

Evaluation of the Online Sport-Specific *Mindful^emotions* Program in a Population of Scandinavian Elite Athletes Measuring Psychological Parameters

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Abstract

Professional athletes are often affected by public pressure, choking under pressure, depression, anxiety, stress, or burnout. Mindfulness training seems to be a valuable tool for reducing those symptoms. Due to the general interest in online applications and the constraints of the global COVID-19 pandemic, the future of mindfulness training might be digital, and the expansion of such interventions is inevitable. Therefore, we translated and digitalised the German sports-specific mindfulness program called *mindful^emotions* (<https://mindful-motions.de/>) and evaluated it with a psychological randomised controlled trial pilot study in a population of Scandinavian elite athletes making it the first English online mindfulness-based intervention (MBI) for professional athletes. 28 athletes started the involvement, and 12 athletes finished the participation. The athletes completed several self-report questionnaires, a diary at the end of the intervention and follow-up questions after one year assessing psychological parameters before and after the mindfulness practices and website feedback. The results suggest that the web-based online program seems at the first glance feasible, comprehensible, and applicable. The nonparametric post-test analyses eventuated in an increase in mindfulness and self-compassion scores for the intervention group, but not for the control group. Overall, due to the small sample size, it is difficult to draw definitive conclusions about the feasibility of the web-based online program, but the website's establishment and the program's implementation were successful. This research supports the need to execute a more extensive and comprehensive investigation of the online *mindful^emotion* program and its potential for elite athletes.

Keywords: *Mindfulness, Intervention, Online, Elite athletes, Mental health*

Mindfulness, as it is known in Western psychology, originated from a Buddhist concept that has been primarily known for clinical interventions to reduce depression, anxiety, chronic stress, and chronic pain (Kabat-Zinn, 1994). Positive changes are seen through mindfulness in emotionality, relationship issues, personality traits, and cognitive measures like attention and intelligence (Sedlmeier et al., 2012). Generally summarised, mindfulness trains attention abilities and leads to stress reduction and relaxation. It supports body control like experiencing individual limits, a sense of pain, muscle activity, or different body perceptions. Investigating meditations' benefits for athletic performance more precisely is thus a logical consequence.

Competitive sports provide challenging situations and induce mental health disorders caused by pressure from private, peer, and society (Fraser-Thomas & Côté, 2009), such as pressure to perform, physical injuries,

burnout, social isolation, and tying identity and self-worth to sports performance. These challenges can lead to feelings of anxiety, stress, self-doubt, depression, and low self-esteem (Reardon et al., 2019). Therefore, an adapted mindfulness program seems helpful to enable athletes cope with the demands of competitive sports. The program should include various techniques like meditation, deep breathing, and cognitive-behavioural therapy to manage stress, build resilience, and maintain a healthy perspective on their sport and life. A review (Brown et al., 2020) comprising 20 studies indicated positive benefits of mindfulness interventions on performance issues like the number of injury and illness days, as well as parameters like increased strength and concentration levels. However, the need for a digital mindfulness program is becoming increasingly apparent due to its flexibility, accessibility, and independence, making it a valuable tool in promoting mental well-being in a modern and fast-paced world.

The general interest in digitalised health offers is highly increased. Additionally, the global pandemic caused by the CoronaVirus SARS-CoV-2 negatively affects both private and working life and has negative psychological impacts triggering stress, anger, and confusion (Brooks et al., 2020). According to this, digital mindfulness-based interventions (d-MBIs) and mindfulness-based mobile applications (MBMAs) are already receiving increased interest in society, or rather inevitable for the future (Mrazek et al., 2019). There are already some evaluated d-MBIs, like the digital Mindfulness-Based Cognitive Therapy (MBCT) the course *Be Mindful*¹, or some evaluated MBMAs, like *Calm*² or *Headspace*³. Headspace also advertises the effectiveness of its intervention explicitly in and for athletes.

Still, no such digitalised mindfulness offers are adapted explicitly for sports or athletes yet (Sommers-Spijkerman et al., 2021). Therefore in 2018, Dr. Florian Seidl developed the first German sport-specific mindfulness program, called *mindfulemotions*, further described in the supplementary material (see S1). This program, however, is linguistically, geographically, and temporally bound and therefore, in principle but especially in times of Corona, not accessible to professional athletes worldwide. Consequently, it got translated to English and transferred to a d-MBI in form of a website. The subsequently described randomised controlled trial (RCT) pilot study aims to gather the digital *mindfulemotions* program's feasibility, comprehensibility, and applicability, and additionally, seeks to investigate the program's potential effects on psychological parameters of Scandinavian elite athletes. The selection of measurements refers to previous research investigating psychological parameters in sports (e.g., Jansen, 2021).

