# Relationship between Athletic Mental Energy (AME) and Elite Athletes' Medal-Winning

**Novrizal Achmad Novan [1*], Masayu Rizka Risjanna [1], Fitri Rosdiana[1], Dikdik Zafar Sidik[1], Dery Rimasa [1]**

[1] Sport Coaching Department, Faculty of Sport and Health Education, Universitas Pendidikan Indonesia

Corresponding author: novrizal@upi.edu

**Abstract:** The aim of this study is to improve understanding and awareness of the idea of athletic mental energy (AME), which is thought to be underrepresented in the literature. Athletes can perform well in competitive situations as a result of AME, which acts as mental energy in other areas. In order to do this, the relationship between mental energy and winning medals was analysed among a group of Indonesia's elite athletes. Cross-sectional analysis and a correlational survey method were both used in the study design. There were 368 elite athletes consisting of 203 male athletes and 165 female athletes from the city of Bandung who participated in different sports and had an average age of 23 were included in this study. The data analysis used was descriptive univariate, bivariate using chi-square and multivariate using multiple linear regression in SPSS 26. The results obtained explained that AME as a whole has a 58.5% impact on the R Square value, while other factors outside the model have a 41.5% influence. In-depth, As a statistical conclusion, it has been found that AME's components of motivation (10,3%), concentration (12,8%), and confidence (14,6%) are highly related to winning medals, with scientific discoveries that back up the theoretical framework. Indonesian elite athletes need to be made aware of the relationship between Athletic Mental Energy (AME) and its contribution to medal success, and it is recommended that relevant information be disseminated by the authorities. Further investigation is needed to examine the relationship between cognitive effort and high-performance in various sports.

**Keywords:** Elite Athletes, Indonesian Athlete, Medal Winning, Mental Energy

## INTRODUCTION

High-performance sports among elite athletes showcase a distinct lifestyle, emphasising strategies for achieving success, showcasing exceptional athletic techniques, and demonstrating the ability to outperform competitors (Barraclough et al., 2022). There is a growing recognition among coaches and managers that performance is not solely determined by technical, tactical, and physical factors. Empirical evidence indicates that the psychological perspective considers physical, technical, and tactical components as crucial. Concurrently, the psychological conditioning of athletes holds considerable significance while the emphasis of sports research on physical skills tends to overlook the various factors that can impact sports performance (Abou

Elmagd, 2019). Unfortunately, at times, an athlete may exhibit sufficient physical preparedness, but the existence of stress, excitement, tension, and anxiety during pre-competitive and competitive events can hinder their cognitive abilities (Natalia et al., 2023), leading to undesirable performance results. The ever-changing socio-economic landscape in the sports industry has resulted in an increased level of neuropsychological stress that athletes encounter (McLoughlin et al., 2021a). While stress is an inherent aspect of life in general and competitive sports in particular, extensive research has established that excessive stress can result in physical and mental health issues. Athletes are subject to a variety of stressors throughout their careers, both related to their sport (such as injury and performance pressure) and unrelated to it (such as bereavement and abuse) (McLoughlin et al., 2021b). These stressors can be quite intense and demanding. According to recent research, there is an indication that elite athletes may be more susceptible to experiencing mental health issues (Gorczynski et al., 2017).

Athletes who exhibit persistent efforts to achieve their highest possible athletic performance levels, regardless of circumstances (e.g., good or bad situations) and setting (e.g., training and competitive environments), are frequently characterised as possessing mental toughness (Gucciardi et al., 2015). The training of athletes is dependent on various factors, including physical, technical, functional, and psychological aspects. Contemporary training models are nowadays designed based on the body's response to efforts. Understanding psychic and biological energy contributes to a higher energy potential athlete (Dumitru & Grimalschi, 2021). The significance of energy for human beings cannot be overstated, as it exists in diverse forms within the natural world. The manifestation of mental energy is evident through its sourcing of diverse forms (Lu et al., 2018). The term "mental energy" encompasses various definitions, including the characterization of distinct biological mechanisms that underlie the ability of neurons in the brain to perform physical tasks (Loy et al., 2018). Additionally, this term can appropriately denote affective, motivational, and cognitive processes (Wang et al., 2021). Mental energy is an important determinant of performance and success (Iso-Ahola & Dotson, 2016). On the other hand, achieving success in various fields relies on the capacity to sustain long periods of work without giving up on fatigue (Herlambang et al., 2019).

