

A PILOT STUDY OF A MINDFULNESS-BASED PROGRAM (MBSOCERP): THE POTENTIAL ROLE OF MINDFULNESS, SELF-COMPASSION AND PSYCHOLOGICAL FLEXIBILITY ON FLOW AND ELITE PERFORMANCE IN SOCCER ATHLETES

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ABSTRACT: Mindfulness-based interventions have consistently demonstrated associations with multiple aspects of flow and sport performance. In this current pilot study we sought to explore the effects of Mindfulness-based program for elite soccer athletes (MBSoccerP) training on self-compassion, mindfulness, and psychological flexibility, flow and sport performance outcomes on a sample of 57 elite soccer players (Portuguese 2^a league) from two different cohorts participated in this study. Also, we examined the relationship between mindfulness, psychological flexibility, and self-compassion at baseline-predicted flow and performance measures. Paired t-tests and correlations were conducted to examine changes and significant relation between variables before and after the MBSoccerP intervention. Also hierarchical regression was used to assess the influence of baseline psychological flexibility, self-compassion, and mindfulness facets on flow and sport performance measures at post-intervention in this pre-/post-pilot study. Results suggested that mindfulness, self-compassion, direct forms of performance and flow improved from pre to post-intervention and psychological inflexibility decreased. Further, mindfulness predicted higher flow at post intervention while controlling for baseline mindfulness. Psychological inflexibility predicted lower dispositional flow at post intervention. Findings suggest that MBSoccerP may be effective for improving flow and performance.

KEYWORDS: Mindfulness, Self-Compassion, Psychological Flexibility, Performance

UN ESTUDIO PILOTO DE UN PROGRAMA BASADO EN LA ATENCIÓN PLENA (MBSOCERP): EL PAPEL POTENCIAL DE LA ATENCIÓN, LA AUTO-COMPAÑIÓN Y LA FLEXIBILIDAD PSICOLÓGICA EN EL FLUJO Y EL RENDIMIENTO DE ÉLITE EN LOS ATLETAS DE FÚTBOL

RESUMEN: Las intervenciones basadas en la atención plena han demostrado consistentemente asociaciones con múltiples aspectos del flow y el rendimiento deportivo. En este estudio piloto buscamos explorar los efectos del programa Mindfulness para atletas de fútbol (MBSoccerP) en una muestra de 57 jugadores de élite. Se realizaron pruebas t de pares y correlaciones para examinar los cambios y la relación significativa entre las variables antes y después de la intervención MBSoccerP. También se utilizó la regresión jerárquica para evaluar la influencia de la flexibilidad psicológica, la autocompañión, e las facetas de atención plena sobre el flow y las medidas de rendimiento deportivo en la postintervención. Los resultados indicaron que la atención plena, la autocompañión, las formas directas de rendimiento y flow mejoraron desde pre hasta después de la intervención y disminuyó la inflexibilidad psicológica. Además, la atención plena predijo un mayor flow en la post-intervención. La inflexibilidad psicológica predijo un menor flow en la post-intervención. Los hallazgos sugieren que MBSoccerP puede ser efectivo para mejorar el flow y el rendimiento.

PALABRAS CLAVE: Atención Plena, Autocompañión, Flexibilidad Psicológica, Rendimiento

UM ESTUDO PILOTO DE UM PROGRAMA BASEADO EM ESPÉCIE (MBSOCERP): O POTENCIAL PAPEL DA ESPÉCIE, FLEXIBILIDADE DE AUTOCOMPAIXÃO E PSICOLÓGICA NO FLUXO E DESEMPENHO ELITE EM ATLETAS DE FUTEBOL

RESUMO: As intervenções baseadas no mindfulness têm demonstrado importantes associações com o estado de flow e otimização desportiva. Neste estudo piloto, procuramos explorar os efeitos de um programa baseado no Mindfulness (MBSoccerP) numa amostra de 57 atletas profissionais de futebol. Testes t e correlações foram realizadas para examinar possíveis efeitos e relações entre as variáveis antes e depois da intervenção MBSoccerP. A regressão hierárquica também foi utilizada para avaliar a influência da flexibilidade psicológica, autocompaixão, e facetas de mindfulness nas medidas de desempenho desportivo e flow. Os resultados indicaram que o mindfulness, a autocompaixão, a performance e o flow melhoraram do pré para a pós-teste, diminuindo o evitamento experiencial. Além disso, o mindfulness foi preditor de maior flow disposicional no pós-teste. O evitamento experiencial foi preditor de um menor flow disposicional no pós-teste. Os resultados sugerem que o MBSoccerP pode ser eficaz na melhoria do flow e performance.

