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The relationship between athletic mental energy and eating behaviors in tennis players

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Abstract. *Study Objectives:* The study aim of this study was to investigation of the relationship between athletic mental energy and eating habits in tennis players. *Methods:* 335 tennis players with a mean age of 20.93 ± 4.26 and a mean sports age of 9.50 ± 2.25 years participated in the study. The Athletic Mental Energy Scale (AMES) and Eating Habits Questionnaire (EHQ) were used in the study. AMES was developed by Lu et al. (2018) and adapted to Turkish language by Yıldız et al. (2020). AMES consists of 18 items and 6 sub-dimensions and was evaluated as 6 likert-type. First and second level confirmatory factor analyses were examined for construct validity of the scale. Internal consistency coefficients were calculated for reliability assessment, and item-total test correlations were also examined to determine internal consistency. The Eating Habits Questionnaire, adapted by Mahmoud and Taha (2017), was a likert-type scale with five options. SPSS 21.0 package program was used for the analysis of the data obtained. Independent Samples T-test for binary comparisons and One-Way ANOVA for multiple comparisons were applied for research analysis. The analysis of the data was evaluated at a 95% confidence interval and a significance level of $p < 0.05$. *Results:* it was determined that there was a significant difference in confidence and calmness sub-dimensions of male tennis players in AMES according to gender, but no significant difference was found in eating habits. It was determined that 330 (98.5%) of the tennis athletes had a neutral nutritional habit. No significant difference was found in AMES and eating habits according to the number of training days. Conclusion: we can say that there was a positive relationship between eating planning and non-fatigue energy in tennis players.

Keywords: Athletic Mental Energy, Eating Behaviors, Tennis Player

Introduction

Energy is very important for man and exists in nature in various forms. In Mental Energy this arises from various forms (1). Mental energy is defined as the ability to think productively about a problem and persist for a long time, to focus attention, avoid distractions, persist in seeking a solution. Mental energy is an important determinant of performance and success (2). Success in different disciplines is based on the ability to work tirelessly for a long time. Research is needed to define and measure mental energy, which is the basis of this skill, on a scientific basis like other types of energy. Cook and Davis (2006) defined mental energy as the ability to think efficiently about a problem for a long time, to focus his attention, to insist on seeking solutions by preventing distractions, and stated that it is an important determinant for success. He stated that the success of successful individuals in different sciences and disciplines lies in their ability to work for a long time without getting tired or distracted on the subject they work on, and in this context, he stated that the source of intellectual success is the sum of mental ability and mental energy. He also described it as surprising that a method and standard for the evaluation of mental energy was not developed (3).

The concept of mental energy draws attention in exercise and sports psychology studies. It is stated that the pyramid, which is the source of the athlete's performance, is based on an energy structure, and this pyramid, which rises on the base of physical energy, contains emotional and mental energy layers, respectively (4).

Athletic mental energy is an athlete's perception of his current energy state. This perception can fluctuate suddenly, affected by psychological changes and experiences. At this point, nutrition can act as an important catalyst. Athletic mental energy allows athletes to make physical and mental effort in sports activities for a long time. It is important for athletic performance and sportive success because athletes use mental energy (1).

The field that deals with the concept of mental energy most and where studies are made is the science of nutrition. Studies have been conducted to improve mental energy and reports have been published showing that it improves (5,6). Even a nutritional supplement called Mental Energy Formula is on sale. It has been stated that this dietary supplement benefits "feeling better, thinking more clearly, higher mental alertness". It is depicted with a model that includes motivation, cognition and energy mood components within the mental energy. Apart from these components, it is also stated that it can be affected by factors such as genetics, health status, nutritional level, age, sleep and pain. (7).

A mental energy model that includes motivation, cognition and energy mood components has been put forward by nutrition scientists. It has been reported that it can also be affected by factors such as genetics, health status, nutritional level, age, sleep, and pain (7). Nutrition is an important component of advanced training and competitive performance for athletes. There is a parallel relationship between eating habits and performance. This relationship is based on providing energy balance with nutrition (8).

