Effect of Mindfulness Training on Emotional Regulation and Mindfulness of Student Coaches of Rowing

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ABSTRACT

The aim of this study was to investigate the effect of mindfulness training on emotional regulation, stress and mindfulness on student coaches of Rowing from Sports Authority of India. The Participants were 18 of students NIS diploma students programme specializing in Rowing, from SAI Thiruvananthapuram, Kerala. The age ranged from 22 to 33 years. The participants were randomly assigned to two groups: an experimental group (N=9) and the control group (N=9). Paired-t test and ANCOVA revealed significant improvement. Percentage gain for the variables that is in the sub-scales of emotional regulation [cognitive reappraisal increased 92.26% (p<.000) and expressive suppression 121.92% (p<.000)], mindfulness attention awareness increased 94.895% (p<.000) while in the five subscale of mindfulness [observe increased 140% (p<.000), describe 31.12% (p<.000), act with awareness 40.44% (p<.002and non-react 78.83% (p<.000),] subscales of DASS [depression decreased 74.949% (p<.000), stress decreased 68.06% (p<.000) and anxiety decreased 71.83% (p<.000), following mindful training. No changes were seen in non-judgment facet of mindfulness. It is concluded that 12-week mindfulness training, to the student coaches in rowing, has resulted in an increase in state of mindfulness and a dimension of trait mindfulness from pre- to post-intervention, as well as significant decrease in aspects of depression, anxiety and stress.

Key words

Mindfulness, Emotional regulation, Anxiety, and Stress

INTRODUCTION

Mindfulness is a form of self-awareness training adapted from Buddhist mindfulness meditation. Mindfulness means 'paying attention in a particular way: on purpose, in the present moment and non-judgmentally'. It has been described as a 'journey of self-development, self-discovery, learning, and healing' (Kabat-Zinn, 1990). It is simply being aware of what is going on, as it is arising, connecting deeply and directly with this and relating to it with acceptance; a powerful act of participatory observation and mindful responses. Both perform leading roles in which the performance and well-being of subordinates depend on the leader's ability of taking responsibility and decision making that is shown to be influenced by mindfulness (Fiol & O'Connor, 2003).

Mindfulness practices comprise a process of self regulation differentiated by the following distinct but interrelated components: attention regulation, body awareness, emotion regulation (reappraisal and extinction), as well as change in perspective on the self (Hölzel et al., 2013). Mindfulness is a multifaceted construct, leading to a five-facet model of mindfulness; the facets are 'observe,' 'describe,' 'act with awareness,' 'non-judge,' and 'non-react' (Baer, 2006).

Emotion regulation refers to a variety of strategies that can be implemented at different points, during the emotion-

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generative process, to influence which emotions arise, when and how long they occur, and how these emotions are experienced and expressed (Gross, 2007).The connection between mindfulness and improved emotion regulation is certainly an intuitive one, given the emphasis on the nonjudgmental acceptance of thoughts and emotions that is at the core of this practice (Kabat-Zinn, 1990). Mindfulness promotes the early awareness and nonjudgmental acceptance of emotional stimuli; it allows people to engage in regulation early in the time course of stimulus processing, before intense emotional responses occur.

The Mindfulness-Acceptance-Commitment-based (MAC) approach which is an integration of Acceptance and Commitment therapy and Mindfulness-Based Cognitive therapy was developed for athletes. It emphasizes non-judging, mindful awareness and acceptance of in-the-moment inner experiences instead of controlling and reducing internal experiences. The MAC approach believes that it is possible to improve performance while experiencing negative internal states. All internal states are seen as normal part of human existence and sports (Gardner & Moore, 2004). Studies on elite canoeists who received Acceptance and Commitment Therapy (ACT) based intervention and the other group received hypnosis intervention. The ACT intervention resulted in better performance in Canoeing training than the hypnosis intervention (Villa, Montes, Cueto, Cepeda, & García, 2004). Sarah Hasker (Hasker, 2010)

