

# Mindful Muscles Practitioner's Manual



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# 1. Introduction

## 1.1. General Introduction

MINDFUL MUSCLES is a 4 module self-administered strengths-based program for people involved in recreational and amateur sports. This manual is for professionals that work with this group, and it aims to give insight into the basic concepts and exercises used, the scientific background and ways in which professionals could work with these modules in their practice.

Strength-based approaches in health care can improve learning in marginalised and vulnerable social groups. It can increase mental and physical health outcomes in different populations (1-3). In contrast to deficit-based approaches, the strength-based perspective emphasises a positive point of view on the capabilities of people instead of focusing on their limitations or deficiencies (4,5). Over the last two decades, 'positive psychology' has been used to promote the health-enhancing properties of physical activity and sports participation (6).

With Mindful Muscles, we argue that a strength-based approach can be helpful in prevention and harm reduction. 4 modules of self-administered exercises empower individuals with varying experiences in PIEDs use (Performance- and Image Enhancing Drugs) to adopt a healthier sport-related lifestyle and provide individuals with dissatisfaction regarding their body image with the tools to cope (7-10). A positive focus on an individual's strengths, capabilities, and skills could reframe, restructure and reappraise their perception of themselves. Ultimately, this will lead to a healthier and possibly drug-free way of sports participation, exercising, and an overall healthier lifestyle. Three main approaches are used to achieve this: Mindfulness, Acceptance, and Self Compassion (MASC).

## 1.2. Aim of Mindful Muscles

The Mindful Muscles project aims to develop and apply educational resources based on MASC. The MASC modules for exercisers help to become more aware of thoughts and emotions. By addressing body image and performance-related thoughts and emotions, the MASC modules aim to lower the chances of risk-taking behaviours, such as using anabolic steroids and other Image-and-Performance-Enhancement Drugs. Research has shown that self-administered/self-care strengths-based programs are equally effective as those delivered by practitioners (11, 12). This way, Mindful Muscles will make a scalable impact on different population groups.

### 1.3. Practical relevance of Mindful Muscles

Recreational exercisers and amateur sporters can benefit from the educational resources related to MASC, as the existing resources often do not fit their needs. The access to learning sources regarding PIEDS use (and related benefits and complications), (sport) supplementation, and lifestyle is believed to be limited. The accessible information often focuses on competitive sports. Generally, it contains a deficit-based approach focusing on fixing weaknesses and lacking skills.

Complementary support is often needed but is hardly available to recreational exercisers and amateur sporters. Mindful Muscles offers an alternative perspective that focuses on existing strengths and capabilities and empowers through mindfulness and self-compassion.

Also, the individuals dealing with body image concerns (possibly related to PIEDs use or other causes) will benefit from the Mindful Muscles resources as the MASC approach will help reframe and restructure their self-image.

Lastly, practitioners and professionals dealing with topics ranging from anti-doping and clean sports education to mental and physical health (e.g., body image dissatisfaction and related behaviour) can benefit from the Mindful Muscles resources. The resources offer an alternative, positive perspective to obtain their goals in health promotion and clean sports purposes.

To summarise, strengths-based approaches that use character strengths, mindfulness-based, and compassion-based training have been successfully applied in various contexts and produce a range of positive mental health outcomes concerning body image issues, substance use, and athletic performance. This evidence is corroborated by self-reports, qualitative methods, and findings from neuroscience studies using brain imaging methods. There is good reason to assume that a strength-based educational program will successfully empower athletes and exercisers to refrain from doping use and adopt a healthier (and more mindful and compassionate) way of exercising and doing sports. So far, however, no such programs exist to counter doping in recreational, grassroots, or amateur sports. This is the gap that MINDFUL MUSCLES aims to address.

## 2. MASC in Mindful Muscles: the key concepts

### 2.1. The key concepts

Mindfulness, acceptance, and self-compassion (MASC) represent psychological constructs integrated into novel treatments and prevention approaches for various psychological and somatic conditions. Psychological interventions based on MASC have become highly popular. A large body of scientific evidence supports their effectiveness in helping people regulate their emotional responses to events and situations and in alleviating symptoms of anxiety, distress, and body image-related concerns. The key principle of MASC-based interventions is to help individuals become more aware and connected to their thoughts and emotions over different issues (e.g., substance use and body image concerns) without directly trying to modify them.

