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Athletic performance and mindfulness in track and field athletes

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Abstract

In the present study, the mindfulness levels of track and field (athletics) athletes were evaluated based on variables such as branch of sports (sprints, middle-distance, jumps and throws), gender, age, national athlete status, personel best record and athletic experience. 213 certified athletes (67 female-22.6% and 146 male-49.3%) competing at the national and international level in the branches of sprints, middle-distance, jumps and throws as part of different clubs affiliated to the Turkish Athletic Federation in the year 2020 and performing regular training at least 6 days a week voluntarily participated in the study. In the present cross-sectional study, the Mindfulness Inventory for Sport (MIS) developed by Thienot et al. (2014) and adapted to Turkish by Tingaz (2020c) was used. Data collection was carried out online through Google Forms. The independent t-test and the one-way analysis of variance were used in the evaluation of data. Based on the findings of the present study, it was determined that the athletes with high performance had higher mindfulness levels. Additionally, it was found that the national athletes and the athletes with high training experience had higher mindfulness levels in different sub-dimensions and in terms of the gender variable, the mindfulness levels of the female participants were higher. It is also notable that the athletes who perform mental training had higher mindfulness levels compared to those who do not. In the evaluation based on branches, it was observed that the sprinters were more competent in the refocusing sub-dimension compared to the athletes in all other branches. The findings obtained in the present study indicated that mindfulness can be affected by different variables. However, considering that the most important goal for athletes is to improve their performance, it is important for them to be aware of the positive effects of mindfulness. Based on this, it can be suggested for athletes to include mindfulness exercises in their training program and develop this approach as much as possible in order to support their athletic performance.

Keywords Mindfulness · Track and field · Athletic performance

Introduction

In order to perform well, athletes are required to focus on not only physiological but also psychological factors (Birrer et al. 2012). To make a psychological evaluation, it can be said that performance can be diminished by long-lasting and high-intensity emotions as well as thoughts. According to the Individual Zone of Optimal Function (IZOF) theory, there is a positive relationship between the presence of athletes' pleasant or unpleasant emotions within the individual zone of optimal function and their athletic performance (Hanin 2007). In the meta-analysis study conducted by Jokela and Hanin (1999), it was concluded that athletes whose state anxiety levels were within the optimal zone of functioning had higher performance levels. Although altering the unpleasant thoughts and emotions that impede athletic performance is a method commonly used by cognitive behavioral approaches, acknowledging pleasant or unpleasant emotions and thoughts without judgment is the purpose of mindfulness (Gardner and Moore 2004). As stated by the founder (Kabat-Zinn 2003), mindfulness means paying attention to the experiences in the present moment on purpose and without judgment. The first known use of mindfulness to improve athletic performance was carried out by Kabat-Zinn et al. (1985) on student-athlete and olympic archers. As a result of the study,

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the positive relationship between mindfulness-based mental training and the performance of the archers was emphasized. Subsequent studies revealed that mindfulness-based interventions increased diving performance in artistic divers (Schwanhausser 2009), contributed to the development of athletic performance in professional footballers (Carraça et al. 2018), and that mindfulness scores predicted the free throw shooting percentage of basketball players (Gooding and Gardner 2009). There are certain other studies that produced different results. In the 1 year follow-up of archers, golfers and long-distance runners who attended at least one session of Mindful Sport Performance Enhancement (MSPE) workshops; Thompson et al. (2011) reported that while the performance levels of the archers and golfers remained unchanged, an improvement was observed in the performance levels of the long-distance runners. In another study, it was found that the athletic performance levels of long-distance runners remained unchanged following 4 weeks of MSPE. On the other hand, it was also reported that a decrease was observed in the athletes' sports-related anxiety levels and certain sub-dimensions of perfectionism while the mindfulness levels of the participants increased (De Petrillo et al. 2009). The difference in the results obtained by Thompson et al. (2011) on the performance of archers and golfers and by De Petrillo et al. (2009) on the performance of long-distance runners can be attributed to the fact that the studies had different durations of application (Tingaz 2020a). Likely due to this, the program developed for athletes by Kaufman et al. (2018) was initially designed with a duration of 4 weeks, but restructured as a six-week program following the studies. Apart from experimental studies, cross-sectional studies, although limited, examined the relationship between the athletic performance and mindfulness levels of athletes. For example, in the study conducted by Abdul Rafeeque and Sultana (2016) with athletes, it was found that there was a positive relationship between mindfulness and athletic performance, and that mindfulness had an intermediary role in the relationship between mental endurance and athletic performance. In another study including athletes, it was observed that athletes with national ranking had a higher score average in the refocusing sub-dimension compared to the athletes with no ranking (Tingaz 2020b).

