

Temperament and Character Traits of University Students with Regard to Physical Activity Level

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ABSTRACT

The purpose of this study was to examine temperament and character traits among university students in terms of physical activity level. Data were collected from college students ($n = 177$; $M_{age} = 20.57 \pm 1.61$) in Fall 2016. Temperament and Character Inventory (TCI) and International Physical Activity Questionnaires (IPAQ) were administered to participants. 83 of participants (46.9%) were grouped as "high level of physical activity group", 30 of them were grouped as "moderate level of physical activity group" (16.9%) and 64 of them (36.2%) were grouped as "low level of physical activity group" according to IPAQ. The low level of physical activity group had higher scores of novelty seeking, reward dependence, and self-transcendence, and lower scores of persistence compared with the high level of physical activity group. Additionally, there was not a significant difference in terms of temperament and character sub-dimensions between the high and moderate groups. We demonstrated that there have been significant differences, specifically between the low and high level physical activity groups, in terms of temperament and character traits. Further studies are needed to clarify the role of temperament and character traits in physical activity behavior.

Keywords: Temperament, character, physical activity

ÖZET

Üniversite Öğrencilerinin Fiziksel Aktivite Düzeylerine Göre Mizaç ve Karakter Özellikleri

Bu araştırmanın amacı, üniversite öğrencileri arasındaki mizaç ve karakter özelliklerini fiziksel aktivite düzeyi açısından incelemektir. Veriler üniversite öğrencilerinden ($n = 177$; $M_{age} = 20,57 \pm 1,61$) Güz 2016'da toplandı. Katılımcılara Mizaç ve Karakter Envanteri (TCI) ve Uluslararası Fiziksel Aktivite Anketleri (IPAQ) uygulandı. Katılımcılardan 83'ü (%46,9) IPAQ'ya göre "yüksek düzeyde fiziksel aktivite grubu" olarak, 30'u (% 16,9) "orta düzeyde fiziksel aktivite grubu" olarak ve 64'ü (% 36,2) "düşük düzeyde fiziksel aktivite grubu" olarak gruplandırıldı. Düşük düzeyde fiziksel aktivite grubunun, yüksek düzeyde fiziksel aktivite grubuyla kıyaslandığında; yenilik arayışı, ödül bağımlılığı ve kendini aşma alanlarında daha yüksek, sebatkarlık alanında ise daha düşük puanlara sahip olduğu görüldü. Ayrıca, orta ve yüksek düzeyde fiziksel aktivite grupları arasında mizaç ve karakter alt boyutları bakımından anlamlı bir fark bulunmamıştır. Mizaç ve karakter özellikleri bakımından, özellikle alt ve üst düzeyde fiziksel aktivite grupları arasında, anlamlı farklılıklar olduğunu gösterdik. Fiziksel aktivite davranışı üzerinde mizaç ve karakter özelliklerinin rolünü açıklığa kavuşturmak için daha ileri çalışmalara ihtiyaç duyulmaktadır.

Anahtar sözcükler: Mizaç, karakter, fiziksel aktivite

INTRODUCTION

The promotion of physical activity is an important priority for public health because living in an active life is widely known to have physical and psychological health benefits.¹ Although the evidence supporting the benefits of physical activity on health, many people are either sedentary or infrequently active.² It is estimated that 72 % of Turkish people are highly inactive.³ In this regard, some investigations examined the reason for not engaging in physical activity. Understanding why individuals live an active or inactive life is complex and multifaceted; encompassing personal, interpersonal, environmental, and policy determinants.^{4,5}

Personality traits are characteristic attitude and behaviour patterns that severalize a person from other people.⁶ Some components of personality can stay firm across the lifespan, however, personality can also change. Researches on this field have shown that personality traits, such as conscientiousness and extraversion, relate to perceived barriers and motives towards physical activity;⁷ metabolic rate and aerobic capacity;⁸ and sedentary behaviour, such as leisure-time sitting⁹ and engagement of computer.¹⁰ A longitudinal survey of two adult samples determined proof that physical activity promotes to personality trait stability at midlife and during old age. Furthermore, the research indicated that adults stating high levels of physical activity at baseline had more stable personality traits over the next 4 to 10 years.¹¹