PALAVRAS CHAVE: Mindfulness, Autocompaixão, Flexibilidade Psicológica, Performance

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Studies suggest that mindfulness-based interventions and training are associated with several aspects and characteristics of flow and enhance sport performance (Gardner, Moore, 2012; Mosewich, Crocker, Kowalski, Delongis, 2013; Palmi, Riera, 2017; Solé, Carraça, Serpa, Palmi, 2014) and regularly conduct to negative psychological functioning (Hofmann, Sawyer, Witt, Oh, 2010), and has also been associated to increases in positive traits of mental health (Nyklíček, Kuijpers, 2008). Nevertheless, it is important to study the best way to operationalize mindfulness traits and related constructs, such as experiential avoidance, self-compassion and flow, on athletes, and specifically on elite sport context.

Csikszentmihalyi (1999), Young and Pain (1999), associated peak-performance experiences, or being "in the zone," with states of flow. Consistently, flow happens when an individual notice a balance between the challenges related with a situation and the capacity to meet those challenges and it is considered as an optimal psychological state, as mind and body are in harmony and total relaxation, functioning is improved and negative thinking, self-criticism, self-doubt are nonexistent (Jackson, 2000). In sport context, the flow state can end in optimal sport performance for athletes (Jackson & Roberts, 1992; Jackson, Thomas, Marsh, & Smethurst, 2001). Lately, a growing interest in the interactions between flow, self-compassion, psychological flexibility,

experiential avoidance and mindfulness-based interventions has developed (Carraça, Serpa, Palmi, & Rosado, 2016, 2018, Rothlin, Birrer, et al., 2015; Mosewich, Crocher, et al., 2013). For example, Gardner and Moore (2004) note some important similarities between flow and mindfulness, pointing out that both constructs share an emphasis on present-moment, non-self-conscious concentration on a particular task.

Several studies have shown these suggested interactions, indicating not only a solid relation between measures of mindfulness and flow in athletes but also significant increases in athletes' levels of flow after getting mindfulness-based interventions and programs (Bernier, Thienot, et al., 2009, 2014; Kaufman, Glass, Arnkoff, 2009; Pineau, Glass, et al., 2011; Pineau, Kaufman, Glass, 2012; Aherne, Moran, Lonsdale, 2011; Kaufman, Glass, Arnkoff, 2009). In this sense, some authors propose that flow may be one of the key paths through which mindfulness training can improve athletes' psychological well-being and to enhance performance (Gardner, Moore, 2004; Kaufman, Glass, Arnkoff, 2009).

The literature in sport psychology firmly established that both positive and negative emotions can influence athletic performance, but positive emotions, such as, enjoyment, happiness and wellbeing in sport participation is an integral part of flow and a significant factor in sustained successful involvement in athletics (Csikszentmihalyi, 1990; Csikszentmihalyi, 1999; Hanin, 2000; Jackson, 2000; Jackson, Fitzgerald, 2010; Lazarus, 2000; McCarthy, 2011; McCarthy, Jones, 2007; Scanlan, Scanlan, et al., 2003).

Furthermore, research on self-compassion has suggested that this concept is closely linked to psychopathology symptoms and inflexibility/experiential avoidance. For example, and concerning psychopathology symptoms, several studies have found positive and negative associations between self-compassion and the others constructs presented in the present study. For example, negative associations between self-compassion and anxiety, depression (Neff 2003; Neff, Rude, Kirkpatrick, 2007; Raes 2010; Ying 2009) and positive associations with happiness, optimism, psychological flexibility, flow and performance (Carraça, et al., 2015, 2016; Hollis-Walker, Colosimo 2011; Neff, Rude, Kirkpatrick, 2007). Literature review and intervention research also suggests that self-compassion frequently increases positive symptoms and reduce stress and decrease or may even mediate negative symptom improvement during MBIs (Ortner, Kilne, Zelazo, 2007; Orzech, Shapiro, et al., 2009; Shapiro, Carlson, Freedman, 2006, Jain, et al., 2007; Kuyken, et al., 2010).

Furthermore, the concepts of mindfulness and self-compassion also intersect with the construct of psychological inflexibility/experiential avoidance (Bond, et al., 2011). This construct denotes an emphasis on managing psychological reactions over performing actions consistent with deeply held values, often in an attempt to avoid unpleasant emotions. This concept may help to address the emotional challenges in the different critical competitions stage and enhance emotional well-being and flow state.

In this current pilot study we sought to explore the effects of MBSoccerP training on self-compassion, mindfulness, and psychological flexibility, flow and sport performance outcomes. Also, we examined the relationship between mindfulness, psychological flexibility, self-compassion at baseline-predicted flow and performance measures.