Athletics is a versatile branch that involves competitive running, throwing and jumping with various performance components. Athletes competing in the branches involving jumps and throws may develop different features and types of awareness compared to runners. It is clear that there is a need for findings related to not only running but also different branches for a better understanding of the relationship between athletic performance and mindfulness in Track and Field athletes. Accordingly, the primary aim of the present study is to evaluate the mindfulness levels of athletes in the branches of sprints, middle-distance running, throws and jumps based on their athletic performance. It is also aimed to examine the mindfulness levels of the athletes based on gender, national athlete status, status of performing mental training and athletic experience.

Methods

Ethics Committee Approval

This study was approved by the Gazi University Ethics Committee, (number: 2020–325) and written informed consent was obtained from each participant according to the declaration of Helsinki.

Study Model

The present study was modelled as a cross-sectional study. In cross-sectional studies, participants' opinions regarding a topic or event, or their features such as interests, skills, abilities and attitudes are determined while data measurement is performed at once and sample sizes are larger compared to other types of studies (Karasar 2017).

Participants

Two hundred thirteem certified athletes (67′ female-22.6%, 146 male-49.3%, $M_{age\ (year)} = 21.52$, $SD = 2.13$, $M_{athletic\ experience\ (year)} = 6.09$, $SD = 4.33$, $M_{personal\text{-}best\ (PB)} = 914.96$, $SD = 136.42$) competing at the national and international level in the branches of sprints, middle-distance, jumps and throws as part of different clubs affiliated to the Turkish Athletic Federation in the year 2020 and performing regular training at least 6 days a week voluntarily participated in the study.

Data Collection Tools

Personal Information Form

In order to obtain the demographic information of the athletes included in the present study, the participants were asked questions regarding their gender, age, weight, height, national athlete status, athletic experience, branch, personal best record/athletic performance (PB) for the year 2020 and the status of performing mental training.

Mindfulness Inventory for Sport (MIS) n the present study, the Mindfulness Inventory for Sport developed by Thienot et al. (2014) and adapted to Turkish by Tingaz (2020c) was used. The inventory consists of three sub-dimensions as "Awareness", "Non-Judgment"; and "Refocusing". The "Awareness" sub-dimension consists of the first 5 items (1, 2, 3, 4, 5) while "Non-Judgment" (reverse-scored 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 6-point Likert inventory (Rarely, Occasionally, Sometimes, Frequently, Usually, Every Time) consists of a total of 15 items. 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".

Application Phase

Data collection was carried out online through Google Forms. Two types of data were collected from the participants. For this, the Personal Information Form and the Mindfulness Inventory for Sport were used. PB performance of each subject was his/her season best at the time of measurement. This best record was compared against the International Association of Athletics Federations (IAAF) scoring tables to convert it into a score. The IAAF scoring tables were designed by Spiriev by statistically analysing the competitive performance of track and field athletes around the world. Using these tables, it is possible to compare the competitive performance level between events. Currently, this method is advocated by the IAAF as a standard for international competitive performance, and it is being studied for scoring entry qualification points for international competitions in the future (Spiriev 2014).