**Mindfulness** involves learning how to purposefully pay attention to present-moment experiences in a non-judgmental way and free from self-criticism.

**Acceptance** involves learning how to experience life as it is. By accepting and getting in touch with thoughts and emotions, people become more capable of adopting healthy coping strategies.

**Self-compassion** involves developing a compassionate, positive, accepting, and self-reassuring relationship with oneself.

Naturally, mindfulness, acceptance, and self-compassion are interlinked. Mindfulness helps to become more aware of thoughts and feelings. And acceptance and self-compassion enable people to relate to them in a self-reassuring and positive way, free from self-criticism.

The Mindful Muscles resources help reframe, re-evaluate, and refocus goals, energy, and aspirations in the gym positively. The Mindful Muscles resources consist of 4 modules that people can do by themselves, possibly with added support from a professional.

1. Values and Thoughts
2. Acceptance
3. Self-Compassion
4. Mindfulness

### 3. Mindful Muscles Exercises

Exercise	Main purpose of the exercise
<b>Becoming aware of unhelpful thoughts</b>	Identifying thought patterns to become more aware of the relationship between thought patterns and feelings.
<b>Examining the Advantages and Disadvantages of Thoughts</b>	Giving insight into the impact of recurring negative thoughts.
<b>Understanding your Values</b>	Identifying personal values in relation to doing sports to stay focused when unhelpful thoughts and tendencies come up.
<b>Realising your Mental Strength</b>	Making people aware of their mental and character strengths to promote positive psychological outcomes such as increased happiness, self-confidence, and reduced stress.
<b>Practicing a Non-Judgmental Stance toward Emotions</b>	Getting in touch with negative emotions and becoming more aware of judgments about those emotions and their effects.
<b>Gratitude journal</b>	Practicing gratitude and becoming more aware of little positive things that happen daily to become more receptive to joy and more positive about themselves.
<b>Compassionate body scan</b>	Becoming more aware of sensations in the body and the often-unnoticed judgments about these sensations and body parts.
<b>Loving-kindness meditation</b>	Retraining the mind to be more positive and self-compassionate and more resilient to negative thoughts and feelings or stressful situations.
<b>Compassionate self-validation</b>	Practicing and strengthening self-compassion skills.
<b>Daily Mindfulness Practice</b>	Getting acquainted with simple mindfulness exercises while exercising.
<b>Positive Imagery</b>	Practicing visualization to regain a state of balance when feeling unsafe or triggered.
<b>Diaphragmatic breathing</b>	Practicing diaphragmatic breathing to regain a relaxed state when feeling stressed or overwhelmed.

### 3.1. Values and Thoughts based Exercises.

The exercises related to Values and Thoughts will help to become more aware of thoughts connected to negative emotions. This is done by categorising specific thought patterns and listing the advantages and disadvantages of thoughts. Some exercises will reflect upon personal values in the context of exercising. This is relevant because people can often easily commit to values, which determine how you approach your training/physical activity.

#### *Becoming aware of unhelpful thoughts*

- **Main purpose of the exercise**  
Identifying thought patterns when negative feelings arise. This helps to become more aware of how biases in thinking relate to feelings.
- **What you do in the exercise**  
In a 'Four-Column Thought Form, people keep track of negative feelings arising in exercise-related situations. They then analyse their thoughts when these feelings occur and categorise these into one of 5 biases. One can use the form to become aware of specific thought patterns and how they relate to feelings.

#### *Examining the Advantages and Disadvantages of Thoughts*

- **Main purpose of the exercise**  
Giving insight into the impact of recurring negative thoughts.
- **What you do in the exercise**  
In a form, people list recurring negative thoughts they have related to doing sports or exercise. They then reflect upon the advantages and disadvantages of these thoughts and how their lives would improve if they didn't believe them.