METHODS

Participants

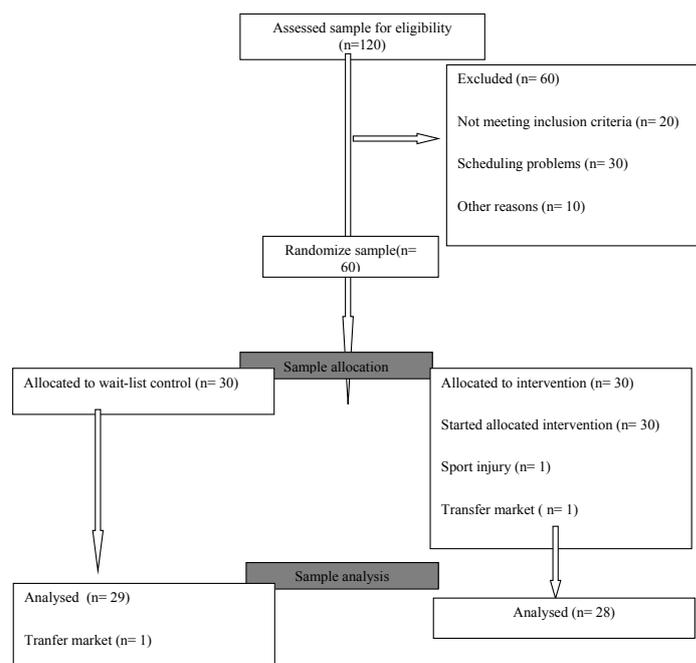
Participants were 57 elite soccer players (Mage = 25.79 years, SD = 3.3) who were randomly assigned to either the intervention or the control group, and were communicate to their intervention condition. Due to various reasons (injuries, change of club) 3 athlete's dropped out. At the end twenty-eight were in the mindfulness intervention condition and twenty-nine were in the wait-list control condition. Both groups did not significantly differ with regard to gender, age and years of practice/hours of soccer training per week. Males athletes comprised 100% of the sample, aged between 18 and 29 years old, and 67.9 % were Portuguese, 21.45% were Brazilian, 7.1% were from Guinea-bissau, and 3.6% were from Ivory Coast. All the players had M= 3.82 elite years of practice, and all had a M= 16.4 global years of practice and 11.18 hours of soccer drills per week in the present season. Inclusion criteria and exclusion criteria for participantantes were defined. The inclusion criteria were that the athlete's be actively competing at elite club level, be 18 years or older (considering evaluation protocol and the intervention program that was designed for older athletes and also considering the personality evaluation that was previously made to excluded personality disorders diagnosis and Portuguese language

proficiency. Criteria for exclusion are a likely mental disorder (for example: medical diagnosis of depression, anxiety, and consumption of psychiatric drugs), significant previous experience with mindfulness programs and being younger than 18.

Procedures

After obtaining ethical approval from the FMH-University of Lisbon Ethics Committee Board, a pilot study was conducted with 57 elite soccer players from the 2ª Portuguese league. Participants were assigned at pre-intervention (time 1), post-intervention (time 2), and were randomly assigned to MBSoccerP intervention.

After allocation to conditions, the protocol and participants instructions (i.e., explanation of the sessions/modules; psychoeducational presentation; program details) were given one week prior to the study commencement to ensure clarity of delivery. All participants completed a self-report paper version of the baseline questionnaires (intervention and control groups). The eight-week intervention (9 sessions, 8 weeks, 90 to 120 minutes, plus 2 sessions of pre to post evaluation program). At the end of the study (nine-week period) the control group were asked to complete the post-test questionnaires. Control group were offered the MBSoccerP training intervention after completion of the study. Participants gave informed consent and completed the questionnaire packages delivered at all-time points (demographic information, pre-test and posttest measures). All participants gave their informed consent to participate in the study and their names were coded in the data file for anonymization. A more detailed progression of participants through MBSoccerP study is outlined in Figure 1.



Note: Flowchart based on Schulz, Altman, and Moher (2010).

Figure 1. Progression of athletes through MBSoccerP research.

The intervention design (MBSoccerP): A Mindfulness Curriculum based on Mindfulness, Stress Reduction, Acceptance and Commitment, and Compassion Mind Training models - MBSoccerP - was implemented in the present study and was adapted for elite soccer athlete's population. The main topics covered in each session of the program were about Introduction to MBSoccerP Mindfulness and Sports; Mindfulness of the Body and Mind-Self-Talk; Mindfulness and Goal Setting versus Process Goals; Building a Mindfulness Practice -Thoughts; Emotions and Meaning in Sports Life-Radical Acceptance; Mindfulness and imagery; Silent Mindful Walking/Running and Self Compassion; Mindfulness Acceptance and Compassion-Body Connection and Athletes Recovery; and Ending MBSoccerP (see table 1).

