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Affective Temperament and the use of Doping by Amateur and Professional Athletes

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ABSTRACT

Managing the toxic e-waste is not just the government or a particular individual's responsibility. Rather it is an integrated community work, where in everybody is aware of potential harm possessed by the e-waste they might just toss away. The electronic waste which is simply tossed into the garbage may be just simply dumped into the land, incinerated or simply burnt with the other waste releasing the toxic effluents which seep into the ground into the land, the water and in the air. With an estimate of 50 million tons of waste disposed of every year [1] the management of this sort of waste may become unmanageable in the coming years if the correct measures are not taken due into considerations. More so the harsh protocols of disposing waste taken up by the locales working in management of this waste like breaking, removal of the yolk and thereby dumping the rest of the cathode ray tubes followed by dumping, incinerating, open burning, de-soldering, acid baths and many such treatment on the e-waste manages to leach poisonous mercury, lead, beryllium, hydrocarbons, brominated dioxins and many such pollutants [2] into the natural resources we all have to consume. This paper briefly submits the main responsibilities of individual producers, the government, a consumer and public in general and how we can all together bring a significant change in the waste management.

KEYWORDS affective temperament, psychology, doping

Introduction:
The use of illegal substances among sportsmen to improve performance is a known phenomenon regulated by law. World Anti-doping Code stated by the World Anti-doping Agency (WADA) in 2004, represents the primaryandmost important documentsetting outthe standardsandrulesof anti-dopingpolicy and is updated annually.[1] However, the personality traits associated with the use of doping have not been investigated yet.

Affective temperament has been recently researched both in clinical pathology and in the healthy population. There are five type of temperaments: depressive, hyperthymic, cyclothymic, irritable, and anxious. Rovai et al. [2]emphasized that among all the affective temperamental types, hyperthymic temperament is seen as the most functional and desirable and is associated with a better ability to cope with stress and a better quality of life. Hyperthymia is characterized by an elevated level of energy, little need of sleep, extroversion, emotional intensity, and greater ability to interact with others. The other affective temperaments - depressive, cyclothymic, irritable and anxious - seem to bear a closer resemblance to anxiety and mood disorders. The predominance of cyclothymic traits was found to be associated to addiction-related problems.[3]

The present study aimed to assess the dimensions of affective temperament in both professional and amateur athletes in light of the use of legal (e.g. supplements, diets, nutrients) and illegal substances. It hypothesized that physically active individuals (professional and amateur athletes) could represent a specific temperamental profile. Although affective temperament has not yet been assessed in athletes, the present work is based on the assumptions that there is a high rate of hyperthymic traits in the physically active population. We predicted that, besides a tendency to use supplements and nutrients, a positive opinion about illegal substances or experience with doping could be observed in some of the researched individuals. In light of the present knowledge, we also hypothesized that illegal substance use would be associated to cyclothymic traits which are predominant in addiction-related problems. The present work assumed that the tendency of legal and/or illegal substance use would differentiate the affective temperament of the studied athletes.

Methods:
The present work studies 50 individuals aged 18-33 (mean 24.7 ± 3.8).The experimental group consisted of 25 competitive rowers recruited from the Regional Rowing Society "Bydgostia" in Bydgoszcz (Poland). Their results were compared to 25 control subjects from the same city who were amateur athletes practicing in one selected fitness club.

The study was approved by the Bioethical Committee of Nicolaus Copernicus University, Collegium Medicum in Bydgoszcz and has been performed according to the ethical standards laid down in the declaration of Helsinki. Participation in the study was anonymous and based on volunteers. All study subjects were informed of the aim of the research in a survey conducted at each of the aforementioned sport clubs. The clubs also agreed to the performance of research on their premises. The research questionnaires were available in designated locations and could be returned to a special sealed box.

Investigated subjects completed a 23-item psychosocial survey designed for the need of the present research. The questions concerned sociodemographic factors (age, sex, education, marital status) and body measurements (height and weight). Other questions focused on the type and motivation for sport training, the use of supplements and nutrients, the knowledge and opinions about the use of doping, including illegal substances, to improve performance.

Affective temperament was measured with the use of the 110-item TEMPS-A questionnaire, adapted to a Polish version by Borkowska et al.[4] This method allows for the assessment of the intensity of five affective temperamental dimensions:

- depressive temperament (questions 1-21),
- cyclothymic temperament (questions 22-42),
- hyperthymic temperament (questions 43-63),
- irritable temperament (questions 64-84),
- anxious temperament (questions 85-110).

The responses in the questionnaire consisted of "yes" and "no" answers selected by the participants depending on whether a statement was compatible or incompatible with the participants' personality. The scores of every particular type of affective temperament represented the quotient of the number of answers marked "yes" (dividend) and the total number of items on the respective subscale (divisor).

