

Dissertation

**MINDFULNESS AND SELF COMPASSION IN CLINICAL  
PSYCHIATRIC REHABILITATION:  
A RANDOMIZED CONTROLLED TRIAL**

submitted by

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## **Declaration**

I hereby declare that this thesis is my own original work and that I have fully acknowledged by name all of those individuals and organisations that have contributed to the research for this thesis. Due acknowledgement has been made in the text to all other material used. Throughout this thesis and in all related publications I followed the “Standards of Good Scientific Practice and Ombuds Committee at the Medical University of Graz”.

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## Disclosures

Part of this thesis has been submitted (Gaiswinkler, L., Kaufmann, P., Pollheimer, E., Ackermann, A., Kapfhammer, H.-P., Holasek, S., & Unterrainer, H.-F. (2018). Mindfulness and Self Compassion in clinical psychiatric rehabilitation: A randomized controlled trial. Under submission). All co-authors gave permission to publish the results of the current investigation.

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## Foreword

*“When watching after yourself, you watch after others.*

*When watching after others, you watch after yourself.”*

*The Buddha in the Sedaka Sutta SN47.19*

*(Anālayo, 2012)*

When I started practicing yoga 9 years ago, I was a busy young woman, living in a busy city and having an even busier mind. When I attended my first yoga class more or less by chance, I slowly realized that in order to lead a balanced life and therefore be able to help other people (re-)gain their balance, I would have to unite my body, mind and soul. Fascinated by my newly developed gate to happiness which this path opened for me and regarding all the benefits I gained through my practice, beginning with a better knowledge about my body and its boundaries and similarly the knowledge about the boundaries in my mind, I wrote my master thesis in psychology about yoga involvement and its influence on psychological well-being. In the meantime, I opened the myriad new doors which yoga revealed to me. One of the many things that touched me most was the inner attitude towards myself, which my former yoga teacher once taught me. If I was not able to hold an exercise because I lacked strength or balance, she taught me to realize and to accept this difficulty as a first step, to give myself a smile as a second step, to realize that others in the room also have difficulties as a third step and then to decide whether I wanted to try it again or if I wanted to do some other exercise, which felt better and was easier to do for me at this time. This attitude helped me to take loving care of myself when it comes to difficult situations. The difficult situation, in this case, the difficulties with the exercise, was the first step - developing mindfulness. To deal with my difficulties in a loving and compassionate way was the second step - treating myself with loving kindness. To recognize that I am not alone with my difficulties was the third step - the experience of common humanity. At this time I called that a positive form of brainwashing. From today's point of view, I know that my yoga teacher, consciously or unconsciously, had taught me the basic principles of self-compassion. This inner attitude has already helped me in many challenging situations in life, so it was a wonderful coincidence for me when I found out that there was a rehabilitation centre in Austria, in Rust on the beautiful Neusiedler lake,

that would like to use this concept of self-compassion for the therapeutic support of their inpatients. This circumstance gave me the chance to learn more about this wonderful practice of love from a scientific point of view and further helped me to contribute to the integration of self-compassion in the treatment of psychiatric diseases. I therefore want to express my deepest gratitude to life itself for creating those wonderful coincidences along my way which always led me in the right direction.

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## Abbreviations

<b>AAS:</b> Adult Attachment Scale	<b>MSC:</b> Mindful Self-Compassion
<b>ACC:</b> pregenual Anterior Cingulate Cortex	<b>mOFC:</b> medial Orbitofrontal Cortex
<b>ACT:</b> Acceptance and Commitment Therapy	<b>n:</b> Sample size
<b>AT:</b> Authors Translation	<b>NCCAM:</b> National Center for Complementary and Alternative Medicine
<b>B.C.:</b> Before Christ	<b>NCT:</b> Number of Clinical Trial
<b>BMI:</b> Body Mass Index	<b>NIH:</b> National Institutes of Health
<b>BSI- 18:</b> Brief Symptom Inventory 18	<b>NEO-FFI:</b> NEO Five Factor Inventory
<b>CAM:</b> Complementary and Alternative Medicine	<b>p:</b> Probability
<b>CI:</b> Confidence Interval	<b>p.:</b> Page
<b>CFT:</b> Compassion Focused Therapy	<b>PMR:</b> Progressive Muscle Relaxation
<b>CV:</b> Curriculum Vitae	<b>SCS:</b> Self-Compassion Scale
<b>DBT:</b> Dialectical Behavioral Therapy	<b>SCL-90-R:</b> Symptom Checklist 90 Revised
<b>EBPP:</b> Evidence Based Practice in Psychology	<b>SD:</b> Standard Deviation
<b>EK:</b> Ethic's Commission	<b>SF-36:</b> Medical Outcomes Study 36 Item Short-Form Health Survey
<b>F:</b> Result of a F-test	<b>SN:</b> Saṃyutta-Nikāya
<b>f:</b> Frequency	<b>t:</b> Result of a t-test
<b>fMRI:</b> functional Magnetic Resonance Imaging	<b>VTA/SN:</b> Ventral Tegmental Area/Substantia Nigra
<b>GSI:</b> Global Severity Index	<b>vs.:</b> versus
<b>ICD-10:</b> International Classification of Diseases	<b>YI-S:</b> Yoga Immersion Scale
<b>ID:</b> Identity Document	<b>χ<sup>2</sup>:</b> Chi Square
<b>IPO-16:</b> Inventory of Personality Organization 16	<b>η<sup>2</sup>:</b> Partial Eta Square
<b>M:</b> Mean	
<b>MBCT:</b> Mindfulness Based Cognitive Training	
<b>MBSR:</b> Mindfulness Based Stress Reduction	
<b>MI-RSB 48:</b> Multidimensional Inventory of Religious and Spiritual Well-Being	

## Zusammenfassung

**Einleitung:** Jüngste Forschungen berichten von einem positiven Effekt des Mindful Self-Compassion (MSC, zu Deutsch: Achtsames Selbstmitgefühl) Trainings auf die psychische Gesundheit im ambulanten Therapiebereich. Aus diesem Grund wurde eine randomisiert-kontrollierte Studie mit 200 psychiatrischen PatientInnen durchgeführt um die klinische Effektivität eines adaptierten, sechswöchigen MSC Trainingsprogrammes mit einer Kontrollintervention bestehend aus dem Training der Progressiven Muskel Relaxation (PMR) zu vergleichen. Beide Trainingsprogramme fanden einmal wöchentlich für jeweils 75 Minuten statt.

**Methode:** Die Hauptzielgröße stellte ein Vergleich zwischen den beiden Gruppen hinsichtlich der Self-Compassion Scale (SCS) dar. Sekundäre Zielgrößen beinhalteten Veränderungen in den physischen und mentalen Komponenten der Lebensqualität (SF-36), dem Global Severity Index (GSI) der psychiatrischen Symptomatik (BSI-18) und dem subjektiven Glücksempfinden (Einzelitem). Nach 24 Wochen gab es eine Nachuntersuchung.

**Ergebnisse:** Von den 200 PatientInnen zeigte die MSC Gruppe ( $n = 114$ ) nach sechs Wochen im Vergleich zur PMR-Gruppe eine signifikante Verbesserung ( $p < 0.001$ ) hinsichtlich der SCS, verglichen mit dem Ausgangswert ( $2.55 \pm 0.62$  und  $2.90 \pm 0.51$ , vs.  $2.57 \pm 0.54$  und  $2.57 \pm 0.62$ ). Dementsprechend gab die MSC Gruppe im Vergleich zur PMR-Gruppe ( $p = 0.013$ ) ein erhöhtes subjektives Glücksempfinden an. SF-36-Parameter und GSI verbesserten sich in beiden Studiengruppen im gleichen Ausmaß während der sechswöchigen Behandlung ( $p < 0.001$ ). Die erhöhten Werte bezüglich SCS der MSC Gruppe blieben nach 24 Wochen konstant ( $p < 0.001$ ).

**Diskussion:** Die Ergebnisse deuten auf die klinische Anwendbarkeit und die Notwendigkeit für weiterführende Erforschung von MSC in psychiatrischen Patientengruppen hin.

## Abstract

**Introduction:** It has been reported in previous research that Mindful Self-Compassion (MSC) has positive effects on mental health. As it was intended to gain initial results in clinical surroundings, a randomized controlled trial was conducted in 200 psychiatric inpatients testing the efficacy of a specially designed 6-weeks MSC program as compared with a control intervention of Progressive Muscle Relaxation (PMR). Both sessions lasted 75 minutes and took place once a week.

**Methods:** A change in the Self-Compassion Scale (SCS) total score at the end of six weeks was the primary endpoint and secondary endpoints included the summary scores on the physical and mental components of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), the Global Severity Index (GSI) of the Brief Symptom Inventory (BSI-18) and subjective feeling of happiness (single item). Assessments were repeated at 24 weeks.

**Results:** The MSC group (n=114) showed an increased improvement in SCS ( $p < 0.001$ ), as mean ( $\pm$  SD) baseline and six week SCS total for the MSC group were  $2.55 \pm 0.62$  and  $2.90 \pm 0.51$ , vs.  $2.57 \pm 0.54$  and  $2.57 \pm 0.62$  for the PMR group. Mean baseline and six-week subjective feeling of happiness for the MSC group was  $4.25 \pm 2.12$  and  $5.68 \pm 2.05$  vs.  $4.30 \pm 2.08$  and  $5.53 \pm 2.16$  for the PMR group ( $p = 0.013$ ). SF-36 parameters, as well as the GSI improved independently of the study group ( $p < .001$ ) at week six. At 24 weeks, the higher score of the MSC group concerning SCS remained stable ( $p < 0.001$ ).

**Discussion:** MSC turned out to be a beneficial intervention in clinical surroundings, and merits further investigation.

# 1. Introduction

The teachings of Buddha are relevant for the actual topic of the current doctoral thesis, therefore, in order to grasp what it is actually about, one has to first take a glimpse at the teachings of Buddha. The current thesis does not make the claim to be complete here, as the teachings of the Buddha per se and their importance for western psychology and science in general are highly complex issues. But it is not necessary to expand those topics to the presented text and any intention to do so would require detailed investigation. Therefore, it is the aim of the doctoral candidate to create a solid framework for a better understanding of the actual topic of the current thesis: the meditation about self-compassion.

## 1.1. A glimpse at the teachings of Buddha

The following story is the canonical story of the life of Buddha, who lived approximately 2600 years ago (Rāhula, 1974):

*The Buddha, whose personal name was Siddhattha, and family name Gotama, lived in North India in the 6th century B.C. His father Suddhodana, was the ruler of the kingdom of the Sakyas (in modern Nepal). His mother was queen Maya. According to the custom of the time, he was married quite young, at the age of sixteen, to a beautiful and devoted young princess named Yasodahara. The young prince lived in his palace with every luxury at his command. But all of a sudden, confronted with the reality of life and the suffering of mankind, he decided to find the solution - the way out of this universal suffering. At the age of 29, soon after the birth of his only child, Rahula, he left his kingdom and became an ascetic in search of his solution. For six years the ascetic Gotama wandered about the valley of Ganges, meeting famous religious teachers, studying and following their systems and methods, and submitting himself to rigorous ascetic practices. They did not satisfy him. So he abandoned all traditional religions and their methods and went his own way. It was thus that one evening, seated under a tree (since then known as the Bodhi- or Bo-tree, the "Tree of Wisdom"), on the bank of the river Neranjara at Buddha-Gaya (near Gaya in modern Bihar), at the age of 35, Gotama attained*

*Enlightenment, after which he was known as the Buddha, 'The Enlightened One'. After his Enlightenment, Gotama the Buddha delivered his first sermon to a group of five ascetics, his old colleagues, in the Deer Park at Isipatana (modern Sarnath) near Benares. From that day, for 45 years, he taught all classes of men and women -kings and peasants, Brahmins and outcasts, bankers and beggars, holy men and robbers - without making the slightest distinction between them. He recognized no differences of caste or social groupings, and the Way he preached was open to all men and women who were ready to understand and follow it. At the age of 80, the Buddha passed away at Kusinara in modern Uttar Pradesh in India. (p. 2-3)*

The teachings of the Buddha were passed orally for many decades. The first written evidence of Buddha's teachings were dated 236 years (247 B.C.) after the Buddha's death and it is still a matter of study whether the story about Buddha is based on historical facts or if it is just a legend (Thomas, 1949). Today, Buddhism is widespread all over the world and the Buddhist population counts more than 500 million people (Rāhula, 1974) as adherents. Concerning Buddhist literature and original sources, one has to keep in mind that early in its history, Buddhism split up into several different schools of thought all over Asia and that every school has its own scriptures referring to Buddha (Thomas, 1949). Nevertheless, the Pali canon from the Theravada school is often regarded as the only complete early version of the Buddha's teachings and therefore lays the cornerstone for all subsequent Buddhist literature (Dalai Lama, 2005). The Pali canon was later summarized and analyzed by Buddhaghosa (1991) in his best-known work "Visuddhimagga", the path of purification, which is known as one of the most important texts in Buddhist literature since it is regarded as "the oldest and the most authentic record of the Buddha's word" (Buddhaghosa, 1991, p.27).

