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Examination of mindfulness and impulsiveness in university student-athletes in terms of sports injury development history

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Abstract
The present study aims to the examination of mindfulness and impulsiveness in university student-athletes in terms of sports injury development history. A total of 181 athletes, 56 female, and 125 males, were included in the study. The Sociodemographic Information Form, the short form of the Barratt Impulsiveness Scale, and the Mindfulness Inventory for Sport were applied to the participants. In conclusion, the athletes with a history of injuring another athlete had a higher score average in impulsiveness scale. The total scores from the overall mindfulness inventory did not differ significantly based on the status of having injured another athlete. It was observed that the athletes who experienced severe injury had a lower score average in the overall impulsiveness scale compared to the athletes who experienced a moderate injury. No significant difference was observed in the score averages from the overall mindfulness scale based on injury severity. Among the most notable results of the present study are the positive relationship between motor impulsiveness and injury frequency and the negative relationship between mindfulness and the total of the impulsivity scale and all its sub-dimensions.

Keywords Impulsivity · Mindfulness · Student-athlete · Sports injury

Introduction

Sports injuries are defined as injuries that occur during participation in athletic activities. Although the biomechanical and medical aspects of sports injuries are addressed, this perspective disregards the injured athlete's state of mind and cognitive, emotional and behavioral role within the process of injury development. Psychological studies contribute to achieving a better understanding of these individual psychological variables, which play a role in making the athlete more prone to sports injury. These studies have also included the analysis of athletes' emotional and behavioral reaction to injury, and the examination of the effects of these reactions on the healing process and the athletes' ability to resume training or competitions (Almeida, Olmedilla, Rubio, & Palou, 2014). With such studies, it is aimed to understand the importance of psychological variables in the processes before and after sports injuries. Deroche, Stephan, Brewer, and Le Scanff (2007) reported that being injury-prone had a positive relationship with neurotic personality traits while it had a negative relationship with global self-esteem. In another study, it was reported that the athletes demonstrated higher levels of stress and self-confidence prior to injury, and higher levels of depression and anxiety after injury (Olmedilla, Ortega, & Gómez, 2014).

One of the important models aimed at understanding the relationship between sports injury development and the individual psychological characteristics of athletes is the Stress-Injury Model proposed by Andersen and Williams (1988). This model is based on the assumption that there are two main mechanisms behind the relationship between stress and injury: 1. General Muscle Tension and 2. Deficits in Attention During Stress. The model proposes that individuals who are under

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high levels of stress in daily life and who are unable to cope with stress effectively tend to evaluate events in daily life under more stress, demonstrate more muscle tension and attentional changes, and therefore have a higher risk of injury. Petrie (1992) reported that there was a positive relationship between negative life stress and injury. Similarly; Hardy, Richman, and Rosenfield (1991) found that life stress was a predictor of injury frequency.

Impulsiveness is among the concepts that were found to have a positive relationship with stress (Moustafa, Tindle, Frydecka, & Misiak, 2017). Impulsiveness is defined as the tendency to react to internal and external stimuli without foresight, disregarding the potential negative consequences for oneself or others (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001).

The relationship between impulsiveness and psychopathological diagnoses such as attention deficit/hyperactivity (Winstanley, Eagle, & Robbins, 2006), obsessive-compulsive disorder, anxiety disorder (Summerfeldt, Hood, Antony, Richter, & Swinson, 2004), eating disorders (Fahy & Eisler, 1993), bipolar disorder (Di Nicola et al., 2010), borderline personality disorder (Henry et al., 2001) and antisocial personality disorder (Lijffijt et al., 2012) was commonly examined, and it is known that many individuals tend to engage in impulsive behavior within everyday life (Evenden, 1999). Impulsiveness was discussed not only in studies with a clinical population but also in studies with non-clinical populations (Hair & Hampson, 2006; Jones, Chryssanthakis, & Groom, 2014; Lightsey & Hulsey, 2002). Regarding impulsiveness as a behavioral pattern as part of personality traits in healthy individuals with no psychopathological diagnosis in addition to evaluating the concept as a symptom of psychopathological diagnoses observed in individuals is thought to be important in terms of understanding the personal problems experienced by individuals who demonstrate a tendency for impulsive behavior in daily life. That is because one of the concepts closely related to impulsiveness in non-clinical populations is risk-taking (Collado, Felton, MacPherson, & Lejuez, 2014). Previous studies reported that there was a positive and significant relationship between risk-taking and injury (Kern et al., 2014). In the related literature, it was reported that there was also a positive relationship between the number of previous injuries in athletes and risk-taking (Kontos, 2000). In the review study conducted by Turner, McClure, and Pirozzo (2004), it was stated that risk-taking behavior was related to increasing the chances of injury outside of high-skilled, risk-taking sports. In a previous study conducted with adolescent snowboarders and alpine skiers, it was concluded that the relationship between risk-taking and injury severity was greater in individuals with higher levels of impulsiveness (Paquette, Dumais, Bergeron, & Lacourse, 2016). These results show that regarding impulsiveness among behavioral psychological factors as one of the potential causes of being injury-prone will be significant in terms of understanding sports injuries and shed light on preventive interventions.

