

Mediator Role of Perceived Stress in the Relationship between Positive/Negative Emotions and Mental Toughness

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Abstract

The main purpose of this research is to identify the mediator function performed by perceived stress level in the relationship between positive and negative emotions and mental toughness. 383 athletes voluntarily participated in the research, 252 (65.7%) male and 131 (34.2%) female. The athletes' ages are between 15 and 55 (19.41±5.57). As part of the convenience sampling approach, data were collected from 40 of Turkey's 81 provinces online (using a web-based Google form). The questionnaire consists of two parts. In the first part, there are questions about the demographic characteristics of the athletes. In the second part, some questions measure perceived stress, positive/ negative emotions, and mental toughness information in sports. Confirmatory factor analysis was used to understand whether the scales were suitable for the sample group and to increase the reliability of the mediator model. In the study, the effect of negative and positive emotions on mental toughness was tested with Simple Linear Regression Analysis. The mediating function of perceived stress in the relationship between positive and negative emotions and mental toughness was evaluated using the SPSS PROCESS macro (Model 4; Hayes, 2018). The direct effect of negative emotions on mental toughness was statistically significant ($\beta=-0.2629$; $p<0.05$). In addition, the direct effect of positive emotions on mental toughness was statistically significant ($\beta=0.3720$; $p<0.05$). Increased negative emotions in athletes were associated with increased perceived stress, predicting lower mental toughness. Once again, increased positive emotions in athletes were associated with a partial effect with reduced perceived stress, predicting relatively higher mental toughness.

Keywords: Mental toughness, Negative emotions, Perceived stress, Positive emotions.

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**Pozitif/Negatif Duygular-Zihinsel Dayanıklılık İlişkisinde
Algılanan Stresin Aracı Rolü**

Öz

Bu araştırmanın temel amacı; pozitif-negatif duyguların zihinsel dayanıklılığa etkisi ve bu etkide algılanan stres düzeyinin aracı (mediatör) rolünü belirlemektir. Araştırmaya gönüllü olarak 252'si (%65.8) erkek, 131'i (%34.2) kadın olmak üzere 383 sporcu katılmıştır. Sporcuların yaşları 15 ile 55 (19.41±5.57) arasında değişmektedir. Araştırma elde edilen veriler kolayda örnekleme yöntemi kapsamında Türkiye'deki 81 ilin 40'ından online olarak (web tabanlı Google form) elde edilmiştir. Anket, iki kısımdan oluşmaktadır. İlk kısımda; sporcuların demografik bilgilerini içeren sorular yer alırken ikinci kısımda; pozitif/negatif duygular, algılanan stres ve sporda zihinsel dayanıklılığı içeren sorular yer almaktadır. Ölçeklerin örnekleme grubu için uygun olup olmadığını anlamak ve aracı model içerisindeki güvenilirliği arttırmak amacı ile doğrulayıcı faktör analizinden faydalanılmıştır. Çalışmada, negatif ve pozitif duyguların zihinsel dayanıklılık üzerindeki etkisi Basit Doğrusal Regresyon Analizi ile test edilmiştir. Pozitif ve negatif duygular ile zihinsel dayanıklılık arasındaki ilişkide algılanan stresin aracılığını test etmek için SPSS PROCESS makrosu (Model 4, Hayes, 2018) kullanılmıştır. Negatif duyguların zihinsel dayanıklılık üzerindeki direkt etkisi istatistiksel olarak anlamlıdır ($\beta=-0.2629$; $p<0.05$). Ayrıca, pozitif duyguların zihinsel dayanıklılık üzerindeki direkt etkisi istatistiksel olarak anlamlıdır ($\beta=0.3720$; $p<0.05$). Sporcularda artan negatif duygular, artan algılanan stres ile ilişkilendirildi ve bu düşük zihinsel dayanıklılığı öngördü. Yine, sporcularda artan pozitif duygular, azalan algılanan stres ile kısmi bir etkiyle ilişkilendirildi ve bu durum nispeten daha yüksek zihinsel dayanıklılığı öngördü.

