pull of the snatch technique in elite male weightlifters.

METHODS

Subjects

The data were obtained from the 2010 World Weightlifting Championship in Antalya, Turkey. Necessary permissions for visual recordings were obtained from the Turkish Weightlifting Federation and the World Weightlifting Federation. The snatch lifts of 7 men who won gold medals in their categories were analyzed. This study was conducted in accordance with the guidelines set forth by the Institutional Review Board of Selçuk University.

Procedures

Two digital cameras (Sony DCR-TRV18E, Tokyo, Japan) which captured images at 50 fields per second were positioned on the diagonal level of the platform at a distance of 9 m from the weightlifters, forming an approximate 45° angle with the sagittal plane of the weightlifters (Figure 1). The lift-off of the barbell was used to synchronize the 2 cameras. To determine the 3-dimensional kinematic data of the barbell and the angular kinematics of the hip, knee, and ankle joints during the snatch lifts, one point on the barbell and five points on the body were digitized using the Ariel Performance Analysis System (APAS, San Diego, CA, USA). The digitized points included the little toe, ankle, knee, hip, and shoulder on the right side of the body. In addition to these points, the digitized point on the barbell was located on the medial side of the right hand. A rectangular cube with a length of 250 cm, a depth of 100 cm, and a height of 180 cm was used to calibrate the movement space. The calibration cube was placed on the platform before the competition, recorded, and then removed. Three-dimensional spatial coordinates of the selected points were calculated using the direct linear transformation procedure with 12 control points. The raw position and time data were smoothed using a low-pass digital filter. Based on the residual analysis, a cut-off frequency of 4 Hz was selected (Gourgoulis et al., 2000; Gourgoulis et al., 2002). The mechanical work performed on the barbell

during the first and the second pulls was calculated from changes in the barbell's potential (PE=mgh) and kinetic energies (KE=½mv^2). These calculations included the vertical work done by lifting the barbell. The power output of the weightlifter was calculated by dividing the work done in each phase by the duration of the phase. The relative power and work values were calculated by dividing the absolute work and power values by the lifter's body mass. The calculated power outputs only included the vertical work done by lifting the barbell (Garhammer 1993).

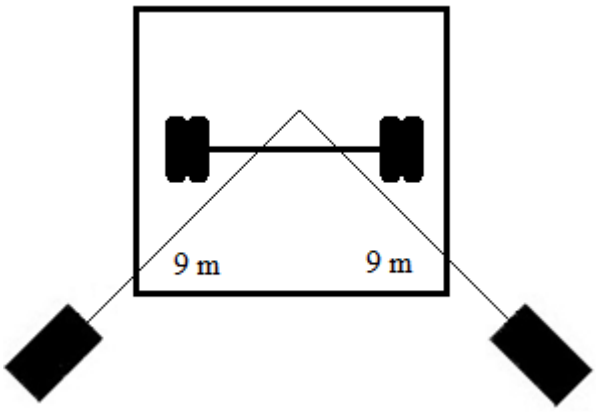

Figure 1. The view from the top of the camera set-up and the platform.

Statistical analysis

Data were presented as mean and standard deviation (Mean ± SD). The hypotheses of normality and homogeneity of the variance were analyzed via Kolmogorov-Smirnov and Levene tests, respectively. The kinematical differences between the first and the second pull were compared using the paired t-test (SPSS 15.0, Chicago, IL, USA). The level of significance was set at α=0.05.

RESULTS

The physical and performance characteristics of weightlifters were presented in Table 1. The heaviest snatch lifts of the elite weightlifters were analyzed in 7 different weight categories at the World Weightlifting Championship. The heaviest snatch lift was performed by the weightlifter in 62-kg category.

Table 1. Physical characteristics of the weightlifters.

Subject	Category (kg)	Age (y)	Barbell mass (kg)	Body mass (kg)	Relative barbell mass (kg/kg)
1	56	22	132	55.61	2.37
2	62	23	147	61.51	2.39
3	69	25	160	68.75	2.33
4	77	23	173	76.72	2.25
5	85	29	175	83.05	2.11
6	94	22	185	91.92	2.01
7	105	28	192	104.43	1.84

The linear kinematics of the barbell related to the snatch performance of the elite weightlifters was presented in Table 2. During the second pull, the vertical velocity of the barbell was significantly greater than that of the first pull (t_6=4.85, p<0.05).

Table 2. Linear kinematics of the barbell.

	Mean±SD
Barbell height at the end of the first pull (cm)	55.0±8.7
Barbell height at the end of the second pull (cm)	97.1±8.1
Maximum barbell height (m)	1.20±0.07
Drop displacement (cm)	16.4±2.55
Maximum vertical velocity of the barbell in the first pull (m/s)	1.16±0.25
Maximum vertical velocity of the barbell in the second pull (m/s)	1.67±0.07*

*p<0.05

The power output and mechanical work values done on the barbell during the first and the second pull were presented in Table 3. The absolute and relative mechanical work and power output values were significantly greater in the first pull than that of the second pull (p<0.05).

Table 3. Mechanical work and power output in the first and the second pull

	First pull	Second pull	t-value
Absolute work (J)	681±240	402±103	2.63*
Relative work (J/kg)	8.6±1.9	5.4±1.6	2.58*
Absolute power (W)	1020±306	2645±456	9.47*
Relative power (W/kg)	13.1±2.4	34.9±6.6	7.40*

*p<0.05

DISCUSSION

The kinematical analysis of the barbell in the present study revealed the evident mechanical differences between the first and the second pull. In literature, the barbell displacement, barbell velocity, barbell acceleration, and angle of the resultant acceleration of the barbell are parameters used for technical evaluation with regard to the barbell kinematics (Ikeda et al., 2012). Elite women weightlifters who won gold medals at the same world championship lifted less height than men the barbell, and the barbell velocity was lower during the first pull, and produced less power output in the second pull (Akkuş, 2012). Although it was observed that the height of the barbell was similar to those reported in the literature, it was remembered that the vertical linear kinematics of the barbell is related to the height of the weightlifter and his/her technique (Baumann et al., 1988). Both the height of the barbell and loss of barbell's height until the catch phase were consistent with those reported by the previous studies (Gourgoulis et al., 2000; Gourgoulis et al., 2004; Harbili 2012). A greater mechanical work during the first pull and a greater power output in the second pull were crucial for a successful lift in the snatch technique (Korkmaz and Harbili, 2016). In the literature, it was reported that the first phase is relatively slow and can be considered strength oriented, while the second pull is faster and can be considered more power oriented (Garhammer, 1991). It was observed in the present study that the first pull produced more mechanical work, whereas the second pull produced higher power output.

CONCLUSION

In the present study, the vertical velocity of the barbell was higher up to by 30% in the second pull with respect to the first pull. In the second pull, greater power and velocity is required to pull the barbell high enough to squat beneath as the barbell weight is held overhead. As a result, it was revealed that the second pull phase was faster and more powerful than the first pull, and that the kinematics of the barbell in the second pull had a decisive role for a successful snatch lift.

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References

Akkuş, H. (2012). Kinematic analysis of the snatch lift with elite female weightlifters during the 2010 World Weightlifting Championship. *Journal of Strength Conditioning Research*, 26, 897–905.

Baumann, W., Gross, V., Quade, K., Galbierz, P. and Schwirtz, A. (1988). The snatch technique of World Class Weightlifters at the 1985 World Championships. *International Journal of Sport Biomechanics*, 4, 68-89.

Burdett, R.G. (1982). Biomechanics of the snatch technique of highly skilled and skilled weightlifters**.** *Research Quarterly for Exercise and Sport*, 53, 193-197.

Enoka, R.M. (1979). The pull in Olympic weightlifting. *Medicine Science in Sports*, 11, 131-137.

Garhammer, J. (1991). A comparison of maximal power outputs between elite male and female weightlifters in competition. *International Journal of Sport Biomechanics*, 7, 3-11.

Garhammer, J. (1993). A review of power output studies of Olympic and powerlifting: methodology, performance prediction, and evaluation tests. *Journal of Strength Conditioning Research*, 7, 76-89.

Gourgoulis, V., Aggelousis, N., Mavromatis, G., Garas, A. (2000). Three dimensional kinematic analysis of the snatch of elite Greek weightlifters. *Journal of Sports Sciences*, 18, 643-652.

Gourgoulis, V., Aggeloussis, N., Antonıou, P., Chritoforidis, C., Mavromatis,G., and Garas, A. (2002). Comparative 3-dimensional kinematic analysis of the snatch technique in elite male and female Greek weightlifters. *Journal of Strength Conditioning Research*, 16, 359-366.

Gourgoulis, V., Aggeloussis, N., Kalivas, V., Antoniou, P. Mavromatis, G. (2004). Snatch lift kinematics and bar energetics in male adolescent and adult weightlifters. *Journal of Sports Medicine and Physical Fitness*, 44, 126-31.

Gourgoulis, V., Aggelousis, N., Garas, A., Mavromatis, G. (2009). Unsuccessful vs. successful performance in snatch lifts: a kinematic approach. *Journal of Strength and Conditioning Research*, 23, 486-494.

Harbili, E. (2012). A gender-based kinematic and kinetic analysis of the snatch lift in elite weightlifters in 69-kg category. *Journal of Sports Science and Medicine*, 11, 162-169.

Ikeda, Y., Jinji, T., Matsubayashi, T., Matsuo, A., Inagaki, E., Takemata, T, Kikuta, M., (2012). Comparison of the snatch technique for female weightlifters at the 2008 Asian championships. *Journal of Strength Conditioning Research*, 26(5), 1281-95.

Isaka, T., Okada, T., Fuanto, K. (1996). Kinematic analysis of the barbell during the snatch movement in elite Asian weightlifters. Journal of Applied Biomechanics, 12, 508-516.

Korkmaz, S., Harbili, E. (2016). Biomechanical analysis of the snatch technique in junior elite female weightlifters. *Journal of Sports Sciences*, 34(11):1088-1093.

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Urban and rural adolescents' behavioral regulation in exercise according to body weight status

Gokmen Ozen[1], Muhammed Emin Kafkas[1] and Cengiz Akalan[2]

[1] Ankara University, Institute of Health Sciences, Ankara, Turkey.
[2] Inonu University, Faculty of Sport Sciences, Malatya, Turkey.
[3] Ankara University, Faculty of Sport Sciences, Ankara, Turkey.

gokmenozen44@gmail.com

Abstract

The purpose of this study was to examine urban and rural adolescents' behavioral regulation in exercise according to their body weight status. The sample size consisted of 513 adolescents (51.5% males, 48.5% females) aged 15-18 (M = 16.49, SD = 1.11) years old and living in urban and rural areas in Turkey. The Turkish version of Behavioral Regulation in Exercise Questionnaires-2 was used as a measurement tool for the study. The study demonstrated a significant difference in the sub-domain of amotivation toward exercise between urban and rural groups ($p < .05$). However, the mean scores of external, intrinsic and introjected sub-domains and the relative autonomy index were not significantly different ($p > .05$). Our results indicated that urban adolescents were less motivated to do exercise than rural adolescents. Obese adolescents living in rural areas had higher amotivation to exercise than normal weight ones.