The study had an anonymous character, analyzed data came from surveys and TEMPS-A questionnaires fulfilled voluntary. The 100 sets of questionnaires used in the study were distributed during the study period in two sport centers of which 75 were returned. 25 sets of questionnaires were excluded from analysis because of missing data. Total of 50 cases were analyzed: 25 rowers and 25 amateurs athletes. Investigated subjects reported their sociodemographic factors (age, sex, education, marital status) and body measurements (height and weight). For some of these psychosocial and clinical variables the basic statistics (mean, median and standard deviations) were counted. Variables collected in the survey designed for the need of present research, concerning the opinion about doping legalization and the use of legal and illegal substances had a dichotomous character (yes or no). Quantitative variable consisting of the frequency of legal substance use was counted choosing among four answer options (daily, once a week, once a month, never). Reporting a type of substance use had an open-question character. The results of each TEMPS-A scale were analyzed as described above. Statistical analysis of the results was performed using Statistica 10 (StatSoft Inc. Tulsa, OK, USA). Normality of the distribution of analyzed variables was verified with the Shapiro-Wilk test, whereas homogeneity of variance was evaluated using the Levene test. Because the parameters have not followed the normal distribution, in further analysis the Mann-Whitney test was applied for between-group comparisons. Comparative groups were matched according to professionalism of investigated subjects (professional/non-professional athletes), the opinion of all study participants about doping legalization (for/against), the use of doping in the whole group (ever used/never used) and the fact whether investigated subjects noticed improvement associated with legal substance use. The results were analysed with 95% confidence intervals.

Results:

The majority of the investigated group was male (66%) with a 34% share of females. Most researched individuals (42%) had midlevel education (high school/college degree). Thirty four percent of the subjects were higher-educated individuals and 24% had vocational education. All researched individuals were single. The mean age in the group of professional athletes was 22.12 ± 2.92 years, while in the group of amateurs the mean age was 27.36 ± 2.50 years. Professional sportsmen weighed mean 73.12 ± 11.05 kg, while amateurs 76.32 ± 15.39 kg. The mean height in the professional group was 181.76 ± 8.90 cm and 170.68 ± 13.37 cm in the amateur group. The mean BMI of was 22,04 ± 2,04 in competitive rowers and 24,25 ± 2,92 in amateur sportsmen.

All responders had a tendency to use legal substances at least once a month. Among amateur athletes, the use of legal substances did not significantly correlate with sex. The most popular substances were: vitamin supplements (n=17), protein-carbohydrate nutrients (n=13), keratin (n=11), and 3-hydroxy-3-methyl-butyric HMB (n=8). Among professional athletes male responders declared that they most often used keratin (n=10), vitamins (n=10), protein-carbohydrate nutrients (n=15), and amino-acid supplements BCAA (n=9). The most popular substances taken by women were vitamins (n=6) and carbohydrate nutrients (n=6).

Sixty-four percent of professional and 34% of amateur sportsmen used these substances on a daily basis. The majority of professionals (76%) and 44% of amateurs considered it to be healthy. Only 8% of professionals and 20% of amateurs expressed a negative opinion about legal substances and considered them to be harmful to their health.

All the professionals and 85% of the amateurs were non-smokers. Only 40% of professional athletes and 68% of amateurs declared alcohol use but not for doping purposes.

Doping was admitted only in the group of amateur athletes. Six investigated subjects admitted to taking testosterone while eight subjects declared the use of marijuana.

Illegal doping substances most known by responders consisted of anabolics, hormones, blood doping, and psychostimulants. The majority of subjects declared that they would never use doping and were against its legalization. Only 4% of professional and 8% of amateur athletes admitted to be ready to use illegal substances in order to improve their results. Four percent of professionals and 24% of amateurs supported the legalization of illicit substances. However, awareness of illegal substances was greater among professionals (88%). Sixty-four percent of amateur sportsmen were not able to identify illegal substances properly.

Table 1 about here

Among all the affective temperamental measures, there was a statistically significant difference (U=0.64, p<0.01) between the occurrence of hyperthymic temperament and other affective temperaments. This difference applied to the whole investigated group (n=50). A comparison of the two investigated groups (Table 1) shows a significant difference in the rate of cyclothymic temperament which was higher in the group of professional athletes than in the group of amateur sportsmen.

Table 2 about here

As shown in Table 2, in the whole group (n=50) the rate of hyperthymic temperament was higher in the group of individuals who used doping (n=14) than among athletes who declared never having used doping (n=36).