In recent years, mindfulness has been a subject of interest in the field of sports injuries. Mindfulness is generally defined as the ability to focus on the experiences in the present moment with a non-judgmental and accepting mindset (Brown & Ryan, 2003; Linehan, 1993; Kabat-Zinn, 1994). Mindfulness allows one to direct their thoughts and ideas towards the present moment with awareness. However, individuals are often unable to use this skill, and this is characterized as a state of indifference or mindlessness. Although attention and awareness are relatively fixed features of normal functionality, mindfulness can refer to a state of augmented attention and awareness towards the present experience and reality. More or less, all individuals innately possess a capacity for mindfulness (Brown & Ryan, 2003). In an experimental study conducted with junior elite soccer players, although no significant difference was observed between the control group and the group that underwent a Mindfulness-Based program in terms of injury rates, it was reported that 67% of the experimental group remained injury free while this rate was 40% for the control group (Ivarsson, Johnson, Andersen, Fallby, & Altemyr, 2015). Previous studies support that mindfulness has a negative relationship with anxiety (Lavallée & Flint, 1996) and stress (Andersen & Williams, 1988), which are closely related to sports injuries (Moen, Federici, & Abrahamsen, 2015; Moghadam, Sayadi, Samimifar, & Moharer, 2013). It is stated that mindfulness is a predictor of self-regulated behavior and positive emotional states (Brown & Ryan, 2003). It was also reported that following a mindfulness-based stress reduction program, the participants' stress symptoms decreased while their mindfulness and subjective well-being levels increased (Carmody & Baer, 2008).

Mindfulness is related to being non-judgmental towards unpleasant inner experiences and non-reactive acceptance. In this way, it is thought that mindfulness may reduce the tendency to be avoidant towards impulsive behavior (Peters, Erisman, Upton, Baer, & Roemer, 2011). There are previous studies supporting the presence of a negative relationship between mindfulness and impulsiveness (Lattimore, Fisher, & Malinowski, 2011; Murphy & MacKillop, 2012; Peters et al. 2011). These results indicate that mindfulness may be related to low levels of impulsiveness. It can be said that increasing one's awareness towards inner experiences may contribute to reducing impulsiveness and, consequently, sports injury frequency by monitoring and regulating impulses characterized by reflection and a lack of thoughtfulness.

It is clear that more findings are needed to understand the psychological factors behind sports injuries. The present study

aims to the examination of impulsiveness and mindfulness in student-athletes in terms of sports injury development history. It was predicted that there would be a negative relationship between the mindfulness and impulsiveness levels of the athletes, and that the athletes with high injury frequency would have low levels of mindfulness and high levels of impulsiveness. It was thought that the results of the present study would contribute to the literature in terms of the importance of the behavioral and cognitive factors underlying sports injuries, which cause significant medical, social and economic problems in the professional life of athletes and lay the groundwork for similar future studies.

Methods

Participants and Recruitment

The present study was modelled as a cross-sectional study and carried out in the School of Physical Education and Sports at Hatay Mustafa Kemal University. For the study, interviews were conducted with student-athletes studying at the School of Physical Education and Sports and competing in different branches. The "G* Power 3.1" program was used to determine the number of participants. With an effect size of .25, an error margin of .01 and 85% power, the number of participants was determined as 173 (Cohen, 1988). The possibility of receiving missing or invalid answers from 173 participants in the measurement tools was estimated at 10% (Suresh & Chandrashekara, 2012). In conclusion, 190 university student-athletes competing in different branches in Turkey in the year 2020 were reached. Nine individuals were excluded from the study as they did not meet the study criteria and/or provided missing scales or did not consent to participation. A total of 181 athletes, 56 female, and 125 males, were included in the study. The participants were interviewed and informed about the scales before participating in the study.