In Buddha's teachings, the reason for the suffering of the world is perceived to lie in the nature of all beings itself and is caused by a lack of wisdom. There are three characteristics of nature (Phra Brahmagunabhorn, 2008) which cause suffering according to Buddha, they are as follows:

- Impermanence (Aniccata)
- The state of suffering and being oppressed (Dukkata)
- Soullessness, a state of being not self (Anatta)

These obstacles must be overcome, mostly through meditation, but also through daily practice. Furthermore, there are four sublime stages named in Buddha's teachings which constitute the "Brahmaviharas" and can be cultivated through meditation about them and the confrontation about the pain their counterparts provide. The four "Brahmaviharas" are also called the "immeasurables" or noble, divine abodes; they are also often called "the four noble truths" and are of fundamental value, as they represent the ideal way in which one should encounter other living beings, including oneself (Salzberg & Kabat-Zinn, 2004; Takakusu, 1998; Thera, 2009). The four noble truths are:

- Loving kindness (Metta)
- Compassion (Karuna)
- Sympathetic joy (Mudita)
- Equanimity (Uppekha)

The four noble truths are seen as qualities required in order to lead a good life and one should strive to develop them since they are recognized as being the ideal way to handle life and all living beings. Loving kindness or "Metta" is described as the ability to love all living beings, regardless of their characteristics. Compassion or "Karuna" means to be aware of the sufferings in the world, including our own, without pity. Sympathetic joy or "Mudita" stands for joy with our fellow human beings and happiness with others. Equanimity or "Uppekha" means letting go of I, acceptance and calmness developed through "right behavior" and the appropriate direction of thought as well as through careful meditation (Min Swe & Sayadaw, 1985; Phra Brahmaganabhorn, 2008; Thera, 2009; Vongsopha, 2014). The meditative development of those four qualities is called "Brahmavihara-bhavana" and the four meditations concerning love, compassion, sympathetic joy and equanimity are described in detail in Buddhist scriptures (Buddhaghosa, 1991; Thera, 2009). In general, the four noble truths are developed in the meditative exercise through the thought of the qualities concerning selected people, always beginning with the easiest (e.g. loved ones, family), and working up to the hardest (enemies, disagreeable people), until one is able to include all people, free from any discrimination, into one's meditation (Thera, 2009). Detailed meditation exercises concerning the four noble truths are collected in the Visuddhimaga, Chapter 9 (Buddhaghosa, 1991). From a Buddhist point of view it's thought that through the right behaviour towards the four noble truths and the right

direction of thoughts and meditative exercises, one's mind will incline and a person will internalize those four noble truths as underscored by a quote from Buddha himself: "What a person considers and reflects upon for a long time, to that his mind will bend and incline" (Thera, 2009, p. 4).

Whereas the four noble truths represent the doctrines that should be followed to lead a good life, the essence of the Buddha's teachings also contain the disciplines that should be practiced and the path that should be walked in order to become free from suffering (Bodhi, 2010; Takakusu, 1998). For a Buddhist monk, issues arising in our western society like fears, traumata, financial problems, complicated ethical decisions and disputes in any form are nothing more than different forms of suffering which can be treated through Buddhist principles (Kornfield, 2008). The noble eightfold path ("ariya atthangika magga") is a way that has to be walked when one wants to alleviate suffering according to Buddha (Fjorback & Walach, 2012).

The teachings of Buddha are often described more like a formula concerning our own experience in the world rather than a belief system which explains the origin and the end of things (Bodhi, 2010; Dalai Lama, 2005). Therefore, it is possible that the noble eightfold path should be regarded more as guidelines rather than as steps, as they all influence each other and can occur at the same time in an awakened mind. Although understanding the path is often regarded as less important than actually practicing it, the right understanding of the path is considered a part of the path itself. For practical training, the eight factors of the noble eightfold path are often divided into three groups (Bodhi, 2010; Rāhula, 1974):

#### Moral discipline group ("Silakkhandha") or ethical conduct ("Sila")

- Right speech: telling the truth, no backbiting or talking about things that could produce disharmony, abstention from rude or abusive language and gossip. The words that are spoken have to be true, useful and friendly.
- Right action: acting honourably, no stealing, dishonest dealings or illegitimate sexual intercourse. The actions that are taken have to be peaceful and promoting of others.
- Right livelihood: living a life and acting out a profession which brings no harm to others, no trading in arms and lethal weapons, killing animals or cheating. The life that is led should be honourable and bring no harm to other living beings.

### Concentration group (“Samadhikkhandha”) or mental discipline (“Samadhi”)

- Right effort: the will to cultivate a harmless, good state of mind and to promote all wholesome states of mind which are already present.
- Right mindfulness: to be aware of the activities of the body, mind, feelings and thoughts.
- Right concentration: to concentrate on the breath as a form of meditational exercise for developing attentiveness.

### Wisdom group (“Paññakkhandha”)

- Right view/thought: to think in a selfless and detached manner, to avoid selfish desire and hatred and to promote thoughts of love and non-violence.
- Right intention/understanding: to see things as they really are (in a way in which the four noble truths reveal it). This true and deep understanding of all things is only possible if the mind is fully developed through meditation.

Evidently, the noble eightfold path as well as the four noble truths offer a helpful approach in developing an open mind (Rāhula 1974). Rāhula (1974) explained it as follows: “From this brief account of the Path, one may see that it is a way of life to be followed, practiced and developed by each individual. It is self-discipline in body, word and mind, self-development and self-purification [...] It is a Path leading to the realization of Ultimate Reality, to complete freedom, happiness and peace through moral, spiritual and intellectual perfection” (p. 98). In order to reach the goal to alleviate suffering there are only two things that must be done in practice according to Bodhi (2010): “to start and to continue” (p. 110).

The second of the four noble truths, compassion, building on loving kindness and developing into sympathetic joy and then equanimity, makes up the main topic of this thesis. Before that actual topic is addressed in detail, a short overview about the importance of Buddha’s teachings for psychological well-being and western psychology at large is given.

## **1.2. Importance of Buddha's teachings for western psychology**

The teachings of Buddha in general seem to offer many opportunities for self-development from a psychological point of view and therefore a lot of content for western psychology (De Silva, 1990; Rāhula 1974). Thus it is not surprising that those teachings are becoming more and more interesting for scientific research, as Buddhism in general is considered akin to a science of the mind, as also often postulated by the current Dalai Lama (Kornfield, 2008; Nabeshima, 2003). In fact, when talking about Buddha's teachings and their importance for science, one has to be mindful and cautious, because Buddhism as it is understood in western societies, often underlies some sort of cultural assimilation and is not inevitably the same as Buddhism as a religion, and/or as a philosophy, as Borup (2013) explained: "Theravada Buddhism, through Zen to Tibetan Buddhism and contemporary "mindfulness boom", singular traditions have kept developing their own identities while also being part of transnational, ecumenical, and global Buddhism. Apart from the practicing Buddhists in the West, Buddhism as an inspiration for therapy, psychology, philosophy, popular culture, consumerism, and management strategies has long lost its monastic attire in the West."(p.293). Nevertheless, a cooperation between experts in Buddhism and experts in western science could contribute to a happier and more peaceful world and therefore needs further contemplation (Nabeshima, 2003). For a detailed description of Buddhism and science, see Borup (2013), Kornfield (2008) and Nabeshima (2003). The implementation and detailed description of possible chances and risks of Buddhism in the West, respectively Buddhist principles in western psychology and science in general would go beyond the scope of the current thesis and will therefore be addressed in detail in further research. As already mentioned above, this issue is highly complex and the current thesis can only offer a glimpse at the teachings of Buddha to give a solid framework for the actual topic. The current thesis relies exclusively on the importance of one small detail of the teachings of Buddha, the meditation about (self)-compassion and its influence on psychological well-being.

Indeed, there is growing interest in science, as well as in the population regarding methods that focus on mindfulness and yoga, and Buddhist principles in general (Barnett & Shale, 2012; Kabat-Zinn, 1990; Kabat-Zinn, 2003). It has become well known that these days medical and psychological research focuses more on complementary and alternative medicine methods (CAM) in general to alleviate the suffering of patients; as a result, interest in often spiritually oriented approaches in the western population is growing

(Barnett & Shale, 2012; Burstein, Gelber, Guadagnoli, & Weeks, 1999; Kabat-Zinn, 2003; Kornfield, 2008). Many of the CAM methods are derived from Traditional Chinese Medicine, Ayurvedic Medicine or Buddhism. Since 1999, it has been the aim of the National Center for Complementary and Alternative Medicine (NCCAM), as an organizational component of the National Institute of Health (NIH), to define “the usefulness and safety of complementary and alternative medicine interventions and their roles in improving health and healthcare” ((NCCAM), 2011). Recent research has suggested CAM methods such as dietary supplements, aromatherapy, chiropractic, massage therapy, movement therapy, progressive muscle relaxation (PMR), acupuncture, spirituality, religion and prayer, reiki, biofeedback, music therapy, hypnosis in addition to yoga and meditation as being important factors for developing a holistic treatment approach (Barnett & Shale, 2012). Those 14 methods represent the most commonly used CAM techniques according to a large national survey conducted for the NIH (Barnes, Bloom, & Nahin, 2008) and supplemented with important CAM methods due to their frequency in use by Barnett and Shale (2012). The authors claim that every psychologist should at least be informed about CAM methods pointing to the EBPP, the Evidence Based Practice in Psychology (American Psychological Association, 2005) where the treatment given by psychologists to their clients/patients is described as “the integration of the best available research with clinical expertise in the context of patient characteristics, culture and preferences”. Indeed, every patient should have the certainty that he or she will get information about, and the possibility of benefiting from, all available treatment methods and that the most proper method regarding their preferences will be applied through their psychologist. For western psychology today it is of enormous relevance to understand and to promote the highest development opportunities possible for their clients (Kornfield, 2008).

It is the aim of the doctoral candidate to contribute to this research field, therefore she first began with examining the effects of yoga on psychological well-being in healthy populations and developed a questionnaire to raise the immersion concerning yoga practice (Gaiswinkler, Unterrainer, Fink, & Kapfhammer, 2015; Gaiswinkler & Unterrainer, 2016). These previous findings suggested an enormous positive impact of yoga concerning the severity of psychiatric symptoms, including depression, somatization and anxiety, as well as an increased level of mindfulness, spiritual well-being and subjective feeling of happiness. The positive relationship between yoga practice and psychological, as well as spiritual well-being and mindfulness was most pronounced in participants who exhibited

high immersion concerning yoga, whereas those participants scored lower on psychiatric symptoms, such as depression, somatization and anxiety compared to participants with low immersion concerning their yoga practice (Gaiswinkler, Unterrainer, Fink, & Kapfhammer, 2015; Gaiswinkler, & Unterrainer, 2016). This highly promising findings led to the inner urge to find out more about CAM methods, respectively the teachings of Buddha, and their influence on psychological well-being. Therefore, the current thesis focuses on another CAM method: meditation, or more precisely: the effects of meditation about self-compassion in psychiatric inpatients.