Anahtar kelimeler: Algılanan stres, Negatif duygular, Pozitif duygular, Zihinsel dayanıklılık.

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Introduction

Within the concept of sports; competition can be considered a phenomenon involving competition and ranking. Although this phenomenon can be classified in different ways, it is also known that it is considered an individual and team sport in many studies. Since the athlete is also the person involved in this phenomenon, it is necessary to consider the phenomenon of sports together with the components that make up the human being (sensory, emotion, personality, and spiritual). Examining the effects of these components that make up the human being on the athlete has been the focus of researchers throughout the history of science. The common point of the researchers is; success or failure in sports has a multifactorial structure with physical, technical, tactical, and psychological factors (Liew et al., 2019). It is known that psychological factors are also effective in determining the winner or the loser (Gould et al., 2009). Athletes are exposed to internal and external variables both in training and during competitions. External factors can be exemplified as ground, opponent, spectator, weather conditions, clothing, etc. We can give an example of the concept that can make many moods under positive (positive) emotions and negative (negative) emotions. For example, positive emotions are concepts such as happy, joyful, good, calm, confident, stress-free, carefree, depressed, and eager; for negative emotions, we can count concepts such as unhappy, sad, bad, scared, angry, dejected, stressed, anxious, depressed, and reluctant (Er et al., 2008). Being aware of these positive-negative emotions and being able to express them correctly have important effects on both our mental and physical health and our life satisfaction (Kuzucu, 2006). In this context, competitions provide important opportunities for the individual in terms of experiencing positive-negative emotions and understanding emotions.

Stress is one of the negative emotions that individuals feel from time to time in different periods of their lives, and are affected in terms their physical and mental health. Stress is the body's non-specific response to a request (Selye, 1956). Perceived stress is the rating of uncontrollable, unpredictable, and overload levels (Roberti et al., 2006). Negative and improbable events in life are stressful experiences (Gerber et al., 2013a). These experiences are also valid for the athlete during the competition. In addition, it is stated that sports affect coping with these experiences, as well as reducing mental stress by reducing depression and anxiety (Bakır, 2017).

We often try to cope with these situations when we feel negative emotions in our lives. While people can sometimes cope with these feelings very easily, sometimes they cannot. Mental toughness is expressed as coping/overcoming (Gerber et al., 2015); in addition to being able to exhibit positive (positive) energy and positive behavior in unexpected situations (as cited in Crust, 2008), it also shows itself in overcoming stressful situations in life (Gerber et al., 2013a). At the same time, it is multidimensional as it includes cognitive, affective, and behavioral components (Crust and Azadi,

2010). From the point of view of athletic success, it is emphasized that mentally strong athletes are more advanced in both training demands and competing with their opponents. Athletes who with under pressure are thought to be more consistent and superior in staying determined, focused, confident, and in control. In other words, it has been revealed in different studies that athletes with higher mental toughness levels experience lower levels of anxiety and have more effective responses to cope with stressful situations (Jones et al., 2007; Sheard et al., 2009; Crust & Azadi, 2010; Wu et al., 2021).

In summary, for athletes in a particular sport, the perceived pressure to reach the top under pressure and cope successfully with challenges can cause stress. The most important factor affecting high performance and success is the ability to stay psychologically strong and maintain motivation in challenging/disturbing situations. This ability is expressed as mental toughness and there is sufficient evidence that it is closely related to coping in general (Romanova, 2021).

The Relationship between Positive and Negative Emotions and Perceived Stress

Annen et al. (2017) found that individuals with negative emotions had higher perceived stress levels. Despite this situation, Wilson et al. (2019) stated that individuals with relatively higher levels of positive emotions have higher levels of coping with stress.

In line with all these theoretical and factual studies; it is thought that the emotions of the athletes may have a positive/negative effect on their stress levels. Based on this situation, the following hypotheses have been developed:

H_{1a}: Positive emotions affect perceived stress.

H_{1b}: Negative emotions affect perceived stress.