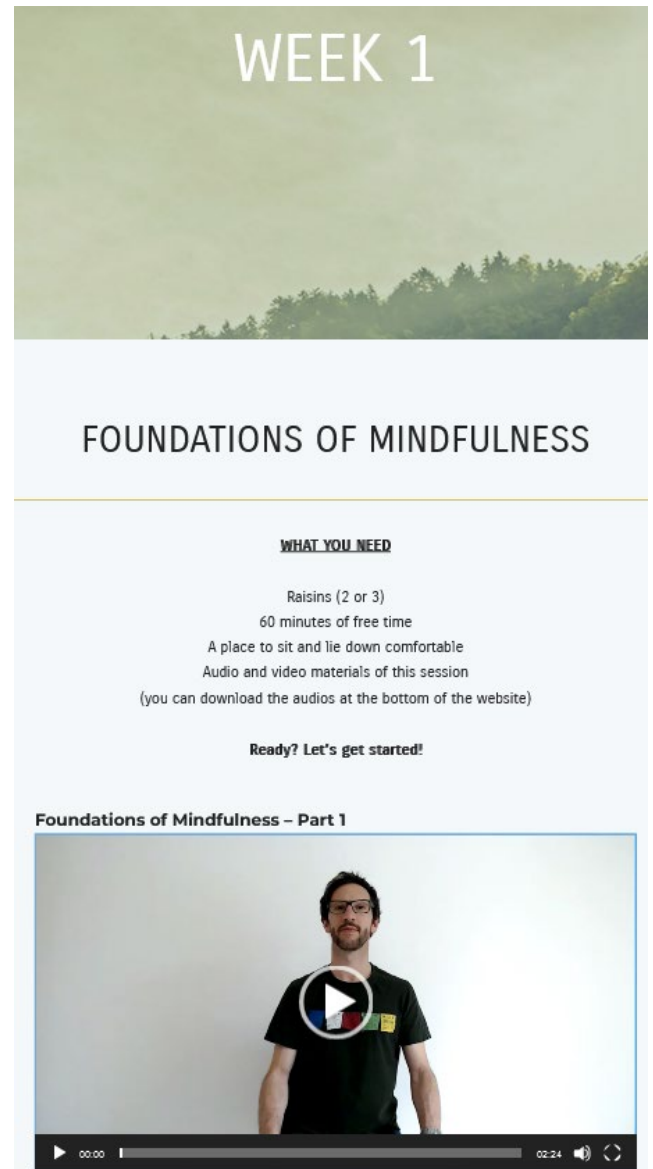
The Digitalisation of the *Mindful[®]motions* Program

This English version of the *mindfulemotions* program is built on the domain *mindful-motions.de* with the web hoster STRATO, is edited with Elementor, and possesses an SSL certificate for secure data transmission. Besides the actual program content, everything on this website is public, including the web pages *Home*, *Program Overview*, *FAQs*, *Library*, *About Us*, and *Contact*.

The seven-week face-to-face guided *mindfulemotions* program was adapted to a seven-week online self-help treatment with guided videos, audio, and reading material. Every web page for each week has the same structure: First, the weekly headline and a summary of the needed equipment, followed by the videos and audios in the predefined order (see Figure 1). The usually face-to-face guided sessions once a week are divided into online videos and got reduced in time to 60 minutes as the original 120 minutes sessions included participants interaction and perception exchange times, which are not applicable in the video format. The athletes can perform the audio-guided tasks, e.g., the body scan, in between the guided video sessions. The contents needed small changes and adaptations from the original materials, such as stronger compromised, more refined content and basic literature to replace the face-to-face exchanges, and a supportive diary instead of exchanges with the expert, to form a valid and convertible online format. Subsequently to the videos, there is general information, texts to read, or little tasks to

accomplish after the sessions. At the end of the first week's web page, a Microsoft Excel document includes all the diaries participants need to complete until the end of the intervention.

Figure 1:
Screenshot of the Program's Beginning of Week 1



The Intervention

The adapted online seven-week program consists of weekly 60-min guided sessions and 30-min home practice. Participants progress from prone, to sedentary, to standing active mindfulness with sports-specific meditation as the goal (Jansen et al., 2019). See Table 1 for an outline of the program.