In the first empirical test of a mindfulness-based intervention for athletes, Kabat-Zinn, Beall, and Rippe (1985) found that, following mindfulness training, a group of college rowers performed well above their coach's expectations (based on experience level and physical ability), and a group of Olympic rowers, several of whom won medals, reported feeling that the training had helped their performance. Birrer, Rothlin and Morgan (2012) suggest that to perform well the athlete would need to achieve a state called discrepancy adjustment, which can be seen as a quasi-meditative state and can be compared to air-plane autopilot. It consists of self-monitoring, self-evaluating, and adjusting behavior, and can also be seen as the task-focused, present-moment awareness that mindfulness promotes. Wegner (1994), proposed that attempting to control negative internal states may ironically increase their occurrence by priming athletes to search for these phenomena. Such scanning can adversely impact sport performance, both by making negative thoughts and feelings more prominent in conscious awareness, and by distracting attention from the task at hand (Bertollo Saltarelli, & Robazza, 2009 ; Janelle, 1999). Thus, rather than trying to control internal phenomena, it may be more beneficial for athletes to develop skills in present-moment awareness and acceptance (Gardner & Moore, 2006 ; Kaufman, Glass, & Arnkoff, 2009). This paradigm-shifting notion is a central tenet of an emerging group of treatments in sport psychology referred to as mindfulness based interventions.

Mindfulness is not the active processing of context-dependent information, but instead is a nonreactive awareness and unconditional acceptance of whatever arises in the present-moment. This Eastern conceptualization of mindfulness has been used more widely to date by clinical psychologists, and is the primary perspective underlying approaches to sport performance enhancement (e.g., Gardner & Moore, 2004, 2007; Kaufman & Glass, 2006).

Rigorous empirical investigations of mindfulness-based interventions for sport performance enhancement were conducted.

Currently, there are two empirically supported approaches specifically for athletes, both of which utilize the Eastern definition of mindfulness: Kaufman and Glass' (2006) Mindful Sport Performance Enhancement (MSPE), and Gardner and Moore's (2004, 2007) Mindfulness-Acceptance-Commitment (MAC). Approach of MSPE is a 6-week Programme consisting of weekly 90-minute group sessions and daily home practice (Kaufman, Glass, & Pineau, 2012). Kaufman et al (2009) found significant increases in aspects of state and trait mindfulness for the golfers, in overall trait mindfulness for the archers, and in state flow for the whole sample. De Petrillo et al (2009) tailored the 4-week MSPE protocol to runners and found a significant increase in state mindfulness and a dimension of trait mindfulness from pre- to post-intervention, as well as significant decreases in aspects of sport related anxiety and perfectionism.

In flow experiences, elite swimmers described that they had been particularly mindful of their bodily sensations and tended to accept them. Mindfulness and acceptance were combined in a psychological skills training programme for golfers. Training based on mindfulness and acceptance proved to be effective for enhancing performance, during competition, for young golfers. (Semple Randye J. et al, 2009) One-year follow-up assessments were conducted on archers, golfers, and long-distance runners (N=25). Participants reported significant increases in the ability to act with awareness and overall trait mindfulness from pretest to follow-up, along with significant decreases in task-relate worries and task-irrelevant thoughts. The long-distance runners exhibited significant improvement in their mile times from pretest to follow-up, with significant correlations between change in runner's performance and trait variables. (Bernier Marjorie et al, 2009). Results suggest that Mindful Sport Performance Enhancement is a promising intervention associated with long-term changes in trait variables that contribute to optimal athletic performance.(Thompson, Rachel W. et al, 2011) Four weeks of Mindfulness Meditation Therapy has an effect shooting performance on Hypothalamic Pituitary Adrenal -Axis by decreasing the level of Salivary Cortisol as a reliable physiological marker of Pre-Competition Stress.(*John Shaji et al, 2011).*

Coaching work can be viewed as a highly complex collection of practices in which effort is made to improve or sustain performance towards identified goals (Dickson, 2001; Lyle, 2002). Performance coaches are often held totally responsible for competition results that are predominantly complex, dynamic and unpredictable; all of which is subject to intense and continuous scrutiny by fans and the media (Dawson, Dobson & Gerrard, 2000; Potrac, Brewer, Jones, Armour, & Hoff, 2000). The complexity and extraordinary demands placed on coaches include performing a myriad of duties, such as assuming the role of educator, motivator, counselor, adviser, trainer, manager and administrator (Surujlal, 2007). For coach increased commitments bring increased expectations, pressures and demands. Understanding how mindful training would have an impact on emotional regulation and mindfulness on students undergoing coach education in rowing was the fundamental purpose of this research.