An instrument to evaluate AME has been developed and verified, and the researchers discovered that AME accurately predicted who would win medals. To be more specific, an increase of one point in score in AME was connected with 1,14 times the probability of winning a medal when the AME score was taken into account (Lu et al., 2018). Mental energy has been the subject

of research in diverse fields, such as sport psychology. Due to the existence of a wide range of concepts and measures, researchers in the field of psychology have initiated the process of conceptualising mental energy. Nutrition researchers are particularly interested in investigating which type of supplement can effectively enhance human cognitive function (Dammann et al., 2013; Mohajeri et al., 2015). The concept of mental Athletic Mental Energy, or AME, has been found to correlate with nutrition and dietary intake (Yildiz et al., 2020). However, it is important to note that this construct does not align perfectly with physical energy levels. Further research is required to enhance comprehension of the AME phenomenon, given that mental energy is a subjective state. As research progressed, the concept was defined as the capacity to engage in cognitive activities, the strength of emotions associated with energy and fatigue, and the drive to undertake cognitive and physical endeavours. Hence, The concept of mental energy in sports pertains to the capacity to engage in sustained and productive cognitive activity, including the ability to concentrate, avoid interruptions, and persevere in the pursuit of a resolution to a given problem.

In the context of high-performance sports, early studies predominantly focused on strategies for recovering from poor performance. The athlete's psychological profile typically covers a comprehensive representation of their personality traits, cognitive abilities, and mental processes that are linked to athletic performance. The profiles of athletes exhibit an outstanding level of stability over time. Despite the increasing focus given to the subject issue, researchers have not yet definitively determined the variables that impact the psychological welfare and overall wellness of high-performance elite athletes (Moesch et al., 2018). Significant focus has been directed towards the study of mental energy as a cognitive resource (Goldfarb & Henik, 2014; Shenhav et al., 2017). The concept of cognitive resource refers to the finite capacity of an individual's cognitive system to process and manage information. This capacity is limited and can be depleted by engaging in cognitively demanding tasks, resulting in reduced performance on subsequent tasks. The notion of cognitive resource has been widely studied in the fields of psychology and neuroscience and has important implications for understanding human cognition and behaviour (Balanev et al., 2022). The literature on mental energy assesses the amount of mental energy that is at one's disposal for cognitive tasks. The concept of mental energy pertains to an individual's conviction in their ability to carry out cognitive or physical activities (Boolani & Manierre, 2019; Wang et al., 2021). During the process of task engagement, mental energy is utilised to augment mental focus, which in turn leads to improved task performance and increased mental intensity (Shenhav et al., 2013). Due to its connection with high-level functions such as perception,

reasoning, and creativity, the use of mental energy by athletes in sports activities is essential for athletic performance and sporting success (Lu et al., 2018). In addition, the lack of a valid and reliable measure of mental energy in sports poses a challenge for researchers to make progress in their understanding of the significance of mental energy in sports environments (Yildiz et al., 2020).

The performance of elite athletes is defined by greater levels of motivation, confidence, anxiety-free performance, attention focused on skills, and effective concentration. Various forms of self-confidence have been recognised by athletes, encompassing a belief in their ability to perform physical skills, reach outstanding levels of physical fitness (Şahin & Bastık, 2019), make intelligent choices (Bostancı et al., 2019), utilise mental skills such as concentrating attention and coping with anxiety (Thomas & Thrower, 2022), recover from difficulties, overcome obstacles, attain mastery and performance of self-imposed standards, and triumph over opponents to demonstrate superiority (Ruiz Barquín et al., 2019). Psychological resilience refers to the capacity of an individual to utilise mental processes and behaviour to foster individual abilities and safeguard oneself against the potential negative effects of stressors (Fletcher & Scott, 2010; Galli & Gonzalez, 2015). Motivation is a crucial factor that propels individuals towards achieving their objectives. It requires an in-depth awareness of goals, procedures, and approaches, along with the development of incentives that regulate and guide human behaviour (Blynova et al., 2022). Achievement Motivation has been identified as a key factor in promoting the acquisition of skills, overcoming challenges, and striving for excellence in athletic endeavours. Motivational general mastery refers to the use of mental imagery to maintain focus and ensure safety in stressful situations (Pakulanon, 2016). Athletes with high levels of self-efficacy in competitive scenarios are inclined to utilise a greater amount of motivational imagery compared to their competitors with low self-efficacy. Following analysing the significance of imagery in sports, a statistically significant variance was found, indicating that male athletes outperformed their female counterparts in the "Cognitive Imagery" subcategory (Kaplan et al., 2022). Specifically, AME will be utilised to measure an athlete's levels of vigour, confidence, motivation, tirelessness, concentration, composed AME and attitude towards winning medals. Therefore, this study aimed to investigate the concept of athletic mental energy (AME) as a metric for assessing various psychological factors that contribute to elite athlete medal winning.