Data Analysis

In the power analysis performed using the "G. Power-3.1.9.2" program, when the effect size was taken as 0.25 (Cohen 1988) and the significance level was taken as $p = 0.05$, it was estimated that 87% power would be established with a total of 213 participants. In this context, the statistical analysis of the data obtained from the inventory was performed using SPSS 25.0 (Statistical Package for Social Sciences). First, the extreme value analyses were evaluated for the control of the assumptions and the suitability of the analyses by considering the null data and Mahalanobis distance. Following these processes, the data of 20 participants with invalid or missing answers were excluded and the analyses were performed on the data of the remaining 213 participants. When the skewness and kurtosis values were examined for the normality of data, it was determined that the data were normally distributed (Kline 2011). Accordingly, the unpaired t-test was used to examine the differences based on the variables of gender, national athlete status, status of performing mental training and PB while the one-way analysis of variance (ANOVA) was performed to examine the differences based on the variables of athletic experience and branch. The Bonferroni multiple comparison technique was used to determine the source of the significant difference determined as a result of ANOVA. $p < 0.05$, $p < 0.01$ was considered as statistically significant.

Funding

Result

As shown in Table 1, no statistically significant difference was determined in the score averages of refocusing ($t = -.410$; $p > .05$), non-judgment ($t = .121$; $p > .05$) and mindfulness total ($t = .941$; $p > .05$) based on the gender variable. It was determined that female athletes had a significantly higher score average ($\bar{x} = 5.24$) compared to the male athletes ($\bar{x} = 5.01$) only in the awareness ($t = 2.119$; $p > .05$) sub-dimension. No significant difference was determined in the refocusing ($t = 1.504$; $p > .05$) and non-judgment ($t = 1.264$; $p > .05$) sub-dimensions based on the national athlete status variable. On the other hand, it was determined that the national athletes had a significantly higher score average ($\bar{x} = 5.17$) in the Awareness ($t = 2.299$; $p < .05$) sub-dimension compared to the non-national athletes ($\bar{x} = 4.93$). Additionally, it was determined that the national athletes had a higher total score average (national $\bar{x}$ 4.32; non-national $\bar{x} = 4.12$). No significant difference was determined in the awareness ($t = 1.513$; $p > .05$) and non-judgment ($t = -.901$; $p > .05$) sub-dimensions and the mindfulness total score ($t = -2.073$; $p > .05$) based on the status of performing mental training. On the other hand, it was found that in the refocusing ($t = 2.806$; $p < .05$) sub-dimension, the athletes who performed mental training had a significantly higher score average ($\bar{x} = 5.05$) compared to the ones who did not ($\bar{x} = 4.71$). No statistically significant difference ($p > 0.05$) was observed in the awareness ($t = -1.795$; $p > .05$), refocusing ($t = -1.621$; $p > .05$) and non-judgment ($t = -.244$; $p > .05$) sub-dimensions based on the performance variable, which was determined in accordance with the participants' personal best time (PB) in 2020. However, it was determined that in mindfulness total scores ($t = -2.073$; $p > .05$), the athletes with high performance levels ($x = 4.30$) had a significantly higher score average compared to the athletes with low performance levels ($x = 4.17$).

When Table 2 was examined, no statistically significant difference was found in the sub-dimensions of awareness ($F = 1.716$; $p > .05$), non-judgment ($F = 1.069$; $p > .05$) and mindfulness total ($F = 2.058$; $p > .05$) based on the branch variable. On the other hand, a significant difference was observed in the refocusing ($F = 3.706$; $p < .05$) sub-dimension. In the between-groups comparison performed to determine the group that caused the difference, it was found that the sprinters had a significantly higher score average ($x = 4.31$) compared to the athletes in the branch of jumps ($x = 4.73$). No