Keywords: Exercise; behavioral regulation; body weight status, relative autonomy

INTRODUCTION

Many communities are experiencing rapid modernization with dramatic lifestyle changes for residents. Modernization has both biological and social effects on people (McMichael, 2016). Several researchers have suggested that various social and environmental factors inherent in the process of modernization may play a causative role in the development of cardiovascular and metabolic disease such as diabetes mellitus, hypertension and coronary heart disease (Lintowska et al., 2017; Salıcı et al., 2017). Scientists have also revealed the magnitude and seriousness of the problem, showing increasing rural/urban trends in the prevalence of cardiovascular, metabolic disease and obesity (Legetic et al., 2016; Taylor et al., 1992). Regular physical exercise regularly is clearly helpful for health, physical and psychological wellness. On the other hand, physical inactivity can have serious implications for people's health such as; cardiovascular diseases, diabetes, and obesity, and increase the risks of colon cancer, high blood pressure, osteoporosis, lipid disorders, depression and anxiety (WHO, 2010). Regular exercise is a significant component of obesity treatment and successful weight management, but low participation rates are quite evident in many modern industrialized countries (Cavill et al., 2006; Waters et al., 2014). Previous studies have indicated that many people lack sufficient motivation to participate in the regular exercise (CDC, 2007; Sisson and Katmarzyk, 2008). Considering these low participation ratios, it is important to know why some people engage in exercise whilst others remain less active.

Self-Determination Theory is beneficial for better comprehending the "why" of motivated behavior (Deci and Ryan, 2000). It is the most well-known theory of motivation that examining the impacts of different types of motivation on human behavior (Ryan and Deci, 2000). This theory has been commonly studied in sport science (Teixeira et al., 2012). According to self-determination theory, human behavior can be regulated by amotivation, external, introjected, identified, integrated, and intrinsic regulation (Deci et al., 1991). These six forms of behavioral regulation are allocated along a self-determination process from non-self-determined to high self-determination. *Amotivation* is related to having no intention to engage in a behavior. *External regulation* refers to engaging in a behavior only in order to meet external expectations or requirements (e.g., punishments, rewards). *Introjected regulation* refers to a behavior enacted in order to enhance self-esteem or to avoid guilty feelings. *Identified regulation* is considered to a volitional behavior enacted in order to obtain personally valuable outcomes. *Introjected regulation* is considered an assimilation of identified regulation and individuals act completely congruent with aspects of one's self and values. *Instrinsic regulation* is considered that a person engages in the behaviour to participating in an activity for the feelings of fun and satisfaction (Markland and Ingledew, 2007). Introjected, identified and intrinsic regulation have positively influenced the exercise behaviour in adolescents, whereas AM has negatively influenced their exercise behaviour (Markland and Ingledew, 2007). Behavioral Regulation in Exercise Questionnaire (BREQ) has been advanced to measure self-determined motivation in the matter of sport, exercise, and physical education (Deci and Ryan, 2000). In recent years, many researches have been investigated to determine the effects of different types of motivation on health, physical activity and exercise psychology (Daley and Duda, 2006; Gillison et al., 2006; Hassel et al., 2015; Sparud-Lundin and Andersson, 2015; Ersöz et al.,2016).

Overweight and obesity in childhood and adolescence is an important public health issue because of its rapidly increasing prevalence and associated adverse medical and social consequences (Fowler-Brown and Kahwati, 2004). World Health Organization (WHO) and other international organizations

reported that the increasing physical inactivity and sedentary lifestyle is a primary cause of cardiovascular diseases, diabetes, and obesity. These organizations seek to encourage all the people to participate in physical activity and exercise (Biswas et al., 2015; Fine, 2014; WHO, 2010). Participation in regular physical activity and exercise includes a complex interaction between psychological, biological, social, and environmental factors (Bryant et al., 2014). Motivation is an important factor in the decision to participation in physical activity and exercise and taking concrete steps to becoming more physically active (Teixeira et al., 2012). Body weight status (BWS) among adults is one of the most influential factors on exercise motivation. Many scientific studies reported significant associations with body weight status influences on adults' exercise behavior and motivation (Lahti-Koski et al., 2002; Dumith et al., 2007; Ersöz et al., 2016) However, a few researcher studied adolescents' exercise behavior related to body weight status (Gillison et al., 2006; Markland and Ingledew, 2007; Voelker et al., 2015). In order to increase the participation rate in exercise, it is important to have a better understanding of the factors impacting an individual's motivation and behavioral regulation to engage in exercise (Roberts et al., 2007). In this context, the body weight status, urban and rural lifestyle are the important factors that affected human psychology and behavior (Ilesanmi et al., 2010; Markland and Ingledew, 2007). These factors may also affect the individuals' exercise motivation and behavioral regulation. Therefore, the aim of this study was to examine urban and rural adolescents' exercise behavioral regulation according to their body weight status (BWS). We hypothesized that: (H1) There would be differences in the behavioral regulation in exercise between urban and rural adolescents. (H2) There would be differences in behavioral regulation in exercise according to the urban and rural adolescents' BWS. To test our hypothesis, we compared the behavioral regulation in exercise in the adolescents.

METHODS

Procedure

This study was carried out in 2013-2014 in metropolitan cities (Ankara, İstanbul, and İzmir) and rural districts around Kars, Kilis, and Malatya in Turkey. Permission to conduct the study was obtained from relevant authorities. The participants voluntarily consented to participate in the study. Adolescents in our study reported living in the same area (urban/rural) in Turkey for the last 10 years. Written informed consent was obtained from each parent or participant aged 18 years old. Participants were informed about the instruments. They were assured that all information obtained would be held in confidence and informed consent was obtained. The names of participants were not recorded. Questionnaire forms were distributed to participants. Participants were requested to fill in the questionnaires. The questionnaire booklet took approximately 10-15 min to complete. The participants also provided demographic information regarding their age and sex and their body weight and height were measured by research assistants. In the end, participants were thanked for their participation. The data collection lasted for about five months. This research was conducted in accordance with the 1964 Helsinki Declaration.

Participants

The study sample was composed of 513 adolescents aged 15-18 years old and living in urban or rural areas in Turkey.The disproportionate stratified random sampling method was used to determine our study sample. Our strata criterions were gender (male and female), age group (15, 16, 17 and 18 years old) and the place of residence (rural and urban). The study sample selected from metropolitan cities (İstanbul, Ankara, and İzmir) for the urban group and from villages and districts in Kars, Malatya and Kilis for the rural group. The sample size for this study was determined by using G-Power 3.1.7 demo

packet program for an expected effect size of 0.25. The sample size was found to be at least 305 people when using conventional power values of 0.05 for alpha and 0.20 for beta (a power of 0.80). Age and gender standardization for urban and rural groups were undertaken using case-weight method for adjustment of mean values with the age and gender structure of the total population. This method adjusts the variable to the overall mean age and gender in the two (or more) samples being compared. Therefore, the following statistical analyses were only performed between rural and urban groups. The number and percentage of samples can be seen in Table 1.

Table 1. Demographic characteristics as a percentage of the sample.

Variable	Group					
	Urban (n = 264)		Rural (n = 249)		Total (n = 513)	
	n	(%)	n	(%)	n	(%)
Age (Year)						
15	66	(25.0)	62	(24.9)	128	(24.9)
16	68	(25.8)	64	(25.7)	132	(25.7)
17	65	(24.6)	62	(24.9)	127	(24.8)
18	65	(24.6)	61	(24.5)	126	(24.6)
Gender						
Male	136	(51.5)	126	(50.6)	262	(51.1)
Female	128	(48.5)	123	(49.4)	251	(48.9)
Body Weight Status						
Normal weight	82	(46.3)	95	(53.7)	177	(34.5)
Owerweight	66	(46.8)	75	(53.2)	141	(27.5)
Obese	116	(59.5)	79	(40.5)	195	(38.0)

Note. Normal wieght = <85th percentile of BMI; Overweight = >85th percentile of BMI; Obese = >95th percentile of BMI (Onis et al., 2007).

A total of 513 participants were recruited. They were 262 male (51.1%) and 251 female (48.9%) from urban (n=249, 47.9%) and rural (n=264, 52.1%) areas. They were aged 15 (n=128, %24.9), 16 (n=132, %25.7), 17 (n= 127, %24.9) and 18 years old (n=126, %24.5). The mean age of the participants was 16.49±1.11 years old. Furthermore, participants' BWS were 177 (34.5%) normal weight (NW), 141 (27.4%) overweight (OW), and 195 (38.1%) obese (OB) according to BMI reference values of World Health Organization (WHO)-Multicentre Growth Reference Study (MGRS) for 5-19 ages' group children (Onis et al., 2007).

Data Collection

Anthropometry and body composition

To determine the age of the participants, "National Identity Card" information was used. Participants' ages were calculated from the date of birth on the card. Body weight and height measurements of participants were measured after an overnight fast. Measures of weight (in light clothing) and height (without shoes) were determined to the nearest 0.1 kg and 0.1 cm by "SECA, Germany" device. Body mass index (BMI) of the participants were calculated using the following formula: body mass (kg) / height^2 (m). BWS of participations were classified as a NW, OW and OB according to BMI reference values of WHO-MGRS for 5-19 ages' group children. NW is defined as a BMI below the 85th percentile, OW is defined as a BMI above 85th and below 95th percentile, OB is defined as a BMI above the 95th percentile for adolescents of the same age and sex (Onis, et al., 2007).

The Behavioral Regulation in Exercise Questionnaire- 2 (BREQ-2)

BREQ was originally developed to evaluate reasons for engaging in exercise by Mullan et al. (1997). The original BREQ contained four subscales that measured external, introjected, identified and intrinsic regulations. BREQ was followed by a revised version after the addition of an amotivation subscale (BREQ-2; Markland & Tobin, 2004). The BREQ-2 has been adapted to Turkish by the translation-back translation method (Ersöz et al., 2012). The BREQ-2 is the most commonly used measure for this purpose, and it has been demonstrated to have good factorial validity (Markland and Tobin, 2004; Hassel et al., 2015). Cronbach's α coefficients for the Markland and Tobin's study ranged from .73 and .86 for the five scales (Amotivation, external, introjected, identified and intrinsic regulation). Moreover, Ersöz et al. (2012) reported that the alphas ranged from .67-.81 for the four scales (Amotivation, external, introjected and intrinsic regulation) in Turkey. Similarly, past research have provided support for the validity and reliability of the BREQ-2 in different societies (Wilson et al., 2004; Daley and Duda, 2006). The questionnaire uses a 5-point likert scale rating, ranging from 0 (not true for me) to 4 (very true for me) on four dimensions: Amotivated domain (AM), 4 items: e.g., *"I can't see why I should bother exercising;"* External regulation (ER) domain, 4 items: e.g., *"I feel under pressure from my friends/family to exercise;"* Introjected regulation (INR) domain, 4 items: e.g., *"I feel like a failure when I haven't exercised in a while"* Intrinsic regulation (IR) domain; 7 items: e.g., *"I find exercise a pleasurable activity."* The Relative Autonomy Index (RAI) was used to get information about the level of relative autonomy of participants' motivation types on the self-determination continuum. An overall RAI was calculated using the weighted subscale procedure developed by Mullan et al. (1997): [(AM* -2) + (ER* -1) + (INR* +1) + (IR* +2)]. The minimum score for the RAI is –48 [RAI_{min} = (-32) + (-16)+0+0] and the maximum score is 72 [RAI_{max} = 0+0+16+56] Higher positive scores for the RAI indicate more autonomous motivation whereas lower negative scores indicate less autonomous motivation.

Statistical analysis

Data analysis was performed with the SPSS (SPSS Inc., Chicago, IL, USA) trial version 17.0 statistical package. Results were presented as mean (M) and standard deviations (SD) "*Skewness and Kurtosis"* scores, visual explanations of histogram plots and *"Kolmogorow Smirnov"* tests within normality analysis were used to determine that data was acceptable with regard to homogeneity. As variances showed a normal distribution,*"Independent-samples t-test and One-Way ANOVA"* were used to determine whether the participants' answers varied according to independent variables. A Least Significant Difference (*LSD)* test was used to define the differences between the groups. The significance level was set at 5% for all inferential statistics.