## METHOD

The present study used a cross-sectional and correlational methodology to construct an original theoretical framework. The model was utilised to determine the correlation between Athletic Mental Energy (AME) and the winning of medals by elite athletes. The study population consisted of 1140 elite athletes from the city of Bandung, Indonesia who competed in the 14th west java provincial sports week 2022 multi-event from 48 sports. The random sampling method was used to obtain a sample size of 368 athletes, which comprised 203 male athletes and 165 female athletes, by utilising the Slovin formula. The data was collected through the use of the survey method. Participants were provided with a comprehensive outline of the research objectives, confidentiality policies, and procedural guidelines. The data were collected throughout a period from September 2022 to November 2022. The present study utilised a questionnaire to gather data on sociodemographic characteristics and the Athletic Mental Energy Scale (AMES).

The socio-demographic characteristics questionnaire is based on an analysis of the relevant literature. The survey consisted of five separate questions regarding the participant's age, gender, educational background, category, and status as an elite athlete representing the city of Bandung at the 14th West Java Provincial Sports Week in 2022. The Athletic Mental Energy Scale (AMES) was developed by Lu et al (Lu et al., 2018). and adapted to the Indonesian language. The instrument comprises 18 Likert-type items rated on a five-point scale. The instrument evaluates 18 items on a five-point Likert scale and is comprised of six subscales: vigour, confidence, motivation, tireless, concentration, and composite AME. The alpha values for the subscales are 0.75, 0.82, 0.86, 0.89, 0.87, and 0.90, and the coefficients range from 0.78 to 0.91. Cronbach's alpha coefficients for the subscales determine the instrument's reliability.

In this study, univariate analysis is carried out, which makes use of analytics that attempt to explain the characteristics of each research variable by using a frequency distribution. In addition, a bivariate analysis was performed on the SPSS 26 application using the chi-square test on the AME composite score variable incorporated with medal winning. Furthermore, a multiple linear regression analysis was conducted to test the effect of each independent variable on the AME component, namely vigour, confidence, motivation, tireless, concentration, and the AME composite score on the medal-winning dependent variable in order to test the hypothesis.

## RESULTS

**Table 1**. Crosstabulation between Medal and Gender

| | | Gender | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | Male (N) | Male (%) | Female (N) | Female (%) | (N) | (%) |
| **Medal** | **Non-Medal** | 80 | 39,4 % | 47 | 28,48 % | 127 | 34,51 % |
| | **Bronze** | 28 | 13,79 % | 34 | 20,60 % | 62 | 16,84 % |
| | **Silver** | 43 | 21,18 % | 42 | 25,45 % | 85 | 23,09 % |
| | **Gold** | 52 | 25,61 % | 42 | 25,45 % | 94 | 25,54 % |
| | **Total** | 203 | 55,2 % | 165 | 44,8 % | 368 | 100 % |

The present study involved a total of 368 participants who completed the research protocol. Among these samples, 203 were identified as male, while 165 were identified as female. Table 1 presents a comprehensive account of the number of medals earned by the athletes who took part in the study as well as reports on the age distribution of a sample population. The sample consisted of 52 individuals aged 12-16, 214 individuals aged 17-25, 77 individuals aged 26-35, 14 individuals aged 36-45, and 11 individuals aged 46 years or older. According to the recorded data, a proportion of 25.54% of athletes, which translates to a total of 94 individuals, achieved gold medals. Similarly, 23.09% of athletes, or 85 individuals, achieved silver medals, while 16.8% of athletes, or 62 individuals, achieved bronze medals. The remaining 34.5% of athletes, equivalent to 127 individuals, did not receive any medals. The data indicate that among the gold medalists, there were 52 male athletes (25,61%) and 42 female athletes (25,45%). Similarly, among the silver medalists, there were 43 male athletes (21,18%) and 42 female athletes (25,45%), while among the bronze medalists, there were 28 male athletes (39,4%) and 34 female athletes (20,60%). Additionally, the non-medalist group consisted of 80 male athletes (39,4%) and 47 female athletes (28,48%)

**Table 2**. Chi-Square Tests

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 153.311 | 150 | .001 |
| Likelihood Ratio | 172.891 | 150 | .001 |
| Linear-by-Linear Association | .251 | 1 | .000 |
| N of Valid Cases | 368 | | |

According to Table 2, which was the output of the results of the bivariate analysis, the Asymp value. Sig (2-sided) on the Person Chi-Square test is 0.001, and this information was known

based on the findings of the bivariate analysis. Because of the Asymp. Sig (2-sided) 0.001 < 0.05, the decision-making basis that there is a significant relationship between Athletic Mental Energy (AME) and elite athlete medal winning. According to what is presented in the table, there are no expected cells with a value of less than five percent. According to the results of the Pearson chi-square test, which can be found above, the p-value is 0.001 and the chi-square is 153.311, indicating that the test criteria were successfully fulfilled and allowing for the execution of multivariate tests.