Procedure

The present study was conducted with student-athletes studying in the School of Physical Education and Sports at Hatay Mustafa Kemal University between the years 2019 and 2020. Data collection was carried out online through Google Forms. The Sociodemographic Information Form, the short form of the Barratt Impulsiveness Scale and the Mindfulness Inventory for Sport were applied to the participants. The participants were informed in detail regarding the purpose of the study, and it was explained in written form that the study was scientific, that they were expected to be objective while giving answers, and that providing accurate information was very important in terms of study results. In the present study; the participants' injury status, history of injuring another athlete and the duration of their injury were evaluated within the scope of the past year. The athletes' history of injuring another athlete was determined with the question "Did you cause another athlete to be injured?". Injury severity was determined based on the time loss in training and competition. A time loss of 1–7 days was regarded as minor while 8–21 days was regarded as moderate and 21+ days was regarded as severe (Mei-Dan, Monastario, & Carmont, 2012). The ethics committee approval for the present study was obtained from the Scientific Research and Publication Ethics Committee of the Faculty of Social Sciences and Humanities at Hatay Mustafa Kemal University.

Measures

Sociodemographic Information Form This form includes information regarding the participants' gender, age, branch, injury status, history of injuring another athlete, injury frequency and the amount of time loss in training and competition following injury.

Short Form of Barratt Impulsiveness Scale 11 (BIS-11-SF) The scale originally developed by Spinella (2007) was adapted to Turkish by Tamam, Güleç, and Karataş (2013). This 4-point Likert scale consists of 15 items and three sub-dimensions involving Non-Planning (NPI), Attentional (AI) and Motor Impulsiveness (MI). The Cronbach's Alpha coefficient was calculated as .82 for the overall scale, .80 for the NPI subscale, .70 for MI and .64 for AI.

Mindfulness Inventory for Sport (MIS) The Mindfulness Inventory for Sport developed by Thienot et al. (2014) was adapted into Turkish by Tingaz (2020a). The inventory consists of three sub-dimensions involving "Awareness", "Non-Judgment" and "Refocusing". The "Awareness" subdimension consists of the first 5 items (1, 2, 3, 4, 5) while "Non-Judgment" (reverse score items) consists of the following 5 items (6, 7, 8, 9, 10) and "Refocusing" consists of the last 5 items (11, 12, 13, 14, 15). The Cronbach's Alpha Internal Consistency Coefficient was calculated as .82 for the inventory, $\alpha = .81$ for the "Awareness" sub-dimension, $\alpha = .70$ for "Non-Judgment" and $\alpha = .77$ for "Refocusing".

Statistical Analysis

SPSS 25.0 was used for data analysis. 9 out of 190 student-athletes were excluded from the study due to missing or invalid data input and the analysis was performed with the remaining 181 athletes. First, the scales with invalid or missing answers were eliminated. Afterwards, the extreme values in the

data were determined and the distribution normality was tested with Q-Q Plot Graphs, Histogram and skewness-kurtosis coefficients. Since the data were found to be normally distributed, the independent t-test was performed for two independent variables including gender, injury frequency and history of injuring another athlete, and the one-way analysis of variance (ANOVA) was performed for more than two variables including duration of injury. The Pearson Correlation Analysis was performed to examine the relationship between mindfulness and impulsiveness. On the other hand, Point-Biserial Correlation was used to examine the relationship between binary categorical variables and continuous variables.

Findings

Table 1 shows that 56 (30.9%) of the participants are female while 125 (69.1%) are male. 90 (49.7%) of the athletes compete in individual sports while 91 (50.3%) compete in team sports. 72 (39.8%) of the athletes caused another athlete to be injured while 109 (60.2%) did not. 148 (81.8%) of the athletes got injured within the past year while 33 (18.2%) did not. 46 (31.1%) of the athletes got injured once within the past year while 102 (68.9%) got injured more than once. Within the past year, 37 (25%) of the athletes were injured for 1–7 days while 45 (30.4%) were injured for 8–21 days and 65 (44.6%) were injured for more than 21 days. The mean age of the participants is 21.79 (SD=2.89)