#### *Understanding your Values*

- **Main purpose of the exercise**  
This exercise helps to identify which personal values are important in doing sports. Reminding yourself of these values can help avoid getting side-tracked by unhelpful thoughts and tendencies.
- **What you do in the exercise**  
People reflect on specific values concerning exercising by thinking about what they mean to them. They are also encouraged to see if they have relevant values and then rank them in order of importance.

### *Realising your Mental Strength*

- **Main purpose of the exercise**  
Making people aware of their mental and character strengths.  
Realising your strengths is associated with many positive psychological outcomes, including increased happiness, self-confidence, and reduced stress.
- **What you do in the exercise**  
People fill in an internationally recognized evidence-based questionnaire that will give them a personalized report of their character strengths.

### 3.2 Acceptance-based exercises

The exercises related to *Acceptance* help identify and accept emotions just as they are experienced, rather than judging them, trying to fight them, or blocking them out. Accepting and getting in touch with emotions can help with developing positive coping strategies in the future. This could be done by using exercises like *Practicing a Non-Judgmental Stance toward Emotions* and *practicing gratitude*.

#### *Practicing a Non-Judgmental Stance toward Emotions*

- **Main purpose of the exercise**  
Getting in touch with negative emotions and becoming more aware of judgments about those emotions and their effects.
- **What you do in the exercise**  
Over a week, people note any negative emotion related to their physical appearance or training practice. Per feeling, they then reflect on judgments that might arise about these feelings and the possible consequences of these judgments.

#### *Gratitude Journal*

- **Main purpose of the exercise**  
Becoming more aware of positive things that happen rather than mainly focusing on the negative ones. Being present in moments that feel good and being grateful about things that are commonly unnoticed helps people become more receptive to joy and positive feelings about themselves.
- **What you do in the exercise**  
For a week, people note 3 positive things per day that made them feel good and grateful.  
They then reflect on what exactly made them feel so good.



### 3.3 Self-compassion-based exercises

The exercises related to Self-Compassion guide people through becoming more connected and compassionate with themselves. The practices also aim to encourage and develop a sense of compassion for things that might feel stressful and uncomfortable. This can involve how one thinks of their behaviour (e.g., how they exercise or how committed they are to exercise routines) or their physique (e.g., how fit they look). This is done by a Compassionate body scan, a Loving-kindness or meta meditation, and a Compassionate self-validation exercise.

#### *Compassionate body scan*

- **Main purpose of the exercise**  
Becoming more aware of sensations in the body and the often-unnoticed judgments about these sensations and body parts.
- **What you do in the exercise**  
In about twenty minutes, people focus on all the separate parts of their bodies. By doing this, one focuses on sensations in the body parts and is extra aware of thoughts and judgments that come up doing this. One notices thoughts and judgments but then returns to the breath and feels the sensations. One can do this exercise at one's own pace or with the guidance of an mp3.

#### *Loving-kindness meditation*

- **Main purpose of the exercise**  
By using a more positive, self-compassionate approach, people retrain their minds to be more resilient to negative thoughts and feelings or to stressful situations.
- **What you do in the exercise**  
In about twenty minutes, people focus on their breathing and form a picture of themselves. Holding that image, they then imagine themselves being held in affection, appreciation, and love while repeating a sentence. After holding themselves compassionately and safely for a while, they move their thoughts towards something they consider negative about themselves, repeating the same phrase. Preferably this is related to their exercise, performance, or physical appearance. This exercise can be done at one's own pace or guided through an mp3.

### *Compassionate self-validation*

- **Main purpose of the exercise**

By practising and strengthening their self-compassion skills, people understand what kind of compassion they are receptive to. This can help them use self-compassion more readily the next time they need it.

- **What you do in the exercise**

People are encouraged to think of the most compassionate, nurturing, and loving person they can imagine. They then imagine that person talking with them about their worries or pressures when exercising. People then write down their experiences in a form with prompt questions that give insight into their experiences and needs.

### 3.4 Mindfulness-based exercises

The mindfulness exercises will help people focus on the present and what they are doing at that moment and allow themselves to be aware and open to the feelings they experience. This is done using daily mindfulness practices, positive imagery, and diaphragmatic breathing.