¹ <https://www.bemindfulonline.com/>

² <https://www.calm.com>

³ <https://www.headspace.com>

Table 1: Detailed Description of the Digitalised Mindful[®]motions Program

Week	Session	Home practice
1	Foundations of mindfulness <ul style="list-style-type: none"> • Focus: basics and understanding • Introduction to the theoretical fundamentals and methods of mindfulness • Practical exercises: raisin exercise, bodyscan 	<ul style="list-style-type: none"> • Bodyscan
2	Perceive the moment <ul style="list-style-type: none"> • Focus: attention and perception • Introduction to perceptual psychology • Explanation of an evaluative perception • Practical exercises: bodyscan, meditation on seeing, breathing meditation 	<ul style="list-style-type: none"> • Bodyscan • Breathing meditation • One daily activity in the context of sport • Diary about pleasant experiences
3	Body – mind – fulness <ul style="list-style-type: none"> • Focus: stress and body • Conscious handling of physical limits through, e.g., mindful yoga exercises • Introduction to stress theory • Practical exercises 	<ul style="list-style-type: none"> • Bodyscan and Yoga • Breathing meditation • Breathing awareness • Body observation • Diary about unpleasant experiences
4	Controlling difficult emotions and thoughts <ul style="list-style-type: none"> • Focus: Emotions and thoughts • Perception and understanding of emotions and thoughts • Practical exercises 	<ul style="list-style-type: none"> • Sitting meditation and mindful exercise • Observing • STOP method • Questionnaire about difficult feelings
5	Values and emotions <ul style="list-style-type: none"> • Focus: values, emotions, and dedication • De-identification as a device for difficult thoughts and emotions • the basis of value-based action • Practical exercises 	<ul style="list-style-type: none"> • Mindful meditation • Awareness of emotional states in sports • STOP-Method • Values in sports questionnaire
6	Acceptance and openness <ul style="list-style-type: none"> • Focus: acceptance and composure • Connection of goals, values, and behavior • Practical exercises 	<ul style="list-style-type: none"> • Mindful meditation • Mindful walking unguided • Exploring avoidance behavior in sports routines
7	Coherence and team-spirit <ul style="list-style-type: none"> • Focus: Review, lookout, and self-care • Name the main exercises • Development of own mindfulness-based practice in everyday life • Practical exercises • Review and lookout 	<ul style="list-style-type: none"> • Practice at home • Try unguided

All intervention group participants had to fill out a diary to record their intervention progress. Every week has its own excel sheet with questions and tasks related to the corresponding video session contents. Additionally, the week one sheet is an overview of the whole seven-week program for the detailed participation documentation like what, when, and how they practised the homework. In week two, the athletes had to fill out the awareness of pleasant events calendar and the one for unpleasant events in the following week. These calendars consist of writing

down the exact feelings, their origin, and consequences. Week four refers to questions about the behaviour with difficult emotions, where they come from, and how to deal with them. In week five, the athletes determined their sports values, upcoming barriers, and how they were able to overcome these. Week six focuses on short- and long-term goals together with their strategies and barriers. The last sheet gives space to judge the participation on a scale from 0-100%. These diaries help the researchers to analyse and interpret the data correctly.

Evaluation of the *Mindful^emotions* Program

Study design

The current results are based on a RCT pilot study with a multimethod evaluation aiming to capitalize on the advantages of multiple methods while reducing their limitations. We hypothesize that the digital *mindful^emotions* program is a feasible, comprehensible, and applicable tool to enable location-, time-, and guiding-independent mindfulness training for elite athletes. We also hypothesize that the digital *mindful^emotions* program can enhance psychological parameters such as mindfulness, self-compassion, worry, rumination, and sport-based motivation.

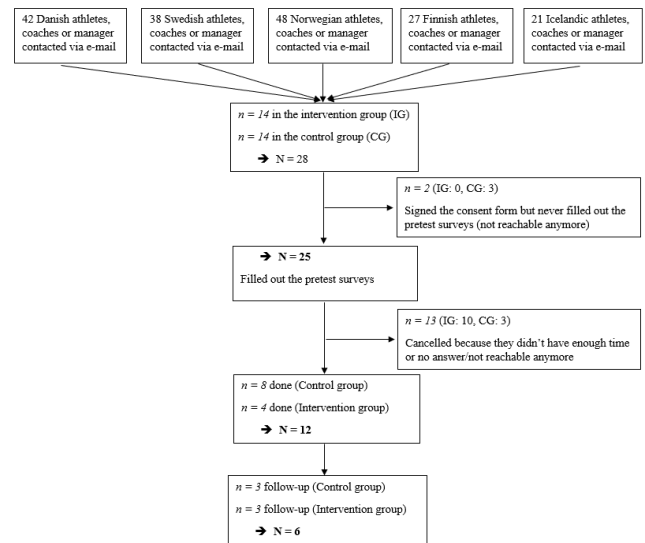
The defined hypotheses are validated with between-method triangulation meaning observing the research issue from at least two different points by linking qualitative and quantitative methods to maximise the validity of field efforts (Flick et al., 2004). In this case: on the one hand, a qualitative analysis of the athletes' participation in the mindfulness intervention by reference to their diaries and the follow-up feedback; on the other hand, a quantitative nonparametric analysis of demographic data and the five questionnaires.