RESULTS

An independent-samples t-test was conducted to compare the all sub-domanin and RAI scores for urban and rural adolescents. The results of analyses were presented in Table 2.

Table 2. Comparison of sub-domains and RAI scores for urban and rural adolescents.

	Group					
	Urban (n= 264)	Rural (n= 249)	95% CI for Mean Difference	t(511)	*p*	*Cohen's d*
	M (SD)	M (SD)				
AM	3.96 (1.80)	3.46 (1.17)	[0.16, 3.21]	2.21	.03*	0.33
ER	5.08 (1.16)	5.22 (1.35)	[-0.67, 0.73]	0.08	.93	-0.11
INR	6.89 (2.09)	6.74 (2.11)	[-1.00, 0.76]	0.27	.79	0.07
IR	19.30 (4.37)	19.58 (3.91)	[-0.82, 4.50]	1.36	.18	-0.07
RAI	32.92 (11.60)	33.78 (12.75)	[-0.60, 7.46]	1.67	.09	-0.07

*Note. * = p < .05, AM: Amotivation, ER: External regulation, INR: Introjected regulation, IR: Intrinsic regulation, RAI: Relative autonmy index.*

Results of the t-test show that there were significant differences on the AM sub-domain (t (513) = 2.21, p = .03, 95% CI [0.016, 3.21], d = 0.33) between urban and rural groups. AM scores of the urban group (M = 3.96, SD = 1.80) were significantly higher than the rural group (M = 3.46, SD = 1.17). However, the scores on ER, INR and IR sub-domains and the RAI were not significantly different between the two groups (p > .05).

Table 3. ANOVA and Post Hoc (LSD) comparison for sub-domains and rai scores of urban group according to BWS groups.

	Urban Group						
	NW (n= 82)	OW (n= 66)	OB (n= 116)				
Variable	M (SD)	M (SD)	M (SD)	F(2, 261)	*p*	η^2	LSD
AM	3.11 (1.45)	3.58 (1.45)	4.27 (2.13)	1.15	.22	.016	N/A
ER	4.88 (0.33)	5.15 (0.55)	5.18 (0.58)	0.12	.89	.001	N/A
INR	6.38 (0.28)	7.08 (0.35)	7.14 (0.46)	0.55	.58	.006	N/A
IR	20.31 (0.41)	19.06 (0.41)	18.72 (0.40)	1.10	.39	.010	N/A
RAI	35.89 (9.66)	32.88 (10.91)	30.84 (12.47)	1.13	.33	.012	N/A

Note. N/A= Not applicable. AM: Amotivation, ER: External regulation, INR: Introjected regulation, IR: Intrinsic regulation, RAI: Relative autonmy index.

The one-way ANOVA analysis for the BWS groups of urban adolescents in Table 3 showed that there were no significant mean score differences between the BWS groups on subdomains of AM, ER, INR, IR, and RAI (*p* > .05).

Table 4. ANOVA and Post Hoc (LSD) comparison for sub-domains and rai scores of rural group according to BWS groups.

	Rural Group						
	NW (n= 95)	OW (n= 75)	OB (n= 79)				
Variable	M (SD)	M (SD)	M (SD)	F(2, 246)	*p*	η^2	LSD
AM	2.47 (0.93)	3.71 (0.93)	4.27 (2.13)	4.37	.01	.056	NW<OB
ER	4.91 (1.21)	5.15 (0.55)	5.18 (0.58)	0.75	.47	.010	N/A
INR	6.87 (2.17)	7.08 (0.35)	7.14 (0.46)	0.25	.78	.003	N/A
IR	20.60 (3.97)	19.06 (0.41)	18.72 (0.40)	1.63	.20	.021	N/A
RAI	38.20 (12.04)	33.54 (13.96)	28.68 (12.01)	2.59	.08	.034	N/A

Note. N/A= Not applicable. AM: Amotivation, ER: External regulation, INR: Introjected regulation, IR: Intrinsic regulation, RAI: Relative autonmy index.

The Anova analyses for the rural BWS groups in Table 4 showed statistically significant group differences on mean AM scores [$F(2, 246) = 4.37$, $p = .14$, $\eta^2 = .056$]. However, rural BWS groups did not differ significantly in terms of ER, INR, IR and RAI scores ($p > .05$). Post Hoc (LSD) analysis showed that the mean AM score of the OB group ($M = 4.41$, $SD = 1.41$) was significantly higher than for the NW participants ($M = 2.47$, $SD = 0.93$).

DISCUSSION

The purpose of the present study was to examine the exercise behavioral regulation in 513 adolescents living in urban and rural areas in Turkey. This research offers revelations in order to better understand the factors that influence behavioral regulation in exercise among urban and rural adolescents with different BWS. We found a significant difference with a moderate effect size between urban and rural groups in the mean Amotivation scores, while other sub-domains scale scores (external, introjected and intrinsic) and relative autonomy index scores were similar between the two groups. It appears from these results that urban participants' exercise amotivation are higher than rural ones, meaning that urban participants were less inclined to exercise. Our findings are consistent with reports by some investigators (Booth et al., 2006; Hume et al., 2012; Legetic et al., 2016; Lopez and Haynes, 2006). Because behavioral regulation in exercise is closely linked to physical fitness and lifestyle, these results for the urban group may be explained by environmental conditions and more sedentary behaviors (e.g., from excessive television watching and video game playing) (Legetic et al., 2016). Lopez and Haynes (2006) reported that urban environmental exposure during childhood was associated with decreased physical activity. This study is consistent with previous studies that reported more positive perceptions among rural people toward physical activity and exercise relative to urban people (Booth et al., 2006; Hume et al., 2012). Urbanization is one of the megatrends that are influential determinants of health in many communities. As urban populations grow, urban poor populations increase concurrently. The poorest residents of cities adopt unhealthy lifestyles but do not have access to health and sport services (Legetic et al., 2016). Recent researches have also revealed a rapid increase in chronic diseases and their associated risk factors in urban regions (Escobedo et al., 2009). For these reasons, there is a need to emphasize the importance of healthy behaviors and the health benefits of regular exercise in order to help decrease AM among urban adolescents. According to self-determination theory, amotivation should be tied to the most negative motivational

consequences (Daley and Duda, 2006). In this regard, our results indicated that urban adolescents were less motivated to do exercise when compared with the rural adolescents. As a result, our study demonstrated a difference in behavioral regulation to exercise between the urban and rural adolescents.

Our results revealed that amotivation scores were significantly different between normal weight and obese adolescents living in rural areas. However, no statistically significant difference among body weight status groups was detected in the other types of subdomain and relative autonomy index in both urban and rural adolescents. Amotivation among rural obese participants was significantly higher in comparison with the rural normal weight group. These findings were similar to results of previous studies in normal weight and obese adults (Gillison et al., 2006; Markland and Ingledew, 2007). Markland and Ingledew (2007) reported that amotivation was negatively associated with sports participation among obese adolescents. Previous studies showed that obese individuals were less engaged in sport and exercise than normal weight counterparts (Davis et al., 2006; Deforche et al., 2009). These results are in accordance with our findings that obese participants who living in rural areas were more amotivated than the rural normal weight group. Ingledew et al., (1995) reported that there was a bidirectional relationship between relative autonomy index and body mass index.

Limitations

While we believe these findings contribute meaningfully to the adolescent exercise or physical activity literature, there are limitations surrounding our research. First, as in other survey-based research, our findings may be influenced by recall error and social desirability motivations of respondents. Second, the sample was limited to participants aged 15-18 years old, thereby restricting our ability to generalize the findings outside this age range. Third, while BMI is widely used and considered to be one of the best ways to assess body composition, it is not necessarily the best method for all people. Future researches should examine the behavior regulation of subjects from different age groups in other regions.

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References

Biswas, A., Oh, P. I., Faulkner, G. E., Bajaj, R. R., Silver, M. A., Mitchell, M. S., & Alter, D. A. (2015). Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: A Systematic Review and Meta-analysis. *Ann Intern Med*, 162(2), 123-132.

Booth, M., Okely, T., Denney-Wilson, E., Hardy, L., Yang, B., & Dobbins, T. (2006). NSW school physical activity and nutrition survey (SPANS) 2004: Summary report. Sydney: NSW Department of Health.

Bryant, W., Fieldhouse, J., & Bannigan, K. (2014). *Creek's occupational therapy and mental health*. Edinburgh: Churchill Livingstone/Elsevier.

Cavill, N., Kahlmeier, S., & Racioppi, F. (2006). *Physical activity and health in Europe: evidence for action.* Copenhagen: World Health Organization, Regional Office for Europe.

Centers for Disease Control and Protection (CDC). (2007). Prevalence of regular physical activity among adults- United States, 2001 and 2005. *Morb Mortal Wkly Rep*, 23;56(46), 1209-1212. Retrieved from: http://www.cdc.gov/mmwr/preview/mmwr/html/mm5646a1.htm

Daley, A.J., & Duda, J.L. (2006). Self-determination, stage of readiness to change for exercise, frequency of physical activity in young people. *Eur J Sport Sci*, 6(4), 231-243.

Davis, J.N., Hodges, V.A., & Gillham, M.B. (2006). Physical activity compliance: Differences between overweight/obese and normal-weight adults. *Obesity*, 14(12), 2259-2265.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26 (3&4), 325-346.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268.

Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Deforche, B. I., Hills, A. P., Worringham, C. J., Davies, P. S., Murphy, A. J., Bouckaert, J. J., & De Bourdeaudhuij, I. M. (2009). Balance and postural skills in normal-weight and overweight prepubertal boys. *Int J Pediatr Obes*, *4*(3), 175-182.

Dumith, S.C., Gigante, D.P. and Domingues, M.R. (2007) Stages of change for physical activity in adults from Southern Brazil: a population-based survey. *Int J Behav Nutr Phys Act*, 4:25.

Ersöz, G., Aşçi, F. H., & Altiparmak, E. (2012). Reliability and validity of behavioral regulations in exercise questionnaire-2. *Turkiye Klinikleri J Sports Sci*, *4*(1), 22-31.

Ersöz, G., Altiparmak, E., & Aşçı, F. H. (2016). Does Body Mass Index Influence Behavioral Regulations, Dispositional Flow and Social Physique Anxiety in Exercise Setting?. *Journal of Sports Science & Medicine*, *15*(2), 295-300.

Escobedo, J., Buitrón, L. V., Velasco, M. F., Ramírez, J. C., Hernández, R., Macchia, A., ... Champagne, B. M. (2009). High prevalence of diabetes and impaired fasting glucose in urban Latin America: the CARMELA Study. *Diabetic Medicine*, *26*(9), 864-871.

Fine, J. (2014). Encouraging families to be active and healthy through a public awareness campaign and program. In 142nd APHA Annual Meeting and Exposition (November 15-November 19, 2014). APHA.

Fowler-Brown, A., & Kahwati, L. C. (2004). Prevention and treatment of overweight in children and adolescents. *Am Fam Physician*, 69(11), 2591-2599.

Gillison, F. B., Standage, M., & Skevington, S. M. (2006). Relationships among adolescents' weight perceptions, exercise goals, exercise motivation, quality of life and leisure-time exercise behaviour: a self-determination theory approach. *Health Education Research*, *21*(6), 836-847.

Hassel, G., Milroy, J. J., & Orsini, M. M. (2015). Investigating Motivation for Physical Activity among Minority College Females using the BREQ-2. *Journal of Student Research*, 4(1), 40-44.

Hume, C., Salmon, J., Veitch, J., O'Connell, E., Crawford, D., & Ball, K. (2012). Socio-demographic characteristics of children experiencing socioeconomic disadvantage who meet physical activity and screen-time recommendations: The READI study. *Preventive Medicine*, *54*(1), 61-4.

