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THE ANALYSIS OF THE CREATIVITY AND DECISION MAKING ABILITIES OF UNIVERSITY STUDENTS ACCORDING TO SOME VARIABLES

ABSTRACT

In this study it is aimed to analyze the creativity and decision making abilities of chess sportsmen according to gender, department and NPD (National Power Degree) score. For this reason, 107 university chess sportsmen of whom are 81 male 26 female have attended to research and The Creativity Scale (Kirton, 1976) and Melbourne Decision Making scale I- II (Man and Ark, 1998) have been used in this study. The creativity abilities of chess sportsmen have been analyzed via ANOVA test for department, and T Test for gender and NPD score. The decision making abilities have been tested via single optioned MANOVA analysis for the three variables. At the end of this study a meaningful discrepancy couldn't be found for the variables gender ($t_{(105)}=1.013$, $P>0.05$), NPD score ($t_{(105)}=1.060$, $P>0.05$) and department ($f_{(1,235)}=0.501$, $P>0.05$) for creativity abilities of students. However, while it has been reached to meaningful results for the purpose of gender they are attentive, prudent and sub-dimension of panic (Wilks Lambda =.887; $F_{(4,102)}=3.253$; $P<0.05$), and for the purpose of department they are prudent ($F_{(2,104)}=3.235$; $P<0.05$), meaningful results could not be ascertained for NPD score (Wilks Lambda =.987; $F_{(4,102)}=0.329$; $P>0.05$).

As a result it can be said that the creativity abilities of chess sportsmen do not change according to gender, department and NPD score. In terms of decision making, it can be claimed that while males are more attentive, females are quick for solution, and the students from social and human sciences hold over their decisions than the students of technical sciences, and the experience is not an effective tool In terms of decision making.

Key words: Chess, Creativity, decision making.

ÜNİVERSİTE SATRANÇ SPORCULARININ YARATICILIK VE KARAR VERME BECERİLERİNİN BAZI DEĞİŞKENLER GÖRE İNCELENMESİ

ÖZET

Bu çalışmada satranç sporcularının yaratıcılık ve karar verme becerilerini cinsiyet, bölüm temel bilim alanı ve UKD (Ulusal Kuvvet Derecesi) puanı değişkenlerine göre incelenmesi amaçlanmıştır. Bu amaçla araştırmaya 81 erkek, 26 bayan olmak üzere 107 üniversite satranç sporcusu katılmıştır. Araştırmada Yaratıcılık Ölçeği (Kirton, 1976) ve Melbourne Karar Verme Ölçeği I-II (Man ve ark, 1998) kullanılmıştır. Satranç sporcularının yaratıcılık becerileri cinsiyet ve UKD puanı için T testi ile bölüm temel bilim alanı ANOVA testi ile analiz edilmiştir. Karar verme ölçeğinde ise üç değişken için tek yönlü MANOVA analizi ile test edilmiştir. Analiz sonucunda öğrencilerin yaratıcılık becerileri için cinsiyet ($t_{(105)}=1.013$, $P>0.05$), UKD puanı ($t_{(105)}=1.060$, $P>0.05$) ve bölüm temel bilim alanı ($f_{(1,235)}=0.501$, $P>0.05$) değişkenleri açısından anlamlı farklılık bulunamamıştır. Ancak Karar verme becerilerinde cinsiyet açısından dikkatli, kaçınan ve panik alt boyutlarında (Wilks Lambda =.887; $F_{(4,102)}=3.253$; $P<0.05$), bölüm temel bilim alanı açısından kaçınan karar verme ($F_{(2,104)}=3.235$; $P<0.05$) alt boyutunda anlamlı sonuçlara ulaşılanırken, UKD puanı için anlamlı sonuçlar tespit edilememiştir (Wilks Lambda =.987; $F_{(4,102)}=0.329$; $P>0.05$).