Table 1 Examination of mindfulness based on the gender variable

Variable	Gender	*N*	x̄	SD	t	*p*
Awareness	Female	67	5.24	.68	2.119	**.035***
	Male	146	5.01	.75		
Non-Judgment	Female	67	2.72	.95	.121	.904
	Male	146	2.71	.98		
Refocusing	Female	67	4.91	.72	−.410	.682
	Male	146	4.96	.88		
Total	Female	67	4.29	.47	.941	.348
	Male	146	4.23	.47		
Examination of mindfulness based on the national athlete variable						
Variable	**National**	**N**	x̄	**SD**	**t**	***p***
Awareness	Yes	138	5.17	.73	2.299	**.023***
	No	75	4.93	.73		
Non-Judgment	Yes	138	2.77	1.07	1.264	.208
	No	75	2.61	.75		
Refocusing	Yes	138	5.01	.86	1.504	.134
	No	75	4.83	.76		
Total	Yes	138	4.32	.50	3.174	**.002****
	No	75	4.12	.37		
Examination of mindfulness based on the mental training variable						
Variable	**Mental Training**	**N**	x̄	**SD**	**t**	***p***
Awareness	Yes	147	5.14	.69	1.513	.132
	No	66	4.97	.82		
Non-Judgment	Yes	147	2.67	.99	−.901	.369
	No	66	2.80	.91		
Refocusing	Yes	147	5.05	.76	2.806	**.005****
	No	66	4.71	.93		
Total	Yes	147	4.29	.48	1.812	.071
	No	66	4.16	.44		
Examination of mindfulness based on the athletic performance/ (PB) variable						
Variable	**Performance**	**N**	x̄	**SD**	**t**	***p***
Awareness	Low	85	4.97	.73	−1.795	.074
	High	128	5.16	.73		
Non-Judgment	Low	85	2.69	.90	−.244	.808
	High	128	2.72	1.01		
Refocusing	Low	85	4.83	.78	−1.621	.106
	High	128	5.02	.86		
Total	Low	85	4.17	.42	−2.073	**.039***
	High	128	4.30	.49		

$^{**}p < 0.01$, $^{*}p < 0.05$

statistically significant difference was determined in the non-judgment (F = 1.265; .05) and refocusing (F = 1.723; .05) sub-dimensions based on the athletic experience variable. On the other hand, a statistically significant difference was determined in the sub-dimensions of awareness and mindfulness total (F = 3.224; $p < .05$; F = 6.102; p < .05, respectively). As a result of the between-groups comparison performed to determine the group that caused the difference, it was determined that the athletes with 1–5 years of athletic experience had a lower score average (x = 5.00) compared to the athletes with 10+ years of athletic experience (x = 5.37) in the awareness sub-dimension. The athletes with 1–5 years of athletic experience also had a lower score average (x = 4.15) compared to the athletes with 10+ years of athletic experience (x = 4.47) in the mindfulness total sub-dimension.

Table 2 Examination of mindfulness based on the branch variable

Variable	Branch	*N*	x⁻	*SD*	*F*	*p*	*Bonferroni*
Awareness	Sprints [A]	68	5.24	.66	1.716	.165	–
	Middle-Distance [B]	37	5.08	.81			
	Throws [C]	38	5.05	.79			
	Jumps [D]	7	4.96	.73			
	Total [F]	213	5.09	.74			
Non-Judgment	Sprints [A]	68	2.56	.96	1.069	.363	–
	Middle-Distance [B]	37	2.76	1.01			
	Throws [C]	38	2.91	.95			
	Jumps [D]	70	2.73	.92			
	Total [F]	213	2.71	.97			
Refocusing	Sprints [A]	68	5.14	.81	3.706	**.013***	A > D
	Middle-Distance [B]	37	5.11	.88			
	Throws [C]	38	4.84	.74			
	Jumps [D]	70	4.73	.83			
	Total [F]	213	4.95	.83			
Total	Sprints [A]	68	4.31	.43	2.058	.107	
	Middle-Distance [B]	37	4.32	.50			
	Throws [C]	38	4.26	.44			
	Jumps [D]	70	4.14	.48			
	Total [F]	213	4.25	.47			