METHDOLOGY

Participants

The participants were 19 elite rowers (four women and fifteen men), who were all members of NIS Diploma course at Sports Authority of India, LNCPE, Thiruvananthpuram. Fifteen of them were

international level players. The swimmers ranged in age from 22 to 32 years (M age =27.23, SD=2.87). The sample comprised 22 % female (n = 4) with the remaining 78% represented by male (n = 15). Furthermore, 27% (n=5) were coaches, from defense 22% (n=4) students. All these participants had undergraduate degree qualification from various parts of the country.

Instrument

Five-Facet Mindfulness Questionnaire FFMQ (Baer et al., 2006) is a self-report questionnaire derived from the factor analysis of five recent and independently developed mindfulness questionnaires. It assesses the inclination to think and behave mindfully in daily life. The five facets include observing, describing, acting with awareness, non-reactivity to inner experience, and non-judging of inner experience. The FFMQ has 39 questions, rated on a Likert-type scale ranging from 1 (never or very rarely true) to 5 (very often or always true). The FFMQ has internal consistency reliability (alpha) of 0.86–0.93 for the five facets (Isenberg, 2009). The FFMQ is a comprehensive scale that integrates conceptualizations of mindfulness underlying five validated mindfulness scales and assesses five different aspects of mindfulness (Bergomi et al., 2012). In terms of construct validity, experienced meditators achieve higher scores on FFMQ facets (Baer et al, 2008)

Mindful Attention Awareness Scale (MAAS) has 15 items that was designed as a single structure factor by Brown and Ryan (2003). They have investigated divergent and convergent concurrent validity of psychometric indices of mindfulness scales with different personality questionnaires. Cronbach's alpha reliability coefficient was 0.80 to 0.87, for different samples of students (Brown & Ryan, 2003).

Emotion regulation Questionnaire (ERQ) (Gross, J.J. & John, O.P., 2003) has 10-item scale designed to measure respondents' tendency to regulate their emotions intwo ways: (1) Cognitive Reappraisal and (2) Expressive Suppression. Respondents answer each item on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7(strongly agree). Construct validity of ERQ was confirmed and internal consistencies (Cronbach's alpha) of the two subscales were (cognitive reappraisal .81 and expressive suppression .73).

Depression Anxiety Stress Scales (DASS: Lovibond & Lovibond, 1993): DASS is composed of 21 items assessing negative emotional symptoms, and yields three subscale scores for depression, anxiety, and stress. The DASS has acceptable psychometric properties (coefficient alphas ranging from .81 to .91) The DASS scales correlate with the BDI in a range from .58 to .74, and they correlate with the BAI in a range from .54 to .81 (Lovibond & Lovibond, 1995).

Intervention

The Mindfulness training Programmeme was held at SAI, LNCPE Trivandrum, Kerala. The experimental group performed the prescribed exercises four times a week for a period of 12 week. Each session lasted was for 45-50 minutes meditation skills were taught. The body scan was a 25-min exercise in which

attention was directed sequentially to numerous areas of the body while the participant was lying down with eyes closed. Sensations in each area had to be carefully observed. In sitting meditation, participants were instructed to sit in a relaxed and wakeful posture with eyes closed and to direct attention to the sensations of breathing. Hatha yoga postures were used to teach mindfulness of bodily sensations during gentle movements and stretching. Participants also practiced mindfulness during ordinary activities like walking, standing, and eating. For all mindfulness exercises, participants were instructed to focus attention on the target of observation (e.g., breathing or walking) and to be aware of it in each moment. When emotions, sensations, or cognitions arose, they had to be observed nonjudgmentally. When the participant noticed that the mind had wandered into thoughts, memories, or fantasies, the nature or content of them was briefly noted, if possible, and then attention was returned to the present moment. Thus, participants were instructed to notice their thoughts and feelings but not to become absorbed in their content (Kabat-Zinn, 1982).

The study employed an experimental design using a quantitative approach to emotional regulation and mindfulness of student coaches in Rowing. The scholar administered the questionnaire to the participant. The questionnaires were completed in the presence of the Scholar. The data was statistically analyzed by using descriptive statistics, ANCOVA, and paired t- test to find out the significant difference. The level of significance chosen was $P< 0.01$ and $P<0.05$.Data analyses were conducted using the Statistical Package for Social Sciences (SPSS – version 16).