Sonuç olarak, satranççıların yaratıcılık becerilerinin cinsiyet ve bölüm temel bilim alanına ve UKD puanına göre değişmediği söylenebilir. Karar verme açısından ise erkeklerin daha dikkatli karar verirken, kadınlar daha çabuk çözüme yönelik oldukları, sosyal ve beşeri bilimler öğrencilerinin teknik bilimlerdekilere göre kararlarını daha çok erteledikleri ve karar verme açısından tecrübenin bir etkisinin olmadığı söylenebilir.

Anahtar Kelimeler: Satranç, Yaratıcılık, Karar verme.

INTRODUCTION

There are many positive things that chess gives to individual. For instance it redoubles the one's discerning power, intelligence, self confidence, teaches to analyze and make synthesis, brings to light one's creative aspect, instructs being imperturbable ; improves will power, memory and logical thinking and sets up environment for successes relying on both artistic creativity and performance. Concerning the chess as a simple game is a mistake. As the great masters say "chess is a sport, science and art" (Dalkıran, 1995).

According to another definition, the chess can give various properties to individuals. The things such as focusing on success, time management, concentration, planning and..etc. can be related to chess. In addition it can be a tool that can cure the physiological problems that occur in individuals. Because chess is amongst the illustrious games that can work on its own, solve the problems, analyze and is far from the monotony, hosting many beauties (Kulaç, 2006)

Problem solving is to reach a concrete result and consciously looking for a proper action and to gain the desired outcome (Polya, 1978). Problem solving needs struggling and finding tools to reach these purposes (Senemo lu, 2007). Problem is an indeterminate or indefinite circumstance. Problem is also a complicity that is desired to be dispelled and the individual has an interaction with this condition (Aksu, 1985). However Kneeland (2001) has defined it as the difference between the requisite and the current situation.

The creativity comes from Latin word "creare". This word means "to breed, to originate, to bring forth" (San, 1985; Korkmaz et al., 2002). Creativity is a term that does not have a certain universal meaning. However, it is observed that the definitions, which researchers variously do, come closer on some basic points. The researchers who were engaged with in this

term improved various models with psycho analytic, behavioral, humanistic, cognitive and interactive approaches, but the dimensions of creativity, its characteristics and the distribution of these features could not be generated objectively (Sonmaz, 2002).

Decision making can be couched as uncertainty of information or the concerns about choices of one's, or with both of them . (Tenenbaum ve Bar-Eli, 1993; Transferred by Satman, 2005). The decision making is a dynamical process and the individual plays active role in this process. Decision making is a dynamic process and the individual plays an active role in it. The individual makes a complicated data collection research, receives response from his or her environment in an increasing way, investigates some data in detail, charges off some information and makes some future planning (Daft, 1994). The values emphasize the importance of object, event and ideas in terms of society, class and individual. Moving from this point of view, values influences the decision maker in a way of routing and binding during decision making process. If this process is inserted in a frame of value, the thoughts and ideas of us are systematized to a degree (Bursalıoglu, 2005).

METHOD

Population of the Research

The students who joined Turkey University Chess Tournament Championship, held in 2011 in Denizli city, Pamukkale University, makes up this research's participants. 81 male ($M_{age} 21,57 \pm 2.07$) and 26 female ($M_{age} 20,88 \pm 1.56$), in total 107 students from various departments have participated in this research.

Model of the Research

The research has been done in the frame of descriptive survey model. The characteristics of University students, who participated in Chess Championship, were

analyzed. It has been reached to the participating students via using the appropriate sampling method. Sampling method is a sampling type, made up with the attainable individuals for the research (Fraenkel and Wallen, 1990).

Data Collection Tool

Data collection tool is made up with 3 parts in the research. The first part is made up by demographic data that are age, class, and department and NPD scores.

In the second part there is Adaptation-Innovation Inventory (KAI), which was improved by KIRTON, M.J. (1976). This scale has been improved to measure creativity, problem solving and cognitive style differences related to decision making (Bagozzi & Foxall, 1995). Their validity and reliability have been tested with many studies. One of these studies is Bagozzi and Foxall's (1995) studies. It has been reported KAI scale of the validity, which is made up with 32 matters, between 0.65 and 0.86, in their studies in three different countries. The Turkish translation of this research has been used in the researches and emphasized the validity was proved (Cenzgizhan, 1997). The assessment has been done via using 5-point Likert scale, consisting of "totally disagree, disagree, undetermined, agree and totally agree" matters. It was reached to the total creativity scores, related to individuals problem solving, via assessing the total scores, used in this research.