Additionally, the temperament and character dimensions have strong biological and social foundations, and include dimensions assessing approaching/avoidance orientations and personal society relationships, which are not covered by the Big Five personality traits.¹² A conceptual framework frequently used in this area is Cloninger's psychobiological model.¹³ Cloninger's model consists of four temperament and three character dimensions, all of which are viewed as being the results of continuous interactions during the lifespan.¹⁴ Temperament is largely genetically determined, independently manifested in early life, and configures automatic behavior responses. Four dimensions of temperament are Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD), and Persistence (P).¹⁵ There was no study found which explores how temperament and character dimensions impact the level of physical activity. Research on this issue only clarifies how such dimensions affect exercise dependence. According to the studies,¹⁶⁻¹⁹ exercise dependent individuals are disposed to present personality characteristics, such as obsessive-compulsiveness, neuroticism, low self-esteem, perfectionism, and high trait anxiety. Even though Iannos and Tiggerman (1997) did not indicate any association between physical activity and dysfunctional personality (e.g., external locus of control, greater obsessive-compulsiveness, and lower self-esteem) in exercise dependents, most of the studies have found a positive relationship between exercise dependence and perfectionism,²⁰⁻²⁴ obsessive-compulsiveness,^{25,26} trait anxiety,^{20,27} and extraversion.²⁸ Additionally, a negative relevance has been found between exercise dependence and self-esteem.^{24,27} Primary exercise dependents become distinct from controls in both temperament and character dimensions corresponding with personality characteristics. They demonstrated lower levels of self-directedness; indicating difficulties in accepting responsibility, lack of long-term goals, low self-esteem, and struggle for identity.²⁹ Other studies have stated a negative relationship between self-esteem and exercise dependence.^{16,19,24}

Rising rates of unhealthy behavior and declining physical activity levels have increased interest in understanding personal factors that underlie these trends. Accordingly, examination of temperament and character traits across physical activity level is important for improving understanding for health programming. This study also advances

knowledge on the dimensional psychobiological model of personality in exercise, which is yet to be well studied in exercise psychology. Therefore, the aim of this present study was to examine differences in temperament and character traits with regard to physical activity level in college students. Our hypothesis was that temperament and character traits would differ in terms of physical activity level.

METHODS

Population and Sampling

Data were collected from 177 university students (55 males, 122 females). These volunteer participants were aged between 18-30 years ($n_{\text{male}}=55$; $M_{\text{age}}=20.84\pm1.77$ and $n_{\text{female}}=122$; $M_{\text{age}}=20.45\pm1.53$). The inclusion criteria were as follows: Being aged between 18-30 and willing to participate in the study. Having any medical disease that would disturb physical activity, being diagnosed with any psychiatric disorder, being addicted to smoking, being unwilling to participate in the study were determined as exclusion criteria. The written informed consents were approved by each participant. Additionally, all participants approved verbally of the present study after given the detailed procedure of the study. The study was authorized by the ethics committee of Namik Kemal University.

Instrument

Participants completed a demographic questionnaire, International Physical Activity Questionnaire, and the Temperament and Character Inventory (TCI). Survey completion took approximately 40 minutes.

Temperament and Character Inventory (TCI). TCI is a self-reported questionnaire that consists of a 240-item self-report questionnaire, in which each item is a true/false question.^{12,30} This scale measures four dimensions of temperament and three dimension of character. The temperament dimensions reflect individual variants in emotional replies to conditional stimuli. The temperament subclasses are, harm avoidance, novelty seeking, reward dependence, and persistence. The character dimensions evaluate personal differences in higher cognitive process which are not innate parameters of behavior. Character subclasses are self-directedness (SD), cooperativeness (CO), and self-transcendence (ST). Cronbach's α for each dimension in the present sample was: 0.61 for NS, 0.86 for HA, 0.64 for RD, 0.58 for PS, 0.81 for SD, 0.74 for CO, and 0.83 for ST. Although the α coefficients for NS, RD, PS, and CO were somewhat lower in the present sample than in the original study,¹² the similar pattern of relatively high internal consistency reliability for character dimensions (i.e., around 0.75 to 0.85 for all three dimensions) relative to temperament dimensions (i.e., around 0.55 to 0.60 for RD and PS) has been observed in a number of studies conducted in other countries including Sweden,³¹ France,³² Korea,³³ and Germany.³⁴ TCI has been reported to be validated and reliable in Turkish language.³⁵

International Physical Activity Questionnaire (IPAQ). IPAQ is a validated instrument to determine the participants' physical activity level.³⁶ IPAQ measures the frequency, duration, and level of intensity of physical activity in the last seven days across all contexts and allows for the calculation of metabolic equivalents (MET). MET presents the weekly amount of physical activity. It is a product of frequency, duration, and intensity of the physical activity performed in the last seven days. Physical activity related METs as hours per week (MET-hours/week) were calculated according to the existing guidelines.³⁷ Based on the self-reported MET, frequency and intensity of the physical activity, people can be classified into a low, moderate, and high level of physical activity group. In this study, participants' PA levels were evaluated the Turkish short version of IPAQ. Translation and validation study of