RESULTS & DISCUSSION

Means, standard deviations, percentage gain and t and ANCOVA values for all variables are provided for the mindfulness and control samples in Tables 1 and 2, respectively. Percentage gain is presented in figure 1.

The pre to post mean of cognitive reappraisal(*M=18.67* ± 1.87 SD; M 35.89 ± 2.85 SD) and percentage gain (92.26%) and expressive suppression (*M* =8 ± .78SD; M18.11; ±1SD) percentage gain (121.92%),the subscales of emotional regulation were found to improve.

The pre to post mean of mindfulness attention awareness (*M=37.* ± 5.79 SD; M= 72.11± 3.22 SD) and percentage gain (94.895%) was found to improve.

The pre to post mean of depression (*M=8.778* ± .97 SD; M 2.11 ± .93 SD) and percentage gain (75.95%),anxiety(*M* = 7.89 ± .78 SD; M= 2.22 ± .97 SD) percentage gain (71.83%), and stress (*M* = 8 ± .71SD; M=2.56 ± .88SD) and percentage gain (68.06%),the subscales of DAS were found to improve.

The pre to post mean of observe (*M= 14.44* ± .88 SD ; M= 34.67 ± 2.40 SD) and percentage gain (140%),describe(*M* = 26.78 ± .97SD; M= 35.11 ± 2.62SD) percentage gain (31.12%), act with awareness (*M* = 15.11 ± 1.76SD;M= 21.22 ± 4.29SD) percentage gain (40.44%), non-judge (*M* = 15.89 ± 2.67SD;M= 15.78 ± 3.11SD) percentage gain (0.69%), and non-react (*M* = 15.22 ± .83SD;M= 27.22 ± 1.79SD) percentage gain (78.83%), the subscales of mindfulness were found to improve.

Table-1: Pre to Post Mean difference, Standard deviation gain percentage and "t" values fERQ, MAAS, DASS and FFMQ of Control and Experimental Group.

Variables	Groups	PRE	SD	POST	SD	MD	GAIN	T-Value	P-Value
Cognitive Reappraisal (ERQ)	Control	18.44	2.13	18.56	2.13	-.11	-0.60	0.43	.681NS
	Experimental	18.67	1.87	35.89	2.85	17.22	92.26	18.63	.000**
Expressive Suppression (ERQ)	Control	9.22	1.09	9.44	1.24	-.222	-2.409	1.51	.169NS
	Experimental	8.00	.78	18.11	1.00	9.89	121.92	21.75	.000**
Mindfulness Attention Awareness (MAAS)	Control	45.78	5.09	46.11	4.86	-.33	- 0.73	2.00	.081NS
	Experimental	37.00	5.79	72.11	3.22	35.11	94.895	12.49	.000**
Depression (DASS)	Control	8.889	1.76	9.889	1.76	-1.00	-11.25	1.81	.108NS
	Experimental	8.778	.97	2.11	.93	6.67	75.95	16.33	.000**
Anxiety (DASS)	Control	8.33	2.92	9.67	2.92	-1.33	-15.99	1.18	.272NS
	Experimental	7.89	.78	2.22	.97	5.67	71.83	11.33	.000**
Stress (DASS)	Control	9.67	1.14	9.89	1.54	-.222	2.299	1.51	.169NS
	Experimental	8.00	.71	2.56	.88	5.444	-68.06	13.21	.000**
Observe (FFMQ)	Control	17.67	1.30	15.33	1.30	-.33	-1.89	.309	.766NS
	Experimental	14.44	.88	34.67	2.40	20.22	140.00	26.00	.000**
Describe (FFMQ)	Control	15.89	2.77	15.78	2.77	.111	0.699	0.29	.782NS
	Experimental	26.78	.97	35.11	2.62	8.33	31.12	10.66	.000**
Act with awareness (FFMQ)	Control	15.33	2.64	15.56	2.64	-.222	-1.45	.686	.512NS
	Experimental	15.11	1.76	21.22	4.29	6.11	40.44	4.603	.002**
Non-judge (FFMQ)	Control	17.33	3.00	17.67	3.00	-.333	1.92	0.31	.766NS
	Experimental	15.89	2.67	15.78	3.11	.111	0.6992	.286	.782NS
Non-react (FFMQ)	Control	15.33	1.42	15.56	1.42	-.222	-1.49	1.00	.347NS
	Experimental	15.22	.83	27.22	1.79	12.00	78.83	21.71	.000**