When it is looked from (KAI) scale to scores it can be claimed that between 32-79 is the lower level creative group; between 80 – 112 is medium level; between 113-160 is higher level creative group.

In the third part there is Melbourne Decision Making Questionary, which was improved by Mann and his friends (1988) was adopted to Turkish and the validity and reliability study was done by Deniz (2004).

The validity and reliability studies of Melbourne Decision Making Questionary I-II (MDMQ) were done upon Selçuk University

Technical Education Faculty, Computer Systems Teaching and Automotive Teaching students of second grade in 2002 – 2003 Academic Year and data was collected from 154 students (Deniz, 2004).

Melbourne Decision Making Questionary divides two parts. 1st part aims to determine the self esteem in decision making. It consisted of six matters and while the three matters are scored straight, the others are scored inverse. The answers, which were given to scoring matters, are scored like that: "Correct" is 2 points; "Sometimes correct" is 1 point, "Incorrect" is 0 point. The maximum point that can be got from the questionnaire is 12 points. The higher points are the demonstration of self esteem in decision making process. However, second part is consisted of 22 matters and it strengthens decision making styles. It has 4 sub-factors (Deniz, 2004).

1. Careful Decision Making Style: it is the condition that the individual's making choice after searching for necessary information and carefully assessing the alternatives before making decision. This factor is signified in six matters (2, 4, 6, 8, 12, 16).

2. Prudent Decision Making style: It is the condition of the abstention of an individual and his or her tendency to leave the decision making to others, so giving the responsibility to them and escaping decision making. This factor is signified in six matters (3, 9, 11, 14, 17, 19).

3. Postponing Decision Making Process: It is a condition of the individual's constantly postponing, delaying and procrastination without any reason. This factor is signified in five matters (5, 7, 10, 18, 21).

4. Panic Decision Making Process: It is a condition of the individual's attaining effort to quick solutions with performing hasty behaviors, feeling him or herself under time pressure when he or she is exposed to a decision making condition. This factor is signified in five matters (1, 13, 15, 20, 22).

Analysis of the Data

Firstly, missing value, exceptional value, normalcy, multiple connection and homogeneity assumptions were overviewed for the assessment of data that was gathered via the scales that were used in the research. Also it was assumed that the sampling generated normal distribution according to central limit theory. Although the adequate size is not certain for sampling volume, in practice it is accepted as n 30 unit (Fischer, 2011). In later phases whether the scales show difference according to the Chess sportsmen's gender, department and NPD (This is a 4 step scoring system in which they complete successfully the steps at chess academy or

according to their performances at competitions). Considering the score types it was searched whether the scores of scales show diversity or not. While t-test was done for the creativity of individuals related to problem solving for NPD score and gender, unilateral variation analysis was done for the department. Unilateral Manova analysis was done for three variation in the decision making scale. Co-variational equation was elicited before to pass to analysis. The significance level was accepted as minimum 0.05 for all gathered statistical results.

FINDINGS

Average and standard deviation values, gathered for the individuals' creative scale

relate to the problem solving, and unrelated t-test results are presented in Table 1 according to the genders of students that participated to intercollegiate Chess championship

Table 1. The Comparison of students' Creative Scale scores according to gender and NPD variation.

	Gender	N	Average	ss	t	df	sig
Creativity	Male	81	115.48	18.07	1.013	105	0.313
	Female	26	111.23	20.30			
	With NPD	65	115,98	17,12	1.060	105	0.292
	Without NPD	42	112,07	20,75			

While male students, who participated in intercollegiate Chess championship, are holding a place in higher level creative group, gathering average 115, 48 points according to gender variable, female students are standing in medium level creative group, gathering 111,23 points. Depending on this result, there could not be a significant difference between the scores of male and female students at the end of the t-test ($t_{(105)}=1.013$, $P>0.05$), (Table 1).