Ilesanmi, O. O., Osiki, J. O., & Falaye, A. (2010). Psychological effects of rural versus urban environment on adolescent's behaviour following pubertal changes. *IFE PsychologIA: An International Journal*, 18(1), 156-175.

Ingledew, D. K., Hardy, L., & De Sousa, K. (1995). Body shape dissatisfaction and exercise motivations. *J Sports Sci*, 13, 60.

Lahti-Koski, M., Pietinen, P., Heliövaara, M. and Vartiainen, E. (2002) Associations of body mass index and obesity with physical activity, food choices, alcohol intake, and smoking in the 1982– 1997 FINRISK Studies. *Am J Clin Nutr*, 75(5), 809-817

Lintowska, A., Filipczak, A., Dadacz, J., & Lwow, F. (2017). The problem of obesity in adolescent primary school students from rural and metropolitan areas. *Physiotherapy*, *24*(1), 4-10.

Legetic, B., Medici, A., Hernández-Avila, M., Alleyne, G., & Hennis, A. (2016). Economic Dimensions of Non-Communicable Disease in *Latin America and the Caribbean. Disease Control Priorities* (3th ed.), Companion Volume. Washington, DC: PAHO.

Lopez, R. P., & Hynes, H. P. (2006). Obesity, physical activity, and the urban environment: public health research needs. *Environ Health*, 5(1), 25.

Markland, D., & Tobin, V. (2004).A modification to the behavioral regulation in exercise questionnaire to include an assessment of amotivation. *J Sport Exerc Psychol*, *26*(2), 191-196.

Markland, D., & Ingledew, D. K. (2007). The relationships between body mass and body image and relative autonomy for exercise among adolescent males and females. *Psychol Sport Exerc*, *8*(5), 836-853.

McMichael, P. (2016). *Development and social change: A global perspective* (5th ed.). London: Sage Publications.

Mullan, E., Markland, D., & Ingledew, D. K. (1997). Development of a measure using confirmatory factor analytic procedures. *Pers Individ Dif*, *23*(5), 745-752.

Onis, M. D., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C., & Siekmann, J. (2007). Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization*, *85*(9), 660-667.

Roberts, G. C., Treasure, D. C., & Conroy, D. E. (2007). Understanding the dynamics of motivation in sport and physical activity: An achievement goal interpretation. In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of Sport Psychology* (3th ed.), 1-30. Hoboken, NJ: John Wiley & Sons, Inc.

Ryan, R. M., & Deci, E. L. (2000).Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*, *55*(1), 68-78.

Salici, A. G., Sisman, P., Gul, O. O., Karayel, T., Cander, S., & Ersoy, C. (2017). The prevalence of obesity and related factors: An urban survey study. Endocrine Abstract, 49(EP679) doi:10.1530/endoabs.49.EP679

Sisson, S. B., & Katzmarzyk, P. T. (2008).International prevalence of physical activity in youth and adults. *Obesity Reviews*, 9(6), 606-614.

Sparud-Lundin, C., & Andersson, K. (2015). Participation and motivation in obesity treatment–a qualitative study of teenagers' and parents' perceptions. *Obes Control Ther*, *2*(1), 1-6.

Taylor, R., Badcock, J., King, H., Pargeter, K., Zimmet, P., Fred, T., ... Wang, R. L. (1992). Dietary intake, exercise, obesity and noncommunicable disease in rural and urban populations of three Pacific Island Countries. *J Am Coll Nutr*, *11*(3), 283-293.

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. *Int J Behav Nutr Phys Act*, 9(78), 1-30.

Voelker, D.K., Reel, J.J, & Greenleaf, C. (2015). Weight status and body image perceptions in adolescents: current perspectives. *Adolesc Health Med Ther*. 6: 149–158.

Waters, E., Silva-Sanigorski, A. D., Burford, B. J., Brown, T., Campbell, K. J., Gao, Y., … Summerbell, C. D. (2014). Interventions for preventing obesity in children. *Sao Paulo Med J.*, 132(2), 128-129.

Wilson, P. M., Rodgers, W. M., Fraser, S. N., & Murray, T. C. (2004). Relationships between exercise regulations and motivational consequences in university students. *Research Quarterly for Exercise and Sport*, *75*(1), 81-91.

World Health Organization (WHO). (2010). *Global recommendations on physical activity for health*. Geneva: WHO Press.

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Differences in selected long jump components according to the results of Turkish youth boys

Isik Bayraktar[1] and Murat Cilli[2]

[1] The Ministry of Youth and Sport, General Directorate of Sport, Ankara, Turkey.
[2] Sakarya University, Sport Science Faculty, Sakarya, Turkey.

isikbayraktar@outlook.com

Abstract

The purpose of this study was to determine differences between the groups which have two different performance levels in the long jump for youth athletes. The technique of long jump consists from the run-up, jump, flight and landing stages. Each stage has been deeply investigated by analysing various kinematic variables such as velocity, length, duration, angle, jump percentages in previous studies. The recent study has found differences between two different performance levels athletes according to the velocity variables, take-off angle and percentage of the take-off distance. Considering the run-up speed of long jump is priority indicator of the jump distance, the athletic coaches should give more attention for the speed ability of athlete when the processes of talent identification and selection in the long jump event.

Keywords: Long jump, kinematic, velocity, take-off

INTRODUCTION

As one of the oldest Olympic sport event, the long jump has a relatively simple technique in terms of teaching and learning. It is technically divided into four stages: run-up, jump, flight and landing. (Jonath, Krempel, Haag, & Müller, 1995). The total measured distance of long jump consists the sum of these three lengths: take-off distance (L1), flight distance (L2) and landing distance (L3) (Hay & Miller, 1985). The parts of the long jump have been examined to determine by analysing various kinematic variables such as velocity of last ten meters and last strides, length of last strides, duration of take-off support phase, distance lost on the board, angle of take-off, the percentage of L1, L2 and L3 rates in previous studies (Hay, 1988; Hay & Koh, 1988; Hay & Miller, 1985; Hay, Miller, & Canterna, 1986; Letzelter, 2011; Linthorne, 2008; Schulek, 2002).

It has been reported that the run-up speed of long jump is priority indicator of the jump distance (Bridgett, Galloway, & Linthorne, 2002; Bridgett & Linthorne, 2006; Hay, 1993; Hay et al., 1986; Lees, Graham-Smith, & Fowler, 1994). Some of the researchers found that the jump distance increases at range from 6 cm to 12.8 cm per 0.1 m/s increase in the velocity of the run-up (Bridgett & Linthorne, 2006; Hay, 1993). Besides, Bridgett and Linthorne (2006) have described the strong relationship between horizontal velocity and jump distance as 96 percent. The horizontal velocity at the end of the run-up should be peak within the last two strides. The most obvious characteristics of last two strides is that the penultimate step (last-but-one) slightly is longer than the last step of the approach in terms of flight time and stride lengths (Lees et al., 1994). The effective run-up is evaluated by many coaches as looking at the position of take-off foot on the take-off board. Although the aim of the run-up is to place athlete's jumping foot close to the front edge of the board (zero-in), Hay (1988) has identified for distance lost –it is known as 'loss of take-off'- (toe-board distance) of 20 cm or less is very good, and the loss of 25 cm or more is poor.

One of the crucial points in long jump performance are take-off features: take-off angle and support phase of take-off. It is known that they have relationship with the run-up speed, in the other words, the take-off angle and the take-off contact time depend on the horizontal velocity of the approach run. A study has revealed the fact that the run up velocity increased the take-off angle and duration of take-off decreased (Bridgett & Linthorne, 2006). The optimum take-off angle should be under 45^{o} since the vertical and horizontal velocity are not equal in magnitude. The most appropriate instance for this issue is the world-class athletes coherently perform 21^{o} for take-off angles according to the study of Linthorne (2008). The author has also reported the typical values of some parameters for elite male long jumpers in his study. He describes that a long jumper who can jump eight meters should have 10.6 m/s for horizontal velocity, 1.8 m/s for loss of horizontal velocity during take-off and 0.11 s for duration of take-off. As the distance of long jump is the sum of L1, L2 and L3, L2 has approximately 90 percent of the total jump distance as the most important part (Linthorne, 2008).

Most of the above explained relations and values are variables which obtained from technical analyses during major championships. As the biomechanical reports of championships analyses are important for the athletes and their coaches, it is also important for sports scientists to understand the performance of the elite athletes in the real condition, competition, rather than experimental studies (Campos, Gámez, Encarnación, Gutiérrez-dávila, & Rojas, 2013; Fukasiro & Wakavama, 1992; Hay & Miller, 1985; Hommel, 2009; Panoutsakopoulos, Papaiakovou, Katsikas, & Kollias, 2010; Seo & Kim, 2011). Nevertheless, most of the studies have focused on senior level athletes rather than youth

or novice athletes. There are few studies involving youth and junior athletes in which they have been examined of their technical skills like elite senior athletes (Berg & Greer, 1995; Huremovi, Biberovi, Pojski, & Original, 2005; Makaruk, Mastalerz, Starzak, & Buszta, 2015; Panteli, Theodorou, Pilianidis, & Smirniotou, 2014) . A study which is deeply examined technical component of novice jumpers is the study of Berg and Greer (1995). They have emphasised that kinematic variables which has affected the long jump performance have not similar relationship with performance for the novice athletes as expert jumpers according to their findings.

The purpose of this study was to determine differences between groups which have two different performance levels.

METHODS

Research Group

A total first thirty two youth long jumpers were selected as participants during the qualification round of the Turkish Youth Indoor Championship in January 2015. This competition has covered between 15 and 17 years old athletes. The participants have divided in two groups as the best 16 athletes and the others.

Table 1. Descriptive values (mean ± SD) of the groups.

	Group A (n=16)		Group B (n=16)	
	Mean	SD	Mean	SD
Age (year)	16.0	0.6	16.4	0.5
BM (kg)	59.7	6.6	65.9	6.5
BH (cm)	170.9	6.0	175.9	5.7

Data Collection Instruments

All trials of the athletes in the research group were recorded by a camcorder at 100 fps (Panasonic HC-w850). The camera was placed perpendicular to the take-off board. The photocells which are used to determine running times of athletes have been established 1m, 6m and 11m distance from the take-off board (SmartSpeed, FusionSport, Australia).

Data Collection

Velocities for 11m-6m section (V1), 6m-1m section (V2), total 10m (V10) and difference between V2 and V1 (Vloss) were calculated for each jump. The official jump distances were recorded. Best performance of the athletes was analysed by the two dimensional analysis software (Tracker, v4.90-95). Thus it was obtained values of kinematic variables which are loss of take-off (TO), length and duration of last two steps (2last, 1last), duration of the contact of take-off (CT-TO), angle of take-off (TO-Angle), take-off distance (L1), flight distance (L2) and landing distance (L3). Further, it was calculated actual distance (sum of official distance and loss of TO), last step velocity (VLS) and the range of last two steps (RL=[1last/2last]x100).

Data Analysis

General characteristics of the participants were presented as means and standard deviations (±SD). Statistical comparison of the groups was carried out using Mann Whitney-U test. For the statistical procedure IBM-SPSS 20.0 pocket program was applied and statistical significance was set at $p<0.05$.