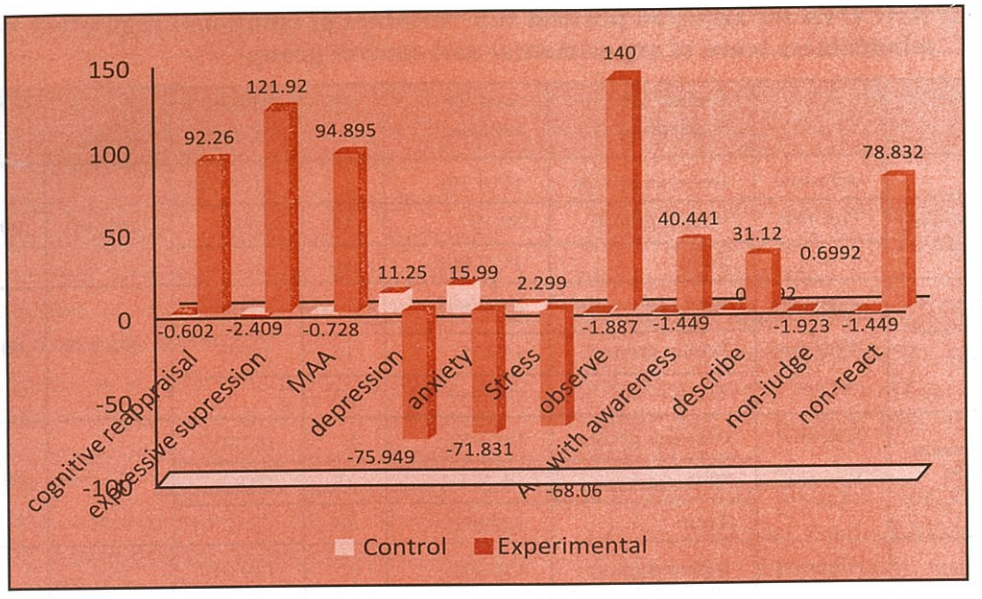

Fig.-1: The percentage gain of emotional regulation, cognitive functions and mindfulness scores in control and experimental group.

Ethical considerations

Participants were informed that their participation was voluntary, their responses would be confidential and that their participation would remain anonymous.

Discussion

The purpose of the study was to have an understanding on to the extent to which mindful training would have an impact on emotional regulation and mindfulness on students undergoing coach education.

Mindfulness and emotional regulation improved while anxiety, depression and stress decreased. Significant improvement was seen in emotional regulation. The two sub-variables of emotional regulation are cognitive reappraisal and expressive suppression. The capacity to control emotion is important for human adaptation. Studies have examined controlling attention to, and cognitively changing the meaning of, emotionally evocative stimuli. These two forms of emotion regulation depend upon interactions between prefrontal and cingulate control systems and cortical and sub-cortical emotion-generative systems (Butler, E. A., 2003).Expressive suppression improved. Suppression alone can disrupt communication and magnified blood pressure responses. Suppression may reduce rapport and inhibited relationship formation.

Five-Facet Mindfulness observing, describing, acting with awareness, and non-reacting improved, while no changes were seen in non-judging. The observing facet includes attention to both internal stimuli (thoughts, feelings, sensations) and external stimuli (sights, sounds, smells). Mindfulness would have resulted in unbiased observation of all stimuli; it might have reduced maladaptive forms of selective attention. Thus, high scores on the observing facet in may indicate a greater tendency to notice a wide range of internal and external stimuli, rather than focusing selectively on the threatening or unpleasant ones. It would also have contributed to shift their attention flexibly rather than

Table-2: ANCOVA for adjusted posttest sub-variables of emotional regulation and mindfulness score of experimental and control group

