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Original article

The relationship between athletic mental energy and eating behaviors

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Abstract. *Study Objectives:* The study aimed to contribute to the research and understanding of the concept of athletic mental energy (AME), which seems to be lacking in the literature. For this purpose, the relationship between athletic mental energy and eating habits was examined in a sample of professional football players. *Methods:* A total of 254 professional men football players with a mean age of 24.22±4.62 years, mean of 11.50±4.50 sports ages, participated in the study. The research used The Three - Factor Eating Questionnaire (TFEQ-R18) and The Athletic Mental Energy Scale (AMES). TFEQ-R18 was developed by Karlson et al (2000) and adapted to Turkish by Kıraç et al (2015). AMES was developed by Lu et al (2018) and adapted to Turkish by Yıldız et al (2020). Descriptive statistics and Simple Linear Regression Analysis methods were used in the analysis of the data obtained. The analyzes were made in the SPSS 22 package program and the significance level was taken as $p < 0.05$ in all analyzes in the study. *Results:* As the result of research, it has been determined that cognitive restraint is positively correlated with AME, uncontrolled eating is negatively correlated with AME, emotional eating is negatively correlated with AME and susceptibility to hunger is negatively correlated with AME. *Conclusion:* We can state that eating behavior are predictors of cognitive energy as a result of research.

Keywords: Athletic Mental Energy, Eating Behaviors, Football Player, Mental Energy

Introduction

Energy, found in various forms in nature, is very important for human beings. Mental energy also appears before us by sourcing these various forms (1).

Mental energy is defined as the ability to persist for long periods thinking productively about a problem, the ability to focus attention, to shut out distractions, to persist in search of a solution. Mental energy is an important determinant of performance and success (2). The success in different disciplines is based upon the ability to work without getting tired for a long time. There is a need for research to define and measure mental energy, which is the basis of this skill, on a scientific basis, like any other type of energy (3).

The use of mental energy by athletes in sports activities is important for athletic performance and sportive success due to its relationship with high-level functions such as perception, thinking, and creativity (1,4,5). In short, athletic mental energy is 'an athlete's perception of the current energy state'. This perception may fluctuate suddenly, affected by psychological changes and experiences. At this point, nutrition can act as an important catalyst. Athletic mental energy

enables athletes to make physical and mental efforts for long periods in sports activities (1). In this context, athletic mental energy can be defined as 'the energy state perceived by the intensity of the mood of the athlete, which is characterized by motivation, confidence, concentration', and it emerges as a concept that should be given importance in the sports environment. However, unfortunately, the current state of the relevant literature makes it difficult to study the effect of mental energy on sports environments (1).

Mental energy is also considered as an important factor in terms of nutritional science and is the subject of studies (6,7). It was first defined by nutritional scientists as 'the capacity to perform daily tasks', it was stated that it could be instantly affected by emotions, and its components were motivation, quality of life, mood, and cognition. As the studies progressed, the concept was defined as 'ability to perform cognitive tasks', 'intensity of emotions related to energy and fatigue' and 'motivation to perform cognitive and physical tasks'. With these definitions, a mental energy model that includes motivation, cognition and energy mood components has been put forward by nutritional scientists. It has also been reported that it can be affected by factors such as genetics, health status, nutritional level, age, sleep, and pain (8). This information indicates that it would be useful to take eating habits in mental energy studies into consideration.

Nutrition is an important component of advanced training and competition performance for athletes. There is a parallel relationship between eating habits and performance. This relationship is based upon providing energy balance with nutrition (9). However, beyond meeting the energy need required for vital activities, the need for regular and balanced nutrition for health and performance is an undeniable fact. In this context, the definition of nutrition can be made as a balanced consumption of carbohydrates, fats, proteins, vitamins, minerals and water from the basic nutritional elements (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 behaviours differ according to positive or negative emotional states (11). Different emotions have different effects on eating behaviour, food consumption, eating motivation, food selection, consumption amount and speed. In addition, different foods may have different effects on an individual's mood. For example, it is known that foods with high carbohydrate content effect improving mood, their stress-reducing aspect, and protein's increasing effects on serotonin (12). For this reason, it is required to examine not only what is eaten but also why it is eaten in nutrition studies (13). In this context, it should be acknowledged that football players should pay attention to their eating behaviors to fulfill the physical requirements of their types of sport.

In the light of all this information, it is thought that this study will contribute to the understanding and research of the concept of athletic mental energy, which is important for sportive success (1,4,5), but there is not enough work in the literature. For this purpose, in this study, the relationship between athletic mental energy level and eating behaviors was examined within the framework of football players of different levels.