**Table 3**. Model Summary Test Results between Athletic Mental Energy (AME) and Elite Athletes' Medal-Winning

| R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|
| .597 | .585 | .512 | 1.204 | 1.890 |

Table 3 displays the regression equation's results, indicating an R Square value of 0.585 or 58.5%. This value signifies that Athletic Mental Energy (AME) has an impact of 58.5% on the elite athlete medal winning. However, it is important to note that the remaining 41.5% of the outcome is influenced by other variables that are not accounted for in the model. A relationship between variables is considered favourable when the R Square value exceeds 50%. Furthermore, Table 3 presents the results of the SPSS output, which includes the Durbin-Watson value of 1.890 and a significance level of 0.05 for the regression model. The dataset used for analysis consisted of 368 samples, with 6 independent variables (k). The dL and dU values were calculated to be 1.7989 and 1.8552, respectively. Autocorrelation is absent as the Durbin-Watson value falls within the range of dU=1.7989 and (4-1,7989 = 2,20102).

**Table 4**. ANOVA Test Results between Athletic Mental Energy (AME) and Elite Athletes' Medal-Winning

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 5.033 | 5 | 1.007 | 1.694 | .013 |
| Residual | 525.043 | 362 | 1.450 | | |
| Total | 530.076 | 367 | | | |

According to the findings of the regression model's ANOVA test, as shown in Table 4, the significance value of 0,013 is less than the predetermined alpha level of 0,05. This indicates that the null hypothesis (H0) is rejected. Therefore, it can be concluded that the estimated linear

regression model is a viable tool for explaining the significant correlation between Athletic Mental Energy (AME) and elite athlete medal winning.

**Table 5**. Coefficients Test Results between Athletic Mental Energy (AME) and Elite Athletes' Medal-Winning

| | B | Std. Error | t | Sig. |
|---|---|---|---|---|
| (Constant) | 1.191 | 1.223 | 2.156 | .018 |
| Confidence | .146 | .043 | 4.059 | .043 |
| Motivation | .103 | .042 | 4.148 | .009 |
| Concentration | .128 | .043 | 4.656 | .013 |
| Tireless | -.065 | .065 | 1.909 | .314 |
| AME | .106 | .022 | 4.131 | .040 |

The coefficient results in table 5 are used to determine the regression equation and the partial or individual influence of the subscales in Athletic Mental Energy (AME) on the Athlete Medal Winning variable. A positive constant value suggests that the AME variable (Confidence, Motivation, Concentration, Tirelessness, and Composite AME) of 1.191 has a positive influence. As a result, if AME has an effect on one unit, the Athlete Medal Winning variable will increase or be fulfilled. This is also highlighted by the Sig. value of 0.018<0.05, indicating that it has a significant relationship to Athlete Medal Winning. This regression testing section's output only contains five of the six subscales examined; the other subscale, vigour, was deleted in the previous testing step which conceptually, vigor and tirelessness are the same constructs (Lu et al., 2018).

The B value in the confidence subscale is 0,146, which is the variable regression coefficient value, and increasing it by one unit increases athlete medal winning by 14.6% with a positive coefficient, indicating that the confidence and athlete medal winning variables have a positive relationship with a significance value of 0,043<0,05, indicating that confidence has a significant relationship to Athlete Medal Winning. In addition, the variable regression coefficient in the motivation subscale is 0,103, and increasing it by one unit increases athlete medal winning by 10.3% with a positive coefficient, indicating that the motivation and athlete medal winning variables have a positive relationship with a significance value of 0.009<0.05, indicating that motivation has a significant relationship with Athlete Medal Winning. The variable regression coefficient in the concentration subscale is 0,128, and increasing it by one unit increases athlete medal winning by 12.8% with a positive coefficient, indicating that the concentration and athlete medal winning variables have a positive relationship with a significance value of 0,013<0,05, indicating that it has a significant relationship to the Athlete Medal Winning. The variable regression coefficient for the tireless subscale is -0,065, and if it increases by one unit, athlete medal winning decreases by 6,5%

with a negative coefficient, indicating that the tireless and athlete medal winning variables have a negative relationship with a significance value of 0,314>0,05, indicating that tireless has no effect on Athlete Medal Winning. Following that, the value of B on the composite variable AME is 0,106, which is the variable regression coefficient, which if increased by one unit increases athlete medal winning by 10,6% with a positive coefficient, indicating that the composite AME and athlete medal winning variables have a positive relationship with a significance value of 0,040<0,05, indicating that confidence has a significant relationship to Athlete Medal Winning.