Table 1 Demographic Information of the Participants

Group	*n*	%
Gender		
Female	56	30.9
Male	125	69.1
Branch		
Individual	90	49.7
Team	91	50.3
History of injuring another athlete		
Yes	72	39.8
No	109	60.2
Injury Status		
Yes	148	81.8
No	33	18.2
Injury Frequency		
Once	46	31.1
More than once	102	68.9
Duration of Injury		
1–7 days	37	25.0
8–21 days	45	30.4
21+ days	65	44.6

No significant difference was observed in the impulsiveness and mindfulness scores of the athletes based on the gender variable. Attentional impulsiveness ($t = -.429$; $p > .05$), motor impulsiveness ($t = .821$; $p > .05$), non-planning ($t = -.039$; $p > .05$), impulsiveness scale overall ($t = -.023$; $p > .05$), Awareness ($t = 1.03$; $p > .05$), non-judgment ($t = 1.53$; $p > .05$), refocusing ($t = -.397$; $p > .05$) and mindfulness overall ($t = .137$; $p > .05$).

According to Table 2, the athletes with a history of injuring another athlete had a significantly higher score average in the attentional impulsiveness ($t = 3.31$; $p < .01$), motor impulsiveness ($t = 3.24$; $p < .01$) and the overall scale ($t = 3.51$; $p < .01$) compared to those who did not injure another athlete. On the other hand, no significant difference was observed between the groups in the non-planning sub-dimension of the scale ($t = 1.06$; $p > .01$). No significant difference was observed in the total score averages from the overall mindfulness inventory ($t = -.053$; $p > .01$), awareness ($t = .797$; $p > .01$), non-judgment ($t = -1.43$; $p > .01$) and refocusing ($t = .774$; $p > .01$) based on the history of injuring another athlete.

According to Table 3, the athletes who got injured more than once within the past year had a significantly higher score average ($t = -2.61$; $p < .05$) in the motor impulsiveness sub-dimension compared to the athletes who got injured once. No significant difference was observed between the groups in the score average from the overall impulsiveness scale ($t = -.053$; $p > .05$) and the attentional impulsiveness ($t = .150$; $p > .05$) and non-planning impulsiveness ($t = -.261$; $p > .05$) sub-dimensions of the scale. There was also no significant difference in terms of injury frequency between the score average from the overall mindfulness inventory ($t = -1.69$; $p > .05$) and the awareness ($t = 1.63$; $p > .05$), non-judgment ($t = .177$; $p > .05$) and refocusing ($t = -1.40$; $p > .05$) sub-dimensions.

Table 2. Impulsiveness and Mindfulness Based on the History of Injuring Another Athlete Within the Past Year.

Variable	Yes		No		t	p
	M	*SD*	*M*	*SS*		
BIS-AI	13.65	3.33	11.95	3.40	3.31	.001**
BIS-MI	7.34	1.73	6.50	1.69	3.24	.001**
BIS-NPI	8.08	2.06	7.75	2.02	1.06	.287
BIS	29.08	4.95	26.21	5.64	3.51	.001**
MIS-A	24.95	2.94	24.58	3.18	.797	.426
MIS-NJ	13.63	4.28	14.50	3.75	−1.43	.154
MIS-RF	22.73	3.77	22.29	3.75	.774	.440
MIS	61.33	5.68	61.37	5.73	−.053	.958

**$p < .01$ BIS-AI: Attentional impulsiveness, BIS-MI: Motor impulsiveness, BIS-NPI: Non-planning, BIS: Barratt Impulsiveness Scale, MIS-A: Awareness, MIS-NJ: Non-judgment, MIS-RF: Refocusing, MIS: Mindfulness Inventory for Sport

Table 3 Impulsiveness and Mindfulness Based on Injury Frequency Within the Past Year

Variable	Once		More than once		t	p
	M	*SD*	*M*	*SS*		
BIS-AI	12.67	3.63	12.58	3.43	.150	.881
BIS-MI	6.48	1.51	7.26	1.78	−2.61	.010*
BIS-NPI	7.81	1.96	7.89	2.09	−.216	.830
BIS	26.97	5.41	27.73	5.56	−.792	.430
MIS-A	24.08	2.97	24.95	3.10	1.63	.104
MIS-NJ	14.00	3.96	13.87	4.18	.177	.860
MIS-RF	21.93	3.85	22.85	3.72	−1.40	.164
MIS	60.02	5.47	61.67	5.74	−1.69	.093