The Relationship between Perceived Stress and Mental Toughness

Gerber et al. (2013a) stated the concept of mental toughness as the source of stress resistance. Moreover, high mental toughness was associated with lower stress and depressive symptoms (Gerber et al., 2013b). Similarly, in a study conducted on a sample of South African tennis players, a negative correlation ($r=-0.44$) was found between mental toughness and stress (Cowden et al., 2016).

Gerber et al., (2018) state that perceived stress affects psychological health, and that when mental toughness levels are high, there are fewer mental health problems at high-stress levels. Poulus et al. (2020) found a low correlation between coping with stress and mental toughness. Similarly, it is stated that perceived stress level differentiates coping strategies (Savcı and Aysan, 2014). Papageorgiou et al. (2019b) stated in their research that mental toughness has a negative and significant effect on perceived stress levels.

In line with all these theoretical and factual studies; it is thought that the perceived stress levels of the athletes will harm their mental toughness. Therefore, another hypothesis of the study was developed as follows:

H₂: Perceived stress affects mental toughness.

The Relationship between Positive and Negative Emotions and Mental Toughness

The increasingly difficult life conditions show that it is more important to understand the thoughts and feelings of the individual. In doing so, your self-compassion; It is said that self-love and self-compassion will help the individual to enjoy his life. Although the individual is interested in himself/herself, the fact that the reason for this interest depends on external evaluation also shows the characteristic of a narcissistic attitude. This attitude has also been the subject of research on controlling/not being able to control emotions. Self-compassion and narcissistic personality traits have been the subject of the relationship on emotion regulation difficulties. When we look at the results of Aktaş and Şahin (2018)'s study on this subject, while emotion regulation difficulty is inversely proportional to self-compassion, it is directly proportional to narcissism. This makes us think that self-compassion feeds on positive emotions while narcissism feeds on negative emotions. From this point of view, we can state that it affects mental toughness by evaluating self-compassion at the point of positive emotions (Wilson et al., 2019). We can also interpret the low mental toughness levels of individuals with high narcissistic levels (Annen et al., 2017) in terms of negative emotions.

Based on all these, it is thought that the emotions of the athletes may have a positive/negative effect on their mental toughness. Other hypotheses of the study are as follows:

H_{3a}: Positive emotions affect mental toughness.

H_{3b}: Negative emotions affect mental toughness.

Mediator Role of Perceived Stress in the Relationship between Positive and Negative Emotions and Mental Toughness

In general, a felt intensity of emotion may continue in the sports environment. For example, an athlete who has been feeling reasonably determined lately can be expected to state that he/she has unshakable confidence in his/her athletic ability. On the contrary, it is possible that the athlete, who has been feeling distressed and uneasy recently, is worried about performing poorly. Therefore, it is expected that the emotional states of the athletes can be an effective factor in their mental toughness. The perceived stress levels of the athletes may have a role in explaining this relationship. Scientific research findings support this point of view. Gerber et al. (2015) reported in their study that high levels of stress and low levels of mental toughness cause higher levels of burnout in individuals. In

addition, although there was no significant effect between stress and mental toughness in the prediction of burnout, it was said that among individuals with high stress, those with high mental toughness were below the moderate burnout limit. However, it was stated that among the group members with low mental toughness, an increase in burnout levels was observed.

In another study, it was determined that emotional control and mental toughness were significantly related to perceived stress (Ward et al., 2018). Papageorgiou et al. (2019b) conducted three studies, respectively, to test a mediation model. These studies found that narcissism, through mental toughness, had an indirect effect on perceived stress.

From this point of view, while it is thought that positive-negative emotions affect the mental toughness of athletes, the following hypotheses have been developed to test the mediating role of the stress levels perceived by the athletes:

H_{4a}: Perceived stress plays a mediating role in the relationship between mental toughness and positive emotions.

H_{4b}: Perceived stress plays a mediating role in the relationship between mental toughness and negative emotions.