Main sessions have as a sequence like: review previous session, homework and overall MBSoccerP; centering exercise; session task focused exercise; yoga for beginners; plan for future practice; homework prescription; mindful-

compassion meditation. Each session had duration of 90/120 minutes and the first 60/90 minutes were used to practice either mindfulness or other 3^o CBT wave sport psychological techniques. The remaining 30/45 minutes of each session was used to answer group dynamic questions, hatha yoga/ stretching exercises, role plays, fill worksheets concerning lectures in 3^o CBT wave sport psychology skills training. Each session also contained a meditation to complete throughout the week and self-guided readings and Several specific interventions were used (e.g., Mindful Walking and Mindful Breathing meditations, STOP exercises, Self-Compassion Letters and Loving Kindness). Additionally, worksheets and email audio applications were introduced to participants could track their mindful compassion training, performance and complete corresponding meditations between each session.

Table 1. Descriptive Statistics, Paired t-tests, and Effect Size Estimates (Hedges g) for all Study Variables (n= 57).

Variables	Pre-test (n=57)		Post-test (n=57)		Paired t-test t-Value	p	Effect size Hedges g
	M	SD	M	SD			
AAQ-II	19.93	7.04	18.98	3.84	1.10	.276	.15
SCS-total	19.61	2.57	20.71	2.76	-3.84	.000	.51
FFMQ-Describe	3.39	.55	3.38	.52	.067	.95	.01
FFMQ-Awareness	3.91	.72	3.90	.57	.285	.78	.04
FFMQ-No React	2.92	.54	3.20	.60	-2.43	.019	.33
FFMQ-NoJudge	3.20	.70	3.51	.63	-3.91	.000	.52
DFS2 - Total	3.75	.52	3.90	.33	2.24	.029	.28
FAIP-A	3.81	.69	3.82	.47	-0.21	.84	.03
FAIP-T(coach)	3.77	.60	3.84	.62	-0.68	.50	.09

Measures delivered at all-time points

All measures were based on self-report and assessed at baseline, post-treatment, and at 2-and 4-month follow up.

Demographics. General demographic information (age, gender, social cultural information), as well as sport-specific information (such as, level of sport participation, years of sport participation) was collected.

Psychological inflexibility. The 7-item Portuguese version of the AAQ- II (Bond, et al., 2007, Portuguese version Pinto-Gouveia, Gregório, et al., 2012) has responses ranging on a 7-point likert scale from (1) never true to (7) always true. This scale reflects the single domain of psychological inflexibility with higher scores indicating greater psychological inflexibility (Pinto-Gouveia, Gregório, et al., 2012). The coefficient obtained in 7-item Portuguese version of AAQ-II ranging between .76 and .84, in this sample was $\alpha = 0.77$

Mindfulness. The Five Facet Mindfulness Questionnaire-FFMQ (Baer, et al., 2006, Portuguese version Pinto Gouveia, Gregório, et al., 2012) is an instrument that was based on five factors includes observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. The factors are measured through a 39-item self-report questionnaire. Responses are coded according to a 5-point likert scale from (1) never or very rarely true to (5) very often or always true (Pinto Gouveia, Gregório, et al., 2012). The internal consistency is reasonable for the five facet scales with alphas ranging from 0.75 to 0.91. (Baer, et al., 2006). Reliability for the scale was $\alpha = 0.84$.

Flow State. The Flow State Scale-DFS-2 (Jackson, Eklund, 2002, Portuguese version Gouveia, 2011) is a 36-item self-report measure that was developed to assess intensity and frequency of the experience of flow in sport and physical activity. The measure has nine scales that represent Csikszentmihalyi's (1990) 29 dimensions of flow, each dimension measured by four items. The dimensions measured include challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration of task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience. Responses range on a 5-point likert scale from (1) strongly disagrees to (5) strongly agree (Jackson, Eklund, 2002). The Portuguese version has an internal consistency of $\alpha = 0.83$. The DFS-2 have high internal reliability and validity (Jackson, Eklund, 2002), in this study was $\alpha = 0.95$.

Self- Compassion Scale-SCS. (Neff, 2003, Portuguese version Pinto-Gouveia, Castilho, 2006) was measured using the 26-item. The SCS consists of six subscales. Three represent the components of self-compassion (Self-Kindness, Common Humanity, Mindfulness, and the other three are constructs

in opposition to the three components of self-compassion (Self-Judgment, Isolation, and Over-Identification). Responses are made on a 5-point scale ranging from 1 (almost never) to 5 (almost always). Mean scores on the subscales were summed after negative items were reverse coded, resulting in an overall self-compassion score (Neff, 2003a). The SCS demonstrated good reliability in the present study, $\alpha = 0.83$.