As already mentioned above, the teachings of Buddha can be of enormous relevance for a better understanding of psychological well-being and offer a variety of self-enhancing theories and practices (Kabat-Zinn & Chapman-Waldrop, 1988; Neff, 2003a; Peterson & Pbert, 1992). Buddha's concept of compassion, which constitutes the second of the four noble truths, was a little known characteristic in western psychology for a long time (Salzberg & Kabat-Zinn, 2004). Western societies frequently seem to have a clear description of what is truly meant by compassion and people often fear that showing compassion toward others might lead to self-induced poverty because in theory one would run the risk of giving away all their possessions to the ones who needed them more; in addition it is feared that having compassion toward others might overwhelm oneself emotionally (Kornfield, 2008). In fact, compassion in Buddhas teachings is seen as a circle which includes all living beings, beginning with oneself (Kornfield, 2008; Nabeshima, 2003). To concretize these views the "Acrobat Simile" in the Saṃyukta-āgama (Anālayo, 2012, p. 1-2) will be reproduced to elucidate what is meant by having compassion for oneself first and then, as a logical consequence, for others:

*Thus have I heard. At one time the Buddha was dwelling among the Kosalans, in a siṃsapā grove north of the town of Sedaka. At that time, the Blessed One said to the monks: "In former times, there was a teacher of acrobatics done in dependence on a pole. He placed the pole straight up on his shoulder and told his disciple: 'Getting up and down on the pole, you protect me and I will also protect you. Protecting each other we will put on a show and gain much wealth.' Then the disciple of acrobatics said to the teacher of acrobatics: 'It won't do, as you said. Instead, we should each take care to protect ourselves. [Like this] we will put on a show and gain much wealth. We will be physically at ease and yet I will get down safely.' The teacher of acrobatics said: 'As you*

*said, we will take care to protect ourselves, this is correct and is also the meaning of what I said'. [The Buddha said]: "Having protected oneself, one right away protects the other; when protecting the other and oneself, this is protection indeed. [How does protecting oneself protect others]? Becoming familiar with one's own mind, developing it, protecting it accordingly and attaining realization — this is called 'protecting oneself protects others'. How does protecting others protect oneself? By the gift of fearlessness, the gift of non-violation, the gift of harmlessness, by having a mind of benevolence and empathy for the other — this is called 'protecting others protects oneself'. For this reason, monks, you should train yourself like this: 'Protecting myself I will develop the four spheres of mindfulness, protecting others I will develop the four spheres of mindfulness.' When the Buddha had spoken this discourse, the monks, who had heard what the Buddha had said, were delighted and received it respectfully. (Anālayo, 2012)*

The “Acrobat Simile” is part of the Pali canon, which is considered one of the most reliable texts where the life and teachings of the Buddha are represented (Freiberger, 2004). The story talks about taking care of each other and makes clear that one is only able to help others if one takes care of themselves first. Furthermore the interpretation of the story includes mindfulness as being a protective factor for negative thoughts and actions (Anālayo, 2012). The essence of the often complicated Buddhist literature and the true nature of the human being from a Buddhist point of view is compassion, as a natural reaction reasoning in the fact that everything is connected and interdependent (Kornfield, 2008; Nabeshima, 2003). For most of us, it is evident that we have compassion for our family or our closest friends. In Buddha’s teachings, through the practice of meditation, that feeling of compassion is expanded until the consciousness is able to include all living beings into these feelings of compassion, as if they were part of our own family (Kornfield, 2008). It is not surprising that practicing Buddhists therefore scored higher in terms of self-compassion than a control group comprised of undergraduate students in previous research (Neff, 2003a). Moreover, previous research suggested that, because self-compassion is derived from Buddha’s teachings, there might be a higher affinity for self-compassion on the Asian continent. This assumption however could only be confirmed for Thailand, in contrast to Taiwan whose culture is more influenced by Confucianism than Buddhism (Neff, Pisitsungkagarn, & Hsieh, 2008). This assumption could underlie furthermore the

fact that (some) Asian cultures rely more on community in general, whereas Western culture is (usually) more individualistic (Neff et al., 2008). While (self)-compassion can be regarded mainly from a Buddhist (but also from other religions') perspective, it can also be conceptualized from various viewpoints of psychology.

### **1.3. Other concepts of (self)-compassion**

Gilbert (2010) described compassion in terms of evolution, using the threat, drive and the soothing system to explain its purpose and existence. Whereas the threat system engages survival mechanisms to protect oneself and others against danger and is therefore associated with negative emotions, the drive and the soothing system are linked to positive emotions (Gilbert, 2010, 2016). While the drive system enables the individual to be motivated in gaining rewards (e.g. food, territories), the soothing system that emerges from the attachment system of mammalian evolution has the purpose of alleviating suffering in others. In this regard, compassion is understood as an evolutionary advantage, assisting the individual in regulating negative effect through soothing in self and others (Gilbert, 2010, 2016). Another perspective of compassion comes from Goetz, Keltner, and Simon-Thomas (2010) who perceive compassion as an imbedded feature in the individual's belief system, along with sympathy, empathy and pity which are necessary traits to care for vulnerable offspring. From the author's point of view, a compassionate attitude may also be a desirable trait for non-kin, as it may lead to a good reputation; having a good reputation is seen as advantageous for survival, as other individuals are more likely to help a compassionate individual in return (Goetz et al., 2010). In addition, (self)-compassion was investigated by Kristin Neff (2003b) who placed a strong focus on the positive effects a caring and loving attitude towards oneself has on mental health. Neff's approach, keeping in mind the origins of (self)-compassion (which lie in Buddha's teachings) is the one on which the current thesis relies on.

### **1.4. Definition of self-compassion**

To develop compassion it is first necessary to recognize suffering; to recognize suffering, one first has to develop mindfulness (Neff, 2016). Furthermore feeling compassion within oneself or toward others presupposes loving kindness which, as discussed earlier, is the first of the four noble truths that one should improve from a Buddhist point of view if one wants to lead a purposeful life and alleviate suffering

(Buddhaghosa, 1991; Thera, 2009). When we feel compassionate, we perceive the situation of our counterpart with a kind heart and naturally develop the wish to alleviate his or her suffering. The same applies for compassion for oneself: self-compassion. A well-known quote from Neff (2016, p. 1) describes it in a short and concise way: “Having compassion for oneself is really not different than having compassion for others”. Referring to Neff (2003b), self-compassion “involves being touched by and open to one’s own suffering, not avoiding or disconnecting from it, generating the desire to alleviate one’s suffering and to heal one’s pain with kindness. Self-compassion also involves offering nonjudgmental understanding to one’s pain, inadequacies and failures, so that one’s experience is seen as part of the larger human experience” (p.87).

Self-compassion, as defined by Neff and Germer (2013), contains three important elements which build on each other as follows (Neff, 2016):

#### Mindfulness:

Developing mindfulness is regarded as the first step in developing self-compassion. Mindfulness means that a person should observe their feelings, thoughts and bodily sensations with an open, curious, non-judgmental mind and attempt to perceive things as they really are. Being mindful furthermore requires an observational distance to all sensations of the body and the mind; in order to be mindful it is necessary to not over-identify with those sensations.

#### Self-kindness:

Being kind with oneself means cultivating a warm and understanding attitude for ourselves when we feel pain, rather than denying the pain or over-identifying with this feeling. Denying the pain will furthermore increase feelings of stress and frustration. When we are able to accept reality with sympathy and kindness it will lead to greater feelings of self-compassion and, subsequently, to greater emotional equanimity.

#### Common humanity:

To develop a feeling of common humanity means to recognize that we are not the only ones suffering and that pain, sorrow and personal inadequacies are all a part of the human condition which we all share.

Those three elements lay the cornerstone in the Mindful Self-Compassion (MSC) program, developed by Neff & Germer (2013) which will be explained in detail hereafter.

### **1.5. Previous research on this topic**

Previous research on the effectiveness of mindfulness-based interventions in general already revealed its tremendous impact on subjective well-being and physical health (Baer, Lykins, & Peters, 2012; Gaiswinkler, & Unterrainer, 2016; Hollis-Walker & Colosimo, 2011; MacBeth & Gumley, 2012; Neff, Rude, & Kirkpatrick, 2007). This fact gets further confirmation through the growing importance of CAM in therapy (Barnett & Shale, 2012; Burstein et al., 1999; Kabat-Zinn, 2003). Interventions like Mindfulness-Based Cognitive Training (MBCT, (Teasdale et al., 2000)) and Mindfulness-Based Stress Reduction (MBSR, (Kabat-Zinn, 1982, 1990)) are well established therapeutic instruments to foster mindfulness in clinical as well as non-clinical subjects (Grossman, Niemann, Schmidt, & Walach, 2004; Teasdale et al., 2000). For enhancing a compassionate attitude towards oneself, therapeutic interventions such as Acceptance and Commitment Therapy (ACT, (Hayes, Strosahl, & Wilson, 1999)), Dialectical Behavior Therapy (DBT, (Linehan, 1993)) or Compassion Focused Therapy (CFT, (Gilbert, 2010)) were developed.

The Mindful Self-Compassion (MSC) program (Neff & Germer, 2013) was developed as a special training program, uniting facets of mindfulness, self-kindness and common humanity to enhance self-compassion (Van Dam, Sheppard, Forsyth, & Earleywine, 2011). By combining meditation, interpersonal exercises, informal practical exercises and home assignments the MSC program is derived from MBSR (Kabat-Zinn, 1982, 1990) and MBCT (Teasdale et al., 2000). The purpose of the training program, which lasts eight weeks with 150 minutes sessions once a week plus one half-day retreat (Neff & Germer, 2013), is to engage the participants and enable an attentive and loving contact with his or her self (Neff, 2003a; Neff et al., 2007). The vast amount of research regarding this topic has already revealed that self-compassion is positively associated with emotional intelligence, happiness, optimism and personal initiative in general (Heffernan, 2010). Furthermore, self-compassion was found to be negatively associated with depression, anxiety, self-criticism, the suppression of negative emotions and a negative body image (Neff et al., 2007). Accordingly, previous research found that patients who treat themselves in a very harsh and critical way tend to have less benefit from therapeutic interventions (Blatt, 1995). In correspondence to this, a major predictor for anxiety and depression,

which are associated with a broad range of psychopathology, turned out to be self-compassion, measured via the Self-Compassion Scale (Neff, 2003a; Van Dam et al., 2011). Various research articles already confirmed the efficacy of developing self-compassion, especially for people who deal with feelings of anxiety and depression (Gilbert, 2010; MacBeth & Gumley, 2012; Raes, 2010; Van Dam et al., 2011). For this reason, the training of MSC and its influence on psychological well-being deserves further examination, especially in clinical surroundings. As there are only investigations known using MSC in the context of healthy populations and ambulant patients, an investigation carried out in inpatient treatment is missing at the moment (MacBeth & Gumley, 2012).

Recent discoveries of neuroscience also promote the dialogue between Buddhism and western psychology as studies with participants experienced in meditation (also Buddhist monks) revealed surprising neurological results (Davidson & Lutz, 2008; Klimecki, Leiberg, Ricard, & Singer, 2013; Levenson, Ekman, & Ricard, 2012; Lutz, Greischar, Perlman, & Davidson, 2009; Tang, Hölzel, & Posner, 2015). It seems that the investigations with participants experienced in meditation support Buddhist assumptions and therefore it creates the impression that those assumptions could be the perfect complement for western psychology (Kornfield, 2008). Studies with functional magnetic resonance imaging (fMRI) found out that there are areas in the brain which show increased activation after compassion training, namely the medial orbitofrontal cortex (mOFC), the pregenual anterior cingulate cortex (ACC) and the striatum (Klimecki et al., 2013). Consequently, the authors supposed that a neural network that includes brain areas such as mOFC, the pallidum, the putamen and the ventral tegmental area/substantia nigra (VTA/SN) which is associated with compassion (Klimecki, Leiberg, Lamm, & Singer, 2012), love (Beauregard, Courtemanche, Paquette, & St-Pierre, 2009) and affiliation (Strathearn, Fonagy, Amico, & Montague, 2009) is likely to exist (Klimecki et al., 2013).

Therefore, with regard to these highly promising findings in normal populations, which demonstrate a clear association between self-compassion and mental health (Neff et al., 2007), it is the aim of the current investigation to attempt an examination of the efficacy of MSC training in clinical psychiatric surroundings. For this reason, the effects of an abridged version of the original MSC training (Neff & Germer, 2013), bearable for people dealing with serious mental health issues and fitting into an already specified treatment schedule, are compared with a well-established relaxation training, the Progressive Muscle Relaxation program [PMR, (Jacobson, 1929)].

## **1.6. Aim of research**

Based on results from previous research, where self-compassion was especially effective for people dealing with anxiety and depression (MacBeth & Gumley, 2012; Raes, 2010; Segal, Williams, & Teasdale, 2002; Teasdale et al., 2000; Van Dam et al., 2011), MSC training might be of special interest for the positive outcome of clinical interventions. Therefore, it seems to be important to examine the effects of MSC training in regards to patients dealing with a variety of mental health issues and should be examined in clinical surroundings. As far as it is known, a study examining the effects of MSC training in psychiatric inpatients was not attempted until now. Assuming this, a randomized controlled trial was conducted at the Promente Rehabilitation Centre Sonnenpark in Austria to examine the efficacy of a specially designed six week MSC intervention, derived from the original MSC training (Neff & Germer, 2013), compared to the well-established PMR program (Jacobson, 1929). It is hypothesized that patients who train in MSC will have an improvement in self-compassion as well as in physical and mental functioning and less symptom burden than patients in the PMR group after six weeks of training.