*$p < .05$ BIS-AI: Attentional impulsiveness, BIS-MI: Motor impulsiveness, BIS-NPI: Non-planning, BIS: Barratt Impulsiveness Scale, MIS-A: Awareness, MIS-NJ: Non-judgment, MIS-RF: Refocusing, MIS: Mindfulness Inventory for Sport

Table 4 shows that the athletes who experienced severe injury had a significantly lower score average from the overall impulsiveness scale ($F = 3.78$; $p < .05$) and the attentional impulsiveness ($F = 3.94$; $p < .05$) sub-dimension compared to the athletes who experienced moderate injury. In the non-planning impulsiveness sub-dimension, it was observed that the athletes who experienced moderate injury had a significantly higher score average compared to both the athletes who experienced minor injury and those who experienced severe injury ($F = 5.26$; $p < .01$). No significant difference was observed in the score averages from the overall mindfulness inventory ($F = 1.40$; $p < .05$) and the awareness ($F = .215$; $p < .05$), non-judgment ($F = 1.80$; $p < .05$) and refocusing ($F = .220$; $p < .05$) sub-dimensions based on injury severity.

When Table 5 was examined, it was observed that the attentional impulsiveness sub-scale had a negative, significant and low-level relationship with the awareness ($r = -.176$; $p < .05$) and refocusing ($r = -.241$; $p < .01$) sub-scales, the overall mindfulness inventory ($r = -.279$; $p < .01$). On the other hand, no significant relationship was found between the attentional impulsiveness sub-scale and non-judgment ($r = -.035$; $p > .05$), injury frequency ($r = -.052$; $p > .05$). While the motor impulsiveness sub-scale had a negative, significant and low-level relationship with the overall mindfulness inventory ($r = -.182$; $p < .05$), there was a positive, significant and low-level relationship between motor impulsiveness and injury frequency ($r = .190$; $p < .05$). Additionally, no significant relationship was observed between motor impulsiveness and the awareness ($r = -.127$; $p > .05$), non-judgment ($r = -.113$; $p > .05$) and refocusing ($r = .-.050$; $p > .05$) sub-scales. The non-planning sub-scale had a negative, significant and low-level relationship with awareness ($r = -.287$; $p < .01$), refocusing ($r = -.365$; $p < .01$) and the overall mindfulness inventory ($r = -.326$; $p < .01$). However, no significant relationship was found between the non-planning sub-scale and non-judgment ($r = .101$; $p > .05$), injury frequency ($r = -.004$; $p > .05$). It was observed that there was a negative, significant and low-level relationship between impulsiveness and mindfulness ($r = .-.352$; $p < .01$). It was also observed that there was a negative, significant and low-level relationship between impulsiveness-mindfulness ($r = -.256$; $p < .01$), refocusing ($r = -.301$; $p < .01$). On the other hand, it was observed that there was no significant relationship between impulsiveness and non-judgment ($r = -.020$; $p > .05$), injury frequency ($r = .026$; $p > .05$). Correlation intervals were evaluated based on Schober, Boer and Schwarte (2018) (.00–.10: insignificant, .10–.39: weak, .40–.69: moderate, .70–.89: strong, .90–1: very strong).

Discussion and Conclusion

In the present study, mindfulness and impulsiveness in university student-athletes were examined in terms of sports injury development history. As a result of the study, it was found that the mindfulness and impulsiveness levels of the athletes did not differ significantly based on their gender. Similarly, findings related to the idea that impulsiveness and mindfulness do not differ significantly between male and female athletes are present in the related literature (Dudek et al., 2016; Ferreira, Noce, da Costa, 2017; Tingaz, 2020b). On the other hand, it was observed that there was a limited number of studies examining the structures of impulsiveness and mindfulness with a study sample consisting of athletes. For this reason, it is clear that more findings on the subject are required. The present study was conducted with a heteronormative approach, and it is thought that with the inclusion of sexual orientation, future studies will produce very valuable findings.