Performance Self-Rating Scale. Athlete's - FAIP-A (Carraça et al., 2013) and Coach's - FAIP-T (Carraça et al., 2013) Performance Self-Rating Scale. This self-rating scale is a 11-item measure, which involves a 5-point likert scale that spans between (1) very poor to (5) very good. The scale is a direct measure of perceived athletic performance that consists of basic constituents of performance like concentration, strength, competitiveness (global performance), motivation, quickness, fitness, endurance, mechanics, aggressiveness, agility, and team cohesion. A definition of each variable was also delivered with the scale itself in order to guide participants. The scale was designed based on Wolanin's (2005) development of a similar athlete's and coach's rating scale used in a preliminary study of the MAC approach. Reliability was average $\alpha = .84$ (FAIP-T), and $\alpha = .83$ (FAIP-A).

Measures delivered following intervention (Post-tested)

Treatment fidelity. To gauge participant adherence and responsiveness, seven questions were included at the end of the posttest questionnaire package. Participants were asked to indicate, on a 0-5 scale; 1-"very poor"; to 5-"excellent". For example, "What did you like most about this training?"; "What aspects of the training could be improved?"; "Please share other comments or expand on previous responses here"; "To what extent did you gain confidence in the following topics, taking into account the different sessions of the program. Participants were also asked to rate their engagement on a 1 (not at all) to 5 (very much) scale.

Fidelity of the intervention and compliance. To maintain the fidelity to the contents and program consistency of the program and protocol the first author of the current study led the intervention and conducts the sessions. He is a clinic and sport psychologist and an experienced mindfulness practitioner and had received training in MBSR and 3^o CBT wave and developed the course program during his PhD program at University of Lisbon in alignment with the 3^o CBT wave therapies and programs (Mindfulness based interventions on clinical and sport context, compassion focused therapy, and acceptance and commitment therapy models) and wrote detailed specifications of the content of each class. Participation in session was recorded and was also asked to participants to complete a record of minutes meditated immediately after each home-meditation session. The main purpose of the interception forms was to encourage reflection on awareness of body sensations, but these forms also provided some information regarding adherence to mindfulness-compassion training through representing internalization of aspects of mindfulness and compassion.

Compliance was measured by noting class attendance and assessing the frequency and duration of formal mindfulness practice and the frequency of informal mindfulness practice (i.e. breath awareness and daily life mindfulness).

Statistical analysis

Before running statistical analysis, the data were selected for missing responses and outliers and also was examined to test the assumptions of normality, linearity and homoscedasticity of multiple regressions. The data collected was analysed using SPSS version 24.

For the study, descriptive statistics (Means and Standard Deviations), paired t-tests, and effect size for all measures pre- and post-intervention are presented in table 1. Internal consistency reliabilities of the measures were examined using Cronbach's alpha. Paired sample t-tests were conducted to determine effect sizes for changes from pre to post-intervention. Pearson correlations were used to determine whether there were any significant relationships between variables. Also hierarchical regression was used to assess the influence of baseline psychological flexibility, self-compassion, and mindfulness facets on flow and sport performance measures at post-intervention.

RESULTS

As expected, mindfulness, self-compassion, direct forms of performance

evaluation and flow increased from pre-to post-intervention, and experiential avoidance (AAQ-II) decreased. Descriptive statistics, paired t-tests, and effect size estimates (Hedges g) for all study variables recommended for use with

small samples were calculated (see table 1), and correlations between all measures at pre and post-intervention were measured and are presented in table 2.

Table 2. Mindfulness-Based Soccer Training Structure (MBSoccerP).