RESULTS

The long jump kinematic variables of the two groups are presented in Table 2. No significant differences were found between Group A and Group B in terms of the loss of TO, Vloss, last two steps length (2last and 1last), range of last two steps (RL), support phase of the TO and percentages of flight distance (L2) as well as landing distance (L3). Whereas there are statistically significant differences with regard to official distance and actual distance, values of the velocity variables (V1, V2, V10, VLS), angle of TO as well as distance of TO (L1). This expected differences of the official and actual distances are due to the composition of the groups by jump distances. The Group B jumpers have significantly shown better long jump performance than Group A jumpers (GroupA=4.90m, GroupB=5.98, $p<0.05$). The Group B athletes were faster than Group A athletes considering the all velocity variables of the study. When the athletes' take-off angle values were compared, it was observed significantly difference between the groups ($p<0.005$) that the Group A athletes have jumped by 17.5 degree, while Group B jumpers mean value is 20.5 degree. There is likewise a significant difference for the percentage of take-off distance (L1%) between the two groups ($p<0.005$). The mean range of take-off distance (L1) in Group A was observed to have more value than Group B (7.8%, 5.8%, GroupA, GroupB, respectively; $p<0.005$).

Table 2. The values of long jump kinematic variables (mean ± SD) and differences between the groups.

	Group A (n=16)		Group B (n=16)		Significance
	Mean	SD	Mean	SD	
Official distance (m)	4.90	0.45	5.98	0.32	*0.00**
Loss of TO (m)	0.17	0.13	0.11	0.09	0.32
Actual distance (m)	5.07	0.43	6.09	0.28	*0.00**
V1 (m/s)	7.76	0.41	8.51	0.46	*0.00**
V2 (m/s)	8.03	0.51	8.72	0.25	*0.00**
V10 (m/s)	7.89	0.45	8.61	0.27	*0.00**
VLS (m/s)	9.08	0.55	9.88	0.51	*0.00**
Vloss (m/s)	0.27	0.22	0.21	0.53	0.71
2last (m)	2.04	0.28	2.20	0.22	0.08
1last (m)	1.96	0.25	2.10	0.18	0.09
RL (%)	96.7	7.3	96.0	9.0	0.76
CT-TO (s)	0.15	0.02	0.14	0.02	0.35
TO-Angle (^{o})	17.5	4.0	20.5	2.8	*0.03**
L1 (%)	7.78	1.66	5.84	1.34	*0.00**
L2 (%)	81.93	4.48	84.53	2.56	0.10
L3 (%)	10.31	3.71	9.63	1.69	0.42

* $p<0.05$

DISCUSSION

In the long jump, the athlete's intention is to jump as far as possible in a horizontal direction with a perfect landing phase. Therefore the athlete should run maximum speed which is a controllable manner in the approach run combined with a minimum speed loss in take-off (Hay, 1985). Even if the long jump has many factors effecting the jump distance, the most component of jump length is the run-up speed. The strong relationship between horizontal velocity and jump distance has been described as 96 percent by Bridgett and Linthorne (2006). They have announced that the jump distance have increased when their run-up speed also increased for experienced male long jumpers. Another study in which the run-up speed of athletes was artificially increased (with the towing method), the researcher has discovered great improvement in the term of the increase in jump distance when the speed increases without create any technical problems (Schulek, 2002). This study has an importance because the analyse was applied while each athlete was jumping by normal run and with towing method run. Thus it was found a positive effect of run-up speed on the jump distance for high level long jumpers. Even if there are abundant studies about the correlation between run-up velocity and jump distance, most of them have been done with high level athletes or adult athletes rather than novice or young athletes. One of the few studies is Berg and Greer's (1995) research about novice long jumpers. They have also found good relation between run-up velocity and jump distance for the study group athletes who have jumped mean 5.55 m. Besides that the run-up velocity was being a determinative factor to explain the differences between male and female as an example for different performance level athletes (Akl, 2014; Hussain, Khan, Mohammad, Bari, & Ahmad, 2011). In the present study, the velocity variables of long jump approach have been one of the determinative factors of the differentiation between the two diverse performance level jumpers (GroupA= 4.90 m, GroupB=5.98 m).

Linthorne (2008) reported that the typical mean value of the horizontal velocity is 10.6 m/s for elite long jumper who jumped 8 meters. According to the result of Berlin 2009 IAAF World CH, the mean value of jump distance is 8.03 m and velocity of last ten meters is 10.4 m/s (Hommel, 2009). Further, Bridget and Linthorne (2006) were found 10.4 m/s run-up velocity for experienced athletes jumped 7.89 m. The mean horizontal velocity is 9.82 m/s in the study of Panoutsakopoulos et al. (2010). The mean jump distance of this athletes is 7.40 m. The researchers, who have examined some kinematic parameters, noticed that the horizontal velocity of the athletes is 9.17 m/s and mean jump distance is 6.79 m (Hussain et al., 2011). In the study of novice athletes, Berg and Greer (1995) have reported that the long jumpers have 8.14 m/s horizontal velocity value and their mean jump distance is 5.55 m. In the current study groups have 7.89 m/s and 8.61 m/s for the values of last 10 meters horizontal velocity (GroupA and GroupB, respectively). In other words, the faster athletes have shown better long jump performance than the others. Thus, it may be said that those who has shown better long jump performance were faster than others, according to these findings.

The run-up speed of athlete decreases associated with the adjustments made in preparation for take-off, but the aim is minimum loss of speed (Hay, 1985). The current study has found the loss of velocity for each group. There is a similarity between the groups in terms of the loss of run-up speed. The adjustment in take-off preparation determines the athlete's take-off angle. As reported in previously studies, once the approach speed increases the take-off angle and duration of take-off contact decreases (Bridgett & Linthorne, 2006; Hay, 1985; Huremovi et al., 2005; Linthorne, 2008; Linthorne, Guzman, & Bridgett, 2005). In the recent study, the take-off angle has been a decisive

variable to the difference between the groups, as well. Whereas, it was not found any difference between the research groups according to the duration of take-off support phase.

Hay (Hay, 1985) addressed that the long jump distance may be considered to be sum of the take-off distance, the flight distance and the landing distance. These three lesser distances have been expressed as percentages of the jump distance which are 4% (L1), 89% (L2) and 8% (L3). But the percentages of jump distance have shown differences in the several studies according to the review (Hay, 1986). In any case the flight distance is overwhelmingly influential in point of the contribution percentage of jump distance. The current study has found a likewise dominant finding for L2% to each group. Also there is a similarity between the groups (GroupA=82%, GroupB=85%, $p>0.05$). But the percentage of take-off distance (L1%) differed between the study groups, which are GroupA=8% and GroupB=6% ($p<0.05$).

It is possible that this difference may occur because of the athlete is not able to do an active jump during the take-off. The presumption is probable when considering low take-off angle of the GroupA (17.5^{o}) from GroupB (20.5^{o}).

In conclusion, it was observed that the only a few parameters which the velocity variables, take-off angle and take-off distance from the performance components of jump distance determining differences between the groups in this study.

CONCLUSION

There are many components of jump distance in the long jump. However, it was observed that velocity variables, take-off angle and take-off distance are a few parameters from the components determining differences between the groups in this study. The speed ability of the athletes has been seen the dominant variables in order to explain the differentiation between groups, as it is for youth athletes in the current study. Because of that, it may be said that the coaches should give more attention for the speed ability of athlete when the processes of talent identification and selection in the long jump event.

References

Akl, A.-R. (2014). Biomechanical study to assess the variations between male and female in long jump. *Sport Scientific and Practical Aspects*, *11*(1), 33–36.

Berg, W. P., & Greer, N. L. (1995). A kinematic profile of the approach run of novice long jumpers. *Journal of Applied Biomechanics*, *11*(2), 142–162.

Bridgett, L. A., Galloway, M., & Linthorne, N. P. (2002). The effect of run-up speed on long jump performance. In K. E. Gianikellis (Ed.), *In Scientific Proceedings of the XXth International Symposium on Biomechanics in Sports* (pp. 80–83). Cáceras,, Spain: Universidad de Extremadura.

Bridgett, L. A., & Linthorne, N. P. (2006). Changes in long jump take-off technique with increasing run-up speed. *Journal of Sports Sciences*, *24*(8), 889–897. https://doi.org/10.1080/02640410500298040

Campos, J., Gámez, J., Encarnación, A., Gutiérrez-dávila, M., & Rojas, J. (2013). Three Dimensional Kinematic Analysis of the Long Jump at the 2008 IAAF World Indoor Championships in Athletics. *New Studies in Athletics (NSA)*, *26*(3), 115–131.

Fukasiro, S., & Wakavama, A. (1992). The men's Long Jump. *New Studies in Athletics (NSA)*, *7*(1), 53–56.

Hay, J. G. (1985). *The biomechanics of sports techniques*. Prentice Hall.

Hay, J. G. (1986). The Biomechanics of the Long Jump. *Exercise and Sport Sciences Reviews*, *14*(1), 401–446. Retrieved from http://journals.lww.com/acsm-essr/Fulltext/1986 /00140/14_The_Biomechanics_of_the_Long_Jump_.17.aspx

Hay, J. G. (1988). Approach Strategies in the Long jump. *International Journal of Sport Biomechanics*, (4), 114–129.

Hay, J. G. (1993). Citius, altius, longius (faster, higher, longer): the biomechanics of jumping for distance. *Journal of Biomechanics*, *26*, 7–21.

Hay, J. G., & Koh, T. J. (1988). Evaluating the approach in the horizontal jumps. *I.Journal of Sport Biomechanics*, *4*, 372–392.

Hay, J. G., & Miller, J. A. (1985). Techniques Used in the Transition From Approach to Takeoff in the Long Jump. *International Journal of Sport Biomechanics*, *1*(2), 174.

Hay, J. G., Miller, J. A., & Canterna, R. W. (1986). The techniques of elite male long jumpers. *Journal of Biomechanics*, *19*(10), 855–866.

Hommel, H. (2009). *Long Jump (Final Report) - Scientific Research Project Biomechanical Analyses at the IAAF World CH in Athletics - Berlin 2009*. Darmstadt. Retrieved from https://www.iaaf.org/development/research

Huremovi, T., Biberovi, A., Pojski, H., & Original, H. (2005). Predictive Value of Kinematic Parameters On The Results. *Sport Scientific & Practical Aspects*, *6*(2), 19–24.

Hussain, I., Khan, A., Mohammad, A., Bari, M. A., & Ahmad, A. (2011). A comperison of selected kinemetical parameters between male and female intervarsity long jumpers. *Journal of Physical Education and Sport*, *11*(2), 182–187.

Jonath, U., Krempel, R., Haag, E., & Müller, H. (1995). *Leichtathletik 2 Springen*. Hamburg: Rowohlt.

Lees, A., Graham-Smith, P., & Fowler, N. (1994). A Biomechanical Analysis of the Last Stride, Touchdown, and Takeoff Characteristics of the Men' s Long Jump. *Journal of Applied Biomechanics*, *10*, 61–78.

Letzelter, S. (2011). The Importance of Horizontal and Vertical Take-off Velocity for Elite Female Long Jumpers. *New Studies in Athletics (NSA)*, *26*(3), 73–84.

Linthorne, N. P. (2008). Biomechanics of the Long Jump. In Y. Hong & R. Bartlett (Eds.), *Handbook of biomechanics and human movement science* (pp. 340–354). Routledge.

Linthorne, N. P., Guzman, M. S., & Bridgett, L. A. (2005). Optimum take-off angle in the long jump. *Journal of Sports Sciences*, *23*(July), 703–712. https://doi.org/10.1080/02640410400022011

Makaruk, H., Mastalerz, A., Starzak, M., & Buszta, M. (2015). The Influence of Different Training Conditions on the Kinematics of Long Jump-Specific Exercise in Young Female Jumpers. *Polish Journal of Sport and Tourism*, *22*(4), 241–246.

Panoutsakopoulos, V., Papaiakovou, G. I., Katsikas, F. S., & Kollias, I. A. (2010). 3D Biomechanical Analysis

of the Preparation of the Long Jump Take-Off. *New Studies in Athletics (NSA)*, *25*(1), 55–68.