Participants

For recruiting, 42 trainers, elite athletes, or sports managers in Denmark, 38 in Sweden, 48 in Norway, 27 in Finland, and 21 in Iceland, so a total of 176 people from each highest divisions were contacted via email between March and July 2020 to engage (their athletes) in this research. Whoever was willing to participate got randomly and alternately assigned based on the time of sending the signed consent form for participation. 28 athletes started the involvement. 15 dropped their participation caused by reasons like the start of a new season, injury, exams, or depression, but more than half simply did not respond anymore. As a result, $N = 12$ athletes finished the participation, four in the intervention and eight in the control group. One athlete from the control condition even voluntarily completed and sent over the mindfulness diary after performing the program by herself. Therefore, 13 athletes are analysed and five intervention journals getting evaluated. Reasons for participation drop-out were registered as well. After one year, all twelve participants got contacted again out of which six participants (three out of each group) answered the follow-up questions: 1) "Did you participate in the mindfulness intervention after the study?" 2) "If yes, how did it feel? Are you still practising? If yes, still with our website, with other guided options, or on your own?" 3) "If no, why not?" (see Figure 2).

The twelve participating athletes were aged between 17 and 41 years ($M = 24.33$, $SD = 6.68$) and indicated to be both individual and team sport types skiing, football, handball, volleyball, badminton, mountain bike, fencing, and running. The athletes practise their sport for an average of $M = 12.33$ ($SD = 2.46$) years on either a top national league or even international level. However, more than half (58.3%) do not make their living by being professional athletes. Regarding the pandemic, its effects, and consequences, nearly half (41.7%) of the athletes have been bothered by feeling down, depressed, hopeless, and with little interest or pleasure in doing things.

Figure 2:
Flow-chart of the Participation Development



Procedure and Measurements

The experiment was conducted according to the ethical guidelines of the Declaration of Helsinki. We communicated all considerations to the participants necessary to assess the question of the ethical legitimacy of the study. The athletes had to write an email to participate in the research, subsequently obtaining the consent form. Afterwards, they were – according to their application time – randomly assigned to either the intervention or the waitlist control group. If the participants were allocated to the online mindfulness intervention group, they received an email with their account details for the program. When they started the course, they first got redirected to the demographic questionnaire and the pre-test surveys and afterwards to the mindfulness program. The demographic questionnaire included all main relevant questions regarding the athlete's background, e.g., age, gender, mother language, and highest education level. Additionally, sport-related questions regarding the length, duration, intensity, and frequency of their practice, and if the athletes make their living out of the sports participation, were asked. Last, questions regarding their mental health history and meditation experience, and COVID-19 related questions like "Social distancing for how many weeks?" or "To what extent are you affected by COVID-19 regarding [...]?", were asked. When interpreting data from interventions with elite athletes during the pandemic, it is important to take effects of disruptions to training and competition schedules, the potential for athletes to become infected with COVID-19, changes in athlete motivation and mental health, and the impact of any COVID-19-related restrictions or guidelines on the study itself, into account.

After filling out all surveys, the athletes were called to download the diary Microsoft Excel file to record their intervention progress and are, from here on, ready to start with week one of the program. After finishing the seven weeks program, they got redirected by default to the post-test questionnaires, followed by the last demand to send the completed Excel file, including all diaries, back via email.

If the participants got assigned to the waitlist control group, they received an email with a direct link to the demographic questionnaire and the pre-test surveys. Their completion time was recorded, and after seven weeks of

doing no treatment, they obtained the direct link to the post-test surveys. As soon as they accomplished all questionnaires, they preserved their account details and were able to conduct the online *mindful^omotions* program, too. After one year, all participants were contacted to answer the follow-up questions described earlier.

All measures were based on self-report and assessed at baseline and post-treatment. For the qualitative evaluation, participants filled out a diary throughout the whole program and gave individual feedback after the intervention and one year later. Additionally, according to the ongoing Corona-Virus pandemic, the demographic questionnaire also gathered the impact of COVID-19, e.g., "to what extent are you affected by Corona regarding your private life, usual sports habits or work?" This pandemic is an abnormal situation with substantial consequences that need to be considered in data analysis and interpretation. The deadline for data collection was January 2021. Follow-up answers were collected until June 2022.