Examination of mindfulness based on the athletic experience variable

Variable	**Athletic Experience** ***Bonferroni***	***N***	x⁻	***SD***	***F***	***p***	***Bonferroni***
Awareness	1–5 [A]	93	5.00	.73	3.224	**.042***	A < C
	6–9 [B]	85	5.06	.77			
	10 + [C]	35	5.37	.59			
	Total [D]	213	5.09	.74			
Non-Judgment	1–5 [A]	93	2.60	.89	1.265	.285	–
	6–9 [B]	85	2.76	1.02			
	10 + [C]	35	2.89	1.03			
	Total [D]	213	2.71	.97			
Refocusing	1–5 [A]	93	4.84	.86	1.723	.181	–
	6–9 [B]	85	4.98	.85			
	10 + [C]	35	5.14	.66			
	Total [D]	213	4.95	.83			
Total	1–5 [A]	93	4.15	.42	6.102	**.003****	A < C
	6–9 [B]	85	4.27	.51			
	10 + [C]	35	4.47	.39			
	Total [D]	213	4.25	.47			

$^{**}p < 0.01$, $^{*}p < 0.05$

Discussion and Conclusion

In the present study, the mindfulness levels of certified athletes competing at the national and international level as part of different clubs affiliated to the Turkish Athletic Federation were evaluated based on the branches of sprints, middle-distance, throws and jumps. Their mindfulness levels were also examined based on the variables of gender, national athlete status, status of performing mental training and athletic experience. Based on the results obtained, although the female athletes had higher mindfulness levels compared to the male athletes in the evaluation of sub-dimensions, no difference was determined in the non-judgment and refocusing sub-dimensions. Similarly, it was determined that there was no significant difference between genders in the mindfulness total scores. In a similar study conducted by Hoja and Jansen (2019) with adult German tennis players, it was reported that there was a significant difference in awareness levels based on the gender variable and that this difference was in favor of female athletes. In another study conducted by Jones and

Parker (2016), it was found that female 800 m runners had higher mindfulness levels compared to the male runners. Unlike these findings, in the study conducted by Tingaz (2020b) with student-athletes in the Faculty of Sport Sciences, it was determined that there was no significant difference in mindfulness levels based on the gender variable. In the study conducted by Serdar et al. (2016) with students at the School of Physical Education and Sports, it was also reported that there was no significant difference in mindfulness levels based on the gender variable. Although there are similar studies in the related literature, different findings were also found regarding the impact of gender on mindfulness. When the content of the studies are examined in detail, it can be said that not only the gender factor but also the variables of being an athlete or athletic level can influence the results. In the present study, evaluations were made in terms of elite athletes and the situation could be examined from different perspectives. Despite this, it can be said that it is necessary to conduct future studies with more detail, larger sample sizes and athletes in different branches in order to provide clearer information on the subject.

It was determined that the national athletes had a higher score average in the awareness sub-dimension and mindfulness total scores. Considering the fact that national athletes undergo years of heavy training, competitive stress, success-failure and the responses they give to these, it can be said that national athletes experience more intense emotions compared to non-national athletes. Additionally, it can be said that they are able to use their mindfulness skills as a tool to stay at the elite level and to improve their performance. That is because mindfulness can provide a positive contribution in terms of normalizing the responses resulting from stressful situations in daily life (Hoja and Jansen 2019). The fact that national athletes have easier and more frequent access to sports psychologists, mentors or psychological performance consultants compared to non-national athletes may also cause this difference.

When the mental training variable was examined, it was determined that the athletes who performed mental training had a significantly higher score average in the refocusing sub-dimension compared to the athletes who did not perform mental training. There are many previous studies on performance improvement and the use of mental training. According to Altıntaş and Akalan (2008), mental training is among the most commonly studied subjects in recent years in terms of its positive contribution to the performance of athletes and combined use with physical training. It is notable that the techniques used within the framework of mental training to improve mindfulness in particular have been gaining popularity among athletes (Kwee, 1995). When the studies where mental training programs supporting the development of mindfulness are examined, in the study conducted by Zadeh et al. (2019) with adult football players, it was determined that the players who performed mindfulness exercises had higher performance levels compared to the players who did not. In a study involving the combined use of mental training with athletics training programs, it was observed that there was a significant difference between the pre-test and post-test levels of student-athletes playing shot put. Although no difference was observed among sprinters, it was determined that there was an increase in the athletic performance rates of student-athletes (Williamson 2019). In the study conducted by Klockare et al. (2015) with athletes in various branches of athletics, it was determined that the use of the Flotation-REST technique supported the improvement of health, stress management and the development of mindfulness among athletes. According to Wrisberg et al. (2010), the presence of at least one sports psychologist in each sports club would lead to greater improvements in athletic performance rates as coaches would be able to focus on the performance levels of athletes instead of their personal issues. Based on the evaluation of the findings obtained, it is observed that the use of mental training can improve awareness, and that the impact can be amplified by the inclusion of mindfulness exercises in these training modules.