Sports nutrition should be planned properly. Balanced individualized nutritional needs according to the gender, age and physical activity status of the athlete and according to the sport branch, training and competition periods (9). Adequate and balanced nutrition is an important part of the sport for young athletes to maintain optimal growth and development as well as performance. What, when, and how young athletes eat and drink before, during and after training and matches to optimize performance (10).

Eating habits can cause irregular eating, which can lead to eating disorders, obesity, or a combination, depending on different motivational factors. It is known that eating behaviors differ according to the following. Positive or negative emotional states (11). Different foods can have different effects on an individual's mood. Foods high in carbohydrates are known to improve mood, stress-reducing aspects, and the boosting effects of protein on serotonin (12).

Unlike other branches of tennis; It is an interval sport with short duration, high intensity, repetitive movements that requires the use of anaerobic skills such as speed, agility and power together with high aerobic abilities, and at the same time, it is a skill-based branch that requires attention, concentration and coordination. It creates various difficulties that may affect the athlete's preparation, performance, and recovery time, and requires a special nutrition program for the athlete (13). In this context, it is thought that this study will contribute to the understanding of the concept of athletic mental energy (1) which is important for sportive success. For this purpose, in this study, the relationship between athletic mental energy level and eating behaviors was examined within the framework of tennis players at different levels.

Materials and Methods

Subjects

A total of 335 tennis players with a mean age of 20.93 ± 4.26 and a mean sports age of 9.50 ± 2.25 years participated in the study. All participated play tennis clubs in Turkey and will voluntarily participate in this study. In determining the research group, convenience sampling method, one of the random sampling methods, was used.

Collection of Data

Athletic Mental Energy Scale (AMES)

The AMES was developed by Lu et al (2018) and adapted to Turkish language by Yıldız et al (2020)

(1,14). The AMES consists of 18 items and 6 sub-dimensions and was evaluated as 6 likert-type. The internal consistency coefficient of the scale is given as .91. Cronbach Alpha internal consistency coefficient obtained from the data set used in the study was determined as .89 (1,15). High scores on the scale indicate a high perception of athletic mental energy. The sub-dimensions of the AMES are vigor, confidence, motivation, tireless, concentration and calmness (composed). The Cronbach Alpha coefficients for the original scale were 0.75; 0.82; 0.86; 0.89; 0.87; 0.90, respectively (1).

Eating Habits Questionnaire (EHQ)

A five likert-type scale was applied for their eating habits, adapted by Mahmoud and Taha (2017) (15). The scores of 'Often', 'Usually', 'Sometimes', 'Rarely' and 'Never' varied between 1 and 5. The scale includes 13 items unhealthy food habits (scores 13 to 65), 9 items eating healthy food (scores 9 to 45), 8 items Following healthy eating habits (scores 8 to 40), 7 items planning for eating healthy food (scores 7 to 35). The total scores of the eating habits scale were 37x5=185 points. The points were classified as followed: Scored between 37-86: unhealthy food habits, Scored between 87-135: specified neutral eating habits (meaning that the healthy eating habits and the unhealthy food habits are equal), Scored between 136-185: ranges between the specified healthy eating habits. Support was received from a specialist dietitian in the data analysis of this inventory.

Statistical Analysis

SPSS 21.0 package program was used for the analysis of the obtained data. Percentage and frequency distributions of the data obtained from the scales were determined. After determining the normality and homogeneous distribution of the data obtained from the athletic mental scale and the nutritional habits scale, it was observed that the data showed a normal distribution, and as a result, the Independent Samples T-test for binary comparisons and One-Way ANOVA for multiple comparisons were applied for research analysis. The analysis of the data was evaluated at a 95% confidence interval and a significance level of $p < 0.05$.

Results

As seen in Table 1, a significant difference was found in confidence and calmness sub-dimensions of the AMES according to the gender variable ($p < 0.05$). It was seen that this difference was in favor of male tennis players.