Panteli, F. N., Theodorou, A., Pilianidis, T., & Smirniotou, A. (2014). Locomotor control in the long jump approach run in young novice athletes. *Journal of Sports Sciences*, *32*(2), 149–156.

Schulek, A. (2002). Long jump with supramaximal and normal speed. *IAAF New Studies in Athletics : NSA*, *17*(Aachen), 37–43.

Seo, J.-S., & Kim, H.-M. (2011). *Long Jump Biomechanics Research Report from the IAAF World Championships Daegu-2011*. Deagu. Retrieved from http://www.jaaf.or.jp/t-f/pdf/Daegu2011.pdf

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Examination of the effects of using different teaching methods in leisure education: an experimental study

Suleyman Munusturlar[1]

[1] Anadolu University, Faculty of Sport Sciences, Department of Recreation, Eskisehir, Turkey.

suleymanmunusturlar@anadolu.edu.tr

Abstract

The main purpose of this study is to examine the effects of leisure education practices using different teaching methods. In this study, quasi-experimental research methodology has been used in the framework of pretest - posttest design without the use of a control group. In total, 155 students between the age of 9-13 (experimental I group: 76 students, experiment II group: 79 students) were selected through a convenience sampling method. The Leisure Education Scale (LES) developed by Munusturlar (2014) was used to measure leisure education levels of students in the study. In order to examine the difference between the pretest- posttest measurements of groups I and II; Paired Sample T-Test has been used. The Independent Samples T-Test was used to examine the difference between the pretest-posttest access results of experimental groups I and II. As a result of the statistical analyses, it was determined that the leisure education score averages in the experimental groups I and II were significantly different in favor of the posttest. When the difference between the pretest-posttest access results of the two groups was examined, it was found that the leisure education had a significant difference in favor of the experimental group I that experienced play-based teaching method in the sub-dimensions of problem-solving and social interaction skills. As a result, it can be concluded that both lecture-teaching and play-based teaching methods are effective in terms of leisure education applications.

Keywords: Leisure education, formal education, teaching methods, play-based teaching, and lecture based teaching.

INTRODUCTION

Leisure Education (LE), which aims to improve skills to make a proper use of free time has become an important part of the modern society as working hours are evolving and enabling people to have more leisure time. The increasing importance is given to the concept of "life quality" also reinforce the role of leisure education in this context (Sivan, 2007).

Leisure education plays an important role in increasing the functionality of the educational process by both training individuals in terms of the wise use of leisure and supporting general education either directly or indirectly (Torkildsen, 1992, 25). The use of the concepts of leisure and education is not a new and up to date notion. The famous thinker Dewey (1916) states that the concepts of leisure and education are related to each other and have many common points. The ancient philosophers as Aristo, Plato and Socrates considered leisure as a part of personal development and learning (Goodale & Godbey, 1988). Another example that demonstrates the connection between education and leisure is the etymological link between the words 'school' and 'schole' which means free time in Ancient Greek (Hemingway, 1988; McLean & Hurd, 2012).

It is not possible to argue that there is only one certain definition that explains education for leisure or leisure education. Johnson, Bullock, & Ashton-Shaeffer, (1997) describe leisure education as teaching processes which enable individuals to develop their recreation and leisure-time skills, attitudes, and values. According to Sivan (2007: 52), leisure education can be defined as a lifelong process, in which people perceive themselves, their own skills, the place and importance of free time in their lives, and make expected changes with the aim of using their leisure time properly.

Leisure education is defined as provision of pedagogical, experiential and recreational experiences that serve to achieve cognitive, affective and kinesthetic domain learning objectives relative to the worthy use of leisure (WLRA, 2001, 203). Whether done in school or outside of it, the goal of leisure education is to enable individuals to enhance the quality of their lives through improving their leisure (Mundy, 1998). Formal leisure education practices are possible through properly designed leisure time programs (Sivan, 2007; Ruskin & Sivan, 2002).

As the concept of education is identified with the systematic, organized and time-constrained school concept; and leisure with personal choices, freedom and happiness; it can be questioned that how the concepts of education and leisure time can find a middle ground. However, it should not be forgotten that schools are one of the cornerstones of the lifelong education process that creates a systematic socialization and learning environment (Sivan, 2008). Due to the fact that the right use of leisure time has an effect on concepts that determine quality of life such as happiness and good life (Ruskin & Sivan, 2002: 6), schools are not only giving vocational training but also have a mission to prepare students for the life (Heyne & Schleien, 1996). In this regard, schools are unique places where students can gain leisure time skills and learn how to use their time properly (Sivan, 2007). The success- oriented education system which based on vocational training also requires curriculum restructuring that focuses on life skills in general such as leisure education. (Theeboom & Bollaert, 1987). In this context, schools are providing important formal education opportunities by creating curriculums that include leisure education (Sivan & Chan, 2012).

Schools have an important responsibility to educate people about the right use of leisure time (Sivan & Chan, 2012). Stumbo and Peterson (2004) state that appropriate systematic programs that can

accomplish the goals of leisure education are important for the attainments towards the right use of leisure time. Achieving these gains at the highest level is possible through the integration of well-organized and systematic leisure curriculum into the school system. (Dattilo, 1991). Systematic leisure education programs become effective with defined objectives, content and teaching environment (Dattilo, 2008). It is vital to include the right target, content and process combinations in school curriculums that are leisure education oriented (Sivan, 2004). Even though leisure education practices are organized within the framework of formal education within the school, using teaching methods that enable socialization will increase the effectiveness of education (Ruskin & Sivan, 2002: 34). A curriculum consists of objectives, content, methods and evaluation elements (Tanner & Tanner, 2007). The content, which is created to reach predetermined cognitive, emotional and psychomotor goals, is transferred to the target group through a method (Glatthorn, Boschee, Whitehead & Bosche, 2012). Teaching methods refer to the question "How to teach?" in order to reach the specified goals and present the use and organization of teaching tools, materials, subjects and teaching techniques within this framework (Clark & Starr, 1991: 25). Teaching methods are commonly categorized as child-centered, teacher-centered, and community-based approaches (Marsh, 1992), under the general classification of instructional strategies: presentation, invention, and research-through teaching (Sharma, 2005). However, teacher and children centered teaching methods are widely preferred in schools (Paris & Gespass, 2001). In the teacher-centered teaching approach, the instructor is the active and the student is the passive subject in the teaching-learning environment. On the other hand, the student is active in the children-centered approach (Weimar, 2013).

One of the most common teaching method in teacher-centered teaching approaches is lecture-teaching method and in this method the teacher prepares students for course objectives by taking help from specific materials and documents (Madi, 2011: 154). Due to the fact that it is a teacher-centered, the lecture-teaching method is also known as the traditional method as the teacher is the instructor and student is the learner (Tan, 2011). Play-based teaching methods play an important role in the framework of children-centered approaches (Vygotsky, 1997). Although play-based teaching methods seem to have a non-systematic structure due to the concept of the game that based on fun and freedom, these methods actually utilize the games as a tool to achieve formal educational goals with educational purposes. (Van Oers & Duijkers, 2013). Educational games help to increase learning motivation and boost the learning outcomes and provide other experiential outcomes beyond the curriculum (Charles, Bustard & Black, 2009). The concepts of competition, discovery, unity and challenge which constitute educational games increase the motivation and concentration of students and increase the effectiveness of learning environment (Zin and Yue, 2009: 271). Due to the change in the educational understanding of the human generation, the new generation of children now prefers children-centered approaches such as teaching through games instead of classroom-oriented lecture-teaching methods (Prensky, 2001).

When the literature is examined, it has seen that there are leisure education models and approaches aiming to give information and to provide values and behaviors for the proper use of leisure time within the scope of informal and formal education (Caldwell, Baldwin, Walls & Smith, 2004; Clark &Anderson, 2011; Dunn & Wilhite, 1997; Mundy, 1998; Mundy & Odum, 1979; Rancourt, 1982; Weber, 2010). These models and approaches seem to suggest different leisure time components as leisure time contents for proper use of leisure time. However, it has been seen that the number of researches on the appropriateness of teaching methods - in which ways these leisure education contents are transferred to individuals- are very limited. This deficiency has shaped the problem statement of the research and revealed the need to carry out the research. It is believed that this

research is significant to demonstrate how important the teaching methods, techniques and strategies of leisure education are within the formal education concept and how important it is to include leisure education into the contents. In accordance with the importance of the research, the purpose of this study is to examine the effects of formal leisure education methods using play-based leisure education (educational games) and lecture-teaching methods on leisure education levels of children aged between the ages of 9-13.

METHODS

In this study, quasi-experimental research model has been implemented in the form of pretest-posttest design without the use of a control group. In this model, without a control group, research group or groups are taken, and the success status is determined by testing the subjects before the experiment. After conducting the experiment, the group or groups are retested and the result of the experiment is evaluated according to the difference between the two tests (Kaptan, 1995: 81). In the direction of the research design, the study group, the data collection tool, the analysis of the data and the information about the experimental pattern setup are given below.

Research Universe and Sample

The universe of the study consists of children between the ages of 9-13, living in the province of Eskişehir. The study group consisted of 155 students who were selected by convenience sampling method in the province Eskişehir. 76 of the students were in the classrooms where the play-based method (Experimental Group I) and 79 of them were in the classrooms where the lecture-teaching method was implemented (Experimental Group II). The research sample was selected from the secondary school – the second step of compulsory education- students who live in the province of Eskişehir. The branches A, B and C of the middle school where the study is conducted were assigned to the experimental group I, the branches of I, D, E, F were assigned to the experimental group II. Before the study groups were established, information about the study and the research process was presented to the students and the students who do not want to participate in the study were determined. All of the students in the secondary school who registered to the elective course, Sport and Physical Activities, stated that they participate in the research study voluntarily. The voluntary participation of the students has played a significant role in the conduct of the research study as the sample was appropriate to the objectives of the research.

Prior to the research, The Leisure Education Scale (LES) developed by Munusturlar (2014) was used to examine the readiness of the students in the two groups on their Leisure Education Level (LEL); LES was also used as a measurement tool of the research. For the purpose of determining whether the leisure education readiness levels in the experimental groups I and II are equal, analyses have been made to see if pretest scores of students in two different groups are normally distributed and also to examine the homogeneity of variances (Kolmogorov-Smirnov Test and Levene Test). As the scores are not normally distributed, non-parametric tests are preferred in the study. For this reason, the pretest scores obtained in the study were compared with the T-test and it was determined that there is no meaningful difference between the groups (awareness: t = 2.427, p = .660, intrinsic motivation: t = 1.362, p = .517, P = .414, social interaction skills: t = 2.364, p = 759, problem solving: t = 1.125, p = .190, time management: t = .600, p = .694; = -1.911, p = .812 and total LEL score: t = 3.456, p = .719). According to these results, it can be said that the LEL results of students who belong to two different groups are similar to each other.

Data Collection Tools

Two different data collection tools have been used to collect research data. The first one is the personal information form prepared to identify the demographic information of the participants. The second data collection tool is the "Leisure Education Scale (LES)" which was developed by Munusturlar (2014) with the purpose to measure the leisure education levels of the participants in the sample of Turkey.

Leisure Education Scale (LES) was designed as a 5 point Likert scale which consist of: awareness (5 items), intrinsic motivation (5 items), extrinsic motivation (7 items), social interaction skills (6 items), time management (4 items), problem solving (4 items), boredom (5 items). In total there are 7 dimensions and 36 items. A total of 12 items is calculated by reverse coding since there is a negative correlation between the dimensions of extrinsic motivation, social interaction skills, boredom and the concept of leisure education (Munusturlar, 2014; Munusturlar and Bayrak, 2016). In the development process of the scale, the Cronbach Alpha reliability coefficient (α) was defined as .85, awareness as a scale lower-dimension was .80, intrinsic motivation was .82, extrinsic motivation was .86, social interaction skills were .84, time management (4 items), problem-solving was .79 and boredom was defined as .77.