## 2. Materials and methods

The present study was carried out at the Promente Rehabilitation Centre, Sonnenpark in Burgenland, Austria. The main target groups (Promente-Reha, 2017) of the Sonnenpark Centre are:

- Men and women from all over Austria, affected by psychiatric disease in the exercise of their respective professions
- People who are at risk of premature retirement due to psychiatric diseases.
- Persons who require intensive treatment after acute psychiatric diseases to facilitate recovery
- Persons with chronic mental illness in which acute hospital treatment does not make sense but considerable suffering and limitations of their performance are existent
- Persons who are not yet sufficiently stabilized after a hospital stay (hospital curative procedure)
- From the health insurer for long or frequent absenteeism registered people (AT)

The rehabilitation clinic “Sonnenpark Neusiedlersee - Centre for Psychosocial Health” is located in Rust, Burgenland and has been in operation since December 2010. The facility consists of a hotel, where the patients' rooms are located, and a medical-therapeutic area, which is housed in a connected ambulance. Throughout the facility there is a direct view of the Neusiedler lake and the breathtaking landscape around it. The area invites relaxation and recovery through its many sports and leisure activities and is a well-known holiday area in Austria. Therefore, Rust and its surrounding ambience seem to be the perfect place to convalesce. From the homepage of the Promente Rehabilitation Centre (Promente-Reha, 2017) we learn that Promente is “a non-profit organization for the operation of medical-psychiatric rehabilitation facilities in Austria” (AT), in addition the organization is “independent of political parties and acts denominationally independent” (AT). The corresponding statement of commitment of the rehabilitation centre declares that rehabilitation is understood as the best possible reintegration of people with mental illness into professional and social environments. The working method of the rehabilitation clinic refers to the bio-psycho-socio-cultural model of functional health (Engel, 1977; Lehrner, Stolba, Traun-Vogt, & Völkl-Kernstock, 2012; Weinreich, 2005). The medical services

applied at the rehabilitation centre are based on the structure, process and quality of results provided and prescribed by the health insurances (Promente-Reha, 2017). The theoretical background of the rehabilitation is regarded to be the concept of the international classification of functioning, disability and health (WHO, 2001). Therapeutically, the main focus lies on the resources of the patient and the work in a multi-professional manner on the mental and social balance and thus on the future of all patients. The goal is to (re-)gain a healthy work-life balance. The cultivation of a respectful approach to the individuals' personal life history is seen as very important. The rehabilitation offers the patient a time-out from everyday life, with the aim of opening up new life perspectives in dealing with their mental illness. The rehabilitation centre's treatment schedule uses the current state of research in science, social psychiatry and relies on the experience of the well-educated employees who are constantly further educated through internal as well as external training programs, workshops and so on. Thus the quality and innovation of the services that are on offer are sure to be cutting edge (Promente-Reha, 2017).

## **2.1. Study participants**

Participating patients were all inpatients at the Promente Rehabilitation Centre, Sonnenpark, located in Rust, who voluntarily, and under written commitment, agreed to be part of the investigation. Persons from protected groups, like minors or persons temporarily or permanently unable to consent, could not be included in the investigation. All patients got sufficient information through an informational letter which was provided through the review board of the Medical University of Graz and will be addressed in detail at a later point. The fixed inclusion criterion was a minimum age of 18 years and the participant had to undergo a six-week inpatient treatment at the Sonnenpark Clinic. The only exclusion criterion was the occurrence of an acute psychotic episode, as it is commonly known that meditation forms might worsen such episodes (Farias & Wikholm, 2015).

The waiting period to attend rehabilitation at the Promente Rehabilitation Centre can be up to one year. Future patients are referred through their medical doctor or their health insurer to the rehabilitation centre. The Promente Rehabilitation Centre Sonnenpark has 100 rooms at its disposal and the stay at the centre typically lasts six weeks. Extensions of the rehabilitation stay are not usually offered, as the residence is financed through the Austrian national health insurance. Patients at the rehabilitation centre are allocated to treatment groups, which are in turn organized in different colour groups (orange, red A, red

B, blue A, blue B, green A, green B, yellow A and yellow B). The colour groups are independent of any psychiatric similarity, age, gender or any other division criteria; they exist solely for reasons of practicality. As the rehabilitation centre is fully booked at any time, incoming patients are assigned to that colour group where the last group of patients before them had been. Therefore it is guaranteed that all groups are full at any time. Every group is comprised of a minimum of 8 and a maximum of 12 patients. Patients in the same colour group share the same treatment schedule since a lot of treatments at the rehabilitation centre take place in a group. The treatment schedule of the rehabilitation clinic is always adapted to the individuals needs and ranges from psychotherapeutic to psychopharmacological to occupational therapy as well as physiotherapeutic methods. A specialist physician for psychiatry, a psychotherapist, a psychologist and an ergotherapist accompany a group of patients over the entire treatment period. Together with the patient, rehabilitation goals are jointly defined and an appropriate individual treatment offer is prepared. One focus in the final stage of the rehabilitation is the planning of the continuing ambulant treatment (Promente-Reha, 2017).

## **2.2. Study design**

The study took place from December 2015 to November 2016 and consisted of a simple questionnaire survey in a classical paper and pencil format. Well-validated German versions of self-report questionnaires were used which are explained in detail in the section of outcome measures. The current study was designed to have an open, randomized, controlled design and there were two investigated groups; the intervention and the control group. There was no stratification, nor blinding of the participants or therapists. As mentioned subsequently, blinding was not an option due to the requirement that the patients had to be informed about the name of the study for reasons of informed consent. Randomization of the groups was done by an independent work counsellor. On the day of arrival, patients were randomly assigned alternately to the intervention or to the control group, depending on the respective availability. For the current investigation, it was required that only those colour groups took part in the study where another twin colour group existed. Therefore, not all colour groups could be included at any time. As every colour group shares a treatment schedule, the selection took place as follows: if red A was the intervention group, then the colour group red B was selected as control group etc.

The investigation was intended to be a measurement repeat design where the first assessment point was the beginning of the rehabilitation stay, the second after the end of the rehabilitation stay and the third was 24 weeks after the end of the rehabilitation stay to test the durability of the response. The assessment after 24 weeks was done by letter.

### **2.3. Ethical considerations**

Since it was the intention of the leading medical doctor of the Promente Rehabilitation Centre to evaluate possible benefits of an abridged version of the MSC program (Neff & Germer, 2013) for clinical purposes, he therefore gave his approval for the investigation.

An ethics application including all relevant information about the current investigation was approved by the institutional review board of the Medical University of Graz, Austria (EK-number: 28-019 ex 15/16). The whole study protocol was additionally approved by the review board of the Land Burgenland since the Promente Rehabilitation Centre Sonnenpark, Rust, Neusiedlersee is not located in the same federal state as the Medical University of Graz, which is located in Styria. The ethics application was comprised of an application form, a study protocol, a declaration of no conflict of interest between the concerned researchers, neither in academic nor in financial form, the CVs of the main researchers, Lisza Gaiswinkler and Human-Friedrich Unterrainer, as well as an informational letter for the patients. The application form declared that the current study was not sponsored by any third party and additionally included information that the study was a psychological questionnaire investigation which was assigned to the special field of psychiatry. The duration of participation in the study was determined to be approximately eight months, whereas the active phase of participation lasted six weeks, which is the predetermined duration of the rehabilitation stay at the rehabilitation centre, as agreed with the national health insurance. Another issue mentioned in the application form addressed the planned measurements which had to be done exclusively for the purpose of the study. As the investigated treatment methods, MSC (shortened and abridged) and PMR, were already implemented in the treatment schedule of the Sonnenpark Rehabilitation Centre regardless, the only extraordinary activities for participating inpatients was filling up the concerned questionnaires, which will be explained in detail henceforth. Initially it was intended to introduce eight questionnaires in total to the participants in addition to a sociodemographic questionnaire: the Brief Symptom Inventory 18 (BSI-18, (Derogatis, 2002; Franke, 2000; Spitzer et al., 2011)), the Self-Compassion Scale (SCS, (Hupfeld &

Ruffieux, 2011; Neff, 2003a)), the Medical Outcomes Study 36 Item Short-Form Health Survey (SF-36, (Bullinger, 1995; McHorney, Ware Jr, & Raczek, 1993; Ware, 1994)), the Multidimensional Inventory of Religious and Spiritual Well-Being (MI-RSB 48 (Unterrainer & Fink, 2013; Unterrainer, Nelson, Collicutt, & Fink, 2012)), the Inventory of Personality Organization 16 (IPO-16, (Clarkin, Foelsch, & Kernberg, 2001; Zimmermann et al., 2013)), the Adult Attachment Scale (AAS, (Collins & Read, 1990; Schmidt, Strauß, Höger, & Brähler, 2004), the NEO Five Factor Inventory (NEO-FFI, (Borkenau & Ostendorf, 1991; P. Costa & MacCrae, 1992) and a self-designed questionnaire to examine the immersion of the participants concerning the respective interventions as an abridged form of the Yoga-Immersion Scale (YI-S, (Gaiswinkler, Unterrainer, Fink, & Kapfhammer, 2015). For the application form it was necessary to estimate the period of time needed for the extraordinary activities (in this case completing the questionnaires). The estimate yielded 90 minutes per participant for each measurement point. As it was intended to test the participants three times there would have been too much stress for the participants. Therefore, and due to concerns of possible alpha error accumulations arising from the amount of questionnaires, the review board of the Medical University of Graz recommended reducing the amount of psychometric measures to a minimum. This concern was met and therefore it was decided to limit the number of questionnaires to a total of three (SCS, BSI-18, SF-36) in addition to the sociodemographic questionnaire. The resulting questionnaires administered in this investigation consequently comprised only the most essential to meet the aim of research. Therefore, the estimated time needed to fill up the questionnaires was estimated at 35 minutes for each measurement point. This made up a total of 105 minutes for each participant to spend exclusively for the concern of study participation and was regarded as reasonable for the participating patients from the perspective of the review board of the Medical University of Graz. The application form furthermore included a summary of the planned project comprised of a justification for the investigation, its relevance, the study design, as well as measures and procedures. Another point addressed in the application form were further ethical considerations enumerated in great detail, where it was necessary to identify and describe all possible problems that might occur, the increase of knowledge gained through the investigation as well as the relevance of the investigation. Possible risks, charges or damage for the participating person had to be specified in a benefit/risk ratio, including possible pain, inconveniences, violation of personal integrity, steps to avoid unforeseen events as well as steps to provide relief if undesirable events occurred. As the whole investigation was merely a

questionnaire investigation carried out in a safe place (the rehabilitation centre) where all patients received routine care and psychologists and medical doctors were present at all times, there were no charges or damages to be expected for the participating patients. Additionally, we provided an estimation of possible benefits for the participants. For participants in the intervention group there was a great short and long-term discharge to be expected. By answering the questionnaires, all patients were given the opportunity to learn more about themselves and to benefit from the introspection. There were no interactions with other studies or adverse effects to be expected. There was no financial (or any other) compensation for study participation. A withdrawal from participation was possible at any time without consequence. As both interventions (MSC shortened and abridged and PMR) were part of the treatment schedule anyway, a withdrawal from participating meant only a withdrawal from filling up the questionnaires; the participation in the treatments was mandatory regardless. Concerning data availability, interested researchers are allowed to request an anonymous data file where absolutely no personal patient data are displayed. The anonymous data file contains exclusively the raw data of the concerning questionnaires. The main researcher is the only one with full data access and is obligated to treat the data confidentially.

The whole investigation was accomplished in accordance with the current revision of the Declaration of Helsinki, guideline for Good Clinical Practice and current regulations and the study was registered at [clinicaltrials.gov](https://clinicaltrials.gov) (Identifiers: NCT02578433, Unique Protocol ID: ECS 1392/2015, brief title: Mindful Self Compassion in Rehabilitation Inpatients). Furthermore, the planning and implementation of the study was done in accordance with the research unit of the Promente Society. All participating patients displayed a full command of the German language and confirmed written informed consent with a signature on the information letter which was provided by the review board of the Medical University of Graz.