## DISCUSSION

Since elite sports have the potential to significantly contribute to the economic growth and societal well-being of nations, elite athletes are driven to exhibit their best performance as they are responsible for upholding the reputation of the nation and region they are representing. This is due to the economic and social advantages that elite athletes, in particular, can provide, thereby enhancing the conditions within each respective country (Khanmoradi et al., 2022). The pinnacle performance of elite athletes is dependent upon interactions of physiological and psychological variables. As a way to mitigate the risk of injuries and promote psychological well-being, athletes must maintain optimal physical conditions (Rusdiyanto et al., 2021). In addition, elite sports also encompass rigorous training, competitive tournaments, fierce competition, and significant cultural difference (Brouwers et al., 2015). Based on the results of the univariate analysis which showed that out of a total of 368 participants consisting of 55.2% male athletes (N=203) and 44.8% female athletes (N=165), how gender identity is constructed in elite sport argues that sport is a unique socio-cultural context where gender category membership may be enacted both the same and different than in other contexts (Hannon et al., 2009). This is because patriarchal societies impose definitions and expectations of masculinity and femininity upon individuals at an early age, and these expectations are then reinforced through socialization (Farias et al., 2017). These prior study findings examine femininity stereotypes while analysing how society's interpretation of femininity and how this affects the progress of women's sports. Overall, these research indicate that gender identity in elite sports is a complicated and nuanced concept influenced by a variety of sociocultural influences.

Based on the results of bivariate tests indicating a significant correlation between Athletic Mental Energy (AME) and medal-winning by elite athletes, it is supported by multiple studies, such as Soccer players' AME positively mediated their psychological skills in soccer (PSIS) and attitudes

(ATS), with ATS positively associated with AME and PSIS (İslam, 2022). AME mediated both aspects. In this connection, the other study examined the cognitive imagery levels of male athletes are notably higher than those of female athletes, particularly in the context of team sports where the levels are more composed. The utilisation of imagery by athletes is also influenced by their levels of mental athletic energy (Kaplan et al., 2022). Furthermore, there is a correlation between pre-competition mental energy and performance among table tennis players with physical disabilities (Chuang et al., 2022). In general, the aforementioned studies indicate that the mental energy of athletes is a significant determinant of their athletic performance, and it is recommended that forthcoming research attempts investigate the associations between cognitive exertion and performance in various sports and among diverse athlete populations.

The results of the multivariate analysis show that the confidence subscale has a statistical Beta value of 0.046. This correlates to a rise of 14.6% in the chance that an elite athlete will win a medal. The previous study revealed a positive and significant correlation between self-confidence and various forms of motivation, including intrinsic motivation to acquire knowledge and achieve goals, intrinsic motivation to seek stimulation, external regulation, identification, introjection, intrinsic motivation, and extrinsic motivation (Sari et al., 2015). Athletes who possess higher levels of confidence in their team's abilities tend to exhibit greater levels of exertion, establish more ambitious objectives, demonstrate increased resilience in the face of obstacles, and ultimately achieve greater performances (Fransen et al., 2017). In addition, the great performances and recognition an athlete receives in their sports community can serve as a solid foundation for building confidence and a solid athletic identity (Şekeroğlu, 2017).

The motivation subscale's multivariate results show a statistical beta value of 0.103, which could increase the number of medals athletes win by 10.3%. Athletes' satisfaction and motivation have a large impact on their performance results. In addition, a high level of intrinsic motivation to engage in activities that offer them satisfaction and enjoyment are more likely to have a positive view of their sport participation (Mėlinis & Vilkas, 2018). Through the mediation of intrinsic regulation and personal-barrier self-efficacy, autonomous motivation in sport organisations results in greater self-efficacy, performance satisfaction, and task-oriented motivational climate (Blecharz et al., 2015). The results of other studies also show that male athletes show higher motivation through competition, whereas team sports athletes have higher motivation and greater task-related motivation (Ong, 2019). By providing competency support and autonomy-supportive behaviours, coaches can assist athletes in developing self-determined forms of motivation, which can contribute

to greater sporting success. Moreover, athletes who are intrinsically motivated tend to have a greater impact on their performance outcomes.

The multivariate results for the concentration subscale indicate a statistical beta value of 0.128, which has the potential to enhance the number of medals won by athletes by 12.8%. The ability to maintain focus and attention, commonly referred to as concentration, is a crucial factor in achieving optimal performance in sporting activities (Strand & Craw, 2023). Athletes need to be able to keep their attention on the task at hand and tune out any distracting influences (Jannah et al., 2019). While concentration can be improved through training and practice, the athlete's ability to focus or divide attention (to apply the maximum mental processing resources to a single element of a task) determines their performance in different sports and tasks within sports (Vaughan & Laborde, 2021). Athletes need to be able to either concentrate their attention on a single activity or split it between many tasks, depending on what they are doing. Maintaining concentration is essential for peak performance in sports.