Athletes may perceive themselves as stressed due to internal and external effects in training and competition/competition environments. High levels of perceived stress may cause athletes to have higher negative emotions and lower positive emotions. In such a situation, whether the athletes have lower mental toughness is the main problem of this research.

The main problem statement of the research is; "Are the positive-negative emotions of the athletes effective on their mental toughness?" and does perceived stress have a mediating role in this relationship? form was developed.

This study aims to measure the effect of positive-negative emotions on the mental toughness of athletes, with the role of perceived stress levels as a mediator. In the sample of competitive athletes, no studies were limited to showing the relationship between emotions and mental toughness. The importance of the research emerges at this point. It is aimed to contribute to the literature with the results found.

Methodology

Model of the Research

In this research model, the conceptual model in Figure 1 was developed to determine the effect of positive-negative emotions on mental toughness and the mediator role of perceived stress level in

this effect. This model was created by evaluating the effect of positive-negative emotions, which are independent variables, on mental toughness, which is the dependent variable and then examining the mediating role of perceived stress, which is the mediating variable, between this relationship.

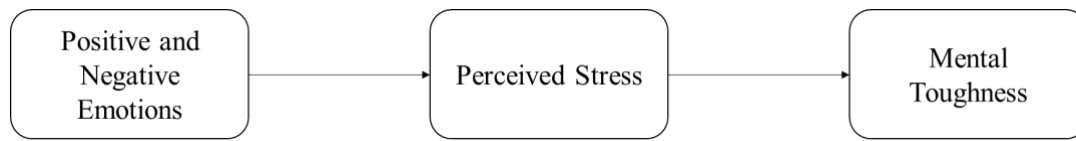


Figure 1. Conceptual model of the research

The conditional effect in question is that perceived stress will decrease/increase the effect of positive-negative emotions in the predicted relationship between positive-negative emotions and mental toughness, thus the effect on mental toughness, which is the dependent variable, will differ. In other words, the study was designed to show that perceived stress has an explanatory role in the relationship between positive-negative emotions and mental toughness, that is, it will have a mediating effect.

The association between positive-negative emotions and mental toughness is indirect because perceived stress performs as a mediator.

Participants and Procedure

The approval required for the study was received (letter dated 21.04.2022 no. E-51450103-050.01.04-00000417173). Ethics board approval was also obtained for the study. Data were collected through online surveys in the fall semester of the academic year 2021-2022. They were collected over a period of five days, from the participants who were provided detailed information about the purpose and the significance of the study in advance.

Within the scope of the research, data were collected from 412 athletes from 26 different sports. 29 athletes who did not have an athlete's license for at least 1 year and were under the age of 15 were excluded from the analysis. Thus, the study was comprised of 383 athletes, 252 (65.8%) of them being male and 131 (34.2%) of them being female. Their ages ranged between 15 and 55 ($M = 19.41$, $sd = 5.57$). The years of experience of the athletes were ($M = 6.16$, $sd = 4.82$). Also, 73 (19.1%) of the athletes were national athletes and 310 (80.9%) of them were not.

Data from 40 of Turkey's 81 provinces were online collected as part of the convenience sampling method (using a web-based Google form).

Informed consent has been uploaded into the form. In this context, data were collected only from volunteers, participants were free to withdraw their consent at any time using the forms. To determine the sample size, G*Power analysis (3.1.9.7, Germany) (Poulus et al., 2020; Papageorgiou

et al., 2019a) was used. According to G*power, a sample of 370 people is sufficient for two predictive variables with a real power of 95 (effect size = 0.20). As another method, the N:q rule (Kline, 2010), which is a useful general rule for the relationship between sample size and model complexity, was also used. Considering Kline's rule of 20:1 as the N:q ratio, it was concluded that the sample size in this study is sufficient.