It was observed that while the athletes with a history of injuring another athlete had a higher score average in attentional impulsiveness, motor impulsiveness, and the overall impulsiveness scale, there was no significant difference between the groups in the non-planning sub-dimension of the impulsiveness scale. On the other hand, it was found that while motor impulsiveness was higher in the athletes who got injured more frequently, there was no significant difference in the other sub-dimensions of impulsiveness. Considering that impulsiveness is closely related to risk-taking behavior (Collado et al. 2014), the fact that athletes with more impulsiveness (particularly motor impulsiveness) tend to get injured and injure other athletes more frequently can be associated with this risk-taking behavior. It can also be said that this risk-taking behavior can facilitate injury inflicted on oneself and other athletes. Potential injuries related to the deficiency of impulsive athletes in the stop-think phase of stop-think-do, which is considered within the scope of normal

Table 4 Examination of Impulsiveness and Mindfulness based on Injury Severity

Variable	Minor (a)		Moderate (b)		Severe (c)		F	η^2	p	Bonferroni
	M	*SS*	*M*	*SS*	*M*	*SS*				
BIS-AI	12.28	3.40	13.78	3.90	12.00	3.05	3.94	.050	.021*	c < b
BIS-MI	6.97	1.95	6.89	1.62	7.11	1.70	.246	.003	.783	
BIS-NPI	7.38	2.11	8.65	1.84	7.61	2.02	5.26	.065	.006**	a < b, c < b
BIS	26.64	5.84	29.32	5.48	26.73	5.09	3.78	.048	.025*	c < b
MIS-A	24.58	3.38	24.47	2.97	24.85	3.00	.215	.002	.807	
MIS-NJ	13.20	4.28	13.50	3.44	14.61	4.35	1.80	.023	.169	
MIS-RF	22.87	3.18	22.32	3.81	22.53	4.10	.220	.002	.803	
MIS	60.66	4.84	60.30	5.79	62.00	6.03	1.40	.018	.249	

**$p < .01$, *$p < .05$ BIS-AI: Attentional impulsiveness, BIS-MI: Motor impulsiveness, BIS-NPI: Non-planning, BIS: Barratt Impulsiveness Scale, MIS-A: Awareness, MIS-NJ: Non-judgment, MIS-RF: Refocusing, MIS: Mindfulness Inventory for Sport

functionality, are generally overlooked. Therefore, it was an expected result that the athletes with high levels of impulsiveness got injured and injured other athletes more frequently. The total scores from the overall mindfulness inventory and the sub-scales of awareness, non-judgment and refocusing did not differ significantly based on the status of having injured another athlete. Athletes with high mindfulness are expected to notice the internal and external factors in the present moment while competing or training and be non-judgmental towards these factors. However, it was observed that this situation did not differ directly or significantly based on the athletes' history of injuring another athlete or injury frequency. Different results may be obtained in future studies with potential mediating variables.

It was observed that the athletes who experienced severe injury had a lower score average in the overall impulsiveness scale and the attentional impulsiveness sub-dimension compared to the athletes who experienced moderate injury. It was found that the athletes who experienced moderate injury had a significantly higher score average in the non-planning sub-dimension compared to the athletes who experienced minor and severe injury. Based on this finding, it can be said that impulsiveness may act as a risk factor mostly for athletes who experience moderate injury. In addition to impulsiveness, other physical factors may be in effect for athletes who experience severe injury, which can prolong the healing process following injury. Therefore, it is thought that this may be the reason why these athletes had lower levels of impulsiveness compared to the athletes who experienced moderate injury. No significant difference was observed in the score averages from the overall mindfulness scale and the sub-scales of awareness, non-judgment, and refocusing based on injury severity. Since no significant difference was observed in the participants' mindfulness levels based on injury severity, which was also the case with injury frequency and the history of injuring another athlete, it is thought that different results may be obtained by examining the effects of mindfulness on mediating variables that may lead to injury.