In the present study, it was determined that the athletes with high performance levels had a significantly higher mindfulness total score average compared to the athletes with low performance levels. These findings may imply that mindfulness is a very important approach. In previous studies with different perspectives, in a study conducted with runners, it was determined that the runners who performed mindfulness exercises had higher athletic performance development rates (Hill et al., 2020). In another study, it was determined that athletes in different branches who performed mindfulness exercises had better performance development (Birrer et al., 2012). In the study conducted by Dehghani et al. (2018) with adult basketball players, it was revealed that the Mindfulness-Acceptance-Commitment (MAC) approach was an effective tool for increasing athletic performance and reducing experiential avoidance and athletic anxiety in athletes. When the related literature is examined, it can be said that the inclusion of mindfulness exercises in training programs in addition to physical training can increase athletic performance.

In terms of the branch variable, it was determined that the sprinters had higher scores in the refocusing sub-dimension compared to the athletes in the branch of jumps. It is clear that athletes competing in sprint competitions may inevitably be more sensitive towards focusing and attention skills, especially if there are obstacles. Refocusing is defined as the ability to quickly regulate the focus of attention from disruptive stimuli to goal-related cues (Thienot et al. 2014). When the related scale items are examined in relation to the skills of the athletes, it can be said that an attention skill over attention, i.e. meta-attention, is required for refocusing. In this context, due to the

fact that most of the sample group in the present study consisted of athletes competing in short-distance obstacle races, refocusing on goals related to approaching obstacles, passing obstacles, establishing a rhythm between obstacles and maintaining speed after passing each obstacle is thought to be important. In a study conducted with elite athletes competing in the branches of long-distance and short-distance running, significant differences were found in basic mental and psychosomatic dimensions. It was also revealed in the aforementioned study that short-distance runners had significantly higher levels of goal-setting, stress reactions, fear control, imagination, competitive planning and mental application compared to the long-distance runners (Znazen et al., 2017).

In terms of the athletic experience variable, it was determined that the score averages in the awareness sub-dimension and mindfulness total scores increased in parallel with athletic experience. It is thought that athletes with higher experience have higher mindfulness levels as not only physical abilities but also physical abilities increase with athletic experience. In contrast with the present study, Tingaz (2020b) reported that the mindfulness levels of student-athletes at the Faculty of Sports Sciences did not differ based on the athletic experience variable.

In conclusion, in the present study, the mindfulness levels of athletes in various branches were evaluated based on different variables. It was observed that the athletes with high performance levels had higher mindfulness levels while the national athletes and the athletes with training experience had a higher score average in different sub-dimensions and the female participants had a higher score average compared to the male participants. It is notable that the athletes who included mental training in their training schedule had higher mindfulness levels compared to those who did not. According to the results obtained based on the variable of branch, it was determined that the sprinters were more successful compared to the athletes in other branches, especially in the refocusing sub-dimension. The mindfulness levels of Track and Field athletes were evaluated from many different perspectives. The findings obtained in the present study indicated that mindfulness can be affected by different variables. However, considering that the most important goal for athletes is to improve their performance, it is important for them to be aware of the positive effects of mindfulness. Based on this, it can be suggested for athletes to include mental mindfulness exercises in their training program and develop this approach as much as possible in order to support their athletic performance.

References

Abdul Rafeeque, T. C., & Sultana, D. (2016). Mediating role of mindfulness on the relationship between mental toughness and athletics performance of inter university track and field athletes. *Int. J. Phys. Educ. Sports Health, 3*, 4–7 Retrieved form http://www.kheljournal.com/archives/2016/vol3issue2/PartA/3-1-68.pdf.