Measure

Perceived Stress Scale (PSS)

Turkish version of the Perceived Stress Scale (PSS) Eskin et al. (2013) by adapting. Also, PSS was developed by Cohen et al. (1983). The scale has 3 different forms. In 3 different forms consisting of 4, 10, and 14 items, it is measured how stressful individuals perceive certain situations in their lives. Finally, the scale was designed in a 5-point Likert structure ranging from "Never (0)" to "Very often (4)". A 10-item form was used in this study. The scores of PSS-10 range from 0-40. A high score indicates an excess of stress perception (Eskin et al., 2013). While the internal consistency coefficient of the scale was found to be .82, it was determined as .88 in this study.

Sports Mental Toughness Questionnaire (SMTQ)

To determine the level of mental toughness in the sports environment, Sheard et al. (2009) developed the "Sports Mental Toughness Questionnaire (SMTQ)". The Turkish version of the scale was carried out by Altıntaş and Koruç (2016). The scale consists of 14 items. The scale, which consists of three sub-dimensions (Confidence, Continuity, and Control) as well as general mental toughness, is of a 4-point Likert type (1=Totally False; 4=Totally True). In this study, 14-item general mental toughness measures were used rather than sub-dimensions. For this study, the internal consistency coefficient of the scale was determined as .846.

The Scale of Positive and Negative Emotions (PANAS Scale)

The Turkish adaptation of the scale developed by Watson and colleagues (1988) was carried out by Gençöz (2000). The scale consists of 20 questions, 10 of which include negative and 10 positive (positive) emotions. The scale is prepared in a 5-point Likert structure and is graded from never felt so much felt. It is known that the score range of the scale is in the range of 10-50. High scores on the scale indicate high levels of positive or negative emotions. In the adaptation study, Cronbach's Alpha values were examined to determine the level of reliability, and it was found to be .83 for positive emotions and .86 for negative emotions (Gençöz, 2000). In this study, the internal consistency coefficients were found to be .839 for positive emotions and .811 for negative emotions.

Data Analysis

Confirmatory factor analysis was used to test whether the scales were suitable for the sample group and to increase the reliability of the mediator model. In the study, the effect of negative and positive emotions on mental toughness was tested with Simple Linear Regression Analysis.

The SPSS PROCESS macro (Model 4, Hayes, 2018) was used to test the research model. In this model, the mediator role of perceived stress in the relationship between positive and negative emotions and mental toughness was tested. 5000 bootstrap samples were used with 95% confidence intervals in the analyses. It can be stated that the confidence interval is of statistical value as long as it does not consist of zero (Hayes, 2018).

Results

In this study, the 4-stage mediation analysis method developed by Baron and Kenny (1986) was used. According to Baron and Kenny (1986), to be able to talk about the mediating effect, some stages must occur: first of all, there must be a cause-effect relationship between the independent variable and the dependent variable. After that, it is expected that the independent variable will affect the intermediary variable. In addition, it is expected that the intermediary variable also affects the dependent variable. In the next stage, the mediator variable must affect the dependent variable while the independent variable is kept under control. After all these stages, the effect of the independent variable on the dependent variable is examined to be able to talk about the mediating effect. If the effect has decreased (β value), it is possible to talk about the role of "partial mediation", if the effect has completely disappeared, the role of "full mediation". However, the mediator variable is expected to maintain a meaningful relationship with the dependent variable (Baron and Kenny, 1986).

To determine the level of influence of the mediating role, it is necessary to determine whether the indirect effect is significant. At this stage, it is sufficient to examine the bootstrap confidence range values. The lower and upper limits of Bootstrap should be above or below zero (Preacher and Hayes, 2008). Before the mediation analysis, tolerance and VIF values were examined to determine whether there are multiple connection problems between the independent variables. These values showed that there is no multi-connection problem in the model (Tolerance; $VIF < 10$).