Table 5 The Relationship Between Impulsiveness, Mindfulness and Injury Development History Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. BIS-AI	–										
2. BIS-MI	.370**	–									
3. BIS-NPI	.413**	.165*	–								
4. BIS	.894**	.608**	.678**	–							
5. MIS-A	−.176*	−127	−.287**	−.256**	–						
6. MIS-NJ	−.035	−.113	.101	−.020	−.318**	–					
7. MIS-RF	−.241**	−.050	−.365**	−.301**	.467**	−.340**	–				
8. MIS	−.279**	−.182*	−.326**	−.352**	.627**	.305**	.677**	–			
9. IF	−.052	.190*	−.004	.026	.189*	−.066	.159	.158	–		

**$p < .01$, *$p < .05$ BIS-AI: Attentional impulsiveness, BIS-MI: Motor impulsiveness, BIS-NPI: Non-planning, BIS: Barratt Impulsiveness Scale, MIS-A: Awareness, MIS-NJ: Non-judgment, MIS-RF: Refocusing, MIS: Mindfulness Inventory for Sport, IF: Injury frequency

It was observed that the attentional impulsiveness sub-scale had a negative, significant and low-level relationship with the overall mindfulness inventory, the awareness sub-scale, the refocusing sub-scale. On the other hand, no significant relationship was found between the attentional impulsiveness sub-scale and non-judgment, and injury frequency. While the motor impulsiveness sub-scale had a negative, significant and low-level relationship with the overall mindfulness inventory, a positive, significant and low-level relationship was observed between motor impulsiveness and injury frequency. On the other hand, there was no significant relationship between motor impulsiveness and the awareness, non-judgment and refocusing sub-scales. It was found that the non-planning sub-scale had a negative, significant and low-level relationship with the overall mindfulness inventory, awareness and refocusing. However, there was no significant relationship between the non-planning sub-scale and non-judgment, and injury frequency. It was observed that there was a negative, significant and low-level relationship between impulsiveness and mindfulness. There was also a negative, significant and low-level relationship between impulsiveness-mindfulness, and refocusing. On the other hand, no significant relationship was found between mindfulness, non-judgment, and injury frequency. The negative relationship between mindfulness and impulsiveness is in parallel with the findings in the related literature (Madžar, Milošević, Hrabač, & Heningsberg, 2017). It was found that there was a positive and significant relationship between awareness and motor impulsivity. Awereness alone can be a factor that increases motor impulsivity. However, mindfulness doesn't just mean awareness. It includes awareness being without judgment. It can be said that the positive relationship between motor impulsiveness and injury frequency is a notable result. To evaluate this finding from a neurochemical perspective, it can be said that impulsive decision-making may be related to the dopamine system and dopamine-2 receptors (Yazıcı & Yazıcı, 2010). Considering that dopamine systems are related to stop-think, mindfulness prompts the individual to stop-think by nature. The ability to be aware of the experiences in the present moment with a non-judgmental mindset is rooted in the stop-think system. Therefore, it can be said that mindfulness may create a buffering effect in the relationship between motor impulsiveness and injury frequency. Although there is a limited number of studies examining the relationship between impulsiveness and mindfulness with a study sample consisting of athletes, in the study conducted by Peters et al. (2011) with university students, it was concluded that there was a negative relationship between impulsiveness and mindfulness. In the aforementioned study, it was stated that mindfulness may be helpful for various types of impulsive behavior. Reid, Bramen, Anderson, and Cohen (2014) are also among those who found a negative relationship between impulsiveness and mindfulness. In another study conducted with university students, it was found that there was a negative relationship between mindfulness and non-planning, which is a sub-dimension of the impulsiveness scale (Rajesh, Ilavarasu, & Srinivasan, 2013).

In conclusion, it was found that mindfulness and impulsiveness in university student-athletes did not differ based on the gender variable. It was observed that the athletes who got injured more frequently had higher levels of motor impulsiveness while the athletes with a history of injuring another athlete had higher levels of attentional impulsiveness, motor impulsiveness and general impulsiveness. Mindfulness levels differed significantly based on injury frequency and the history of injuring another athlete. It was observed that the athletes who experienced severe injury had a lower score average in the overall impulsiveness scale and the attentional impulsiveness sub-dimension compared to the athletes who experienced moderate injury. In the non-planning sub-dimension, it was observed that the athletes who experienced moderate injury had a significantly higher score average compared to the athletes who experienced minor and severe injury. Among the most notable results of the present study are the positive relationship between motor impulsiveness and injury frequency and the negative relationship between mindfulness and the total of the impulsivity scale and all its sub-dimensions.

Compliance with Ethical Standards

Conflict of Interest The author declare that he has no conflict of interest.

Ethical Approval The study protocol was approved by the Scientific Research and Publication Ethics Committee of the Faculty of Social Sciences and Humanities at Hatay Mustafa Kemal University.

Informed Consent Informed consent was given to all participants in order to get their allowance for this study.

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