Table 1. Independent Samples Test Results of the AMES according to Gender Variable

Dimensions	Gender	N	Mean	SD	t	p
Vigor	Female	168	13.76	1.980	.482	.630
	Male	167	13.66	1.941		
Confidence	Female	168	14.39	1.982	-2.107	**.036***
	Male	167	14.84	1.886		
Motivation	Female	168	13.08	1.924	1.589	.113
	Male	167	12.72	2.133		
Tireless	Female	168	11.08	3.000	-.647	.518
	Male	167	11.29	2.944		
Concentration	Female	168	6.65	1.799	1.198	.232
	Male	167	6.41	1.801		
Composed	Female	168	10.10	3.326	-2.154	**.032***
	Male	167	10.84	2.925		
AMES Total Score	Female	168	69.07	6.374	-1.062	.289
	Male	167	69.77	5.691		

*p<0.05

Table 2. Independent Samples Test Results of the EHQ according to Gender Variable

Dimensions	Gender	N	Mean	SD	t	p
Unhealthy food habits	Female	168	36.25	3.270	.739	.460
	Male	167	36.00	2.941		
Eating healthy food	Female	168	27.10	3.263	-.518	.605
	Male	167	27.28	2.845		
Following healthy eating habits	Female	168	24.36	2.527	1.452	.148
	Male	167	23.96	2.523		
Planning for eating healthy food	Female	168	21.34	2.794	.328	.743
	Male	167	21.25	2.530		
EHQ Total Score	Female	168	109.05	6.987	.779	.436
	Male	167	108.48	6.482		

As seen in Table 2, no significant difference was found in the sub-dimensions and EHQ total score according to the gender variable (p> 0.05).

As seen in Table 3, 330 (98.5%) of the tennis athletes were found to be a neutral nutritional habit.

As seen in Table 4, no significant difference was found in sub-dimensions and total score of the AMES

Table 3. Eating Habits Level

Eating Habits Level	N	%
Unhealthy	4	,9
Neutral	330	98,5
Healthy	1	,3
Total	335	99,7

Table 4. Anova Test Results According to the Training Days Variable of the AMES

Variables		Sum of Squares	df	Mean	F	p
Vigor	Between Groups	2,118	2	1,059	,275	,760
	Within Groups	1278,795	332	3,852		
	Total	1280,913	334			
Confidence	Between Groups	5,427	2	2,713	,716	,489
	Within Groups	1257,899	332	3,789		
	Total	1263,325	334			
Motivation	Between Groups	10,352	2	5,176	1,251	,287
	Within Groups	1373,397	332	4,137		
	Total	1383,749	334			
Tireless	Between Groups	14,143	2	7,072	,801	,450
	Within Groups	2931,009	332	8,828		
	Total	2945,152	334			
Concentration	Between Groups	8,259	2	4,129	1,275	,281
	Within Groups	1075,162	332	3,238		
	Total	1083,421	334			
Composed	Between Groups	7,795	2	3,897	,391	,676
	Within Groups	3305,626	332	9,957		
	Total	3313,421	334			
AMES Total Score	Between Groups	37,239	2	18,620	,508	,602
	Within Groups	12164,086	332	36,639		
	Total	12201,325	334			

Table 5. Anova Test Results According to the Training Days Variable of the EHQ

Variables		Sum of Squares	df	Mean	F	p
Unhealthy food habits	Between Groups	42,604	2	21,302	2,221	,110
	Within Groups	3174,114	331	9,589		
	Total	3216,719	333			
Eating healthy food	Between Groups	33,620	2	16,810	1,807	,166
	Within Groups	3079,496	331	9,304		
	Total	3113,117	333			
Following healthy eating habits	Between Groups	1,294	2	,647	,101	,904
	Within Groups	2129,296	331	6,433		
	Total	2130,590	333			
Planning for eating healthy food	Between Groups	11,518	2	5,759	,812	,445
	Within Groups	2347,727	331	7,093		
	Total	2359,246	333			
EHQ Total Score	Between Groups	199,938	2	99,969	2,220	,110
	Within Groups	14907,847	331	45,039		
	Total	15107,784	333			

according to the number of training days variable (p> 0.05).