Table 1

Good fit Indexes of the Scales

Scales	IN	N	M	sd	Alpha	X2/sd	CFI	TTI	GFI	NFI	RMSEA
MT	14	383	40.82	5.96	0.846	2.103*	0.918*	0.881*	0.955**	0.885*	0.074*
PS	10	383	17.92	6.78	0.880	2.175*	0.926*	0.898*	0.926*	0.911*	0.078*
PE	10	383	39.27	6.95	0.839	2.184*	0.945*	0.924*	0.954**	0.923*	0.076*
NE	10	383	21.48	7.05	0.811	2.143*	0.949*	0.904*	0.972**	0.935*	0.081*

IN: Item Number; N: Number of Subjects; M: Mean; MT: Mental Toughness; PS: Perceived Stress; PE: Positive Emotions; NE: Negative Emotions

**Perfect Fit; *Acceptable Fit

According to Table 1, the scales used in the study are valid and reliable in terms of sample groups. Good fit indexes of the scales are in agreement with the literature (Bentler and Bonett, 1980; Browne and Cudeck, 1993; Baumgartner and Homburg, 1996; Hu and Bentler, 1999; Schermelleh-Engel et al., 2003; Marsh et al., 2006; Byrne and Gun'ko, 2010; Meyers et al., 2016).

Table 2

Correlation Coefficients among Positive Emotions, Negative Emotions, Mental Toughness, Perceived Stress

Variables	1.	2.	3.	4.
1. Positive Emotions	-			
2. Negative Emotions	-.27*	-		
3. Mental Toughness	.43*	-.31*	-	
4. Perceived Stress	-.42*	.50*	-.48*	-

*p<.01

According to Table 2, there is a negative meaningful relationship between positive emotions and negative emotions ($r=-.27$; $p<.01$); negative emotions and mental toughness ($r=-.31$; $p<.01$); positive emotions and perceived stress ($r=-.42$; $p<.01$); between perceived stress and mental toughness ($r=-.48$; $p<.01$). Also, there is a positive meaningful relationship between mental toughness and positive emotions ($r=.43$; $p<.01$); perceived stress and negative emotions ($r=.50$; $p<.01$).

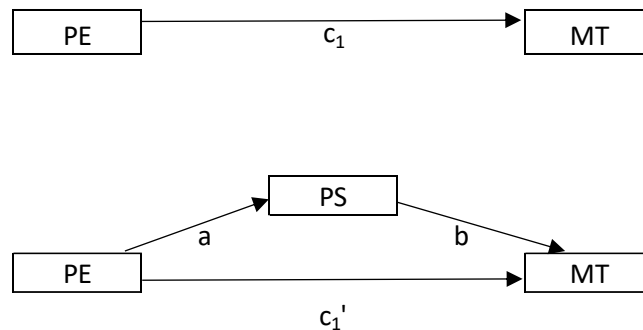


Chart 1. Perceived stress in the relationship between positive emotions and mental toughness

Table 3

The Mediating Effect of Perceived Stress on The Positive Emotions-Mental Toughness Relationship

1. Equation: Intermediary Variable (independent variable)	2. Equation: Dependent Variable (independent variable)	3. Equation: Dependent Variable (independent variable and mediating variable)	
(a)	(c ₁)	(c ₁ ')	(b)
$\beta=-.4139$	$\beta=.3720$	$\beta=.2406$	$\beta=-.3174$
$t=-9.1498$	$t=9.3970$	$t=5.8976$	$t=-7.5887$
$p=0.000$	$p=0.000$	$p=0.000$	$p=0.000$
$se=.0452$	$se=.0396$	$se=.0408$	$se=.0418$

According to the simple linear regression analysis, it was observed that positive emotions had a significant effect on mental toughness ($\beta=.3720$; $F(1.381)=88.303$; $p<0.05$). As can be seen from Table 3, the direct effect of positive emotions on mental toughness (c_1) is statistically significant ($\beta=0.3720$; $p<0.05$). When stress, perceived as a mediator variable, was included in the model, positive emotions continued to affect the level of mental toughness (c_1'). However, there was a decrease in the effect value ($\beta=0.2406$; $p<0.05$; partial effect). In other words, as perceived stress increases, the effect of positive emotions on mental toughness decreases.