Table 3 about here

Individuals expressing a positive opinion about the use of illegal substances and their legalization were also characterized by a higher rate of hyperthymic affective temperament compared to athletes whose opinion about illegal substances was unfavorable (Table 3). The rate of hyperthymic temperament was also higher in the group of sportsmen who noticed a performance improvement (U= 0.69 ±0.14, p<0.01) after legal supplementation compared to athletes who noticed no improvement (U=0,57 ±0,18, p<0.01) . These individuals were also characterized by a tendency of increased depressive temperament, however this finding was not statistically significant.

Discussion:

As predicted, hyperthymic temperament was predominant in the investigated group as compared with other temperamental types (depressive, cyclothymic, irritable and anxious).

Among all the five affective temperamental traits, hyperthymic temperament is considered to be an adaptive and protective factor representing, metaphorically, the "bright side", while the other four affective temperaments represent the "dark side" of human nature.[5,6] This seems to be confirmed by a recent study conducted by Walsh et al.[7] measuring affective temperament expression in daily life. The authors investigated 138 healthy participants and found that hyperthymic temperament was associated with positive affect, fullness of thought, doing exciting things, grandiosity, and a preference to seek the company of others in daily life. In this light, the present research shows sportsmen as a population with specific traits associated with the undertaking of exciting activity and sociability. The results of the present work differ from those found in the study of the Polish population of students in whom anxious and irritable traits were most dominant. [4] However, a study by the same authors established the predominance of hyperthymic temperament in military pilots. [8] Similar results were found by authors investigating males applying to become air force cadets.[9] A comparison of these results shows that physically active subjects from the investigated group were closer to the pilot rather than to the student population. Military pilots work in situations that require them to take quick decisions under pressure and in dangerous circumstances. Athletes may develop similar skills while competing with others as competition also requires quick decisions under stress. Both groups represent goal-directed behavior in emotionally demanding circumstances. The study of Tei-Tominaga et al. [10]confirms this assumption by finding that individuals with a higher rate of hyperthymic temperament were more resistant to stress while persons with a high rate of depressive and anxious temperaments were significantly less likely to be resistant to stressful situations. The predominance of hyperthymic temperament seems also to be a significant protective factor against suicide.[11,12]

Although the individuals from both groups were predominantly hyperthymic, professional athletes were found to have significantly more cyclothymic traits than amateurs. In the above cited study of healthy subjects, [7] cyclothymic temperament positively correlated with negative affect, risky behavior, restlessness, and negatively correlated with positive affect and a preference to socialize in daily life. In this light, although professional athletes represented an overall hyperthymic profile as a group, they could differ from amateurs in their tendency of mood changes that could also lead to negative affect. It cannot be excluded that a higher prevalence of cyclothymic traits could be associated with a professional approach to sport as not only recreation but also a field of rivalry.

Most studies of affective temperament found cyclothymic temperament to be predominant in the context of specific professional skills or in clinical pathology. The predominance of cyclothymic traits seems to be characteristic for populations of psychiatric patients diagnosed with type II bipolar disorders [13,14]and play an important role in the relationship between atypical depression and bulimia nervosa. [15] Studies in children and young adults showed the association between cyclothymic temperament and extremes of emotionality, sleep disorders, increased sensitivity to separation, eating disorders in females and antisocial-aggressive behavior in males. [16]

The predominance of cyclothymic traits in clinical settings refers also to addiction. Khazaal et al. found that among patients addicted to alcohol or opiates, cyclothymic temperament was predominant among individuals with bipolar disorder and, to lesser extent, in patients with unipolar depression. [17]In the comparative group of subjects with "no or substance-induced mood disorders", the rate of cyclothymic temperament was still the highest among patients addicted to opiates. Pacini et al. found cyclothymic temperament to be predominant in alcohol-dependent patients irrespective of comorbid psychiatric diagnosis. [18]

However, the present findings of a higher prevalence of cyclothymic traits in professional sportsmen should be interpreted in the context of the possession of specific skills rather than pathology. Akiskal et al. found cyclothymic temperament to be predominant in artists and architects, while hyperthymic temperament played a central role among managers, journalists and self-employed businessmen. [19] In the study of Figueira et al. investigating affective temperament of individuals of different professions, the highest scores in the scale of cyclothymic affective temperament was most characteristic of artists and lawyers while hyperthymic temperament was predominant among engineers.[20]Depressive and anxious temperaments were highest among students of psychology and nursing. In this light, professional sportsmen could be closer to individuals with a predisposition to creativity in shifting and stressful work situations. When compared to the professionals, amateur athletes may lack such traits as they undertake sport "for fun" in a less demanding way. The association between a predominance of cyclothimic traits and the predisposition to proficiency in sport seems worth considering.