Materials and Methods

Research Model and Hypotheses

The model of the research is designed with a relational screening model. In this model, it is aimed to determine the relationship between two or more variables and to obtain clues about possible causes and consequences (14). The variables considered within the scope of the research were determined as a result of the literature review. The research hypotheses are as follows.

H_1: Cognitive restraint (CR) positively affects athletic mental energy (AME).

H_2: Uncontrolled eating (UE) negatively affects athletic mental energy (AME).

H_3: Emotional eating (EE) negatively affects athletic mental energy (AME).

H_4: Susceptibility to hunger. (SH) negatively affects athletic mental energy (AME).

Participants

A total of 254 men football players with a mean age of 24.22 ± 4.62 years, a mean of 11.50 ± 4.50 sports years participated in the study. The research group was formed by random sampling method. Easily accessible sampling method was preferred.

Collection of Data

In this section Athletic Mental Energy Scale (AMES), Three - Factor Eating Questionnaire (TFEQ-R18) are used.

Athletic Mental Energy Scale (AMES)

The Athletic Mental Energy Scale was developed by Lu et al (2018) and adapted to Turkish by Yıldız et al (2020). The scale consisting of 18 items in total has a 6-point Likert type structure. 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.

Three – Factor Eating Questionnaire (TFEQ-R18)

The Three - Factor Eating Questionnaire (TFEQ-R18) was developed by Karlson et al (2000) and adapted to Turkish by Kıraç et al (2015). The scale consisting of 18 items in total has a 4-point Likert type structure. The internal consistency coefficient of the scale is given as .71. Cronbach Alpha internal consistency coefficient obtained from the data set used in the study was determined as .63 (16,17). The TFEQ-R18 scales were derived in obese subjects; however, indicating that the instrument is valid also in non-obese individuals. (18,19). The questionnaire has 4 sub-dimensions of eating behavior: cognitive restraint (2,11,12,15,16,18) (conscious restriction of food intake in order to control body weight or to promote weight loss), uncontrolled eating (1,7,13,14,17) (tendency to eat more than usual due to a loss of control over intake accompanied by subjective feelings of hunger), emotional eating (3,6,10) (inability to resist emotional cues) and susceptibility to hunger (4,5,8,9). The TFEQ-R18 consists of 18 items on a 4-point response scale (definitely true/mostly true/mostly false/definitely false). Responses to each of the 18 items are given a score between 1 and 4 and item scores are summated into scale scores for cognitive restraint, uncontrolled eating, emotional eating and susceptibility to hunger (17).

Statistical Analysis

The normality of the data obtained from the scales was examined by skewness and kurtosis values (Table 1). For all scales, these values are between -1.5 and +1.5. This shows that the data are normally distributed (20). The participants are shown with percentages and frequency. Descriptive statistics were used to determine the mean scores of the scales used in the research. Descriptive statistics and Simple Linear Regression Analysis methods were used in the analysis of the data obtained. The analyzes were made in the SPSS 22 package program and the significance level was taken as $p < 0.05$ in all analyzes in the study.

Results

When Table 2 is examined, it is seen that the mean age of the sample is approximately 25 and the mean age of sports is approximately 12.

When Table 3 is examined, the scores of the sample on the AMES and TFEQ R-18 sub-dimensions are seen. According to the results, contrary to emotional eating was found to be high point of the other scores.

Table 1. The normality of the data obtained

	Skewness	Kurtosis
AMES	-.386	.459
CR	-.259	-.355
UE	.247	.144
EE	.456	-.328
SH	-.494	-.100

Table 2. Age and age of sports of the participants

N	Age		Age of sports	
254	$\bar{x}$± S.D.	24.22 ±4.62	$\bar{x}$± S.D.	11.50 ±4.50
	Min	18	Min	3
	Max	33	Max	25

$\bar{x}$: Mean; S.D.: Standard Deviation

Table 4 indicates the results of correlation analysis about the correlate of athletic mental energy by eating behavior in the sample of professional football players. When the results obtained are examined, it is seen that AME and eating behavior sub-scales ranging from -,435(EE), -,422(UE), -,184(SH) to ,213(CR).

Table 5 indicates the results of regression analysis about the prediction of athletic mental energy by eating behavior in the sample of professional football players. When the results obtained are examined, it is seen that eating behaviors significantly predict athletic mental energy and explain about 28% of the variance. Standardized regression coefficients were found = .153 for CR; β = -.292 for UE; β = -.237 for EE; β = -.149 for SH.