#### **2.4. Informational letter**

Before participation in the study was approved, sufficient information about all details of the study was provided via an informational letter where after the patients had to confirm informed consent. As prescribed by the review board of the Medical University of Graz, the title of the current investigation “Mindfulness and Self-Compassion in Clinical Psychiatric Rehabilitation: A Randomized Controlled Trial” had to be mentioned in the

informational letter. The term “randomized controlled” was explained in the footnote for better understanding as follows: “Randomized controlled means that there is both an intervention group and a control group; the intervention group receives the therapy to be examined and the control group receives the standard therapy. “Randomized” means that the assignment to the intervention and control group happens at random.” Hence, patients knew the purpose of the study; at the beginning of the rehabilitation stay when they were allocated to the study groups, they had no prior information to which group they would have been allocated but at the beginning of the treatments they had knowledge of which groups they would be assigned to. All information explained in the informational letter was additionally explained through the main investigator and the leading medical doctor upon arrival at the rehabilitation centre, where the patients had the opportunity to ask questions. Information in the letter included the fact that participation in this study was completely voluntarily and that a withdrawal from participation can take place at any time and for any reason or no reason. Moreover, it was ensured that a decline or withdrawal from participation would have no negative consequences for the future of their medical care and furthermore that in some cases a premature termination could be called at the behest of the treating physician if contraindications arose, for example if further participation would not be in the interests of the patient.

In general, the information letter provided information about the nature of clinical trials overall and mentioned the importance of those trials for revealing new scientific findings. In the following, it was explained that written informed consent is imperative for participation and patients were obliged to only give consent if they had understood the nature and course of the clinical trial, if they were willing to participate and if they were aware of their rights as a participant. Furthermore, the purpose of the corresponding study was described as the development and verification of appropriate therapy models to ensure the best possible treatment of the patient. In addition, the therapy model to be evaluated was described in the letter as one where a person learns the best possible way to handle oneself. Moreover, the course of the clinical trial was described in detail. An estimated timeframe for completing the questionnaires was provided to the patients, as well as the applied questionnaires and which data in detail will be collected. At the very least the participants were informed about the collection of their data and it was guaranteed that participation was subject to confidentiality. Participants were informed that data will be passed on exclusively for statistical purposes and in a manner that respects patient privacy. It was assured that the provisions of the Data Protection Act, as amended, are to be

complied with. In addition it was explained that participants will not receive any remuneration for taking part in the study and that no costs will be incurred for participation.

The opportunity to ask further questions concerning patient rights and the ramification of participation in the study in general was given along with the telephone number of the main investigator. With the signature on the consent form, the patient declared his or her participation in the study and submitted that he or she got sufficient information about possible risks and the nature, importance and scope of the clinical study, as well as the requirements arising from it. The patient declared that he or she also read the text of the corresponding informational letter and consent declaration, which was comprised of four pages in total. The patients furthermore declared that any questions they had had been answered satisfyingly through the corresponding investigators and that enough time was provided to decide whether to participate or not. Finally, the patients submitted that he or she received a copy of the corresponding patient information and consent statement. The original remained with the main investigator. The consent form attained validity with the signature from the participating patient as well as the signature of the main investigator.

## **2.5. Sociodemographic data**

At the beginning of the questionnaire we included a sociodemographic data sheet which obtained gender, age, diagnosis, medication, education, occupation, marital status, offspring, dietary habits, the use of alcohol and/or drugs, nicotine use, subjective feeling of happiness, religious affiliation as well as weight & height (BMI). Gender, age, education, occupation, religious affiliation, offspring and marital status are designated as “sociodemographic variables” in the following, whereas diagnosis, medication, the use of alcohol and/or drugs, dietary habits as well as the BMI are designated as “health related variables”. Furthermore, previous experience with mindfulness/relaxation techniques was raised, as well as the duration for knowing the technique and the frequency in which these techniques are applied in the present. Those variables are designated as “previous experiences”. At the end of their rehabilitation stay, patients completed the same questionnaires (SCS, BSI-18, SF-36) as at the beginning of their stay apart from the sociodemographic questionnaire where questions about previous experiences with mindfulness/ relaxation techniques were replaced with questions about the patients’ additional practice (designated as “intervention-related variables”) while demographic

questions were removed. For example, some sample questions included whether additional practice takes place (yes/no), in which form the practice is observed (whether in an informal or in a ritualized way), the frequency (daily, multiple times a week, more often than once a week, less than once a week) and the duration (longer than 15 minutes, 10 to 15 minutes, less than 10 minutes) of this practice, as well as patient trust in the trainer (How much trust do you have in your trainer from 1 [none] to 10 [full]?) and the sympathy for practice of MSC or PMR in general (How much do you like MSC/PMR on a scale from 1 [not at all] to 10 [very much]?). The sociodemographic data sheet at week 24 also contained only the questions about the additional practice (form, frequency, duration and sympathy/favour for the practice).

## **2.6. Outcome measures**

As a primary outcome measure, the change in the total score of the German version (Hupfeld & Ruffieux, 2011) of the Self-Compassion Scale SCS (Neff, 2003a) was used. As a well-validated and multidimensional measurement instrument, the SCS captures the amount of self-compassion by means of 26 items which have to be answered by the participant on a five-point Likert scale. The mean scores range from 1 to 5 and higher total scores indicate greater self-compassion. As a multidimensional measurement instrument, the SCS features six subscales with the following categories: Self-Kindness, Self-Judgment, Common Humanity, Isolation, Mindfulness and Over-Identification. The subscales have to be summarized and subsequently divided by the number of subscales into a SCS total score. The internal consistency (Cronbach's  $\alpha$ ) of the German version of the SCS total score was reported as  $\alpha=.91$ . The Cronbach's  $\alpha$  of the subscales amount to  $\alpha=.83$  for Self-Kindness,  $\alpha=.74$  for Self-Judgement,  $\alpha=.75$  for Common Humanity,  $\alpha=.80$  for Isolation,  $\alpha=.66$  for Mindfulness and  $\alpha=.70$  for Over-Identification (Hupfeld & Ruffieux, 2011).

One secondary outcome measure comprised the German version (Bullinger, 1995) of the Medical Outcomes Study 36 Item Short-Form Health Survey SF-36 (McHorney et al., 1993; Ware, 1994) which is a well-established questionnaire designed to quantify quality of life via 36 items. The self-report items are answered via different response formats (dichotomous and Likert scales with different gradations). The SF-36 covers eight sub-dimensions: Physical Functioning, Role Limitations due to Physical Health, Role Limitations due to Emotional Problems, Energy/Fatigue, Emotional Well-Being, Social

Functioning, Pain and General Health, which can be summarized into a Physical and a Mental Component. The total scores of the SF-36 range from 0 to 100, with higher scores indicating better health status. The internal consistencies for the subscales derived from a student sample of the corresponding study (Bullinger, 1995) were reported as  $\alpha=.88$  for Physical Functioning,  $\alpha=.74$  for Physical Role,  $\alpha=.73$  for Bodily Pain,  $\alpha=.69$  for General Health,  $\alpha=.78$  for Vitality,  $\alpha=.81$  for Social Functioning,  $\alpha=.77$  for Emotional Role and  $\alpha=.82$  for Mental Health. In a sample comprised of healthy mothers, Cronbach's  $\alpha$  was found to be  $\alpha=.73$  for Physical Functioning,  $\alpha=.76$  for Physical Role,  $\alpha=.86$  for Bodily Pain,  $\alpha=.65$  for General Health,  $\alpha=.82$  for Vitality,  $\alpha=.79$  for Social Functioning,  $\alpha=.79$  for Emotional Role and  $\alpha=.85$  for Mental Health (Bullinger, 1995). Further internal consistencies were reported for a sample of patients with back pain as follows:  $\alpha=.92$  for Physical Functioning,  $\alpha=.84$  for Physical Role,  $\alpha=.72$  for Bodily Pain,  $\alpha=.64$  for General Health,  $\alpha=.82$  for Vitality,  $\alpha=.85$  for Social Functioning,  $\alpha=.90$  for Emotional Role and  $\alpha=.87$  for Mental Health. Furthermore, the values of Cronbach's  $\alpha$  were given for a sample comprised of patients who experienced migraines, where the internal consistency was stated to be  $\alpha=.92$  for Physical Functioning,  $\alpha=.80$  for Physical Role,  $\alpha=.79$  for Bodily Pain,  $\alpha=.76$  for General Health,  $\alpha=.83$  for Vitality,  $\alpha=.73$  for Social Functioning,  $\alpha=.86$  for Emotional Role and  $\alpha=.84$  for Mental Health (Bullinger, 1995). Apart from the subscale General Health, all subscales consistently showed a greater Cronbach's  $\alpha$  than .70 and can therefore be regarded as satisfyingly stable internally.

As a further secondary outcome the German version (Spitzer et al., 2011) of the Brief Symptom Inventory - 18 (Franke, 2000) was used. As a short version of the highly established Symptom Checklist (SCL-90-R (Derogatis, 1996)), the BSI-18 captures psychiatric symptoms in three dimensions: Somatization, Depression and Anxiety. The BSI-18 contains a Global Severity Index (GSI) calculated via the addition of three subscales and is therefore assessed by means of 18 items. The items of the BSI-18 consist of statements about psychiatric symptoms in the preceding seven days and have to be answered in a self-report form on a five-point Likert scale from 0 (absolutely not) to 4 (very strong). Mean scores therefore range from 0 to 24 and higher scores indicate a greater symptom burden. Cronbach's  $\alpha$  for the GSI of the German version of the BSI-18 was reported to be  $\alpha=.88$  detected in investigations with students,  $\alpha=.82$  for non-clinical participants,  $\alpha=.90$  for patients with the main diagnosis of somatoform disorders,  $\alpha=.88$  for patients with the main diagnosis of anxiety disorders and  $\alpha=.89$  for patients with the main diagnosis of depression (Spitzer et al., 2011).

In addition to the well-established questionnaires that were used in this investigation, single items were applied to get further insight into the patient's attitude toward health. For this purpose, the amount of subjective happiness and the use of nicotine were captured by means of a single item. The item "How happy do you feel right now?" had to be answered on a 10-point Likert scale ranging from 1 (not at all) to 10 (totally) with higher scores indicating higher approval concerning the relevant issue. The use of nicotine was captured via the number of patients smoking and the daily number of cigarettes.

## **2.7. MSC Intervention**

For the MSC intervention in a clinical context, the original MSC training by Neff and Germer (2013) was adapted. Due to the increased symptom burden of the patients, the content of the intervention was selected carefully through the corresponding teachers, who are both experienced psychotherapists. The intervention groups were led by Paul Kaufmann, who is additionally a psychiatrist and Ewald Pollheimer. Both are certified graduates from the official MSC trainer seminar, bringing with them more than 10 years' experience in the teaching of mindfulness. In contrast to the original MSC training, where a lot of interpersonal exercise and subsequent exchange is implemented, interpersonal exercises were reduced to a minimum in the clinical adaption of the training. Patients were encouraged to limit their interpersonal exchange to the feelings they perceive during the actual meditation exercises instead of bringing up their personal history. Since every patient undergoing rehabilitation at the Sonnenpark Rehabilitation Centre has a personal psychotherapist, patients were asked to address those topics in their psychotherapy sessions, as they might have been too overwhelming for their fellows.

In the first unit patients were provided with instructional words regarding the upcoming intervention. The purpose of mindfulness and self-compassion were explained and the definition of mindfulness was reported as perceiving what is happening in the current moment without judging it. Mindfulness was described as the curious research of the present experience without the urge to change it. The trainer explained that if one is able to recognize the present moment, they will recognize that they currently experience the emotion of anger, pain, grief, sorrow, relaxation or joy. Furthermore, the trainer indicated that every human being needs compassion by bringing up the example of a little child that needs consolation from their parents if it experiences a negative feeling. The same way in which one would treat this child is the way in which one should meet himself when

experiencing difficulties in life. Furthermore, it was established that every person who attends the rehabilitation centre is suffering in some way. Otherwise there would be no reason to attend a six-week psychiatric and psychotherapeutic stationary treatment. That first conclusion therefore gave some insight into the mindfulness approach. Subsequently the patients were informed that the MSC training they would undertake in the next few weeks would be an abridged version of the original MSC training. The course and the contents of the upcoming intervention were explained to the patients. First, the definition of self-compassion was given as follows: “Self-compassion, [therefore,] involves being touched by and open to one’s own suffering, not avoiding or disconnecting from it, generating the desire to alleviate one’s suffering and to heal oneself with kindness. Self-compassion also involves offering nonjudgmental understanding to one’s pain, inadequacies and failures, so that one’s experience is seen as part of the larger human experience.”(Neff, 2003b) (p. 87). Moreover, the three components of self-compassion and their counterparts were explained:

The first component which was explained to the patients was mindfulness with its counterpart over-identification. Being mindful makes it possible to accept difficult feelings since there is no danger of suppressing or over-identifying with them. Self-kindness, the second component, is a caring and understanding approach towards ourselves which includes comforting ourselves; self-condemnation is its counterpart. The third component, common humanity, is meant to perceive the personal experience as a part of human life, not as something isolating or abnormal. Recognizing the component “common humanity” means to perceive that life is never perfect and neither are we. The counterpart of that component is isolation. The three components were then, subsequently, split up into two questions and one answer to refine the meaning of mindfulness and self-compassion and their fusion; mindful self-compassion:

Mindfulness asks: “What am I experiencing right now?”