#### *Daily Mindfulness Practice*

- **Main purpose of the exercise**

To get acquainted with simple mindfulness exercises, practice focusing on the here and now with awareness of what's happening inside while exercising.

- **What you do in the exercise**

People can choose from several audio exercises and are encouraged to do these for at least a week and write down their experiences on a provided form.

#### *Positive Imagery*

- **Main purpose of the exercise**

To practice evoking visualising yourself in a positive, comfortable situation, where you can become relaxed and distance yourself from stressful thought patterns and realign yourself with the present. Doing this can help people find their balance and feel safe whenever triggered.

- **What you do in the exercise**

People visualise a safe and relaxing place. It can be anywhere, real or imagined. They then imagine the place in as much detail as possible, focusing on all the senses.

### *Diaphragmatic breathing*

- **Main purpose of the exercise**
- Diaphragmatic breathing replicates how you breathe when you're relaxed. By practising diaphragmatic breathing, people can help return their body and mind to a relaxed state when they feel stressed or overwhelmed.
- **What you do in the exercise**  
For at least 5 minutes, people practice taking long deep breaths by focusing on expanding the belly while bypassing the chest.

## 4 Experiences with MASC from the field

### 4.3 Experience with MASC in sport performers

**Dr Peter Olusoga is a Senior Lecturer in Psychology at Sheffield Hallam University in the UK. As a psychologist, he is regularly consulted by various athletes and organisations. His work focuses on stress, coping, burn-out and well-being in sports coaching.**

*"My work with sports performers and coaches is mainly based on mindfulness, acceptance, and self-compassion. Concepts like toughness, strength, grit, and determination often characterise performance environments. Self-compassion and self-care are often neglected. I will work on identifying core values both in and outside of sports. Identifying values in different life domains (work, relationships, personal growth, education, and spirituality) allows the development of a more rounded sense of their own identity that is no longer solely tied to performance. This will enable a shift in perspective. Sport is part of a person's actions; it is not who they are.*

*Practising mindfulness is also important in my work with sports performers. Avoiding unpleasant thoughts, emotions, and bodily sensations is often the cause of what we call 'experiential avoidance'. Specifically, this means we might move away from what we truly value because it might cause some discomfort. Mindfulness is the practice of noticing without judgement, so I work with performers on noticing their thoughts and emotions without judging them as good or bad. Through various meditations and experiential exercises, we will work on accepting that these unpleasant thoughts, feelings and sensations might come up. However, moving towards what is valued while experiencing them is still possible.*

*Practising mindfulness in this way also allows performers to be more self-compassionate. When we realise that thoughts and emotions are transitory, passing, fleeting mental events that we can notice, acknowledge and then let go of, it can free us from spending energy and effort trying to get rid of, reduce or replace them purposefully. Understanding that this is just how the human mind works, that everyone experiences unpleasant, unhelpful thoughts and emotions, means that performers can be a bit kinder to themselves. They don't have to believe their thoughts. One of the issues plaguing performance is that performers often feel they need to achieve a certain mindset to perform to their capabilities; they have to think a certain way and feel a certain way to perform well. But the reality is that practising mindfulness, self-compassion, and working towards valued ends regardless of our current mental experience is the way to a much more fulfilling sporting experience."*

#### 4.4 MASC in strength training

**Dave Hembrough is a senior Sport Science officer and the lead strength and conditioning coach at Sheffield Hallam University. Dave is also the founder and head coach of Hallam Barbell Club, an award-winning weightlifting and strength training club.**

*"I have used mindfulness as a tool both personally and in my professional environment. Approaches to help individuals to be more aware, increase focus, be less distracted and be 'in the present moment' are extremely helpful.*

*My experience with mindfulness suggests that there are immediate benefits and longer-term benefits. When someone uses a mindfulness technique, a direct effect is a calmness and relaxed state of mind at the moment. Additionally, longer-term, more sustained benefits come through regular practice. These qualities include being generally calmer and more reflective, having greater acceptance and self-compassion, and being less reactive.*