Table 3. Mean scores of the participants from the AMES and TFEQ R-18 subscale

Variable	$\bar{x}$	S.D.
AME	82.91	10.11
CR	14.00	3.74
UE	10.42	2.59
EE	5.88	1.53
SH	10.89	2.44

$\bar{x}$: Mean; S.D.: Standard Deviation

Table 4. Correlation test results of the AMES and TFEQ R-18 subscale

	CR	UE	EE	SH
AME	213**	-422**	-435**	-184**

***p<0.01*

Discussion

The concept of athletic mental energy, which is important for sportive performance and sportive success (1,4,5), emerges as a concept that should be given importance in the sports environment to improve the existing insufficient literature, studies on the concept are required (1,3,15). In this context, it is thought that it is important to determine the possible effective elements to contribute to the definition and understanding of the concept. When the results of our research designed and conducted in this direction are examined, it is seen that eating behavior significantly predict athletic mental energy (Adj. R2= .275).

When the current literature is examined, it is seen that mental energy is improved by nutrition and nutritional supplements (6,7,8,21,22). It can be said that our research results are in parallel with these statements. In this context, it can be stated that mental energy and deficiencies in athletic mental energy can be eliminated with nutrition and its current level can be improved. In addition, it can be said that, to meet the high concentration need in sportive activities, the structure of the athletic mental energy (2), which is affected by fluctuations, can be kept under control with nutrition.

In this context, the hypotheses of our research have been confirmed. A positive relationship was found between CR that means controlling people's weight or restricting food intake to increase weight loss and AME (H1). UE that means uncontrolled food intake susceptibility to overeat due to subjective ideas against hunger is negatively predicted with AME (H2). A negative predict was found between IE, which means inability to emotional symptoms, that is, eating during emotional times, and AME (H3). A negative predict was found between SH, which means difficulty in controlling eating levels when hunger is felt, and AMI (H4).

Table 5. Regression test results of the AMES and TFEQ R-18 subscale

AME	B	Beta	t	R	R^2	Adj. R^2	F	p
Cons.	104.90		25.57					
CR	.412	.153	2.75					**.006***
UE	-1.14	-.292	-4.69	.535	.286	.275	24.98	**.000***
EE	-1.56	-.237	-3.68					**.000***
SH	.223	-.149	-2.76					**.006***

*$p<0.05$

Although TFEQ-R18 was prepared in a Swedish obese population, it has been reported that the factors are also valid in non-obese individuals (17,18,19). However, when the literature is examined, it is seen that the studies are more intense based on nutritional disorders. In this context, when the studies within the framework of groups that do not do physical activity or who are not athletes are examined, it is found that less energy-intensive food is consumed instead of more 'healthy food' with CR. A negative association of energy-dense food consumption with CR in adolescents and young adults has been reported. It has been found that the contribution of fat to energy intake is lower in individuals with high CR scores, especially in young people and young adults (19). In addition, results were indicating that cognitive restriction scores are negatively related to the frequency of use of both sweet and fatty and salty and fatty foods (23). It has been reported that CR is negatively predicted with daily energy intake (24). On the other hand, results indicated a prediction between energy intake and UE is obtained in adult males who are not athletes. It has been reported that energy-intensive food intakes such as sugar and fat are positively associated with UE (19,23). In addition, results were indicating that emotional eaters have high snack food intake and that energy intake is associated with IE in men (19). It is thought that this observed difference is due to the sample studied. When individuals who do physical activity are added to the studies, similar results can be obtained in favor of individuals who do physical activity (25).

In this context, as the basis of the hypothesis in our study, it is thought that the idea telling that the necessity to be aware of physically fulfilling certain conditions for successful performance by football players and due to this awareness should be predicted with AME-related components such as motivation and concentration, UE should be negatively predicted with AME, CR should be positively predicted to AME, EE should be negatively predicted to AME and SH should be negatively predicted with AME is acceptable. The results we obtained also confirm our hypothesis. Considering our sample group, this observed difference should not be surprising. Professional athletes need a balanced and careful diet. It can be determined that their nutritional knowledge levels are higher than amateur football players (9).

Conclusion

At this point, in the light of the results obtained, this situation of the athlete, who can pay attention to nutrition in line with his goals, can be predicted with having AME components. These results draw attention to the fact that, although the mental energy is related to nutrition and food, it is not in a perfect match with bodily energy, as can be understood from its definition, mental energy is a mood, and studies are required to understand the concept of AME better.

Conflicts of Interest

The authors declare that there is no conflict of interest in this manuscript.

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