Sessions	Key concepts/Learning Goals	Experiential and Psycho-educational Training	After-Session Assignment
1- Introduction to MBSoccerP Mindfulness and sports	-Definition of Mindfulness; -Definition of Flow -Stress: Responding vs. Reacting to Stimulus; -Awareness the best mental tool; - Attention; - The mindful athlete	-3 Minutes meditation - Mindful breathing - Mindful eating	- Breath Meditation - STOP technique - Check in to informal and formal practice - Selected pre, match and post-match worksheets - Simple Awareness and/or Mindful Eating
2 - Mindfulness of the Body and mind- self-talk	- Body as a anchor to present/conduit for experience; - Pleasant & Unpleasant vs. mindfulness and positive & negative thinking experiences; - Automatic pilot and sport mechanics	- Body Scan - Raisin exercise - The mindfulness solution: Aware, Accept and Action mindfulness and self-talk: red thoughts means stop; yellow is neutral and green is go ("I can do it"); - Metaphor feed the tiger/unwelcome party guest	- Body Scan -Selected Readings/worksheets Remember and repeat: Aware, Accept and Action -Body Scan, Sitting Meditation. - Pleasant Events Calendar
3 - Mindfulness and Goal Setting versus Process Goals	- How mind hold the body back; -Goals and Values; - Performance values	-Process goals exercise- ARMS: Action oriented, Realistic, measurable; sequential Performance values and value-driven behavior: Mind is not your friend, and thanks your mind, the voice in my head. Mindful yoga Smart Goals: Soothing-Supportive; Specific; Meaningful; accountable/attach/Associate; resources; Time. - Introducing mindful yoga for beginners	- Kindness Meditation - Meditation on Smart Phone App/ email audio exercise -Selected Readings/Worksheets /diffusion rate form Mindful Yoga (Yoga 1), Body Scan, Sitting. - Unpleasant Events Calendar
4 - Building a Mindfulness Practice	- Formal vs. informal practice -Integrating practice and competition -Finding a home in the body - Helpful practice for athletes Commitment Thoughts -Content and physically experienced processes; - Removing judgment and self-criticism; Cognitive fusion -Methods of experiencing thought (timing, counting, listening, thought process visualizations)	-Mindfulness of thoughts - Mindful yoga	-Noting Meditation -Relax, Ground, and Clear Meditation -Mediation on thoughts, Smart Phone App/ email audio exercise -Selected Readings/ Worksheets STOP: The One Minute Breathing Space Mindful Yoga (Yoga 2) and Sitting
5 - Emotions, meaning in sports life. Radical acceptance	-What are emotions and physical sensations; -No Bad or shameful emotions -Identifying/ labeling to mitigate impact; Experiential avoidance - Emotion lifespan; - Mindfulness of emotions pre, match, post-match	- Finding a home in the body Mindful yoga -Values and committed action Importance of acceptance versus resignation Letting go RAIN four step process: Recognize, Allow, Investigate, and Non-Identification	-Finding a home in the body -Creating a Practicing committed action Everything is perfect as it is -Ongoing formal and informal practice
6 - Mindfulness and imagery	Flow Exposure Sport mindfulness Common problems Focus on the task	Mindful yoga Imagery as a tool to. Recall success; Rehearse a game plan; remain focused; remind your goal Compassion imagery exercise on sport context. Awareness of your best performance. Review of 3 A's of mindfulness: Aware, Accept and Action	Ongoing practice Compassion imagery Remember and repeat: Aware, Accept and Action Selected pre, match and post-match worksheets Body Scan, Sitting, Yoga (+ Mountain or Lake Med.)
6a - Silent mindful running and self-compassion		Silent Mindful Walking/mindful running in nature (90-120 minutes) The compassionate letters	Ongoing practice - Mindfulness in breathing one minute meditation - Mindful walking - Body scan Receiving affection from friends, strangers and enemies - Metta (to others and oneself)
7 - Mindfulness Acceptance and Compassion-Body connection & athlete recovery	Ways of training compassion: receiving compassion, showing compassion to oneself and to others Fear of compassion. Shame	Mindfulness of emotions Mindful yoga Loving Kindness Exercise/compassion flow/imagery The compassionate letters experience review	Ongoing practice Breathing practice - 3-minute breathing space in pairs - Closing metta Body Scan, Sitting, Yoga (+ Lovingkindness) Mindful Eating, STOP, etc
8 - Ending MBSoccerP		Body scan review Compassion sport imagery Defusion, values, flow and acceptance review. Mindful yoga	Enhance ongoing MBSoccerP practice

From pre to post test results indicated that correlations were positive, moderate to high and significant between AAQII total and DFS total ($r = 0.32$, $p < 0.05$); SCS total pos ($r = 0.42$, $p < 0.01$); FFMQ awareness ($r = 0.31$, $p < 0.05$); FFMQ no react ($r = 0.39$, $p < 0.01$).

DFS total results indicated that correlations were positive, weak to moderate, and significant with SCS total ($r = 0.38$, $p < 0.01$).

SCS total results indicated that correlations were positive, weak and significant with FFMQ describe ($r = 0.34$, $p < 0.05$); FFMQ dimensions results indicated that correlations were positive, moderate to high and significant between FFMQ describe and SCS total ($r = 0.30$, $p < 0.01$); FFMQ non react ($r = 0.26$, $p < 0.05$) correlations were positive, weak and significant; between FFMQ awareness and DFS total ($r = 0.31$, $p < 0.05$); SCS total ($r = 0.34$, $p < 0.01$); describe ($r = 0.34$, $p < 0.05$); and no react ($r = 0.28$, $p < 0.05$) correlations were positive, moderate and significant; between FFMQ no judgment and SCS total ($r = 0.54$, $p < 0.05$); describe ($r = 0.32$, $p < 0.01$); awareness ($r = 0.37$, $p < 0.01$); no react ($r = 0.39$, $p < 0.05$); no judgment ($r = 0.58$, $p < 0.05$); Also results indicated correlations positive, moderate and significant between FAIP-A and FFMQ awareness ($r = 0.53$, $p < 0.05$).