Self-compassion asks: “What do I need right now?”

Mindful self-compassion says: “Carefully and lovingly deal with yourself, also and especially when you are suffering.”

Apart from the explanation about what mindful self-compassion is, it was also explained what mindful self-compassion is not. For this reason, often disguised traits were explained and discussed in detail. It was clarified that self-compassion has nothing in

common with self-pity. Self-compassion rather reminds one that everybody suffers from time to time; therefore it is possible to develop a feeling of common humanity. It was clarified that mindfulness has the ability to prevent exaggeration of the extent of suffering and furthermore reinforced the idea that, indeed, we might be the ones who are suffering the most. Additionally, it was specified that self-compassion has nothing to do with weakness; self-compassion is, in fact, more likely to be a strength which provides us with support if we struggle. Patients were informed about scientific findings where it was discovered that greater self-compassion was associated with a better coping strategy in difficult situations such as divorce (Sbarra, Smith, & Mehl, 2012), trauma (Allen & Leary, 2010; Thompson & Waltz, 2008; Vettese, Dyer, Li, & Wekerle, 2011) or chronic pain (J. Costa & Pinto-Gouveia, 2011). Moreover, concerns about whether or not self-compassion might be egoistic were discussed. Accordingly it was explained that if one includes oneself into the feelings of compassion, one enjoys a greater feeling of connectedness with their fellows. As a further step in the introduction of the MSC intervention, patients were provided with further scientific findings concerning the original MSC trainings program which usually lasted eight weeks (Neff & Germer, 2013). The patients were informed that studies revealed that people high in self-compassion tended to be more caring and supporting in their relationships, that they were more willing to compromise and exhibited greater compassion toward others (Neff & Beretvas, 2013; Neff & Pommier, 2013). Lastly it was discussed whether self-compassion might be an excuse. This concern was ameliorated by explaining that self-compassion is more likely to provide the required safety to admit possible mistakes and to account for them instead of blaming others (Neff & Beretvas, 2013; Neff & Pommier, 2013). In addition, it was explained that recent research showed that people high in self-compassion usually accept responsibility for their actions and are more likely to apologize if they had hurt somebody (Neff & Beretvas, 2013; Neff & Pommier, 2013). Finally, further research findings were shared with the patients as follows: it was reported that self-compassion was found to reduce feelings of anxiety (Neff, 2012; Neff et al., 2007), depression (Neff, 2012; Neff et al., 2007), stress (Allen & Leary, 2010; Rockliff, Gilbert, McEwan, Lightman, & Glover, 2008), rumination (Neff, 2003a; Neff, Hsieh, & Dejitterat, 2005), perfectionism (Neff, 2003a; Neff et al., 2005), body shame (Albertson, Neff, & Dill-Shackleford, 2015) and fear of failure (Neff, 2003a; Neff et al., 2005) and to increase satisfaction with life, feelings of happiness, self-confidence, optimism, curiosity, creativity and gratefulness (Heffernan, 2010; Hollis-Walker & Colosimo, 2011; Neff et al., 2007). Furthermore, scientific findings about self-

compassion were summarized into two super ordinate factors: Motivation and coping and resilience.

### Motivation

It was reported to the patients that concerning motivation in general, people who are high in self-compassion tend to have a higher intrinsic motivation along with an increased wish to learn and grow (Neff et al., 2005). Subsequently it was explained that although their personal standards seem to be equally high, those people are less annoyed if they do not reach those standards. If a person high in self-compassion fails, science reveals that they are more likely to begin a new attempt (Neff et al., 2005). Furthermore, patients were told that self-compassion promoted a healthy lifestyle including a healthy diet (Adams & Leary, 2007), fitness (Magnus, Kowalski, & McHugh, 2010), the ability to quit smoking (Kelly, Zuroff, Foa, & Gilbert, 2010), more regular doctor visits (Terry & Leary, 2011) and a higher consciousness as well as a higher sense of personal responsibility for mistakes and the willingness to apologize (Neff & Pommier, 2013).

### Coping and resilience

The patients were also provided with information that persons with higher self-compassion have a better resilience, which is shown especially in a more effective coping with failure (Neff, 2003a; Neff et al., 2005), chronic pain (Costa & Pinto-Gouveia, 2011), divorce (Sbarra et al., 2012) or traumata in general (Allen & Leary, 2010; Thompson & Waltz, 2008; Vettese et al., 2011). It was reported that, as a consequence, those people tended to have a better overall psychological health (Neff & Germer, 2013) due to coping better with everyday life; moreover, they exhibit less addictive behaviour (Vettese et al., 2011), less relapse into a depressive state of mind and less depression and anxiety in general (Neff, 2012; Neff et al., 2007). The information that people who suffer from self-defeating behaviour tend to be less embarrassed with their behaviour (Schanche, Stiles, McCullough, Svartberg, & Nielsen, 2011) was shared with the patients. Furthermore, it was reported that a higher feeling of self-compassion led to an improvement in psychiatric symptoms in people dealing with Cluster C-personality disorders (Schanche et al., 2011). Likewise, patients got additional theoretic input by exploring the different areas where self-compassion usually acts upon and what can be done in those areas to actually foster self-compassion. Concerning the body, patients were informed that it is important to care for their bodies and to not harm it. Regarding the mind, it was explained that it is necessary to

admit thoughts; here patients were informed that it is important to find a tradable dose which is not too overwhelming. In the area of emotions, it was stated that it is self-compassionate to accept feelings; here it was also recommended to find a tradable dose which is not too overwhelming. In relationships a self-compassionate attitude was characterized as an authentic contact with others. In the spiritual field, patients were told that it is necessary to feed one's own values if we want to become self-compassionate.

Levels of acceptance were then reported and discussed as an important part in developing mindfulness and self-compassion. It was explained that if a person discovered a negative emotion they should explore that feeling as a first step, to tolerate that feeling in order to allow it as a further step and then to fully accept it as a last step. Patients were encouraged to explore and to turn to discomfort with curiosity, to tolerate and to withstand the feeling without fear of endangerment, to allow it, which means to be able to let feelings come and go and to find a tradable dose and lastly to accept anything that they face and to regard pain as a part of a fulfilled life. In addition, part of the induction period involved educating the patients about what construed natural progression. It was hoped that by doing so they wouldn't demand too much of themselves or be disappointed if their progress was not as linear as they might have hoped. The levels of progress as taught to the patients are:

- Pursuit, euphoria: the wish to feel better, accompanied with initial enthusiasm.
- Disappointment, disillusionment: when it is recognized that there occur difficulties on the way to self-compassion or when resistance strengthens the discomfort. Here we emphasized how indispensable it was progressing to the last level in the process.
- True acceptance: if this level is reached and the level of disappointment and disillusionment has been overcome then permanent change is possible.

Subsequently it was explained that change happens through learning. It was specified that learning happens through repetition or through a strong stimulus, while learning through repetition is a more comfortable way of doing it. It was reported that interest is an important factor in learning. Subsequently, it was explained that it will be necessary to bring up interest in oneself if one wants to develop self-compassion. The patients were invited to show interest and to be curious and attentive for themselves. Afterwards, it was declared that repetition is able to change the brain because it develops new nerve connections which are demonstrated to be long lasting. As a result, patients were encouraged to keep going with the intervention even if it becomes difficult at some point

because through perseverance they will be able to change their life permanently. Lastly it was again mentioned that when the training gets difficult, the patients should remember about the levels of progress and that it is totally human to develop a feeling of disappointment or disillusionment after the initial pursuit and euphoria has gone. It was explained that when the level of disappointment or disillusionment has been overcome and the last level of acceptance is reached, it is advised to keep on going until the learning is integrated into the self-concept. It was pointed out that self-compassion can be seen as a decision for life.

In the following sessions, the actual training took place, including the core meditations (loving breathing, Metta meditation, to give and to receive compassion), the body scan with compassion and informal exercises (self-compassion break, gentle touch, enjoying with all senses, self-compassion in everyday life and mindfulness in everyday life). While the first session served to introduce the concept of MSC training, the second session comprised the core meditations “loving breathing” and the “Metta” meditation. In the third session, “giving and receiving compassion” was trained and the “body scan with compassion” was accomplished. The fourth session comprised the “self-compassion break” and the “gentle touch”. Subsequently in the fifth session, “self-compassion in everyday life” as well as “mindfulness in everyday life” was exercised. In the sixth and final session, to “enjoy with all senses” was trained, further advice for practicing at home was given and further reading was recommended. The training was finalized with a special song “Japanese bowls” (Mayer, 2010).

MSC training is comprised of different meditational exercises, as well as informal practical exercises that support the patient in encountering emotional charges in a mindful and compassionate way. Although not all topics of the original MSC training could be addressed, the trainers did their best to include as much as possible from the original training. The applied exercises are therefore mainly part of the original MSC training by Neff and Germer (2013). Nevertheless, some parts have been abridged and are therefore attributable to Paul Kaufmann and Ewald Pollheimer and were translated from German into English by the doctoral candidate. The original, translated instructions are attached in the appendix.

## **2.8. Core meditations**

### Loving breathing

At the beginning of the meditation, patients were invited to choose a sitting position that supports muscles and allows remaining upright without strain during the entire exercise. It was recommended to keep the back straight and upright, to let the shoulders fall loosely backward down and the chin to be pulled gently towards the chest. Then, patients were asked to inhale a few times gently and deeply in and out and to release all unnecessary tension. Patients were asked to close their eyes or to open them slightly when this was more comfortable for them. Patients were encouraged to place a hand for a moment on their heart (or elsewhere) to remind them that they turn to themselves and their experiences now in a loving and attentive way. Subsequently, they were asked to focus their attention on their breath and to linger with attention at the place where breathing is most noticeable. Then, patients were asked to investigate the breathing in their body and to simply feel their breath for a while. It was proposed to turn to the breath the way one would turn to a beloved child or to a pet, with curiosity and tenderness. Patients were informed that their mind may be often distracted and would not remain focused with the sensations of the breath. If so, it was suggested to not to worry about how often thoughts digress. It was recommended to rather direct the attention gently back to the breathing whenever it was noticed that the mind has wandered. Just as one would love to bring back a small child or a young puppy again and again when it has run away. Patients were reminded to appreciate how their breath brings life into their body and nourishes them - regardless of whether they are conscious of it or not. It was recommended to leave the breathing entirely to their body and the patients were reminded that there is nothing they need to do. The trainer recommended feeling how the breath provides the whole body and moves it with a soothing rhythm that comes and goes like the waves of the ocean. Patients were encouraged to leave themselves completely to their breath, to trust it and to literally become their breath, gently blended and cared for. After a while, the trainer recommended ignoring their breathing and let everything that occurs in the awareness be exactly as it is, just for that moment. Then, patients were requested to ask themselves what they perceived right at that moment in their body and mind. After a few minutes, the trainer closed the meditation with the instruction that the patients could now open their eyes slowly and gently. Afterwards, the personal experiences were shared and discussed within the group and with the trainer.

### Metta meditation

Patients were encouraged to assume a comfortable position while sitting or lying down and to close their eyes or to leave them slightly open. They were instructed to take a few deep breaths to arrive in the body and at the present moment. If desired, patients were encouraged to put a hand on their heart, or wherever it has a soothing effect on them, and to use it as a mnemonic for reminding them to turn to themselves and their experience not only with awareness but with loving awareness. The trainer guided the patients into taking a little time to get inside their body and to feel what is there at the present moment. He encouraged the patients to let all sensations, thoughts or feelings simply come and go. After a while, patients were asked where they could perceive their breath most clearly. Patients were reminded that if their attention drifts they should pay heed to the gentle movement caused by their breathing. While breathing, the patients should ensure that they allow themselves to be conscious in a gentle way of how it feels to be right now in that body. Then it was recommended to offer oneself words or phrases that fit to the needs exactly at this moment. It was explained that these words ought to be easy, simple, clear, sincere and friendly. An example for the traditional “Metta sentences” was given as follows:

*“May I be healthy.*

*May I be happy.*

*May I be safe and secure.*

*May I live in ease.”*

The trainer additionally mentioned that if one is struggling and in need of some compassion then perhaps phrases such as:

*“May I be free from suffering.”*

could be especially helpful.