## CONCLUSIONS

Elite sports play an important role in economic growth and societal well-being, with athletes striving for peak performance. Gender identification in top athletics is complicated and impacted by sociocultural variables such as patriarchal societies and socialisation. Maintaining ideal physical conditions and resolving cultural variations are critical for athletes' well-being. Athletic Mental Energy (AME) is highly connected with medal-winning in top athletes, favourably improving psychological skills and attitudes. Male athletes have higher amounts of cognitive imagery, and cognitive effort impacts pre-competition mental energy. The confidence subscale connects favourably with elite athletes' medal potential, with more self-confidence leading to greater effort, ambitious goals, resilience, and enhanced performance. Athletes' success is significantly influenced by intrinsic motivation, with autonomous motivation in sport organisations resulting in higher self-efficacy, contentment with performance, and task-oriented motivation. Coaches may assist athletes in discovering their own drive, which can increase their success in sports. Maintaining concentration and attention is critical for optimum performance in sporting activities, since athletes must focus on tasks while avoiding distractions.

## Conflict of Interest

The authors declare that they have no conflicts of interest to report regarding this study.

## Acknowledgement

This study was made possible by support from the Bandung City, Indonesian National Sports Committee as well as the Strength Conditioning and Exercise Science Study Programme, FPOK UPI. The authors would like to express their gratitude to both of these organisations. As well as elite athletes from the city of Bandung who participated in the 14th PORPROV competition in 2022 and were willing to answer questions pertaining to AME.

## REFERENCES

Abou Elmagd, M. (2019). General Psychological Factors Affecting Physical Performance and Sports. *Journal of Advances in Sports and Physical Education*, *02*(07), 142–152. https://doi.org/10.36348/JASPE.2019.v02i07.004

Balanev, D. Yu., Tyutyunnikov, P. R., & Kokh, D. A. (2022). Human Sensorimotor Activity as a Factor of Cognitive Resource Development. *Bulletin of Kemerovo State University*, *24*(6), 752–759. https://doi.org/10.21603/2078-8975-2022-24-6-752-759

Barraclough, J., Grecic, D., & Harper, D. (2022). Examining the psychological characteristics of developing excellence profiles of male English youth soccer players: differences across ages and performance levels. *International Journal of Sport and Exercise Psychology*, 1–23. https://doi.org/10.1080/1612197X.2022.2152854

Blecharz, J., Horodyska, K., Zarychta, K., Adamiec, A., & Luszczynska, A. (2015). Intrinsic Motivation Predicting Performance Satisfaction in Athletes: Further Psychometric Evaluations of the Sport Motivation Scale-6. *Polish Psychological Bulletin*, *46*(2), 309–319. https://doi.org/10.1515/ppb-2015-0037

Blynova, O., Popovych, I., Hulias, I., Radul, S., Borozentseva, T., Strilets-Babenko, O., & Minenko, O. (2022). Psychological safety of the educational space in the structure of motivational orientation of female athletes: a comparative analysis. *Journal of Physical Education and Sport*, *22*(11), 2723–2732. https://doi.org/10.7752/jpes.2022.11346

Boolani, A., & Manierre, M. (2019). An exploratory multivariate study examining correlates of trait mental and physical fatigue and energy. *Fatigue: Biomedicine, Health & Behavior*, *7*(1), 29–40. https://doi.org/10.1080/21641846.2019.1573790

Bostancı, Ö., Karaduman, E., & Mayda, M. H. (2019). Investigation of self confidence levels in elite extreme athletes. *Physical Education of Students*, *23*(3), 106–111. https://doi.org/10.15561/20755279.2019.0301

Brouwers, J., Sotiriadou, P., & De Bosscher, V. (2015). Sport-specific policies and factors that influence international success: The case of tennis. *Sport Management Review*, *18*(3), 343–358. https://doi.org/10.1016/j.smr.2014.10.003

Chuang, W.-C., Lu, F. J. H., Gill, D. L., & Fang, B.-B. (2022). Pre-competition mental energy and performance relationships among physically disabled table tennis players. *PeerJ*, *10*, e13294. https://doi.org/10.7717/peerj.13294

Dammann, K. W., Bell, M., Kanter, M., & Berger, A. (2013). Effects of consumption of sucromalt, a slowly digestible carbohydrate, on mental and physical energy questionnaire responses. *Nutritional Neuroscience*, *16*(2), 83–95. https://doi.org/10.1179/1476830512Y.0000000034

Dumitru, R. C., & Grimalschi, T. (2021). The contribution of psychological and biological energy to increasing the quality of sports training factor indices. *The Science of Physical Culture*, *37/1*. https://doi.org/10.52449/1857-4114.2021.37-1.05

Farias, C., Hastie, P. A., & Mesquita, I. (2017). Towards a more equitable and inclusive learning environment in Sport Education: results of an action research-based intervention. *Sport, Education and Society*, *22*(4), 460–476. https://doi.org/10.1080/13573322.2015.1040752