Turkish version for the university students indicated an evidence for construct validity, criterion validity (accelerometer-IPAQ short form) ($r = .30$), and test retest stability ($r = .69$).³⁸

Data Analysis

Data was analyzed by SPSS (Statistical Package for Social Sciences) for Windows 15.0 software program. Confidence Interval was noted as 95 % and a two tailed p value < 0.05 was accepted as statistical significance. The numerical data was expressed as mean \pm SD and percent values used for descriptive statistics. Categorical parameters were assessed with χ^2 test. Shapiro-Wilk and Kolmogorov-Smirnov tests were used to determine whether the numerical data were parametric. The parametric numeric data was evaluated with student t test. The comparison of more than two groups was assessed with a series of one-way analysis of variants (ANOVA). Tukey HSD was applied for pair wise analysis of three groups.

RESULTS

The present study consisted of 177 participants. The mean age of the participants was 20.57 ± 1.61 . 122 of the participants were female (68.9%) and 55 of participants were (31.1%) male. 73 participants (41.2%) were studying nursing, 28 participants (15.8%) were studying medical laboratory techniques, 31 participants were studying elder care, and 45 participants were studying physical education and sports (25.4%). 92 of the participants (52%) were exercising regularly, 85 of participants were exercising irregularly or were not exercising. All participants were single and 40 of them (22.6%) had lower income, 131 of them (74%) had medium income, and 6 of them (3.4%) had higher income. 83 of participants (46.9%) were grouped as "high level of physical activity group", 30 of them were grouped as "moderate level of physical activity group" (16.9%), and 64 of them (36.2%) were grouped as "low level of physical activity group" according to IPAQ (Table 1).

Table 1. Demographical and Exercise Characteristics of Participants

	n=177
Age (years)	20.57 ± 1.61
Gender	
Male	55(%31.1)
Female	122(%68.9)
Occupation	
Nursing	73(%41.2)
Medical Laboratory Techniques	28(%15.8)
Elder Care	31(%17.6)
Physical Education and Sports	45(%25.4)
Exercising Style	
Regularly	92(%52)
Irregularly	85(%48)
Exercising Level	
High PA	83(%46.9)
Moderate PA	30(%16.9)
Low PA	64(%36.2)

PA: physical activity

$p=0.97$). The mean score of NS was 20.5 ± 6.78 in the high level of physical activity group, 20.55 ± 7.04 in the moderate level of physical activity group, 23.67 ± 8.73 in the low level of physical activity group. The mean NS score was significantly different between groups ($F=3.51$,

$p=0.032$). Post-hoc tukey test revealed that the score of NS was significantly higher in low level of physical activity group compared with high level of physical activity group ($p=0.035$). The mean values of RD were 12.25 ± 6.44 , 12.27 ± 6.33 , 15.26 ± 9.12 in high level of physical activity group, moderate level of physical activity group, and low level of physical activity group, respectively. The mean score of RD was significantly different between groups ($F=3.23$; $p=0.04$). The RD score was significantly higher in the low level of physical activity group compared with high level of physical activity group ($p=0.046$). The mean scores of P were also significantly different between groups ($F=5.45$; $p=0.005$). High level of physical activity group had significantly higher score compared with low level of physical activity group ($p=0.006$) (Table 2).

Among character subclasses, the mean scores of SD were found to be similar between groups ($F=0.80$; $p=0.45$). The mean values of C were also found to be similar between groups ($F=1.12$; $p=0.052$). The mean score of ST was 12.73 ± 6.55 in the high level of physical activity group, 11.68 ± 6.58 in the moderate level of physical activity group, 15.67 ± 8.59 in the low level of physical activity group. There was a significant difference between groups in terms of ST scores ($F=4.06$; $p=0.02$). The mean score of ST was significantly higher in the low level of physical activity group compared with both of the other groups ($p=0.047$; 0.044) (Table 2).

DISCUSSION

The main results of present study were as follows: the low level of physical activity group had higher scores of NS, RD, and ST, and lower score of P compared with the high level of physical activity group. Additionally, there was not a significant difference in terms of temperament and character sub-dimensions between high and moderate groups. As mentioned in the introduction section, the number of studies that investigated the associations between temperament and character traits and exercising are limited.^{16,19,24,29} Moreover, the studies that mentioned the relationship between exercising and temperament and character traits were mostly targeting exercise dependence.^{16,19,24,27,29} The present study is the first to demonstrate the differences between temperament and character traits in different physical activity groups.