According to NPD score variable, while the students who has NPD, gathered an average score of 115.48 in the higher level, the ones who did not have NPD got a medium level degree with the score of 112.07. There could not be found a significant difference between the scores of students with NPD and without NPD for the problem solving, at the end of t-test result that was done depending on this conclusion ($t_{(105)}=1.060$, $P>0.05$), (Table 1).

Table 2. The Comparison of scores according to department variable

	Department	N	Ort.	ss	F	sig	Significance
The creativity for the problem solving	Social - Human Sciences	55	117,19	17,17	1,235	0,295	p>0.05
	Science-Health Siences	12	111,44	22,92			
	Technical Siences	40	111,57	19,11			
	Total	107	114,45	18,63			

According to department variable, while the students, participating in intercollegiate Chess championship, who are studying literary, social and administrative sciences, were the higher level creative group with the average score (117.19), the students of science, Mathematics and health science

(111.57) and the students of technical sciences (111.57) were the lower level degree. Depending on this result, there could not be found a significant difference in the class variable at the end of unilateral variation analysis ($f_{(1,235)}=1.235$, $P>0.05$), (Table 2)..

According to interest level variable, average standard deviation values for

ADBF scale and unilateral Manova results are presented in Table 3.

Table 3. According to interest level variable , Decision Making Scale Average Standard Deviation Values and Unilateral MANOVA Results

	Gender	N	Avr.	ss	F	sig	
gender	Careful decision	Female	81	12,05	1,70	8,718	0,04
		Male	26	13,11	1,21		
	Prudent decision	Female	81	11,95	1,74	1,871	0,17
		Male	26	12,46	1,33		
	Postponing decision	Female	81	8,95	1,43	3,895	0,51
		Male	26	9,57	1,30		
Panic decision	Female	81	10,44	1,27	7,299	0,08	
	Male	26	9,88	1,02			
Department	Careful decision	Social - Human Sciences	55	12,55	1,75	2,003	0,140
		Science-Health Sciences	12	12,58	1,73		
		Technical Sciences	40	11,90	1,45		
	Prudent decision	Social - Human Sciences	55	12,44	1,50	3,235	0,043
		Science-Health Sciences	12	12,08	1,51		
		Technical Sciences	40	11,58	1,82		
	Postponing decision	Social - Human Sciences	55	9,22	1,44	0,406	0,668
		Science-Health Sciences	12	9,08	1,08		
		Technical Sciences	40	8,95	1,52		
	Panic decision	Social - Human Sciences	55	10,14	1,19	2,470	0,089
		Science-Health Sciences	12	9,75	,97		
		Technical Sciences	40	9,58	1,38		
NPD	Careful decision	With NPD	65	12,33	1,62	0,015	.0902
		Without NPD	42	12,29	1,73		
	Prudent decision	With NPD	65	12,03	1,59	0,115	0,735
		Without NPD	42	12,14	1,79		
	Postponing decision	With NPD	65	9,03	1,45	0,420	0,519
		Without NPD	42	9,21	1,41		
	Panic decision	With NPD	65	9,80	1,20	0,748	0,389
		Without NPD	4	10,02	1,		
		2		35			

According to gender variable, the unilateral manova test results, that were done upon the students' scores of "careful, prudent, panic" sub dimensions, demonstrate that male and female students show significant difference in terms of decision making abilities (Wilks Lambda =.887; $F_{(4,102)}=3.253$; $P<0.05$). This finding shows that the scores, gathered from linear component, which was made up from

obsessive and consistent scores, change depending on gender variable.

At the end of this analysis, it was determined that there was an undergo for the benefit of males ($F_{(1,105)}=8.718$; $P<0.05$) in the matter of careful decision making and for the benefit of females ($F_{(1,105)}=7.299$; $P<0.05$) in the matter of panic decision making. Whether the students

being male or female in the sub dimensions of prudent decision making ($F_{(1,105)}=1.871; P>0.05$) did not change their these abilities.