*As a strength and conditioning coach, I regularly use mindfulness techniques during warm-ups and cool-downs with clients. Using it in warm-ups adds to a better workout experience. It helps clients to switch off external distractions and to focus on the activity at hand. Equally, a mindful exercise at the end of a workout, as part of a cool down, helps clients reflect on their workout and give self-appreciation for their effort while remembering the reason for working out."*

## 5 Using MASC in your practice.

The following suggestions on how to use MASC in your practice were derived from interviews with practitioners in physical health, mental health, sport supervision, and clean sports advocacy. Of course, not all suggestions apply to all, all the time. Applying them in your specific practice will always ask your discernment.

### 5.3 Preconditions for using MASC in your practice.

Before using MASC and the exerciser manuals in your practice, you as a practitioner should be sufficiently familiar with the concepts and exercises. This way, you can better assess for which clients it could be suitable and beneficial to practice MASC. Realising that MASC will only fit some clients in your practice is essential.

#### **Clients for whom MASC is believed to be most suitable:**

- Clients willing to try out new approaches to improve their mental well-being.
- Clients who are affected too much by the opinion of others and are (as a result) not satisfied with themselves, or when other people's opinions seem to be an important topic for the client.
- Clients dealing with conditions, impairments or diseases who would benefit from more acceptance of their situation to improve both their physical and mental health.
- Clients who have engaged in sports and/or exercise for a long time and are prone to using performance and image-enhancing substances because they feel they are not improving sufficiently.
- Clients who deal with and/or have problems overcoming obstacles/challenges in their daily lives.
- Recreational sporters and athletes dealing with insecurity and self-esteem regarding their performance or looks despite beating their previous best performance or objective improvements.
- Recreational sporters dealing with stressful periods.
- Recreational sporters and/or athletes who are/were or consider using illicit substances to improve their performance and/or body image.
- Recreational sporters and/or athletes who have difficulty concentrating or dealing with their emotions or the pressure inherent in sporting competition.

#### 5.4 Cues to motivate suitable clients.

In case a client is considered suitable to work with MASC, the practitioner should also be able to discuss the purpose, benefits, and disadvantages of MASC with the client.

Although it is believed that everyone can benefit from MASC, (intrinsic) motivation is considered an important precondition if you want any benefit from the modules. And an understanding of how MASC can improve one's mental health in challenging situations is considered essential to tap into motivation.

#### **Practitioners could point out the benefits of MASC, like:**

- Clients will be able to recognize and observe thought patterns and dysfunctional core beliefs and reconsider them.
- MASC could help clients channel their thoughts and emotions.
- Body image and self-acceptance will be improved in addition to recognizing emotions.
- MASC could lead to overall well-being by initiating self-reflection on how goals are met.
- Clients could become less burdened by self-judgments and -criticism.
- MASC supports an overall stronger mental and physical well-being as it offers coping strategies for challenging situations.
- MASC helps to be more in the present moment and accept life as it is.
- MASC could strengthen the courage to be an individual.

For clients who are into serious/competitive (recreational) sports, a few additional benefits could be worth mentioning:

- MASC could help resist using illicit substances or make you reconsider their use in case the client is using them and has doubts.
- It could build self-esteem and help deal with negative feelings.
- It could support a more positive attitude towards (life) goals, exercise, and self-love.
- It could help set strict boundaries and support the realization that crossing these self-set boundaries is not an option.
- Recreational and/or elite athletes will learn that mind and body work together. Improving self-esteem and peace of mind will reflect on physical performance.

## 5.5 Introducing the modules to your clients

To make the implementation of the MASC concepts and modules into your practice easier, it is suggested to introduce MASC utilizing an educational program like a workshop outside the usual programs or embed it as part of an existing treatment. These educational programs should contain both education and a demonstration of how to apply the modules (as a whole) to achieve the goals set.

You should approach the topic of the MASC program from a psychological needs angle and connect with people's motivation to change before offering such a program. It could also be useful to point out that the program is free, it poses no harm, and it can be done at any moment of the day.