Patients were encouraged to find words that feel good for them at the moment. Furthermore, patients were reminded that if they notice their attention waning, they should re-enter into their body and return to their sentences. Finally, patients were asked to linger with their attention on their body in the knowledge that they can return to their sentences at any time. The meditation was closed with the instruction to gently open their eyes. At the

end of the session, personal experiences were shared and discussed within the group and with the trainer.

### To give and to receive compassion

In the third session, patients were asked to find a comfortable sitting position, to close their eyes and breathe in and out a few times, deep and relaxed. They were further asked to allow themselves to feel the sensations intensively during inhalation and exhalation. The patients were encouraged to perceive how their breath nourishes their body when they inhale and relaxes their body when they exhale. The trainer guided the patients to let their breath flow naturally and to stay with their attention fixed on the sensations felt during inhalation and exhalation. If desired, patients were encouraged to put a hand on their heart or anywhere else on their body to remind themselves to think about their experience with loving awareness. Patients were furthermore asked to realize how their inhalation nourishes every single cell and then to let the exhalation happen naturally. The trainer suggested they associate a word with each inhalation, for example "love", "compassion", "ease", or "peace" or to imagine inhaling warmth or light. Next, the trainer proposed the patients think of someone who they would like to share the warmth with. Either someone the patient loves or a person who has just been struggling with difficulties in his or her life and needs a sense of empathy. It was recommended to let a clear picture of the person emerge before one's mind's eye. Then, patients should focus their attention on the exhalation and send the person with each exhalation warmth and benevolence. It was furthermore suggested to associate a loving word with each exhalation, or to imagine how to send something benevolent to the person with each exhale. Subsequently, the trainer instructed the patients to inhale for themselves and to exhale for the other person with the following sentence in mind:

*"An inhalation for me, an exhalation for you."*

*"One for me, one for you."*

Patients were told that however they may feel, they should allow their feelings to simply be there and connect with the intention of breathing benevolence for themselves and someone else. The patients were encouraged to let the breathing flow in and out, like gentle waves of the ocean. The trainer suggested that perhaps it would be possible that the individual can become a part of this uninterrupted, boundless stream of inhalation and exhalation. If

desired, patients were reminded that they can focus a little more on themselves or the other person depending on what seemed appropriate at the time. It was stated that as they exhale, they can also send love and compassion to other people, groups or the world in general. The exercise was finished with the instruction to gently open their eyes. Afterwards, the personal experiences were shared and discussed within the group and with the trainer.

## **2.9. Other meditations**

### Body scan with compassion

This exercise was recommended to be best performed on the floor, lest one should fall asleep too easily. Patients were therefore asked to lie on their back and let their arms lie sideways beside their body. They were instructed to lay their legs stretched away from each other approximately shoulder-width apart and to place a hand on the heart area to remember to deal with oneself kindly. The patients were guided, through the trainer, to feel the warmth of their hand and take three deep, relaxing breaths. Then, the arm should be placed next to the body. Patients were asked to focus their attention on the toes of their left foot and see what they feel there. The trainer suggested that they may feel warmth, cold, moisture or dryness and encouraged the patients to linger while feeling the bodily sensations, regardless of how the respective sensation may feel. If difficulties should arise, the trainer asked the patients that they may make this area soften in the mind, e.g. by imagining that one wraps oneself with a warm towel. It was also suggested to turn to the area with a compassionate attitude and say words like:

*"There's something hurting there, that's all right."*

Patients were encouraged to let their attention wander from the toes of the left foot, continuing to the soles, and then to the whole foot. After that patients were asked to turn to their feet with an inner feeling of gratitude and to remember that this small support surface can carry and hold the body all day long and that although the feet do hard work one usually gives them too little attention. Patients were encouraged that if their feet felt good right now, they could simply be grateful for the fact that they do not feel pain there. If their thoughts would digress, which will inevitably be the case after a few seconds, the trainer encouraged the patients to simply return to their bodily sensations with their attention. If one loses oneself in a particular body position in judgments or unpleasant associations, it

was recommended to put a hand on the heart, gently breathe in and out, and return to the bodily sensations. If focusing on a specific part of the body were difficult the trainer would suggest patients draw attention to another part of the body, as the exercise should ideally run gently and lovingly. After facing the sensations in the left foot with sympathetic awareness, patients were asked to turn to the rest of the body regions, up to the apex of the head. Example of the order was: Toes of the left foot – left sole – whole left foot – ankle – shinbone and calf – knee – thigh – hip – whole left leg – toes of the right foot – right sole – whole right foot – ankle – shinbone and calf – thigh – hip – whole right leg – lower belly button area – lower back – upper back – chest – left shoulder – left upper arm – elbow – forearm – hand – finger – the whole left arm and the left hand – right shoulder – right upper arm – elbow – hand – finger – whole right arm and right hand – neck – nape – chin – lips – mouth – cheeks – nose – eyes – ears – forehead – whole face and the whole back of the head – apex head. The trainer encouraged the patients to relax one body region at a time and to focus their awareness on the sensations that appear from moment to moment. Patients were asked to keep an attitude of gratitude to the individual parts of the body. They should, for example, think about the hard work their stomach needs to digest food or the strength that their neck needs to hold up their head all day long. When loving attention has been given to every part of the body, patients were asked to place a hand on their heart again and to give their whole body to the end of the exercise a "shower" full of gratitude and affection. The trainer would then instruct the patients to gently open their eyes and share their experiences during the exercise in a group discussion.

## **2.10. Informal exercises**

### Self-compassion break

The patients were advised that if they feel stressed or when difficult feelings occur, they should try to track where the discomfort originates in the body. They were asked to note in which part it is most noticeable and encouraged to connect with the discomfort at that spot, where they can feel it as a bodily sensation. Subsequently they were instructed to tell themselves the following as an expression of mindfulness:

*“This is a moment of suffering.”*

It was furthermore proposed to use sentences or formulations that best fit the sensations. Some possibilities which were suggested are: “This hurts.”, “Ouch.”, “This is stress.” Then, the patients were advised to tell themselves that:

*“Sorrow is part of the human experience”*

as an expression of common humanity. Other possibilities that were suggested were “Other people feel the same as me.”, “I am not alone.”, “We all experience difficult times in our lives.” After that, patients were encouraged to put their hands upon their heart, feel the warmth and the gentle pressure of their hands or chose a calming touch which fits for them and is able to calm them down. Afterwards, the patients were advised to tell themselves:

*“May I be kind to myself”*

as an expression of loving kindness. For a more personal expression, patients were recommended to ask themselves: “What is it that I would like to hear now the most?” Examples would be:

*“May I accept myself the way I am.”*

*“May I give myself the compassion that I need.”*

*“May I learn to accept myself the way I am.”*

*“May I forgive myself.”*

*“May I be safe and secure.”*

Whenever patients experienced difficulties finding the right words they were encouraged to recall a similar situation of a close friend or a loved one and to think about what they would say to him or her. For variation, a general sentence of MSC was recommended:

*“Sorrow and joy are part of life. May I be kind to myself.”*

### Gentle touch

For this exercise, patients were advised to comfort and care for themselves if bad feelings occurred; furthermore, they were informed that it often helps to give oneself a hug or to put a hand upon our heart and to feel the warmth in times of stress. It was stated through the

trainer that although this might sound weird or embarrassing at first the body would not know that. It was explained to the patients that the body reacts to physical contact in much the same way that a baby reacts to the hug of its mother and moreover that the skin is a highly sensitive organ. It was explained that science reveals that physical touch leads to the production of oxytocin, which conveys a feeling of safety and therefore has a soothing effect when difficult emotions occur; it reduces cardiovascular stress for example. The trainer stated that this might be reason enough to simply try it out and proposed putting their hands on their heart multiple times a day for a week if discomfort is felt. The patients were advised to breathe in and out two to three times consciously if they felt stressed and to place their hand upon their heart gently and feel the gentle pressure and warmth of their hand. It was proposed to try out putting both hands upon the heart and to see how it feels if they put both hands upon their heart and feel the difference between one or both hands upon their heart. The patients were encouraged to feel the touch of their hand on their chest and to make small circling movements there. The trainer recommended feeling the natural movement and the lifting and lowering of the chest while inhaling and exhaling; patients were advised that they could stay with this exercise as long as the individual wished to. Furthermore, it was explained that for some people it might be unpleasant to put their hands upon their chest and that if this was the case, one should simply try to find which region of the body a gentle touch was perceived as comforting and soothing. Therefore, the following examples were given: Placing the hand on the cheek, holding the face with both hands, gently stroking the arm, hugging the arms in front of the chest and thereby gently hugging oneself, small circling up and down movements on the chest, placing a hand on the belly, placing one hand on the belly and the other one on the heart or putting the hands on the lap. Patients were encouraged to make this exercise a habit, to help with comforting oneself and to remember how easy it can be to treat oneself in a loving way. Subsequently, the patients shared their experiences within the group.

#### Self-compassion in everyday life

Patients were informed that the goal of the current intervention is a life characterized by mindfulness and self-compassion in everyday life. It was stated that this means being conscious of oneself when one is under stress or suffering (mindfulness), and then to encounter this experience with affection and kindness (self-compassion). In connection to this, it was explained that it is necessary to know exactly what is good for oneself and to be able to remember that in difficult situations. Concerning the body, it was recommended to

let the body soften and to ask oneself what is doing physically well (for example fitness, massages, a hot bath, a cup of tea). Patients were encouraged to think about new ideas on how to relieve tension and stress in their body. Regarding the mind, it was recommended to promote calmness and to therefore think about what can be done for the mind, especially if stress is experienced (e.g. to meditate, to watch a funny movie, to read an inspirational book). It was recommended to try out new strategies that make it easier to let thoughts come and go. In the field of emotions the trainer informed the patients that it is important to care for and comfort themselves and to be aware of strategies which lead to this result (e.g. to pet a dog, to write diary, to cook). Concerning relationships, it was stated that it is important for a human being to be in contact with others. Patients were encouraged to think about what makes them really enjoy connecting with others (e.g. meeting with friends, to write a birthday card, to play a game) and if they would like to invest in those relationships. In addition, the patients were advised to think about existing possibilities to foster relationships. Spiritually, the trainer explained that it is important to regard one's own values and to make sure that one nurtures his or herself in a spiritual way (e.g. to pray, to go for a walk in the forest, helping others). In the case one has neglected his or her spiritual side, the concerning individual was advised to think about whether there is something that one would like to do more often. Afterwards, there was space to discuss and share the experiences.

#### Mindfulness in everyday life

For this exercise, patients learned that mindfulness can be exercised at any moment during daytime - while brushing one's teeth, when one goes from the car park to the office, while eating breakfast or every time the mobile phone rings. The patients were encouraged to choose one of these daily activities, such as making their morning coffee or tea, brushing their teeth or taking a shower and were advised to look for something that is always done earlier in the day before one is taken up by the daily tasks of life. The trainer recommended selecting a sensory perception to look into, for example, the taste of the coffee or the tea or the sensation when the water first comes into contact with their body when showering. The patients were asked to be conscious of this experience and to fully enjoy it. They were advised to direct their attention back to the sensations when their thoughts digressed and to engage in the activity with friendly, loving awareness until it was completed. Thereupon, possibilities to foster mindfulness in everyday life were discussed.

### Enjoy with all senses

In this exercise, the patients were encouraged to take a walk in the room (or of course outside when practicing alone). The trainer explained that the goal of a walk is to experience as many pleasant things as possible successively and slowly by using all senses: seeing, smelling, hearing, feeling, maybe even tasting. The patients were asked how many happy, beautiful or inspiring things they can discover while walking and were encouraged to enjoy the fresh air, the warming sun, a beautiful leaf, the shape of a stone, a smiling face, the song of a bird, the feeling of the earth beneath their feet. The trainer advised the patients to allow themselves to be pampered with it and to enjoy it to the fullest if seeing something pleasing or pleasurable. Patients were encouraged to imagine this experience as if it were the only thing that existed in the world. The trainer told the patients to be like a honeybee flying from one flower full of nectar to the next. If an experience has satisfied them, patients should go to the next one. The patients were encouraged to take their time and enjoy it.