As it is seen Table 3, according to department variable, the unilateral manova results displayed that there was no significant difference in terms of sub dimensions of decision making the students, studying at Social - Human Sciences, Technical Sciences and Science-Health Sciences (Wilks Lambda =.909; $F_{(8,202)}=1.233; P>0.05$).

The standard deviation values and the average of scale, related to the 4 sub dimensions, and the variation analysis results, done at the level of sub dimension

according to department, are displayed in Table 4. While there was a significant difference ($F_{(2,104)}=3.235; P<0.05$), at the sub level of prudent decision making, there could not be found a significant difference between the scores of careful decision making ($F_{(2,104)}=2.003; P>0.05$), postponing decision making ($F_{(2,104)}=0.406; P>0.05$) and panic decision making ($F_{(2,104)}=2.470; P>0.05$).

When the table 3 analyzed, it can be observed that the unilateral manova results prove there is no difference between the students with NPD or without NPD according to NPD score variable (Wilks Lambda =.987; $F_{(4,102)}=0.329; P>0.05$).

DISCUSSION AND CONCLUSION

According to gender variable while male students, who participated in intercollegiate Chess championship, are holding a place in higher level creative group, gathering average 115, 48 points, female students are standing in medium level creative group, gathering 111,23 points. At the end of t-test, which was done depending on this result, there could not be found a significant difference between the creativity scores of male and female students related to the problem solving ($P>0.05$). In the mental performance, the superiority of male sportsmen to female sportsmen, came out as more high in their studies, which was done upon 250 thousand chess sportsmen, took more than 13 years related to gender difference (Chabris and Glickman (2006). Only 1 % of great chess masters are female in the world. According to Charness and Gerchak (1996), the numbers of best male and female players are equal, but the participating rates are different. However Howard emphasizes that the gender difference cannot be explained with social factors, although the encouragement and giving the chance to females to take part in competitions, this difference continues (Howard, 2005).

When it is looked at to the studies in terms of gender, generally the studies that had been done upon the differences of chess sportsmen were about the performance and scoring points. The differences, arising in these studies, were tried to be explained with participating rates and also mental performance. There is a parallelism between the findings of this study and Charness and Gerchak's (1996) and Howard's (2005), Chabris and Glickman's (2006) gender variable research findings, done related to the cognitive effect of chess game.

According to department variable, the data, gathered from the students, who participated intercollegiate chess championships, displayed that there was no change in terms of creativity. Yaman (2005) evaluated the effect of problem based teaching approach on the creative thinking levels of teacher candidates, in the study of "The Effect of Problem Based Teaching Approach on The Ability of Creative Thinking in Science Teaching. In the research, Torrence Creative Thinking Test, which was improved by Torrance (1962) was used as a data collection tool. It was analyzed in the research whether there was a significant difference or not in the before

and after the application, in the creative thinking levels of students according to their gender and the types of high schools, which they graduated from. At the end of the application, it was observed that the creative thinking levels of the teacher candidates in test group was more improved the ones in control group. These results demonstrated that The Problem Based Teaching Approach improved creative thinking better than the conventional teaching methods. These results display a parallelism with the research findings that we did.

According to NPD scores of individuals related to problem solving in the intercollegiate chess championships, while the students with NPD, gained a higher level with the score of 115.48, the ones without NPD score, gained a medium level with the score of 112.07. At the end of t-test that was done depending on this result, there could not be found a significant difference between the scores of students with or without NPD, in point of Problem solving ($P>0.05$).

According to gender variable, the unilateral manova test results, that were done upon the students' scores of "careful, prudent, panic" sub dimensions, demonstrate that male and female students show significant difference in terms of decision making abilities ($P<0.05$). This finding shows that the scores, gathered from linear component, which was made up from obsessive and consistent scores, change depending on gender variable.