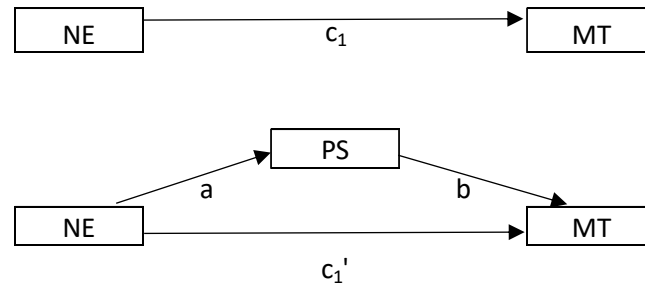


Chart 2. Perceived stress in the relationship between negative emotions and mental toughness

Table 4

The Mediating Effect of Perceived Stress on the Negative Emotions-Mental Toughness Relationship

1. Equation: Intermediary Variable (independent variable)	2. Equation: Dependent Variable (independent variable)	3. Equation: Dependent Variable (argument and mediator variable)	
(a)	(c ₁)	(c ₁ ')	(b)
$\beta=.4850$	$\beta=-.2629$	$\beta=-0.0781$	$\beta=-.3812$
$t=11.3977$	$t=-6.3852$	$t=-1.7787$	$t=-8.3539$
$p=0.000$	$p=0.000$	$p=0.0761$	$p=0.000$
$se=.0426$	$se=.0412$	$se=.0439$	$se=.0456$

As can be seen from Table 4, the direct effect of negative emotions on mental toughness (c_1) is statistically significant ($\beta=-0.2629$; $p<0.05$). When stress, perceived as a mediator variable, was included in the model (c_1'), negative emotions did not maintain their effect on the level of mental toughness ($\beta=-0.0781$; $p>0.05$; full effect). There was also a significant decrease in the effect value. In other words, the effect of negative emotions on mental toughness is mediated by the perceived stress dimension.

Table 5

Bootstrap Lower and Upper Limits of Mediation Effects

Mediating Role of Perceived Stress	Effect	BootSE	BootLLCI	BootULCI
PE-MT	0.1314	0.0249	0.0864	0.1826
Mediating Role of Perceived Stress	Effect	BootSE	BootLLCI	BootULCI
NE-MT	-0.1849	0.0346	-0.2578	-0.1238

To determine how effective, the mediating role is, it is necessary to determine whether the indirect effect is significant. For this, bias-corrected bootstrap confidence interval values are sufficient. Bootstrap lower and upper bound must be above or below zero (Preacher and Hayes, 2008). It is understood that both of the Bootstrap confidence interval bias-correction values are within zero. Perceived stress mediated the relationship between mental toughness and negative emotions. At the same time, perceived stress has a partial mediating role in the relationship between mental toughness and positive emotions.

Discussion

The question of whether perceived stress mediates the association between positive/negative emotions and mental toughness is being investigated in this research. The main findings in this regard are as follows: (1) Perceived stress fully mediates the relationship between negative emotions and mental toughness, and (2) Perceived stress partially mediates the relationship between positive emotions and mental toughness. More specifically, higher levels of negative emotions in athletes were linked to higher levels of perceived stress. Which was predictive of lower levels of mental toughness (**H_{4b}**). Again, higher levels of positive emotions in athletes were linked to a partial effect with lower levels of perceived stress. Which was predictive of higher levels of mental toughness (**H_{4a}**).

Athletes can feel less anxious about recent events if they are happy, pleasant, strong, and focused. Again, if the athletes feel distressed, unhappy, guilty, and uneasy may make them perceive the events they have experienced recently as more stressful. This situation was also confirmed by the findings of the study (**H_{1a}**, **H_{1b}**). According to Annen et al. (2017) linked the high levels of perceived stress to the fact that individuals have negative emotions. The fact that individuals have relatively higher positive emotions may enable them to cope with stress better (Wilson et al., 2019). It can be said that these findings in the literature overlap with the research findings.