In the present study, despite having potentially protective and stress coping advantages, hyperthymic traits were also associated with illegal substance use. It is worth emphasizing, however, that this refers solely to the amateur athlete group. Among these individuals, a higher rate of hyperthymic temperament was associated not only with expressed approval of doping legalization but also with admitted illegal substance intake. Although cyclothymic temperament was not found to be associated with illegal substance use, these findings still encourage interpretation of the predominance of hyperthymic traits in light of substance abuse-related problems. In the study of Khazaal et al. cited above [17], the scores of hyperthymic temperament were lower than the predominant cyclothymic temperament but higher than the other temperamental types. This implies that in the case of addiction, besides the tendency of mood changes that seems to be most associated with clinical pathology, hyperthymic traits also play an important role. Hyperthymic affective temperament has been shown as having a mirror opposite load in factor analyses as novelty seeking according to the model of Cloninger.[21] Novelty seeking is a dimension that is associated with the need for additional stimulation provided by new situations. Perhaps the need to experience new situations could apply to a wide range of behavior in this group – not only to the undertaking of sport activities in non-professional way but also to the experimenting with illegal substances. It is worth mentioning that the use of legal substances such as alcohol and tobacco was also higher in the group of amateur athletes. Therefore, the present results show hyperthymic temperament as leading to the undertaking of risky behaviors. As it was established that the rate of hyperthymic temperament was also higher in the group of sportsmen who noticed improvement after legal supplementation, it could be concluded that this type of temperament might also be associated with the increased need of stimulation of the reward system. Such a mechanism could apply to the majority of individuals in the investigated group as they were frequent legal substance users.

The present study has a preliminary character and should be interpreted in light of its limitation due to small sample size, the predominance of male subjects and differences in educational level among subjects which can be treated as potential sources of bias. Although there is no data associated with the influence of educational level on affective temperament, in previous studies male sex was associated with the predominance of hyperthymic traits, which could explain the higher hyperthymic rate in the investigated group.[2]Another limitation refers to the context of voluntary, anonymous research which did not allow to direct contact with investigated subjects and to verify obtained data. Further limitations are associated with the specificity of methods used. Compared to other measures used in the assessment of personality, the TEMPS-A has a relatively shorter history, although it is being increasingly used in different language and item versions.

Conclusion:
The present study is the first that investigated affective temperament in athletes. It showed that despite common hyperthymic traits, the groups of professional and amateur sportsmen temperamentally differed from each other. It also suggested that hyperthymic and cyclothymic temperament do not have to be interpreted in terms of "functional" and "non-functional" traits. Hyperthymic temperament may be related to experimenting with risky behaviors while cyclothymic features may refer to greater professionalism in sport.

Table 1. Differences in affective temperament rates in groups of professional (n=25) and amateur (n=25) athletes. Mean value±SD.

Affective temperament	Professionals	Amateurs
depressive	0,20 ± 0,10	0,24 ± 0,14
cyclothymic	0,30 ± 0,18*	0,21 ± 0,17*
hiperthymic	0,63 ± 0,16	0,64 ± 0,18
irritable	0,22 ± 0,16	0,20 ± 0,17
anxious	0,16 ± 0,16	0,20 ± 0,18

*Difference significant p<0.05, U Mann-Whitney Test.

Table 2. Differences in rates of affective temperament among all investigated athletes (n=50) who were for or against doping legalization. Median value ±SD.

Affective temperament	For	Against
depressive	0,21 ± 0,11	0,22 ± 0,12
cyclothymic	0,20 ± 0,05	0,26 ± 0,19
hiperthymic	0,82 ± 0,08*	0,61 ± 0,16*
irritable	0,25 ± 0,20	0,20 ± 0,16
anxious	0,13 ± 0,08	0,19 ± 0,18

*Difference significant p<0.01, U Mann-Whitney Test.

Table 3. Differences in rates of affective temperament among athletes who ever used (n= 14) or never used (n= 36) doping. Mean value±SD.

Affective temperament	Never used doping	Used doping
depressive	0,23±0,12	0,21±0,11
cyclothymic	0,26±0,19	0,19±0,07
hiperthymic	0,62±0,16*	0,78±0,18*
irritable	0,21±0,17	0,21±0,20
anxious	0,19±0,17	0,11±0,08

*Difference significant p<0.01, U Mann-Whitney Test.

Table 5. Differences in rates of affective temperament between athletes who had noticed improvement or lack of improvement after legal supplementation.

Affective temperament	Improvement	Lack of improvement
depressive	0,19 ±0,11	0,27 ±0,12
cyclothymic	0,26 ±0,19	0,24 ±0,16
hiperthymic	0,69 ±0,14*	0,57 ±0,18*
irritable	0,22 ±0,16	0,18 ±0,18
anxious	0,18 ±0,18	0,19 ±0,13

*Difference significant p<0.01, U Mann-Whitney Test.

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