The positive short-term effects on the psychological parameters were gathered by reference to mindfulness (FFMQ), self-compassion (SCS), worry (PSWQ), rumination (RRS), and sport-based motivation (SOQ).

The self-reported Five Facet Mindfulness Questionnaire (FFMQ) was developed to represent the elements of mindfulness as it is currently conceptualised and the dispositional tendency to be mindful in daily life (Baer et al., 2006). The 39 items consist of the five facets observing, describing, acting with awareness, non-judging of inner experience, and nonreactivity to an intimate experience. The Cronbach's α values for the five subscales ranged from .82 to .95.

The Self-Compassion Scale (SCS), developed by Neff (2003) investigates how participants typically act towards themselves in difficult times. The scale consists of 26 items and is based on a six-factor model comprising the positive elements of self-kindness, mindfulness, common humanity, and the negative elements self-judgment, isolation, and over-identification. The Cronbach's α values were .93 for the positive subscales, .95 for the negative, and ranged from .76 to .89 for the four subscales, indicating good internal consistency (Neff, 2016).

Meyer et al. (1990) constructed the Penn State Worry Questionnaire (PSWQ) to measure the manifestation of how strongly participants worry about their future. Cronbach's α for the PSWQ was .69 in this study.

The Ruminative Response Scale (RRS) (Nolen-Hoeksema et al., 2008) consists of 22 items and measures whether the participants generally feel down, sad, or depressed. In this study, Cronbach's α for the rumination scale was .91.

The Sport Orientation Questionnaire (SOQ) was developed by Gill and Deeter (1988) to represent achievement orientation across diverse sports and exercise activities and consists of 25 items. Competitiveness, win orientation, and goal orientation are the three dimensions of the 5-point Likert scale. Cronbach's α for the SOQ was .94 in this study.

Data Analysis

Only participants with a processing level of 80%, measured with the Excel file diary, were included. Quantitative behavioural data analyses were carried out with IBM SPSS Statistics 25. Caused by the group distribution (IG: $n = 4$, CG: $n = 8$), nonparametric tests for independent samples were conducted in SPSS with the Mann-Whitney-U-Test, comparing the pre-test outcomes followed by the comparison of the post-test scores of the psychological tests were executed.

All qualitative data were analysed and evaluated through a reflexive thematic analysis, creating codes, and revising themes from the athletes' diaries and feedback messages. The exploratory analysis resulted in the four main themes: (1) process feedback, (2) dealing with emotions, (3) mindfulness goals, and (4) sports values. The general feedback was used along with the athlete's addressed questions, challenges, or technical issues before, during, or after the whole study to evaluate the feasibility, comprehensibility, and applicability of the program. The emotion theme questions the solution strategies of uncomfortable feelings that come during their everyday life, sports situations, or the intervention itself. The goals refer to specific objectives that the athletes aim to achieve or enhance as an impact or outcome of the intervention, such as being more mindful, more concentration, or more body awareness. Last, the sports values give us insights into the athletes' performance related qualities throughout the mindfulness practices and their behaviours, strategies, and barriers within their everyday sport routines.

The results section combines quantitative and qualitative findings across four themes to address the study hypotheses. The outcomes of PSWQ and RRS are revised within the emotions theme, SCS and FFMQ in the goals theme, and SOQ in the sports values theme.

Results

As assumed, results showed no significance for group differences in all pre-test values ($p > .308$), allowing post-test analyses. The results of the post-test (Mann-Whitney-U-Test) indicated significant differences in the total FFMQ ($p = .016$) and SCS ($p = .028$) scores. Total RRS ($p = .368$), SOQ ($p = .933$), and PSWQ ($p = 1.0$) analyses were found not significant. Based on these findings, further post-test analyses were conducted for all FFMQ and SCS subscales and are presented later in the chapter. Figure 3 shows the overall mind-map feedback segment summarising the athletes' comments for each week and the follow-up.

(1) Process feedback

There were no questions, challenges, or technical problems before, during, or after the online mindfulness intervention addressed by the athletes. All participants of the intervention group could successfully download the excel file for the intervention diary, complete them without any noticeable issues, and send them back as agreed initially. Additionally, the waitlist control group participants were contacted after seven weeks without any treatment, filled out the post-test surveys, and were also registered on the website successfully, all without questions, challenges, or technical problems as well. The reasons why some athletes did not finish the study when they started the participation are not to ascribe to the applicability and setup of the digitalised *mindful^omotion* program but rather to unexpected personal challenges coming up along the way. In the control group, one athlete finished the whole intervention afterwards but did not continue, argued by repeating exercises and less time due to university. The other two athletes participated in the program afterwards but neither finished nor continued due to work, parental, and athletic constraints. Nevertheless, two of the three emphasised their regrets of drop-out with the ambition to start over with the program ("I just don't create the space for it [the exercises], I know it would be good for me", "Now that I got your email, I'm thinking about starting it up again").