Fletcher, D., & Scott, M. (2010). Psychological stress in sports coaches: A review of concepts, research, and practice. *Journal of Sports Sciences*, *28*(2), 127–137. https://doi.org/10.1080/02640410903406208

Fransen, K., Mertens, N., Feltz, D., & Boen, F. (2017). "Yes, we can!" review on team confidence in sports. *Current Opinion in Psychology*, *16*, 98–103. https://doi.org/10.1016/j.copsyc.2017.04.024

Galli, N., & Gonzalez, S. P. (2015). Psychological resilience in sport: A review of the literature and implications for research and practice. *International Journal of Sport and Exercise Psychology*, *13*(3), 243–257. https://doi.org/10.1080/1612197X.2014.946947

Goldfarb, L., & Henik, A. (2014). Is the brain a resource-cheapskate? *Frontiers in Human Neuroscience*, *8*. https://doi.org/10.3389/fnhum.2014.00857

Gorczynski, P. F., Coyle, M., & Gibson, K. (2017). Depressive symptoms in high-performance athletes and non-athletes: a comparative meta-analysis. *British Journal of Sports Medicine*, *51*(18), 1348–1354. https://doi.org/10.1136/bjsports-2016-096455

Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The Concept of Mental Toughness: Tests of Dimensionality, Nomological Network, and Traitness. *Journal of Personality*, *83*(1), 26–44. https://doi.org/10.1111/jopy.12079

Hannon, J., Soohoo, S., Reel, J., & Ratliffe, T. (2009). Gender stereotyping and the influence of race in sport among adolescents. *Research Quarterly for Exercise and Sport*, *80*(3), 676–684. https://doi.org/10.1080/02701367.2009.10599608

Herlambang, M. B., Taatgen, N. A., & Cnossen, F. (2019). The Role of Motivation as a Factor in Mental Fatigue. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, *61*(7), 1171–1185. https://doi.org/10.1177/0018720819828569

İslam, A. (2022). The Effect of Athletic Mental Energy on Psychological Skills and Attitudes toward Soccer. *Journal of Educational Issues*, *8*(3), 149. https://doi.org/10.5296/JEI.V8I2.20473

Iso-Ahola, S. E., & Dotson, C. O. (2016). Psychological Momentum—A Key to Continued Success. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01328

Jannah, M., Halimatussa'diyah, L., & Widohardhono, R. (2019). Concentration Profiles Among Shooting Student Athletes. *Proceedings of the 3rd International Conference on Education Innovation (ICEI 2019)*. https://doi.org/10.2991/ICEI-19.2019.72

Kaplan, E., Bozdağ, B., Akif, M., Üniversitesi, E., Fakültesi, S. B., Türkiye, B. /, Üniversitesi, Y. B., & Türkiye, Y. /. (2022). The Relationship of Use of Imagery in Sports with Athletic Mental Energy. *Mediterranean Journal of Sport Science*, *5*(4), 892–903. https://doi.org/10.38021/ASBID.1162677

Khanmoradi, S., Zardoshtian, S., Fattahi, S., & Dickson, G. (2022). Investigation of the Interaction effect of Social Welfare and Elite Sport Development of Iran with Emphasis on Economic and sports variables. *Sport Management and Development*, *11*(2). https://doi.org/10.22124/jsmd.2020.17220.2378

Loy, B. D., Cameron, M. H., & O'Connor, P. J. (2018). Perceived fatigue and energy are independent unipolar states: Supporting evidence. *Medical Hypotheses*, *113*, 46–51. https://doi.org/10.1016/j.mehy.2018.02.014

Lu, F. J. H., Gill, D. L., Yang, C. M. C., Lee, P.-F., Chiu, Y.-H., Hsu, Y.-W., & Kuan, G. (2018). Measuring Athletic Mental Energy (AME): Instrument Development and Validation. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.02363

McLoughlin, E., Fletcher, D., Slavich, G. M., Arnold, R., & Moore, L. J. (2021a). Cumulative lifetime stress exposure, depression, anxiety, and well-being in elite athletes: A mixed-method study. *Psychology of Sport and Exercise*, *52*, 101823. https://doi.org/10.1016/j.psychsport.2020.101823

McLoughlin, E., Fletcher, D., Slavich, G. M., Arnold, R., & Moore, L. J. (2021b). Cumulative lifetime stress exposure, depression, anxiety, and well-being in elite athletes: A mixed-method study. *Psychology of Sport and Exercise*, *52*, 101823. https://doi.org/10.1016/j.psychsport.2020.101823

Mėlinis, R., & Vilkas, A. (2018). *Peculiarities of Sport Athlete Motivation (13–17 year) in Different Branches of Sports*.