Data Collection and Analysis

The data were gathered from 155 students who were studying in the center of Eskişehir province between March-May 2017. The students participate the research on a volunteer basis and selected by convenience sampling method.

According to the Levene test results- which is conducted to make the decision of using parametric and nonparametric test before the difference statistics- the variances were homogeneous ($p > 0.05$) and according to Kolmogorov-Smirnov test results, the groups showed a normal distribution ($p > 0.05$). In the light of this information, in order to identify the development within the experimental groups I and II; Paired Samples T-Test and in order to determine whether there is a difference between the access values of the two groups The Independent Samples T-Test was used. Statistical significance level was set as 0.05.

Experimental Research Design

The leisure education objectives and contents applied to the experimental groups were determined according to the dimensions of leisure education that presented as a result of the research conducted by Munusturlar (2014) on the sample of Turkey. The dimensions which are covered by the leisure education curriculum of the educational groups of I and II are; awareness, social interaction skills, problem-solving and time management. Before the implementation, the current levels of leisure time education of the students in the both groups were determined by using Leisure Education Scale. The process has lasted for 5 weeks for both of the groups. After the implementations, the students have subjected to the Leisure Education Scale again in order to determine the post-implementation leisure education levels. During the implementation process, a course hour was regarded as 40 minutes. The leisure education curriculum was planned as two games in each class hour in the experimental group I which is imposed to play-based education. In the experimental group II which is imposed to lecture-teaching method, the leisure education curriculum was planned as one leisure education activity in each class hour. The leisure education practices were delivered by the same instructor in both groups, so as to control the access differences arising from the tutors. The leisure education practices were

implemented by five instructors in total. The leisure education course plan was designed for both groups in detail by the researcher and explained to the instructors in detail by pre-training.

Table 1. Information on experimental application

	Experimental group I (Play-based teaching, Educational Games)				**Experimental group II (Lecture-teaching)**			
	Number of Games	Practice Duration	Practice Number Per Week	Weekly Practice Duration	Number of Topics	Course Length	Number of Courses Per Week	Course Length per Week
Awareness	4	40 min	2	80min	4	40 min	2	80min
Motivation	4	40 min	2	80min	4	40 min	2	80min
Social Int. Skills	4	40 min	2	80min	4	40 min	2	80min
Time Management	4	40min	2	80min	4	40 min	2	80min
Problem Solving	4	40 min	2	80min	4	40 min	2	80min
Total	20	200 min	10	400min	20	200 min	10	400min

RESULTS

To determine whether there is a meaningful difference between the pre-test and post-test scores of the total LE score and its sub-dimensions of the students in the experimental group I that leisure education contents were delivered by game based teaching methods and in the experimental group II that contents were delivered by lecture-teaching method; Paired Sample Test has been conducted and the findings are presented in Table 2 and Table 3.

Table 2. Comparison of Pre-Post Test Scores of the Group (Experiment I) in which Leisure Education was delivered through Play-based Teaching Methods

Variable		**N**	$\bar{X}$	**sd**	**t**	**p**
Awareness	Pre test	76	3,68	0,61	3,426	.00**
	Post test	76	4,27	0,79		
Intrinsic Motivation	Pre test	76	4,02	0,73	1,513	.04*
	Post test	76	4,59	0,76		
Extrinsic Motivation.	Pre test	76	3,60	0,72	,712	.02*
	Post test	76	3,78	0,73		
Social Interaction Skills	Pre test	76	3,69	0,68	2,302	.00**
	Post test	76	4,47	0,79		
Time Management	Pre test	76	3,24	0,82	1,048	.00**
	Post test	76	3,69	0,94		
Problem Solving	Pre test	76	3,09	0,78	3,902	.00**
	Post test	76	4,00	0,97		
Boredom	Pre test	76	3,02	0,61	2,104	.00**
	Son test	76	3,60	0,72		
Total Leisure Education Scores	Pre test	76	3,01	0,58	1,218	.00**
	Post test	76	3,78	0,61		

** p < 0.05 ** p < 0.01*

According to the results of Paired Sample Test - conducted to determine whether pretest and posttest results of LE applications based on play-based teaching method differed - it was found that there was a significant difference between pretest and posttest results in favor of posttest scores ($p < 0.05$). This meaningful difference was found in both the leisure total education scores ($t = 1,218$; $p = 0.00$), and in the subscale awareness ($t = 3,426$, $p = 0.00$), intrinsic motivation ($t = P = 0,00$), time management ($t = 1,048$, $p = 0,00$), problem solving ($t=3.930$, $p = 0.00$) and boredom ($t = 2.104$, $p = 0.00$). According to this data, when the input and output behaviors related to leisure education and its sub-dimensions of the students imposed to play-based teaching method are compared, it can be said that a significant increase is recorded in favor of output behaviors (Table 2).

Table 3. Comparison of Pre-Post Test Scores of the Group (Experiment II) in which Leisure Education was delivered through Lecture-teaching Method

Variable		N	$\bar{X}$	sd	T	p
Awareness	Pre test	79	3,55	0,60	,932	.00**
	Post test	79	3,99	0,61		
Intrinsic Motivation	Pre test	79	4,03	0,65	1,116	.00**
	Post test	79	4,51	0,74		
Extrinsic Motivation	Pre test	79	3,58	0,69	2,066	.03*
	Post test	79	3,89	0,71		
Social Interaction Skills	Pre test	79	3,70	0,68	4,090	.00**
	Post test	79	4,06	0,79		
Time Management	Pre test	79	3,36	0,79	3,125	.00**
	Post test	79	3,89	0,86		
Problem Solving	Pre test	79	2,78	0,82	1,113	.00**
	Post test	79	3,11	0,87		
Boredom	Pre test	79	3,11	0,63	,604	.00**
	Post test	79	3,76	0,78		
Total Leisure Education Scores	Pre test	79	3,12	0,59	3,768	.00**
	Post test	79	3,84	0,67		

** p < 0.05 ** p < 0.01*

According to the results of Paired Sample Test - conducted to determine whether pretest and posttest results of LE applications based on lecture-teaching method differed - it was found that there was a significant difference between pretest and posttest results in favor of posttest scores ($p < 0.05$). This meaningful difference was found in both the leisure total education scores ($t= 3,768$; $p= 0,00$), and in the subscale awareness ($t=,932$; $p= 0,00$), intrinsic motivation ($t= 1,116$; $p= 0,03$), time management ($t= 3,125$; $p= 0,00$), problem solving($t= 1,113$; $p= 0,00$) and boredom ($t=,604$, $p= 0,00$). According to this data, when the input and output behaviors related to LE and its sub-dimensions of the students imposed to play-based teaching method are compared, it can be said that a significant increase is recorded in favor of output behaviors (Table 3).

Table 4. Comparison of Pre-Post Test Leisure Education Score Accesses of Experimental Group I and Experimental Group II

Variable		N	$\bar{X}$	sd	t	p
Awareness	Experimental Group I	76	0,59	0,11	2,979	1.34
	Experimental Group II	79	0,44	0,08		
Intrinsic Motivation	Experimental Group I	76	0,57	0,12	1,546	4.14
	Experimental Group II	79	0,48	0,11		
Extrinsic Motivation	Experimental Group I	76	0,18	0,05	,366	.89
	Experimental Group II	79	0,31	0,06		
Social Interaction Skills	Experimental Group I	76	0,79	0,15	1,398	.00**
	Experimental Group II	79	0,36	0,07		
Time Management	Experimental Group I	76	0,45	0,06	4,028	.76
	Experimental Group II	79	0,53	0,10		
Problem Solving	Experimental Group I	76	0,82	0,14	3,930	.00**
	Experimental Group II	79	0,33	0,05		
Boredom	Experimental Group I	76	0,58	0,11	,104	1.12
	Experimental Group II	79	0,64	0,13		
Total Leisure Education Scores	Experimental Group I	76	0,61	0,14	3,218	.90
	Experimental Group II	79	0,79	0,16		

** p < 0.05 ** p < 0.01*

Determining whether there is a significant difference between the accession values of the total LE score and its sub-dimensions of the students in the experimental group I that leisure education contents were delivered by game based teaching methods and in the experimental group II that contents were delivered by lecture-teaching method; Independent Groups T-Test was conducted and the findings are presented in Table 4. As a result of the statistical analysis, it was found out that there is a meaningful difference between the pretest-posttest access scores of the two groups in favor of the sub-dimensional play-based teaching method (Experiment I) in terms of problem-solving (t=1,398, p= 0,00) and social interaction skills (t= 3,930, p= 0,00). When the pre-test test access averages for the LE total score, awareness, motivation and time management sub-dimensions of Experimental Group I and II groups were examined, no significant difference was found between the two groups (Table 4).

DISCUSSION and CONCLUSION

One of the primary results of this research, which was conducted in order to determine the contribution of the teaching methods to be used in formal leisure education to the improvement of the leisure education level, is that the leisure education provided by both the play-based and the lecture-teaching methods have improved the leisure education levels of the participants. A significant difference between the pre and post test results of both groups leads us to this result. In other words, both methods have generated a positive difference in the leisure education levels of the participants. In support of this finding, Janssen (2004) found a difference in favor of the experimental group in his experiment-control group study, which was designed as an eight-week leisure education program, in favor of both the leisure time habits and the quality of life scores. Searle, Mahon, Iso-Ahola, Sdrolias and Dyck (1995) found that the subjective well-being and life satisfaction scores of the programmed leisure education were higher in favor of the experimental group as a result of their experimental studies. On the other hand, Weber (2010) did not find any significant difference in the pre- and post-

test results of the 10-hour curriculum-based leisure education program that he conducted. The results Weber found can be assumed as a result of a relatively small sample size. In the study, which share great similarities with the sample and the methodology of our research, Caldwell et al. (2004) conducted a curriculum-based leisure education consisted of 6 courses last 50 minutes.

It was also found out that participants' awareness, motivation, social interaction skills and leisure skills increased after LE application. In another study focused on curriculum-based leisure education, it was found that there was a significant difference in favor of the experimental group on variables such as leisure time satisfaction, happiness and active lifestyle (Desrosiers, Noreau, Rochette, Carbonneau, Fontaine, Viscogliosi & Bravo, 2007). Hughes & Keller (1992) also found that leisure education, which applied on caregivers, improved participants' awareness, leisure skills, leisure time resources and communication skills. As a result of the research study, it can be considered that the findings were significant as all five leisure time dimensions covered in the research were developed. The findings are regarded as significant as they can be interpreted in the sense that it is possible to achieve the goals of the targeted leisure education despite the difference in the teaching method used by the instructor.

In the research findings, it was found that both play-based and lecture teaching methods were effective in terms of leisure education, and play-based teaching method was found to be more effective than lecture-teaching method in problem-solving and social interaction skills dimensions when the difference between the two groups' pre-posttest accesses was examined. Since problem- solving and social interaction skills are not only about cognitive and emotional dimensions but related to the kinesthetic dimension, it can be concluded that the play-based teaching method which offers to practice may have been more effective in this context. In support of this finding, Rancourt (1982) stated that he found a meaningful difference in the kinesthetic dimension of the leisure time attitude in favor of the experimental group in the results of the experimental study in which the Mundy Odum Leisure Education Model designed as a three lecture workshop was applied. In the qualitative findings of his experimental research, Weber (2010) pointed out that in the framework of leisure time education themes such as awareness, socialization and leisure time management came to the forefront. It is considered that these themes also support the finding of high social interaction skills and problem-solving scores that are in favor of experimental group I. In particular, it has been observed that leisure education practices for therapeutic purposes have improved leisure skills and problem solving skills in favor of the experimental group (Bedini, Bullock & Driscoll, 1993; Bullock & Howe, 1991).