Figure 3:
Summarized Overall Feedback of Study Participants for Each Intervention Week and the Follow-Up



Table 2: Follow-up Answers of the three Intervention Group Participants

Athletes:	Mountainbiking National Team	Running Other higher league	Fencing National Team
<i>Do you still practice mindfulness?</i>	Yes, I still practice mindfulness.	Yes, I was practicing mindfulness before and have continued after the study.	Yes I still practice mindfulness.
<i>If yes, how much / how many times? How do you feel with it? Do you still practice with the website, some other guided options or on your own?</i>	When I'm into it I do it about four times a week. Mostly by my own. When I have the discipline to do it on regular basis I feel more relaxed and sleep better. I have used the website a couple of times, it's a good way to start again after a break. Would really like if it stays up.	I practice on my own, and I would say it's 3-4 time per week. It helps me a lot in my running career and in my personal life. I feel comfortable practicing mindfulness and I am able to use some of the new things I learned by participating in the study.	I mix it up quiet a bit, so sometimes I do a longer session, walks, and other times it is some mindful breathing exercises. But I do it more or less daily. It makes me feel a bit more grounded, especially if I feel full of emotions and thoughts. I don't use the website, I have some other guided sessions as well as doing it on my own.
<i>Individual comment</i>	Thank you very much for this!	So I just wanted to thank you for this opportunity.	-

Personal feedback of the athlete's related to the website made both negative and positive points. The main negative statements criticized the surfeit of repeated exercises and the need to find space and time without interruptions, and practicing some exercises alone, which would not be needed in weekly face-to-face session at a specific location. However, the positive assumptions were outclassing with primary compliments to the material ("Loved the reading exercises", "Very interesting texts, love it", "I would love to keep listening to these files", "Nice content, already missed it", "Really enjoying the material") and the whole program in general ("Found a good routine", "I really enjoyed the training", "I have used the website a couple of times, it's a good way to start again after a break", "I would really like if the website stays up"). Six athletes answered the follow-up questions. Three out of three answers from the intervention group participants are still practicing mindfulness with positive feedback. Their answers are presented in Table 2. Hence, the website's applicability can be supported.

(2) Dealing with emotions

The main tough feelings mentioned by the athletes are worry (about the future) and anxiety. Furthermore, stress, social pressure, and rumination are also highlighted as very difficult feelings that the athlete's pointed out to always cope with. During the interventions, multiple diary entries seized strategies learned to overcome those difficult feelings, such as "I focus on my breath to overcome feelings of anxiety", "I was more aware of my body while having these feelings", "I was quick to notice these feelings, and once I accepted them and focused on my breathing it was much easier to handle the situation", or "The emotions practice went very well and is something that I think can help me".

However, the additional quantitative evaluations of rumination and worry scores resulted in nonsignificant changes from pre- to post-intervention for both rumination RRS ($p = .368$) and worry PSWQ ($p = 1.0$).

(3) Mindfulness goals

Besides the athlete's very sport performance and success related goals, such as getting better at saving shoots, playing on the highest level, or making their living

from their sports, intervention related goals, such as mindfulness level, body awareness, or attention/focus control, were primarily analysed for the studies hypothesis. These results did reflect the progress in the aimed directions. In the first weeks the athlete's reported struggles like "still hard to stay focused", "mind wandered a lot", hard to pinpoint unpleasant events", or "want to do it [the exercises], but not sure if I can". In the later weeks enhancements in these areas got reported, e.g., "already learned a lot of things", "I'm learning to focus", "starting to develop more senses in new body parts", and "noticing improvements in all aspects of mindfulness". The final weeks and follow-up answers emphasize the targeted results of an empowering, calming, and supporting mindfulness practice routine ("Found a good routine", "breathing focus keeps me on track", "easy to empty the mind today", or "Very easy to get into a state of acceptance").

Additionally, the relevant psychological parameters of mindfulness and self-compassion, measured pre and post intervention, support these findings by significant pre-post score enhancements.

FFMQ: Mann-Whitney-U-Test indicated significant differences in the total FFMQ ($p = .016$) score. Results suggested significant differences for the following subscales of the mindfulness questionnaire: Observing ($p = .048$), Describing ($p = .004$), and Awareness ($p = .004$). There were no group differences for Nonjudging ($p = .933$) and Nonreactivity ($p = .154$).