When working with competing (recreational) athletes, it is suggested to introduce the modules as a psychological preparation for competition. This preparation could help them deal with pressure, and MASC could be offered as a tool to cope with difficulties in reaching the set goals. Additionally, the program can be introduced as a psychological self-help tool to discover new training methods, find love in what they do, or make more well-considered decisions when choosing whether to use illicit substances.

## 5.6 Your role when your clients use the MASC resources.

Practitioners who work with exercisers all see a role for themselves in applying MASC in their practice. This could consist of giving feedback when asked, helping clients to choose a suitable module to start with, cheering them on when they feel like giving up or supporting clients to keep being consistent in applying MASC and setting goals. Talking with and guiding clients in coping with the challenges of applying MASC in their lives and/or the conclusions clients draw from it is considered an important role a professional could take in working with MASC in their practice. What the focus and depth of the guidance should be is, of course, dependent on your professional background and individual discernment is always needed.



## 6 Research on the concepts used in Mindful Muscles

### 6.3 Research on interventions regarding Values and Thoughts

There is a variety of interventions to identify your thoughts. These interventions often aim to break through unconscious automatic behavioural patterns that hinder daily functioning. A well-known intervention to identify thoughts is schema therapy or schema-focused therapy. This therapy integrates aspects from both cognitive behavioural theories and psychoanalytic theories. It helps people identify themes arising from unmet emotional childhood needs that express as inadequate coping styles in the present (13-15). After identifying these needs and inadequate coping styles, this therapy helps to analyse and understand these needs to break the patterns.

Most of the research on these types of interventions is aimed at borderline personality disorder or other mental health issues. Despite this fact, interventions to identify your thoughts are relevant for MASC. To face challenges in one's self-perception more mindfully, one needs to identify limiting thoughts.

### 6.4 Research on acceptance-based interventions

**Acceptance** involves learning how to experience life as it is. By accepting and getting in touch with thoughts and emotions, people become more capable of adopting healthy coping strategies.

Acceptance is often researched as part of or combined with mindfulness (25, 26) or as part of cognitive behavioural therapy (27, 28). Regardless of whether the concept of acceptance has been researched on its own or in combination with another concept, most of the research on acceptance is related to body image concerns and eating disorders. Compared to mindfulness, the samples used in the studies to acceptance are small (acceptance on its own, up to N=99; combined with another approach up to N=144).

#### 6.4.1 Proven power of acceptance-based interventions related to body image concerns.

In a study among female college students, acceptance-based approaches and cognitive restructuring were found to have a protective effect related to increased body dissatisfaction and distress towards feeling about their body when challenged (27). Fogelquist et al. conducted a randomised controlled trial on the effects of acceptance and commitment therapy in reducing eating disorder symptoms and body image problems in

female participants from a specialised outpatient eating disorder clinic (28). The outcomes of the two-year follow-up showed that the participants who received the acceptance-based intervention showed a significantly larger reduction in eating disorder symptoms and body image problems than the control group. Also, the intervention group perceived lesser needs for specialised care than the control group.

#### 6.4.2 Proven power of acceptance-based interventions on eating disorders

In a pilot study (with a randomized controlled trial design) among 20 women with binge eating disorders, it was found that the women receiving a brief and low-intensity intervention based on a combination of acceptance and mindfulness reported significantly fewer eating psychopathological symptoms and binge eating symptoms (29). Also, reductions in self-criticism and indicators of psychological distress were reported next to significant increases in compassionate actions and body image-related psychological flexibility.

### 6.5 Research on self-compassion-based interventions

***Self-compassion*** involves developing a compassionate, positive, accepting, and self-reassuring relationship with oneself.

A growing body of evidence shows that the use of self-compassion-based interventions is associated with improved mental health outcomes, positive emotional outcomes when facing failures and suffering, a reduction in self-criticism, and improved overall well-being (30-33). Importantly, self-compassion-based interventions are believed to be strongly associated with body image concerns and related behaviours (34), lower risk of substance use (35), and improved sports performance and motivation in both male and female athletes (36, 37). These traits make compassion-based interventions an important and relevant part of the MASC approach within Mindful Muscles. In addition to the mental impact of self-compassion, clinical neuroscience research has shown that this type of intervention can alter brain responses to threatening stimuli (38).