Hierarchical regression was used to assess the influence of baseline psychological flexibility, self-compassion and mindfulness facets on flow and sport performance measures at post-intervention. The results suggest that baseline self-compassion did not have a significant effect on any outcomes, but results indicate that baseline experiential avoidance/psychological inflexibility predicted lower dispositional flow at post intervention (see table 3) while controlling for baseline AAQ-II. Also baseline Mindfulness facet FFMQ-self-awareness predicted higher flow at post intervention while controlling for baseline FFMQ_self-awareness (table 3).

DISCUSSION

Athletes who took MBSoccerP program demonstrated positive changes with effect sizes in the small to moderate range. Self-compassion and FFMQ- non judge had the largest effect size and was the constructs that demonstrated a

statistically significant change from pre to post. Changes in self-compassion are related to changes on awareness and changes in flow are related with changes on self-compassion. Additionally, psychological flexibility at baseline predicted dispositional flow at post-intervention. Flow and mindfulness non-judge at baseline predicted self-compassion at post intervention. These results are supported by previous research as Gardner and Moore (2004, 2007, 2009, 2012); Carraça, Serpa, Palmi, and Rosado (2018) suggested that the more experiential avoidance players were prior to the intervention, more flow they perceived themselves as having after the intervention, and more mindfully they were, more flow and compassion they get, as well as may lead to enhanced psychological flexibility in sports performance.

Acceptance of negative internal states might be one factor that has a positive impact on athlete's self-confidence and flow state as a player. The ability to be more mindful and accepting toward internal states might also help the athletes to cope better with stress in general, as well as in performance related situations. Mindful, non-judging and present-moment attention keeps the focus on task relevant cues in the service of valued athletic goals and helps in recovering from injuries (Birrer, Röthlin, Morgan, 2012; Palmi, Planas, Solé, 2018).

In the line to the findings to, higher levels of mindfulness facets correspond with higher levels of dispositional flow experience, this is in accordance with previous studies (e.g., Aherne, Moran, Lonsdale, 2011; Kaufman, Glass, Arnkoff, 2009; Kee, Wang, 2008), and the formerly proposed overarching theoretical framework. More precisely; The focus is where it is supposed to be, avoiding the pitfalls (distraction from flow, disruption automatic, smooth performance) of the 'Constrained Action Hypothesis' (Wulf, McNevin, Shea, 2001) and the 'Reinvestment Theory' (Masters, Maxwell, 2008), since less conscious cognitive effort needs to be, or is, 'reinvested' on the control of mechanics of the movements on-line. Due to the nature of a correlational research design, it is impossible to infer causality. However, previous mindfulness intervention studies aiming to enhance flow (e.g., Aherne, Moran, Lonsdale, 2011) substantiate the claim that mindfulness may aid to increase the likelihood

Table 3. Correlations between Mindfulness (FFMQ), Self-Compassion (SCS), Psychological Flexibility (AAQ-II), Direct performance evaluation forms (FAIP-A, FAIP-T) and Dispositional Flow (DFS 2), Pre- and Post-Intervention.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	1a	2a	3a	4a	5a	6a	7a	8a	9a
1. AAQII-total pre	—	-.43**	-.62**	-.36**	-.56**	-.024	-.56**	-.40**	.098	-.41**	-.32*	-.42**	-.24	-.31*	-.39**	-.16	-.19	-.18
2. DFS-total pre		—	.58**	.46**	.39**	.05	.15	.34**	.153	-.19	.33*	.38**	.099	.099	.096	-.02	.004	.14
3. SCS-total pre			—	.45**	.51**	-.14	.43**	.21	-.04	-.19	.11	.67**	.34*	.25	.39	.21	-.01	.08
4. FFMQ – describe pre				—	.60**	.20	.31*	.24	.002	.05	.15	.30**	.58**	.23	.26*	-.06	-.11	-.01
5. FFMQ – Awareness post					—	.15	.41**	.53**	.097	-.13	.31*	.34**	.34**	.44**	.28*	0.01	.24	.14
6. FFMQ – Noreact pre						—	-.15	.19	-.04	-.13	-.16	-.19	-.18	-.02	-.001	-.16	-.016	-.05
7. FFMQ-ojudg pre							—	.13	-.12	-.21	.15	.54**	.32*	.37**	.39**	.58**	.17	.25
8. FAIP-A								—	.24	-.19	.09	.12	-.07	.53**	-.15	-.10	.45**	.01
9. FAIP-T									—	.12	-.02	.07	-.07	.07	-.26	.12	.24	.19
1a. AAQII-total post										—	-.06	.01	.28*	-.15	.06	-.23	-.30*	.11
2a. DFS-total post											—	.28*	.34**	.48**	.27*	.16	.11	.18
3a. SCS-total post												—	.40**	.58**	.47**	.50**	.27*	.30*
4a-FFMQ – describe post													—	.39**	.42**	.17	-.15	.07
5a- FFMQ – Awareness post														—	.39**	.56**	.40**	.38**
6a- FFMQ – Noreact post															—	.25	.04	.07
7a-FFMQ-NoJudg post																—	.30*	.32**
8a-FAIP-A post																	—	.15
9a-FAIP-T post																		—