At the end of this analysis, it was determined that there was an undergo for the benefit of males ($P<0.05$) in the matter of careful decision making and for the benefit of females ($P<0.05$) in the matter of panic decision making. Whether the students being male or female in the sub dimensions of prudent decision making ($P>0.05$) did not change their abilities. Although there could not be gained a

significant result in the sub dimensions of postponing decision making ($P>0.05$), it can be observed that the average scores of females differed at a significant degree from the scores of males. Moving from this point of view, it can be said that the female students show an attitude devoted to constantly postponing, and holding in delay without any reason more than males.

"As a result, while male students head towards to decision making after searching for necessary information and assessing alternatives (careful decision making), the female students head to quick solutions, feeling themselves under time pressure, (panic decision making) when they are exposed to the decision making process." When we look at the studies, done in the other fields, it can be seen that Leaper (1998) searched whether there was a difference or not during the decision making process between with the same gender friendships and the friendships of different genders. For this reason 146 university students, between the ages of 18-25, 25 (female- female), 24 (male – male) and 24 (female – male) participated in this research. It was cared that there would not be an emotional and sexual relation between the couples, who joined to the study. According to research result, there was not a significant difference during the decision making process between with the same gender friendships and the friendships of different genders. These results display a parallelism with the research findings that we did.

According to department variable, unilateral Manova results displayed that there was no significant difference in terms of the sub dimensions of students' decision making, who were studying at social and human sciences, science and math and technical sciences ($P>0.05$). This finding shows that the scores that can be gained from the linear component, made up with the scores of sub dimensions of careful, prudent, postponing and panic decision

making, do not change depending department variation.

The results of variation analysis, which was done in terms of decision making sub dimensions, according to department condition and the average and the standard deviation values, related to sub dimensions of the scale, were displayed. According to this, while there was a significant difference at the sub dimensions of prudent decision making ($P < 0.05$), there could not be found a significant difference between the scores of the careful decision making ($P > 0.05$), postponing decision making ($P > 0.05$), and panic decision making ($P > 0.05$). As a result it can be said that the students, studying at social and human sciences are prudent, and trying to escape from the process of decision making, leaving it to others, when compared to the students, studying technical sciences.

According to NPD score the unilateral manova results expressed that there was no significant difference between students with NPD and without NPD in terms of sub dimensions of decision making ($P > 0.05$). Dauvergne (2000) reached to the results that chess strengthen the problem solving abilities with teaching how difficult to make abstract and free decisions, in his study, in which he analyzed educational and psychological researches to emphasize the advantages of chess learning and playing for children. And also he added that chess enabled the quick and flawless decision practice under time pressure. According to research results chess teaches to choose the best one from many choices and to think how logical and effective. As a result, it shows the importance of flexible planning, concentration and the results of decisions to individuals.

De Groot (1946; Transferred by Gobet and Charness, 2006) used a sampling, consisted of 5 great master and 5 masters in his research, in which he analyzed the chess players' thinking behaviors. He

asked from the participants to think loudly when choosing next move. During the research, the both same level chess players made a similar research and thought about same positions and suggested similar amount of moves. However the great masters chose better moves than the masters, and produced faster moves, reached a decision more faster and during their research analyzed appropriate moves and move serials.

Another study that gave similar results was done by Calderwood, Klein and Crandall (1988). They compared the quality of the chess masters' and more lower level players' moves, in the normal timed chess game rules and fast chess games tournaments, in their research, named as "The Time Pressure at Chess, The Quality of Move and Ability". The research findings displayed that the masters could make quite well decisions (5 seconds per move), even under time pressure.

Klein, Wolf, Militello and Zsombok (1995) tested the assumption of the people's, who were successful at decision making, first choices were satisfactory ones, so they did not have to produce more choice, in their research, named "The Features of Successful Choice Produce in Chess". The sampling, consisting of 16 chess players, was grouped higher and medium levels. Four different chess positions were presented and asked from the players to mention saying the all the moves that they thought no matter how weaker they were. It was observed that only some of the playable moves were worth to play, however most of the first moves were quite well ones. These results displayed that the decision makers could move deeper research rather than wider, depending on their abilities of producing choices suitable to their first thought moves. These results show parallelism with the study findings of us.

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