As seen in Table 5, no significant difference was found in sub-dimensions and total score of the EHQ according to the variable of training days (p> 0.05).

As seen in Table 6, there was a negative and weak correlation (r = -.124) between the confidence sub-dimension of the AMES and the Unhealthy food habits sub-dimension of the EHQ. There was a negative, weak correlation (r = -.139) between the confidence sub-dimension of the AMES and the to-

Table 6. Pearson Correlation Test Results between AMES and EHQ and their sub-dimensions

Variables		Unhealthy food habits	Eating healthy food	Following healthy eating habits	Planning for eating healthy food	EHQ Total Score
Vigor	r	.047	.056	.053	.064	.092
	p	.392	.307	.334	.243	.092
Confidence	r	**-.124***	-.069	-.063	-.068	**-.139***
	p	**.024**	.211	.248	.217	**.011**
Motivation	r	.033	.012	.009	.078	.055
	p	.547	.827	.876	.155	.318
Tireless	r	.074	.020	.029	**.113***	.099
	p	.177	.710	.592	**.040**	.071
Concentration	r	.089	-.054	-.013	.053	.032
	p	.103	.324	.810	.338	.554
Composed	r	.059	.013	-.027	.050	.043
	p	.279	.816	.619	.365	.438
AMES Total Score	r	.081	.000	-.004	**.123***	.084
	p	.140	.993	.938	**.025**	.124

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

tal score of the EHQ. There was a positive and weak correlation (r = .113) between the Tireless sub-dimension of the AMES and the Planning for eating healthy food sub-dimension of the EHQ. There was a positive, weak correlation (r = .123) between the total score of the AMES and the Planning for eating healthy food sub-dimension of the EHQ.

Discussion and Conclusion

The concept of athletic mental energy emerges as an important concept for sportive performance and success (1). For this, it was determined that studies that will contribute to the definition and understanding of the concept should be done (1,3). In this context, when the results of our research are examined, it is seen that Planning for eating healthy food significantly predicts athletic mental energy. In a similar study, athletic mental energies and nutritional habits of football players were examined and similar results were obtained (16). Energy is a commonly used word in research and general on the conversation. By its simplest definition, energy is the capacity for doing work (17). Energy is important to human life because it allows us to satisfy our needs. Energy exists in diverse forms and comes from different sources, such as kinetic energy, chemical energy, solar energy, nuclear energy, and of particular interest in our research, mental energy (18).

When the literature is examined, it is seen that mental energy develops with proper nutrition planning and additional nutritional supplements. (5-7,19,20). It can be said that it is parallel with our research results. It can be said that the level of athletes' athletic mental energy can be improved when their nutritional deficiencies are eliminated. It is possible to control athletic mental energy level by controlling nutrition (2).

In this context, a significant difference was found in the confidence and calmness sub-dimensions of athletic mental energy according to the gender variable of tennis players in our study. It is seen that this difference is in favor of male tennis players. There was no significant difference in eating habits. There was no significant difference in athletic mental energy and nutritional habits according to the number of training days variable. However, when the literature is examined, it is seen that studies based on nutritional disorders are more intense. In this context, when studies conducted in groups that do not engage in physical activity or non-athletes are examined, it is seen that less energy-intensive food is consumed instead of healthier food (21).

It is seen that studies based on eating disorders are more intense. In this context, when studies conducted within the framework of groups that do not engage in physical activity or who are not athletes are examined, when the energy use and eating habits are included in the studies, similar results can be obtained in favor of individuals who do physical activity. Parallel to the studies in the literature (21-25). In another study conducted on amateur football players, professional athletes need a balanced and careful diet. It has been determined that nutritional knowledge levels are higher than amateur football players (16).

In this context, in our study, it was determined that there was a negative relationship between AMES Confidence and EHQ unhealthy diet in tennis players. It was determined that there was a positive relationship between tireless and AMES total score with planning for eating healthy food sub-dimensions of the EHQ. In the results we obtained, it can be said that nutrition planning was a positive predictor of athletic mental energy levels of tennis players.

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