SCS: Mann-Whitney-U-Test indicated significant differences in the total SCS ($p = .028$) scores. There was a significant difference for the mindfulness- compared to the control condition ($M_{IG} = 9.75$, $M_{CG} = 4.88$, $p = .027$) in the total score. There was no group difference between the positive and negative subscales. All significant results favoured the mindfulness intervention group performing the online mindful emotions program compared to the no-treatment control condition.

(4) Sports values

As the *mindful^emotions* program aims to enhance the mental health of elite athletes to enable improved athletic performance, sports values were another theme in the evaluation. The athletes reported very positive

applications of the learned knowledge within their sports practice, both in training and competition ("Used the training during competitions", "It helps me a lot in my running career", and "I have already used this mindful training a lot when I have trained handball and also when I have played matches"). These results emphasize the goal to sustainably involve mindfulness practices in athletes' professional life seems achievable with this online program. However, the quantitative data evaluation of sport motivation showed no significant changes from pre to post intervention in the SOQ ($p = .933$).

Discussion

As the intervention's content got considered to be very long and intense, the current research still suggests the greater effectiveness of extended mindfulness programs over short-term interventions. Indeed, some effective short-term interventions are achieving significant enhancements, especially in anxiety (Cavanagh et al., 2018), but quite a lot of short-term investigations couldn't support these findings (e.g., Noetel et al., 2020). Hence, long-term interventions steadily increase psychological skills like attention, stress, depression, well-being, and anxiety (Bühlmayer et al., 2017). Concerning the procedure, many studies are currently not clear about the amount and form of guidance needed to treat the participants, often also patients, adequately. In the present case of elite athletes, one the one hand, there were comments like "I need to talk about it with someone", "I have difficulties to breath", or "I was stressed, insecure, afraid, and angry", support the need of professional help along the way. On the other hand, the athletes successfully used the mindfulness tools taught within the weekly video session to cope with those feelings shown by sayings like "In the end, it is all about noticing and accepting", "I started handling unpleasant physical events very well and better than usual", or "I'm getting better in naming my emotions and by doing that it is easier to deal with them; naming emotions is a powerful thing". The risk of participants being overwhelmed by their emotions within intense mindfulness interventions is unavoidable. Here, the challenge for digital treatments is giving them the comfort to feel safe with a contact person at hand, if needed. Both provider and recipient always need to keep in mind that mindfulness programs should not be used instead of standardized psychotherapeutic procedures. Dr. Florian Seidl's contact details were provided in the present study but, in favour of the gained mindfulness tools, none of the athletes used them. The widely held view that face-to-face teaching of such interventions is essential to achieve successful outcomes for participants is reasonable. Also, a few athletes in the present study highlighted that the guiding is helping but some would, individually, prefer or even need more guidance. However, multiple feedback comments included the intense connections with the guide, his voice, and his leadership supporting the satisfaction with the presented guidance. This is strengthened by research supporting intervention qualities conveyed through self-help material like guided videos and audios (Cavanagh & Millings, 2013), and online mindfulness courses also reducing perceived stress, anxiety, and depression comparably to the face-to-face intervention reductions (Krusche, Cyhlarova, & Williams, 2013).

Regarding the strategies to deal with their emotions, many stressful situations like competitions, work-life balance, team interaction challenges, or anxiety about COVID-19 were pointed out, including consequential anxiety and pain. Over the seven weeks, athletes reported

less stress and increasing relaxation resulting in more detailed sensations, a lighter mind, and better feelings in general. It is to be considered whether the stress investigation is defined by the triggering situation or the feeling itself. Feelings of rumination (brooding about the past) and worry (anxiety about the future) are deeply connected to stress and, therefore, often investigated in mindfulness research (Davey & Wells, 2006). Hence, the present study investigated rumination and worry scores with the RRS and PSWQ Questionnaires. Quantitative analysis did result in slightly decreased rumination or worry scores only. However, current research suggests lower post-intervention worry scores (e.g., Gu, Cavanagh, & Strauss, 2018), which is expected to be significantly confirmed with the present online intervention program within a large-scale investigation. Further, from physical pain caused by injuries, over physical-mental pain like stress-caused stomach pain, up to mental pain caused by failure or anxiety, all kinds of reports were found in the diaries. The participants explained to get more and more aware of the exact locations, with some even reporting being able to locate, subsequently accept, and breath into this pain. Finding strategies to cope with unpleasant feelings and pain is addressed in the middle of the program. However, finding the individual approach to dealing with unpleasant feelings such as pain is a long process, explaining both the athletes' struggles and success in these tasks.