Altintaş, A., & Akalan, C. (2008). Mental Traınıng and Hıgh Performance. *Spormetre The Journal of Physical Education and Sport Science, 6*(1), 39–43. https://doi.org/10.1501/sporm_0000000131.

Birrer, D., Röthlin, P., & Morgan, G. (2012). Mindfulness to enhance athletic performance: Theoretical considerations and possible impact mechanisms. *Mindfulness, 3*(3), 235–246. https://doi.org/10.1007/s12671-012-0109-2.

Carraça, B., Serpa, S., Rosado, A., & Palmi, J. (2018). The Mindfulness-Based Soccer Program (MBSoccerP): Effects on elite athletes. *Cuadernos de Psicología del Deporte, 18*(3), 62–85 Retrieved from https://revistas.um.es/cpd/article/view/323541.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). NJ: Erbbaum.

De Petrillo, L. A., Kaufman, K. A., Glass, C. R., & Arnkoff, D. B. (2009). Mindfulness for long-distance runners: An open trial using Mindful Sport Performance Enhancement (MSPE). *Journal of Clinical Sport Psychology, 3*(4), 357–376. https://doi.org/10.1123/jcsp.3.4.357.

Dehghani, M., Delbar Saf, A., Vosoughi, A., Tebbenouri, G., & Ghazanfari Zarnagh, H. (2018). Effectiveness of the mindfulness-acceptance-commitment-based approach on athletic performance and sports competition anxiety: a randomized clinical trial. *Electronic Physician, 10*(5), 6749–6755. https://doi.org/10.19082/6749.

Gardner, F. L., & Moore, Z. E. (2004). A mindfulness-acceptance-commitment-based approach to athletic performance enhancement: Theoretical considerations. *Behavior therapy, 35*(4), 707–723. https://doi.org/10.1016/S0005-7894(04)80016-9.

Gooding, A., & Gardner, F. L. (2009). An investigation of the relationship between mindfulness, preshot routine, and basketball free throw percentage. *Journal of Clinical Sport Psychology, 3*(4), 303–319. https://doi.org/10.1123/jcsp.3.4.303.

Hanin, Y. L. (2007). Emotions in sport: Current issues and perspectives. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of Sport Psychology* (3rd ed., pp. 31–58). Hoboken: Wiley. https://doi.org/10.1123/jcsp.3.4.377.

Hill, A., Schücker, L., Hagemann, N., & Strauβ, B. (2020). The influence of mindfulness training on running economy and perceived flow under different attentional focus conditions–an intervention study. *International Journal of Sport and Exercise Psychology, 0*(0), 1–20. https://doi.org/10.1080/1612197X.2020.1739110.

Hoja, S., & Jansen, P. (2019). Mindfulness-based intervention for tennis players: A quasi-experimental pilot study. *BMJ Open Sport and Exercise Medicine, 5*(1), 584. https://doi.org/10.1136/bmjsem-2019-000584.

Jokela, M., & Hanin, Y. L. (1999). Does the individual zones of optimal functioning model discriminate between successful and less successful athletes? A meta-analysis. *Journal of sports sciences, 17*(11), 873–887. https://doi.org/10.1080/026404199365434.

Jones, M. I., & Parker, J. K. (2016). A conditional process model of the effect of mindfulness on 800-m personal best times through pain catastrophising. *Journal of Sports Sciences, 34*(12), 1132–1140. https://doi.org/10.1080/02640414.2015.1093648.

Kabat-Zinn, J., Beall, B., & Rippe, J. (1985). A systematic mental training program based on mindfulness meditation to optimize performance in collegiate and Olympic rowers. Paper presented in World Congress in Sport Psychology, Copenhagen, Denmark.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical psychology: Science and Practice, 10*(2), 144–141. https://doi.org/10.1093/clipsy.bpg016.

Karasar, N. (2017). *Bilimsel araştırma yöntemleri: kavramlar, teknikler ve ilkeler (27. Baskı)*. Ankara: Nobel.