		Source of Variance	Sum of Squares	Df	Mean Square	F Ratio	P-Value
Cognitive Reappraisal (ERQ)	Adjusted Post test	Between groups	1118.799	1	1118.799	283.541	.000**
		Within groups	59.187	15	3.946		
		Total	1177.986	16			
Expressive Suppression (ERQ)	Adjusted Post test	Between groups	278.464	1	278.464	288.559	.000**
		Within groups	14.475	15	.965		
		Total	292.939	16			
Depression (DASS)	Adjusted Post test	Between groups	182.052	1	182.052	253.703	.000**
		Within groups	10.764	15	.718		
		Total	182.816	16			
Anxiety (DASS)	Adjusted Post test	Between groups	129.019	1	129.019	112.559	.000**
		Within groups	17.194	15	1.146		
		Total	146.213	16			
Stress (DASS)	Adjusted Post test	Between groups	100.618	1	100.618	117.554	.000**
		Within groups	12.839	15	.856		
		Total	113.457	16			
Mindfulness Attention Awareness (MAAS)	Adjusted Post test	Between groups	1986.583	1	1986.583	116.670	
		Within groups	255.411	15	17.027		
		Total	2241.994	16			
Observe (FFMQ)	Adjusted Post test	Between groups	1293.789	1	1293.789	447.418	.000**
		Within groups	43.375	15	2.892		
		Total	1337.164	16			
Describe (FFMQ)	Adjusted Post test	Between groups	250.805	1	250.805	85.580	.000**
		Within groups	43.960	15	2.931		
		Total	294.765	16			
Act with Awareness (FFMQ)	Adjusted Post test	Between groups	117.492	1	117.492	13.895	.002**
		Within groups	126.833	15	8.456		
		Total	244.425	16			
Non-judge (FFMQ)	Adjusted Post test	Between groups	7.732	1	7.732	0.011	.918NS
		Within groups	10.703	15	.714		
		Total	18.435	16			
Non-react (FFMQ)	Adjusted Post test	Between groups	631.841	1	631.84	431.702	.000**
		Within groups	21.954	15	1.464		
		Total	653.795	16			

becoming rigidly absorbed in any particular class of stimuli. In addition, higher scores for the describing involve labeling experiences such as sensations or cognitions with words. Acting with awareness refers to focusing attention on one's current activities .Non-judging of inner experience involves refraining from an evaluation of thoughts and feelings and non-reactivity to inner experience refers to noticing thoughts and feelings, without showing a reaction towards them. The result suggests that mindfulness would equip them to learn to respond differently to the internal stimuli they observe. In particular, they appear more likely to observe inner stimuli with words. Findings for the describing facet also are consistent with recent neuroscience data suggesting that verbal labeling of affect modulates brain responses to emotional stimuli in normal volunteers (Hariri, Bookheimer, & Mazziotta, 2000; Lieberman et al., 2007

Mindfulness attention awareness improved. Consciousness encompasses both awareness and attention. Attention is a process of focusing conscious awareness, providing heightened sensitivity to a limited range of experience (Westen, 1999). In actuality, awareness and attention are intertwined, although attention and awareness are relatively constant features of normal functioning, mindfulness can be considered an enhanced attention to and awareness of current experience or present reality. The broad purpose of the training Programme was to enhance mindfulness, that is, to teach participants the principles of mindfulness and the practice of mindfulness meditation so that they can learn to relate mindfully to whatever they experience.

Significant improvements on all measures were achieved from pre-post treatment in the DASS scores. Depression lowered, reduction in stress was noticed and anxiety further decreased .Mindful training was effective as these participants had a very hectic schedule through the day. Most of the participants were satisfied with the intervention and they learned new psychological skills to deal with thoughts and emotional reactions associated both with sports.They learned new skills to handle stress and anxiety and their understanding of the aspects affecting their sport performance.

CONCLUSION

The 12-week mindfulness training to the student coaches in Rowing found significant increase in state mindfulness and a dimension of trait mindfulness from pre- to post-intervention, as well as significant decrease in aspects of depression, anxiety and stress.

LIMITATIONS OF THE STUDY

The sample size in this study was small, but individual attention could be given. Besides relying on to questionnaire, the use of psycho-physiological measurements could have been incorporated.

RECOMMENDATIONS

With a larger sample size, randomized study groups and well selected measures, a better understanding of the usability and possible applications of mindfulness could be achieved. There is a need for new approaches and methods to objectively measure the psycho-physiological variables. This study suggests that mindfulness could provide a new perspective in the field of sport.

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