Athletes' feeling tense and nervous, that is, high perceived stress levels may negatively affect their ability to be calm in the face of unexpected situations. Research findings also support this view (**H₂**). Gerber et al. (2013a) stated in their study that mental toughness is the source of stress resistance. That is, they stated that higher mental toughness was associated with lower stress and depressive symptoms. In another study, it is stated that there is a negative relationship ($r=-0.44$) between stress and mental toughness in tennis players (Cowden et al., 2016). Similarly, Poulus et al. (2020) found a low negative correlation between mental toughness and stress in their research. Gerber et al. (2018) stated that it is important to have high mental toughness to have fewer mental health problems at high-stress levels. Papageorgiou et al. (2019b) stated in their research that mental toughness has a

negative and significant effect on perceived stress levels. It can be said that all these research findings coincide with the current research findings.

Positive emotions, while can be expressed as pleasure and enjoyment from life, and negative emotions of the person can be expressed as the activeness of unpleasant emotions such as anger, fear, and stress (Gençöz, 2000). Athletes in a positive mood can be expected to have higher levels of ability to recover quickly, cope with pressure, and face difficulties when they fail in training and competitions. Similarly, it can be expected that athletes who are in negative moods will be more unstable mentally in this process. The results obtained in the research support these views (**H3a**, **H3b**). Stock et al. (2018) investigated the relationship between mental toughness, positive-negative emotions, and academic achievement in a study they conducted with a sample of university students. Findings indicated that there were significant relationships between mental toughness sub-dimensions and positive-negative emotions. This finding is consistent with the findings of the study.

The fact that the athletes have higher levels of positive emotions and lower levels of negative emotions may cause the athletes' perceived stress levels to be at relatively low levels. In such a case, it can be expected that the athletes will have higher mental toughness. Research findings also support that perceived stress explains the negative emotions-mental toughness relationship (**H4b**), while the positive emotions-mental toughness relationship partially explains the perceived stress (**H4a**). Gerber et al. (2015) stated that high levels of stress and low levels of mental toughness affect burnout. According to Ward et al. (2018), it was determined that emotional control is significantly related to both mental toughness and perceived stress. Papageorgiou et al., (2019b) found that subclinical narcissism through mental toughness has an indirect effect on perceived stress. In this context, the stated findings and the research findings are relatively similar.

Conclusion and Recommendations

In this study, the emotions felt by the individual affect the level of mental toughness and a very strong predictor such as stress plays a key role in this relationship. Stress guides us in understanding the impact of both positive and negative emotions on mental toughness. In short, considering the perceived stress level in possible future studies that will explain the relationship between emotions and mental toughness will enable us to understand this relationship more clearly.

Considering that the emotions of the athletes are affected by stress, emotional regulation or stress management is needed to increase mental toughness to a certain level. Perceived stress is the most important variable in the regulation of felt emotions. Researchers working on emotion regulation need to make sure that the stress level is below a certain level while making these applications.

Well-managed stress management will guide researchers both on emotion regulation and on increasing mental toughness to a certain level. These factors must be taken into account, especially in emotional interventions among young athletes.

Within the scope of the research, the mediating role of perceived stress in the relationship between mental toughness and emotions was examined. In future studies, the role of more than one mediator variable (such as styles of coping with stress) in this relationship can be investigated. Again, the moderator roles of variables such as gender and age in the relationship between emotions and mental toughness can be examined in future studies.

The limitations of this research are as follows: Although it tried to collect data homogeneously, it is known that the convenience sampling method has some limitations. Another limitation is the nature of the method and sampling. Since our research is cross-sectional as well as a cause-effect relationship, generalizability should be taken into consideration.

Araştırmacıların Katkı Oranları Beyanı

Araştırmanın yöntem ve bulgular kısmıyla ilgili süreçler ikinci ve üçüncü yazar, giriş kısmı ile ilgili süreçler birinci ve ikinci yazar, tartışma ve sonuç kısmı ile ilgili süreçler ise tüm yazarlar tarafından ortak gerçekleştirilmiştir.

Çatışma Beyanı

Yazarların araştırma ile ilgili bir çatışma beyanı bulunmamaktadır.

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