Temperament is defined as behavioral characteristics that can be sourced from emotions and impulses. Temperament is constructed in early ages, moreover, it can be said that temperament is innate. The temperament traits endure during the lifespan and they are more constant than character traits. Character traits are also important parts of personality. Character traits are considered to be associated with rationality and personal will. Character traits include moral values, such as love, hope, beliefs, attitudes etc. As a result character traits are rulers and judges.^{12,39}

Temperament and character personality model was created by Cloninger.¹² Cloninger defined neurobiological association between temperament traits. According to this definition NS is associated with the dopaminergic system, HA is associated with the serotonergic system, and RD is associated with the noradrenergic system.^{12,29} After this first definition, there have been cumulative data that explained the complex associations between temperament and character traits and neurobiological systems.^{12,29,39}

In our study, the low level of physical activity group had significantly higher NS scores compared with the high level of physical activity group. Higher NS means irritability, rapid excitability, curiosity, enthusiasm, impulsivity, and irregularity. The advantages of higher NS are being open-minded and sometimes creative. The individuals who had higher NS trait are enthusiastic for finding potential rewards.

The disadvantages of NS are anger and inconsistency, which is due to quickly giving up and inconsistency in other daily tasks. Regular exercising and high level of exercise are associated with a constant lifestyle.³⁹ Regarding the data that mentioned higher NS in the low level of physical activity group, our results suggest that individuals, who had irregular and inconsistent lifestyle, namely had higher levels of NS, may consider regular exercise as an ordinary life event, not as a novelty. But, further studies are needed to confirm our results and explain the role of NS in attitudes toward regular exercise.

Table 2. The comparisons of subscores of Temperament and Character Inventory between Physical Activity Groups.

	High PA (n=83)	Moderate PA (n=30)	Low PA (n=83)	Statistic
Novelty seeking	20.5±6.78	20.55±7.04	23.67±8.73	F=3.51, p=0.032*
Harm avoidance	17.21±5.39	16.96±5.32	17.10±6.67	F=0.21; p=0.97
Reward dependence	12.25±6.44	12.27±6.33	15.26±9.12	F=3.23; p=0.04*
Persistence	8.57±1.92	6.67±1.76	4.64±1.79	F=5.45; p=0.005**
Self-directedness	20.58±7.05	19.86±7.73	21.85±7.78	F=0.80; p=0.45
Cooperativeness	17.89±8.21	15.75±8.00	16.15±6.68	F=1.12; p=0.052
Self-transcendence	12.73±6.55	11.68±6.58	15.67±8.59	F=4.06; p=0.02*

PA: physical activity, *: >0.05, **: >0.01

RD is associated with emotional responsivity, social attachment, and considering the confirmation of others. Higher scores of RD mean sensitivity, high emotionality, dependence, and sociality. These people usually seek for relationship with others and are also open-minded. The most important disadvantages of high RD are losing objectivity and being affected by others. Contrarily the low scores of RD can be expressed as inflexibility, being practical, and being insensitive to social events.^{12,29,39} In our study, high score of RD in the low level of physical activity group may be considered as regular exercise not meeting the needs of individuals who had high RD scores.

P is defined as persist to frustration and fatigue. The individuals who have high levels of P are usually hardworking, patient, and willing to work. They challenge frustration and fatigue. They usually do not give up and when they are criticized they will face their mistakes. These people are also perfectionist and tempt to adjust crises.^{12,39} In our study, we found that the high level of physical activity group had higher scores of P. Thus, P might be well associated with higher level of physical activity.

Among character traits we found that the mean score of ST was significantly higher in the low level of physical activity group compared with the high level of physical activity group. Individuals who have higher level of ST are defined as creative, helpful, and spiritual. In eastern countries these people are accepted as wise, however, in western countries they are defined as deceivable. These people can tolerate uncertainty and they can enjoy most of activities, even ones they cannot control. They are also able to accept the reality of death and they can face death easily.^{29,39} Regarding these issues about ST, we can say that higher level of physical activity is associated with being well, healthy, and surviving longer. Thus, it is plausible to understand higher level of ST in the low level of physical activity group compared with higher level of physical activity group.

There are some limitations of this present study. Firstly, although both scales were validated and reliable in the Turkish language, they were self-reported; so this issue might be considered as a limitation. Because there have been no similar studies, we could not calculate

sample size estimation and power analysis; which might be considered as another limitation.

The present study is the first to demonstrate the differences of temperament and character traits in different physical exercise groups. We demonstrated that there have been significant differences between specifically low and high level exercises groups in terms of temperament and character traits. Further studies are needed to clarify the role of temperament and character traits in exercising attitudes.

CONCLUSION

It was concluded that physical activity level was significantly associated with temperament and character traits of university students. The findings have demonstrated that participants with high physical activity level had lower scores of novelty seeking, reward dependence, and self-transcendence and higher score of persistence than in the low level of physical activity group.

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