Sivan and Chan (2012) concluded that the results of the research on students' opinions on leisure education in the classroom environment demonstrated that students find lectures on the proper use of leisure time in the formal classroom environment boring and unable to meet their expectations. Green and Heyne (1997) suggest that well-placed practical leisure education in the school curriculum strengthens the social interaction skills and friendship of the students. It can be said that the play-based teaching method is more effective when it is compared with the pre-test access scores of the lecture-teaching method. This finding may also mean that the teaching method may be a decisive component in reaching the specified goals or in transferring the content of the education to the students. Hey, Lvett, Church and Hey (2016) stated that children-centered teaching methods provide more permanent learning than teacher-centered methods when the instructor play a role as a good observer and control the process. Goldberger, Ashworth and Byra (2012) emphasize the need for teachers to use different teaching methods depending on the learning characteristics of the students, the context and the learning environment.

As a conclusion, it can be argued that that leisure education using that based on play-based and lecture-teaching methods improves the leisure time education levels (leisure literacy). In addition,

play-based teaching method is more effective than the lecture-teaching method on developing social interaction and problem-solving skills. It is thought that the results of this research will shed light on the question and doubts arising from the curriculum-based leisure education, which is carried out in the formal education system in dozens of countries all over the world, regarding the necessity and applicability in Turkey.

Limitations and Recommendations

This research was carried out in the same school as it provides great convenience in terms of implementation. Therefore, including different schools into the research may also reveal differences that may arise from differences between schools. Another limitation of this study is that the curriculum for leisure education is prepared according to Munusturlar (2014). It is believed that the implementation of different leisure education curricula for different applications would also provide important findings.

Sivan (1997) states that successful leisure time education may be possible when a well-planned leisure time curriculum in schools is considered in conjunction with the leisure time experience. For this reason, it is suggested to implement leisure education curriculums planned as elective or compulsory courses in schools primarily. It is suggested that individuals who receive leisure education at younger ages through a planned curriculum should also be provided with well-programmed leisure time opportunities to ensure permanent behavior change. For future research, it is suggested to investigate how to improve leisure literacy through deliberate and unintentional ways of enculturation. It should not be forgotten that leisure is a blessing to achieve happiness and life satisfaction we seek for. When we develop ourselves about how to use leisure time more efficiently, we will have found the formula for happiness and high level of life satisfaction.

References

Bedini, L. A., Bullock, C. C., & Driscoll, L. B. (1993). The effects of leisure education on factors contributing to the successful transition of students with mental retardation from school to adult life. *Therapeutic Recreation Journal*, 27(2), 70-82.

Bullock, C. C., & Howe, C. Z. (1991). A model for therapeutic recreation program for the reintegration of persons with disabilities into the community. *Therapeutic Recreation Journal*, 25(1), 7-17.

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York, NY: Free Press.

Dunn, N. J., & Wilhite, B. (1997). The effects of a leisure education program on leisure participation and psychosocial well-being of two older women who are home-centered. *Therapeutic Recreation Journal*, *30*(3), 197-212.

Caldwell, L.L., Baldwin, C.K., Walls, T., & Smith, E., (2004). Preliminary effects of a leisure education program to promote healthy use of free time among middle school adolescents. *Journal of Leisure Research, 36*(3), 310-335.

Charles, M., Bustard, D., & Black, M. (2009). *Experiences of promoting engagement in game-based learning*. Proceedings of the European Conference on Games Based Learning, 397-403. Retrieved from Education Research Complete Database.

Clark, B.S. & Anderson, D.M., (2011). I'd be dead if I didn't have this class: The role of leisure education in college student development. *Recreational Sport Journal, (35)*, 45-54.

Clark, L.H. ve Starr, I.S. (1991). *Secondary and Middle School Teaching Method*. Macmillan Publishing Company, New York, USA.

Dattilo, J. (1991). Recreation and leisure: A review of the literature and recommendations for future directions. In L. Meyer, C. Peck, & L. Brown (Eds.), *Critical issues in the lives of people with severe disabilities* (pp. 126137). Baltimore: Paul H. Brookes.

Dattilo, J. (2008). *Leisure education program planning: A systematic approach* (3rd ed.). State College, PA: Venture.

Desrosiers, J., Noreau, L., Rochette, A., Carbonneau, H., Fontaine, L., Viscogliosi, C. & Bravo, G., (2007). Effect of a Home Leisure Education Program After Stroke: A Randomized Controlled Trial, *Achives of Physical Medicine and Rehabilitation*, 88, (9), 1095-1100.

Glatthorn, A. A., Boschee, F., Whitehead, B. M. & Bosche, B. F. (2012). *Curriculum Leadership: Strategies For Development and Implementation*. Third Edition, Sage, Washington.

Goldberger, M., Ashworth, S. & Byra, M. (2012). Spectrum of Teaching Styles Retrospective 2012. *Quest*, 64:268–282.

Goodale, T., & Godbey, G. (1988). *The evolution of leisure*. State College, PA: Ventura.

Green, F., & Heyne, L. (1997). Friendship. In S. Schleien, M. Ray, & F. Green (Eds.), *Community recreation and people with disabilities: Strategies for inclusion* (2nd ed.). Baltimore: Paul H. Brookes.

Hemingway, J. (1988). Leisure and civility: Reflections on a Greek ideal. *Leisure Sciences*, *10*, 179-191.

Hey, W., Lovett, M., Church, T. & Hey, D. (2016). Understanding the Intentions of Teaching Styles to Improve Student Learning in Physical Education. *KAHPERD Journal*, 54, (1), 53-65.

Heyne, L.A., & Schleien, S.J. (1996). Leisure education in the schools: A call to action. *Journal of Leisurability*, 23(3), 3-14.

Hughes, S. & Keller, M., J. (1992). Leisure Education: A Coping Strategy for Family Caregivers. *Journal of Gerontological Social Work*, 19, (1), 115-128.

Janssen, M. (2004). The effects of leisure education on quality of life in older adults. *Therapeutic Recreation Journal*, 38(3), 275–288.

Johnson, D. E., Bullock, C. C., & Ashton-Shaeffer, C. (1997). Families and leisure: A context for learning. *Teaching Exceptional Children*, 30, 30-34.

Kaptan S. (1995). *Bilimsel Araştırma ve İstatistik Teknikleri*. Ankara: Tekışık Web Ofset Tesisleri.

Madi, B. (2011). *Öğrenme Beyinde Nasıl Olur*, Efil Yayınevi, Ankara.

Marsh, C. (1992). *Key concepts for understanding the curriculum*. Falmer Press, London.

Mclean, D. D., Hurd, A. R., Roger, N. B. (2008). *Kraus'Recreation and Leisure in Modern Society*. Jones and Bertlett Publishers, Sudbury, Massachusetts.

Mundy, J., (1998). *Leisure education: theory and practice* (2nd ed.). Champagne, Ill., Sagamore.

Mundy, J., & Odum, L. (1979). *Leisure education: Theory and practice*. New York: John Wiley & Sons.

Munusturlar, S. (2014). *Boş Zaman Eğitiminin Benlik Saygısı ve Öznel İyi Oluş Üzerine Etkisi.* Yayınlanmamış Doktora Tezi, Anadolu Ünıversitesi, Sağlık Bilimleri Enstitüsü, Beden Eğitimi ve Spor Anabilim Dalı, Eskişehir, Türkiye.

Munusturlar, S. & Bayrak, C. (2016). Developing the Leisure Education Scale. *World Leisure Journal*, DOI: 10.1080/16078055.2016.1251489, 1-20., 14/11/2016.

Paris, C. & Gespass, S. (2001). Examining the mismatch between learner-centered teaching and teacher-centered supervision. *Journal of Teacher Education*, Vol. 52, No. 5, November/December, 398-412.

Prensky, M. (2001). *Computer games and learning: Digital game-based learning*. In J. Raessens, & J. Goldstein, Handbook of computer game studies (s. 97- 122). Cambridge: The MIT Press.

Rancourt, A. M. (1982). *The Mundy-Odum Leisure Education Model: Changing leisure attitude and leisure knowledge* (Unpublished Doctoral dissertation; Retrieved from ProQuest Dissertations & Theses, PQDT). Florida State University, Tallahassee, FL.

Ruskin, H., & Sivan, A. (2002). *Leisure education in school systems.* Jerusalem: Magness Press.

Searle M. S., Mahon M. J., Iso-Ahola S. E., Sdrolias H. A., van Dyck J., (1995). Enhancing a sense of independence and psychological well-being among the elderly: A field experiment. *Journal of Leisure Research*, 27:107-124.

Sharma, P. L. (2005). *Discovery Teaching and Learning*. Sarup& Sons, New Delhi.

Sivan (1997): Recent Developments In Leisure Education Research And Implementation, *World Leisure & Recreation*, 39 (2), 41-44.

Sivan, A., (2007). Educating for leisure. In E. Cohen-Gewerc & R. A. Stebbins (Eds.), *The pivotal role of leisure education: Finding personal fulfillment in this Century* (pp.51-62). Pennsylvania: Venture Publishing.

Sivan, A. (2008). Leisure education in educational settings: From instruction to inspiration. *Society and Leisure*, 31(1), 49-68.

Sivan, A. & Chan, D. W. K. (2012): Leisure education in schools from students' perspectives: the case of Hong Kong, *World Leisure Journal*, 54:1, 26-37.

Sivan, A. (2014). Leisure education and the role of schools : Planning and implementation in times of change. *African Journal for Physical Health Education, Recreation and Dance*, , 20, (4), 1524-1536.

Stumbo, N. J. & Peterson, C. A. (2004). *Therapeutic recreation program design: Principles and procedures (3rd. Ed.)* San Francisco: Pearson.

Tan, L. (2011). Comparison of PBL and The Traditional Teaching Method in The Teaching of Economics. In D. Jin & S. Lin (Eds.), *Advances in Computer Science, Intelligent System and Enviroment* (pp.565-572). Springer-Verlag Berlin Heidelberg.

Tanner, D. & Tanner, L. (2007). *Curriculum development : theory into practice* (4th ed.). Upper Saddle River, N.J. : Pearson/Merrill Prentice Hall.

Theeboom, M. & Bollaert, L. (1987). Leisure Education and the School. European Journal of Education, 22, (3/4), pp. 299-308.

Torkildsen, G. (1992). *Leisure and recreation management* (3rd ed.). London: E&FN Spon: An Imprint of Chapman & Hall

Van Oers, B. & Duijkers, D. (2013). Teaching in a play-based curriculum: Theory, practice and evidence of developmental education for young children, *Journal of Curriculum Studies*, 45:4, 511-534, DOI: 10.1080/00220272.2011.637182

Vygotsky, L. S. (1997). *Educational psychology*. Boca Raton, FL: St Lucie Press.

Weber, M. F. (2010). *A leisure education program for postsecondary students with intellectual disabilities* (Unpublished master's thesis; Retrieved from All Theses at Tiger Prints) Clemson University, South Carolina.

Weimar, M. (2013). *Learner-Centered Teaching: Five Key Changes to Practice*. 2nd ed. San Francisco: Jossey-Bass. ISBN: 9781118119280

WLRA, (2001). World Leisure and Recreation Association International Position Statement on Leisure Education and Youth at Risk, Leisure Sciences: *An Interdisciplinary Journal*, 23:3, 201-207.

Zin, N. A., & Yue, W. S. (2009). *History Educational Games Design*. 2009 International Conference on Electrical Engineering and Informatics (s. 269-275). Selangor, Malaysia.