Kaufman, K. A., Glass, C. R., & Pineau, T. R. (2018). *Mindful sport performance enhancement: Mental training for athletes and coaches*. Washington, DC: American Psychological Association. https://doi.org/10.1037/0000048-000

Kline, R. B. (2011). Methodology in the Social Sciences. Principles and practice of structural equation modeling, 3rd edn. New York, US: Guilford Press.

Klockare, E., Gustafsson, H., Davis, P., & Lundqvist, C. (2015). Track and field athletes' experiences and perceived effects of flotation-REST: An interpretative phenomenological analysis. *International Journal of Sport Psychology, 46*(5), 409–428. https://doi.org/10.7352/IJSP.2015.46.409.

Kwee, M. (1995). Wherever you go, there you are: Mindfulness meditation in everyday life. *Behaviour Research and Therapy, 33*(8), 996. https://doi.org/10.1016/0005-7967(95)90133-7.

Schwanhausser, L. (2009). Application of the mindfulness-acceptance-commitment (MAC) protocol with an adolescent springboard diver. *Journal of Clinical Sport Psychology, 3*(4), 377–395.

Serdar, E., Donuk, B., & Cengiz, R. (2016). Analyzing the level of mindfulness and entrepreneurship of the university students. *International Journal of Social Sciences and Education Research, 2*(4), 1320–1328.

Spiriev, B. (2014). IAAF Scoring Tables of Athletics Monaco: Revised Edition.

Thienot, E., Jackson, B., Dimmock, J., Grove, J. R., Bernier, M., Fournier, J. F. (2014). Development and preliminary validation of the mindfulness inventory for sport. *Psychology of Sport and Exercise, 15*(1), 72–80. https://doi.org/10.1016/j.psychsport.2013.10.00

Thompson, R. W., Kaufman, K. A., De Petrillo, L. A., Glass, C. R., & Arnkoff, D. B. (2011). One year follow-up of mindful sport performance enhancement (MSPE) with archers, golfers, and runners. *Journal of Clinical Sport Psychology, 5*(2), 99–116. https://doi.org/10.1123/jcsp.5.2.99.

Tingaz, E. O. (2020b). Examination of mindfulness according to some variables in Student-Athletes of Sports Sciences Faculty. *The Journal of Turkish Sport Science, 3*(1), 21–28 Retrived from https://dergipark.org.tr/en/pub/tsbd/issue/52814/696809.

Tingaz, E. O. (2020a). Sportif performansı artırmada yeni bir yaklaşım: Bilinçli farkındalık (Mindfulness). Z. F. DinÇ (Ed.), *Sporda psiko-sosyal alanlar* (p. 39–46). Akademisyen.

Tingaz, E. O. (2020c). Adaptation of the Mindfulness Inventory for Sport into Turkish: A Validity and Reliability Study. *Spormetre The Journal of Physical Education and Sport Science, 18*(1), 71–80. https://doi.org/10.33689/spormetre.642682.

Williamson, M. (2019). *The impact of confidence on athletic performance – How the implementation of mental training affect track and field performances*. https://mdsoar.org/handle/11603/16691

Wrisberg, C. A., Loberg, L. A., Simpson, D., Withycombe, J. L., & Reed, A. (2010). An exploratory investigation of NCAA division-I coaches' support of sport psychology consultants and willingness to seek mental training services. *Sport Psychologist, 24*(4), 489–503. https://doi.org/10.1123/tsp.24.4.489.

Zadeh, M. M., Ajilchi, B., Salman, Z., & Kisely, S. (2019). Effect of a mindfulness programme training to prevent the sport injury and improve the performance of semi-professional soccer players. *Australasian Psychiatry, 27*(6), 589–595. https://doi.org/10.1177/1039856219859288.

Znazen, H., Slimani, M., Miarka, B., Butovskaya, M., Siala, H., Messaoud, T., Chamari, K., & Souissi, N. (2017). Mental skills comparison between elite sprint and endurance track and field runners according to their genetic polymorphism: A pilot study. *Journal of Sports Medicine and Physical Fitness, 57*(9), 1217–1226. https://doi.org/10.23736/S0022-4707.16.06441-0.

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