#### 6.5.1 Proven power of self-compassion-based interventions on body appreciation

In a study by Ziemer et al. (39) among undergraduate women (N=152), self-compassion-based interventions were found to decrease negative and positive affect; these were also found in the control groups. However, the participants receiving the self-compassion-based

intervention reported increased self-compassion, associated with greater increases in obtaining a positive body image and positive affect.

In another study (40) among 151 women, no significant differences were found in reducing body dissatisfaction between the interventions. However, more participants expressed a preference for the self-compassion-based intervention initially and reported a higher likelihood of recommending the intervention to others post-testing. These findings suggest a higher acceptance and compliance with the intervention. Ziemer et al. conducted a study into the effect of self-compassion-based writing interventions on perceived body image among 152 women (39). They found a decrease in both negative and positive affect for all groups.

However, the intervention group reported greater increases in self-compassion. Mediator models indicated that the effect on body appreciation and body image quality of life was mediated by self-compassion. These findings suggest the value of self-compassion in achieving increased body appreciation.

## 6.6 Research on mindfulness-based interventions

**Mindfulness** involves learning how to purposefully pay attention to present-moment experiences in a non-judgmental way and free from self-criticism.

Mindfulness is known for its different ways of applications and different definitions. A commonly used definition encompasses attentional (i.e., ability to regulate attention and "focus on the moment intentionally") and acceptance-based (i.e., ability to maintain a positive and open attitude to mindful experiences, even when they are unpleasant) components (16, 17). Of the three components of MASC, mindfulness is the most widely applied and, thereby, the most researched component.

A few fields in which mindfulness was researched are substance (ab)use (alcohol, drugs), craving- and relapse-prevention, eating behaviour, emotional regulation, body image and self-esteem.

Despite the large variety of research conducted on this concept, it might not be appropriate to speak of the efficacy of mindfulness as an intervention; the studies often use relatively small sample sizes (usually up to 100 participants, with a few exceptions up to 350 participants). Therefore, it might be more appropriate to talk about the proven power of the concept.

However, clinical neuroscience research using brain scanning (fMRI) shows that mindfulness is a learnable skill and that it influences brain activity in areas (e.g., anterior cingulate cortex/ACC, and pre-frontal cortex/PFC) that are implicated in emotion regulation, cognitive

control and social cognition, and self-regulation (18, 19). Thus, there is demonstrable clinical proof that mindfulness can influence physical processes.

#### 6.5.2 Proven power of mindfulness-based interventions in substance use

In a randomised controlled trial among female participants (N=217), a mindfulness approach significantly improved awareness and days abstinent compared to the other study groups. The intervention arm was also revealed to experience significantly less substance craving (20). A similar effect was found in a quasi-experimental study among males with opiate addiction (N=60); the two groups obtained significantly different scores in the post-test, suggesting the positive benefits of decreasing the substance-related cravings of mindfulness-based group therapy (21). In a study by Bowen et al. (22) on the efficacy of a mindfulness-based relapse prevention intervention for substance use disorders, the intervention was found to significantly lower the rates of substance use compared to the control group over a 4-month post-intervention period. Additionally, the participants receiving the intervention were found to experience decreased craving and increased acceptance.

### 6.1.2 Proven power of mindfulness-based interventions in body image concerns

In 2012, Alberts et al. conducted a study among women (N=26, mean age = 48.5 years) on the effects of a mindfulness-based intervention on eating behaviour, food cravings, dichotomous thinking, and body image concerns (23). They concluded that the mindfulness intervention significantly decreased all outcomes compared to the control group. In a larger randomised controlled trial among undergraduate women between the age of 18 to 48 (N=202), both the mindfulness and dissonance groups reported immediate significant benefits to state appearance-ideal internalisation, perceived sociocultural pressure, and related distress compared to the control group. At the 1-week follow-up, both groups demonstrated improved trait appearance-ideal internalisation, weight and shape concerns, and body appreciation compared to the control group (24).

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