Table 4. Hierarchical regression with baseline mindfulness, compassion and psychological flexibility on flow (post-intervention) controlling for flow at baseline.

Predictor variable	B	SE B	β	R ²	Adjusted R ²	(Δ) R ²	F
DFS-II total post							
Step 1 AAQ-II total pre				.103	.086*	.103	6.30
	-.182	.073	-.32*				
Step 1 FFMQ – self-awareness pre	1.951	.932	.354**	.136	.070**	.136	2.046

of flow occurrence (Birrer, et al., 2012). Interestingly, Kee and Wang (2008) suggest state that the relation between mindfulness and flow seems to be symbiotic and maybe flow and performance enhancement should be certainly considered as by products rather than outcome goals.

Given the clear conceptual overlap, a number of studies have been conducted at the intersection of flow and mindfulness (Carraça, Serpa, et al., 2018; Palmi, Planas, Solé, 2018, Solé, Carraça, et al., 2014). Birrer, Rothlin, Morgan (2012) and concluded "there is empirical evidence that dispositional mindfulness is a performance-relevant trait in sports and that mindfulness-based interventions may be helpful for athletes". Mindfulness has been shown to be trainable, both at the state- as well as at the dispositional level, through formal- and informal practice, and psycho-education (Baer 2003; Carmody, Baer, 2008). Promising results have been demonstrated in mindfulness-intervention studies that attempted to enhance flow and performance (Aherne, Moran, Lonsdale, 2011; Bernier, Thienot, et al., 2009; Kaufman, Glass, Arnkoff, 2009); mindfulness appears to be related to more flow (and less fear, fewer task-irrelevant thoughts). So, in our results we find self-compassion as important up grade post-intervention MBSoccerP. It should be noted these results are still to be treated with caution, as more research is warranted, but the current study revealed that self-compassion is positively associated with adaptive psychological characteristics such as mindfulness and flow, and inversely related with psychological characteristics such as experiential avoidance. Further investigation into the reciprocal relations between mindfulness, flow, self-compassion and experiential avoidance is necessary. Moreover, some authors have started to study and develop the potential of helping athletes and exercisers to develop self-compassion to benefit performance levels and exercise maintenance or improvement (Magnus, Kowalski, & McHugh, 2010; Kowalski, Sabiston, et al., 2011).

CONCLUSION

The results of this study lead to the conclusion that the Mindfulness-Based Soccer Program (MBSoccerP) is effective in increasing the attributes of mindfulness, compassion, psychological flexibility, and in which terms that mediates dispositional flow and peak performance on elite soccer players.

To sum up it was hypothesized that players who reported higher mindfulness, psychological flexibility and self-compassion, they can be more effectively perform their soccer skills and flow state. Although many researchers have confirmed that who practice psychological flexibility, self-compassion and mindfulness exhibit higher levels of flow state and sport performance. So these benefits lead us to consider this program to encourage soccer players and coaches to design such programs and to assist elite soccer players seeking optimal performance as well as personal well-being. The results of this study should be interpreted with some caution given a few limitations, for example, the small sample size reduces our ability to generalize these findings, and hence future studies should include a larger sample size.

Recognizing both the dearth of research on mindfulness, self-compassion and psychological flexibility and the need to address the emotional challenges in the different critical competitions stage, this study may contribute to the literature by suggesting that cultivating mindfulness, psychological flexibility and self-compassion may provide a pathway through which elite soccer players can enhance their emotional well-being and flow state. Implications for practice include developing and implementing the MBSoccerP program to nurture performance enhancement to bring awareness and acceptance to challenging experiences in the moment while at the same time actively engaging in self-soothing behaviours and improved psychological states and eventually promote more adaptive behavioural outcomes in elite sport context.

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