Moesch, K., Kenttä, G., Kleinert, J., Quignon-Fleuret, C., Cecil, S., & Bertollo, M. (2018). FEPSAC position statement: Mental health disorders in elite athletes and models of service provision. *Psychology of Sport and Exercise*, *38*, 61–71. https://doi.org/10.1016/j.psychsport.2018.05.013

Mohajeri, M. H., Wittwer, J., Vargas, K., Hogan, E., Holmes, A., Rogers, P. J., Goralczyk, R., & Gibson, E. L. (2015). Chronic treatment with a tryptophan-rich protein hydrolysate improves emotional processing, mental energy levels and reaction time in middle-aged women. *The British Journal of Nutrition*, *113*(2), 350–365. https://doi.org/10.1017/S0007114514003754

Natalia, A., Yuliia, I., & Nataliia, S. (2023). Features of the relationship between the pre-start state and stress resistance in athletes of different qualifications. *Journal of Physical Education and Sport*, *23*(1), 237–246.

Ong, N. C. H. (2019). Assessing objective achievement motivation in elite athletes: A comparison according to gender, sport type, and competitive level. *International Journal of Sport and Exercise Psychology*, *17*(4), 397–409. https://doi.org/10.1080/1612197X.2017.1349822

Pakulanon, S. (2016). The effective imagery use for athletes. *Journal of Sports Science and Health*, *17*(1), 1–11. https://www.researchgate.net/profile/Sasima-Pakulanon/publication/312575826_THE_EFFECTIVE_IMAGERY_USE_FOR_ATHLETES/links/58822219aca272b7b4424bd1/THE-EFFECTIVE-IMAGERY-USE-FOR-ATHLETES.pdf

Ruiz Barquín, R., Gutiérrez García, C., & Plura Maldonado, A. (2019). Psychological characteristics of developing excellence in mixed martial arts athletes. *Revista de Artes Marciales Asiáticas*, *14*(2s), 37–39. https://doi.org/10.18002/rama.v14i2s.6005

Rusdiyanto, R. M., Subarjah, H., Mamun, A., Mulyana, Qohhar, W., Rama Yuda, B. A., & Widyaningsih, R. (2021). The Physiology and Psychological Condition of Indonesia's Elite Pencak Silat Athletes. *Annals of Tropical Medicine and Public Health*, *24*(03). https://doi.org/10.36295/ASRO.2021.24310

Şahin, S., & Bastık, C. (2019). Investigation of motivational cluster profiles and physical self perceptions of athletes performing sports at elite level in individual branches. *Journal of Human Sciences*, *16*(3), 831–843. https://doi.org/10.14687/jhs.v16i3.5802

Sari, İ., Ekici, S., Soyer, F., & Eskiler, E. (2015). Does self-confidence link to motivation? A study in field hockey athletes. *Journal of Human Sport and Exercise*, *10*(1). https://doi.org/10.14198/jhse.2015.101.03

Şekeroğlu, M. Ö. (2017). Study of the Concepts of Athletic Identity and Continuous Sport Self-Confidence in the Light of Various Variables. *Journal of Education and Training Studies*, *5*(13), 44. https://doi.org/10.11114/jets.v5i13.2901

Shenhav, A., Botvinick, M. M., & Cohen, J. D. (2013). The Expected Value of Control: An Integrative Theory of Anterior Cingulate Cortex Function. *Neuron*, *79*(2), 217–240. https://doi.org/10.1016/j.neuron.2013.07.007

Shenhav, A., Musslick, S., Lieder, F., Kool, W., Griffiths, T. L., Cohen, J. D., & Botvinick, M. M. (2017). Toward a Rational and Mechanistic Account of Mental Effort. *Annual Review of Neuroscience*, *40*(1), 99–124. https://doi.org/10.1146/annurev-neuro-072116-031526

Strand, B., & Craw, M. (2023). Focus, Flush, Reset, and Reflect: Essential Skills for Optimal Performance. *Strategies*, *36*(1), 19–30. https://doi.org/10.1080/08924562.2022.2146615

Thomas, O., & Thrower, S. N. (2022). Developing and Maintaining Sport-Confidence: Learning From Elite Athletes. *Frontiers for Young Minds*, *10*. https://doi.org/10.3389/frym.2022.675054

Vaughan, R. S., & Laborde, S. (2021). Attention, working-memory control, working-memory capacity, and sport performance: The moderating role of athletic expertise. *European Journal of Sport Science*, *21*(2), 240–249. https://doi.org/10.1080/17461391.2020.1739143

Wang, X., Janiszewski, C., Zheng, Y., Laran, J., & Jang, W. E. (2021). Deriving Mental Energy From Task Completion. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.717414

Yildiz, A. B., Dogu, G. A., Buyukakgul, S. P., & Yilmaz, C. Y. (2020). The relationship between athletic mental energy and eating behaviors. *Progress in Nutrition*, *22*(2-S), e2020017–e2020017. https://doi.org/10.23751/PN.V22I2-S.10547