Regarding the short- and long-term goals such as, increased mindfulness, focus, and self-compassion, positive results were gathered. Increased focus, as one of the most significant benefits and goals of mindfulness (Hatchard et al., 2017), was strongly confirmed within the present research. Athletes accounted for increased focus both as a short- and long-term goal and as a result of their mindfulness practice. Especially the process from the goal to its realization is trackable along with the intervention. Starting with having trouble focusing their mind caused by many different thoughts, they developed the skills to ease this challenge and finally were able to control their attention. They were also able to use the physical focus in everyday life regarding, e.g., the way they sit down or how they perceive touches or pressure on their body. The athletes did not specifically report increased confidence but enhanced trust in their own bodies, decision, and skills through the mindfulness practice, which is consequently followed by feelings of confidence. Furthermore, confidence is profoundly connected to self-compassion. Especially in the sport context, both mental self-compassion as a resource to buffer against adverse outcomes of failure and inadequacy in sport, as well as body self-compassion as an attitude towards the body despite perceived physical imperfections (e.g., Eke et al., 2020), can lead to increased confidence. Therefore, self-compassion was measured in the present research resulting in significantly increased SCS scores of the intervention condition from pre- to post-test.

Last, the SOQ results did not show any score changes from pre to post, but the athlete's reported changes in their sport behaviour, training routine and competition strategies to a certain extent. It gets clear, that practicing mindfulness in multiple exercises is easier than adapting it into the actual sports behaviours. However, enough elite athletes already using meditation and mindfulness techniques in their competition preparation and during the matches, are known (Haberl, 2016).

Not the long-term benefits of one invention, but the positive effects of long-term traditional meditation practice were pointed out in a current review (Behan, 2020).

Findings summarized the improvements in anxiety, depression, and pain scores – in line with the results of the present pilot study – and structural and functional brain changes. This review also referred to the adequate translation to different populations across the lifespan and range of ability, supporting these findings in a sample of elite athletes. Additionally, meditation interventions as a potential low-cost beneficial method, specifically useful during this pandemic, were concluded. Based on this rare but great potential, further studies examining general long-term effects of mindfulness and both short-term and long-term benefits of online mindfulness interventions have to be conducted within different populations.

Limitations

This pilot study attempted to establish the digitalized *mindful®motions* online program and develop a preliminary understanding of mindfulness practice's effectiveness and compatibility with competitive sports. Promising results have been demonstrated. However, the study had some limitations that should be considered when interpreting the findings. One limitation was the small and unequal sample size, which could limit the generalizability of the results. A larger sample size with an active comparison group could provide more insights into the effectiveness of the program. Another limitation were the data collection constraints caused by the COVID-19 pandemic, which increased the number of confounding variables and limited the interpretation quality of the outcomes. The period of accepting new participants was more than six months, which should generally be prevented due to confounding variables but was unavoidable within this pandemic situation. Further, the study was unable to investigate possible mediators of psychological characteristics, such as self-compassion, which could further enhance the understanding of mindfulness's effectiveness in competitive sports. Finally, it is important to consider the risk of participants becoming overwhelmed and touched by new perceptions and emotions, as evidenced by one athlete who fell into depression and cancelled the program. Personal interaction with a professional teacher should always be ensured for participant safety, even within digital interventions, which

was not satisfactorily given in the present study as there was e-mail contact offered only.

Conclusion

The mixed-method triangulation of qualitative followed by quantitative (nonparametric) analyses of participation results after the online mindful®motions program eventuated a stronger mind-body connection with enhanced focus and attention control, increased confidence and motivation, and decreased stress, anxiety, and pain in favour of the intervention condition. Additionally, results report significantly increased mindfulness and self-compassion and decreased rumination in the mindfulness compared to the control condition from pre- to post-intervention. Therefore, despite the above limitations, the present study extends previous research by offering the first evidence of positive psychological effects of an online mindfulness intervention for elite athletes. As to finish, one participant, a professional Swedish mountain biker, concluded at the end of the mindfulness intervention: "I'm kind of sad, I will miss this voice [Dr. Florian Seidl]. It really makes me smile and relaxes me. I feel gratitude and empathy after the program, but it needs to get watered to keep growing."

Statements

All authors have read and approved the final manuscript and the manuscript is not under consideration for publication elsewhere.

The authors received no direct funding for this research.

No potential conflict of interest was reported by the authors.

The research involves human participants.

Informed consent was obtained by the participants before participating to the study.

The experiment was conducted according to the ethical guidelines of the Declaration of Helsinki. We communicated all considerations to the participants necessary to assess the question of ethical legitimacy of the study.

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