In the first, as well as in the last session, patients were encouraged to do additional practice supplementary to the intervention time. They were encouraged to choose those exercises that are most helpful for them and to set an adequate and manageable time basis. Therefore patients were given a handout which included all meditations and informal exercises as well as an exercise log. The given tips on maintaining practice included the recommendation to perceive the practice as an opportunity to love and to hug oneself and to accomplish the exercise in the most pleasant way. In addition, it was recommended to not try too hard and to rather arrange the exercise in a playful way without striving for a result and to regard life in general as a form of practice. Moreover, the patients were asked not to condemn themselves if they did not practice and to simply continue with the practice the next day. The patients were advised to simply start with the practice and to look at any result after they had practiced for three minutes. With those minimal sessions it should be ensured that patients are not overwhelmed and are able to decide whether to keep on going with the practice or to stop at any time. Furthermore, it was recommended to practice the core meditations or other meditations derived from the MSC program every day at the same time, for example before breakfast, so that it can become a routine to provide oneself with mindfulness and to treat oneself in a self-compassionate way. Patients were advised to engage in practical exercises to be completed in an informal way, i.e. to practice the

exercise on an ad hoc basis as needed. Besides the exercise mediations and informal exercises, the patients were advised to meditate in general about compassion and loving kindness for themselves and others. Furthermore, it was recommended to do the following informal exercises: to practice sentences of loving kindness, to enjoy food, compassionate listening, to perceive and to name feelings (in the body), to admit becoming softer, to care for oneself and others, to recognize unsatisfied needs and to forgive (oneself and others). Additionally, the patients were supported with an exercise log to record their practice and were encouraged to download meditation apps to their smartphone. Hence, the app “7Mind” (version 1.3, (developed by Kohtes, Leve, Ronnefeldt, and Esch (2014)) was recommended, which comprises a complete course program for meditation and mindfulness and further individual opportunity for training on mindfulness. The app was developed by Zen master and PR-professional Paul J. Kohtes in cooperation with two students of the University of Witten/Herdecke (Germany), Jonas Leve and Manuel Ronnefeldt. Furthermore, the development of the app was supported by Professor Tobias Esch, who is an expert in the field of mind-body medicine with experience in teaching at the University of Harvard. Likewise the patients also received recommendations for further reading, including “The mindful path to self-compassion: Freeing yourself from destructive thoughts and emotions.” by Christopher Germer (2009), “Self-compassion Step by Step: The Proven Power of Being Kind to Yourself” by Neff (2013) and “Self Compassion” by Neff (2011). In line with this, some additional videos for inspiration were recommended, including a short clip about a scene from the film “Good Will Hunting”, twin boys talking to each other, an interview with the experienced monk and meditator Matthieu Ricard about Empathy Fatigue and a video about a laughing flash mob in a metro station. At the end of the last session, a special song from Peter Mayer, “Japanese Bowl” (Mayer, 2010) with a meaningful text was shared with the patients as follows:

*“I’m like one of those Japanese bowls  
That were made long ago  
I have some cracks in me  
They have been filled with gold  
That’s what they used back then  
When they had a bowl to mend  
It did not hide the cracks  
It made them shine instead*

*So now every old scar shows  
From every time I broke  
And anyone's eyes can see  
I'm not what I used to be  
But in a collector's mind  
All of these jagged lines  
Make me more beautiful  
And worth a much higher price  
I'm like one of those Japanese bowls  
I was made long ago  
I have some cracks you can see  
See how they shine of gold."*

Furthermore, additional poems and inspirational texts were shared with the patients in the handout: "The Journey" by Mary Oliver (1986), "Second Sight" by David Whyte (2012), "The way it is" by William Stafford (1998), "The Guest House" by Jalaluddin Rumi (Barks, 2003), "About Patience" by Rainer Maria Rilke (2007), "Love after Love" by Derek Walcott (2005), "With that moon language" by Hafiz (Ladinsky, 2002) and "Also, a morning meditation" by Verrresh Denny Yuson-Sanchez (Campbell, 2015).

## **2.11. Control intervention**

For the control intervention, the highly established relaxation technique Progressive Muscle Relaxation (PMR), developed by Jacobson (1929), was applied. The essence of this technique is to learn the distinction between tension and relaxation of all muscle groups of the body by tensing and subsequently relaxing every single muscle. The sessions were instructed by Andrea Ackermann, a clinical psychologist who is highly experienced in PMR. In the first session, the purpose of the PMR was introduced to the patients and sufficient information was provided. The PMR trainer explained in detail that PMR is a technique where one can learn to first tense and then relax essential muscle groups in a certain order while in the meantime concentrating on rising sensations concerning one's emotions. Patients were informed that with some exercise they will be able to lower the muscle tension below the normal tension level, whenever they want and whenever they need it. It was explained that learning to relax works similarly to learning other skills, such

as swimming, driving or piano playing. The trainer explained that learning to relax requires exercise, concentration and commitment. It was furthermore stated that they must take all the time that is needed. In this regard, a quotation from Erich Kästner (Kästner, 2015) was shared with the patients:

*"Nothing good happens unless you do it!"*

Before the actual exercise took place, the trainer explained the whole procedure.

### Tension and relaxation

It was explained that the patients will find with a bit of exercise that the relaxation of the musculature also causes other signs of physical restlessness and excitement (e.g. heart palpitations, sweating or trembling) to decrease or to disappear completely and that they will feel much calmer and more relaxed in general. The principles of PMR as a technique that can help to reduce physical and psychological stress and nervousness and to deal with daily stress situations in a more relaxed way was explained to the patients. It was stated that by tightening a muscle group and then subsequently relaxing the resulting tension with an exhale, these muscles are allowed to ease far below their normal tension level. The effect was compared to an unmoving pendant pendulum. If one wants it to swing strongly to the left (relaxation), one could push it strongly in this direction. The trainer insisted that it would be easier, however, to pull it completely in the opposite direction (tension) and then to drop it, regarding the tightening of the muscles as getting a start into relaxation. The patients were informed that the stretching should not exceed five to seven seconds in order to avoid over-tensing the muscles. When stretching, the importance of continuing to breathe normally and not to stop the breath was explained. To relax a muscle group, it was recommended to take about 20-30 seconds to relax.

### Paying attention to sensations

Furthermore, the patients were reminded that a further advantage of this technique lies exactly in the fact that one learns to contrast the sensations during strain and release and developing the ability to recognize and differentiate these connected sensations more easily. When tightening a muscle group it was explained that one feels the muscles become hard and contract. It was recommended to pay close attention to these sensations. The trainer stated that when the muscle group is relaxed, these sensations disappear and pleasant feelings of relaxation take their place. It was also mentioned that this can be quite

different from person to person. While some people feel warmth flowing into their muscles or a pleasant tingling, others feel heaviness and yet others feel weightlessness. The patients were informed that their only task would be to pay attention to these sensations during the relaxing period for 30 seconds, to follow them and to let them take the relaxation deeper.

### Correct breathing

The patients were advised to breathe normally during the exercises and to breathe deeper than usual only when the tension is released. Otherwise, it was recommended that the breathing should not be conscious or that patients should even attempt to control it. It was stated that a calm and relaxed breathing is created during the exercise itself.

### Concentration

It was pointed out that it may not be so easy to concentrate on oneself or on muscle relaxation for 20 minutes. Patients were prepared to anticipate distraction from noise, other bodily sensations, or general digressive thoughts and it was assured that this would be completely normal and no cause for concern. If a distraction occurs, it was recommended to notice this calmly and focus the attention again on the body. Patients were encouraged to simply continue with the exercise in the event of a distraction and not to think further about it. If one was practicing alone, they were advised that it might be helpful to give the instructions for the exercises by means of their inner voice, and also to comment on feelings that occurred during relaxation. For example: "Breathe out and relax, let go of all tension and focus on your sensations when you relax your muscles, look at how softer and more relaxed they become ..." etc.

### End of relaxation

When all the essential muscle groups were relaxed, it was recommended to maintain the pleasant state of relaxation for a few minutes. One option that was explained is to go through the individual muscle groups again and again, to feel the degree of relaxation or simply to sit or lie down relaxed and to feel pleasant, soothing sensations. Furthermore, it was pointed out that it might be helpful to say internally if one wants to end the relaxation. For this reason the patients were advised to take their time to come back from relaxation and to first clench their hands into fists, to stretch and sway, to breathe a few times vigorously and then to slightly open their eyes. This process of "awakening" would adjust the body to the waking state again after the relaxation, just as after sleeping. The patients were informed that this withdrawal of relaxation has to be done after each exercise. Only if

the exercise would be done in bed in the evening immediately before sleeping, the relaxation would not have to be withdrawn because otherwise patients might not be able to sleep due to feeling refreshed from the relaxation techniques. It was explained that when the withdrawal of the relaxation is omitted, it would be easier to fall asleep. Relaxation cannot be forced. It was emphasized how important concentration and regular practice are for the success of the training. The trainer pointed out that being able to relax also requires the ability to let go, to take time and to have patience if the relaxation does not happen. During discussions most people admitted to having experienced wanting to fall asleep only for sleep to not come. It is not until the intention to sleep is abandoned, and the perplexing anger and anxiety about too little sleep are released, that sleep sets in abruptly. This was explained to be very similar with relaxation. It was stated that it will not be possible to achieve relaxation by means of a deliberate volitional effort and that particularly hard-exercising people who use their whole will or those who believe that they can achieve everything with the will often fail. It was made clear that tensions and cramps (and the accompanying phenomena) cannot be solved with will, because will is tension. On the road to relaxation therefore, the trainer explained that there is a need to let go of the conscious will and that a more passive, more responsive attitude would be necessary. Furthermore, the patients were given some instructions on the basic conditions of a successful PMR in the first session as follows. Those instructions were repeated before the actual exercise time every session.

The patients were advised to try to practice once a day, and arrange it so that they would have 20-25 minutes of time in which they would not be disturbed and would not feel under pressure. Furthermore, it was insisted that it would be especially important that they should not be distracted and disturbed in their concentration during the exercise. For this reason, it was recommended to exercise in a quiet, possibly darkened room. The patients were advised to be careful not to be interrupted by persons or pets in the room, or by the ringing of the telephone or the doorbell. Concerning the ideal body position, it was recommended to use a seat which is designed in such a way that no effort is required for the body while sitting and where the feet could have good contact with the ground. The patients were advised that when exercising while sitting, they should make sure that the feet are comfortable, that the legs are loosened, that they find a comfortable position for their head, that the shoulders loosely hang and that the hands and forearms lie relaxed on the sides or in the lap. It was furthermore mentioned that it is, of course, possible to practice while lying down. Therefore, it was recommended to lie on the back, arms slightly

angled, legs stretched out and feet slightly outward. It was mentioned that it might be more convenient to put a pillow or a roll in the neck, the back, or the thighs. The patients were informed that it was important to choose the most comfortable position for them and essential to not feel restricted during the exercise by cramped garments (jacket, necktie, belt, shoes) or eyeglasses, contact lenses or watches in their freedom of movement and concentration ability. It was therefore recommended to put them down beforehand. The patients were instructed to tense every muscle group for up to seven seconds and subsequently relaxing it for up to 30 seconds. During the contraction and the relaxation of their muscle groups patients were encouraged to recognize arising feelings associated with the bodily sensations.

In the following sessions, the actual PMR training took place. All PMR sessions had basically the same structure apart from the feedback round which had space reserved for questions and discussion. The relaxation exercises were accompanied by pleasant, soothing music, e.g gentle pan flutes, beautiful strings, oboe, clarinet, harmonica and harp (Stein, 1996). The room was slightly darkened and the patients could decide whether to practice in a sitting or a lying position. Additionally, comfortable chairs, lots of colourful pillows and blankets, as well as green mats were available. The clinical psychologist sat on a chair at the end of the room to prevent the patients from distraction through her presence but at the same time to be able to overlook all patients in case somebody needed help or assistance. The following text is derived from the original PMR training (Jacobson, 1929) and was translated from German to English by the doctoral candidate. The original instruction given to the patients in a translated version is attached in the appendix.

### Introduction

Introducing the exercise, the patients were asked to take the most comfortable position possible and to make sure that they relax and sit or lie comfortably. When sitting, the patients were advised to lean their back against the chair, to firmly and securely stand on the floor with their feet, arms and hands resting loosely in their lap and with their head in a comfortable position. When lying, the patients were advised to make sure that their back is comfortable, that the legs are stretched and are lying side by side, the feet slightly outward and the hands slightly angled sideways beside them. The patients were asked to make sure that their head be positioned so that it does not threaten to roll to the left or right. Subsequently, the trainer told the patients to focus their attention now inside their body. If pleasant, it was recommended to close the eyes or to look at a point in front of the feet or

on the ceiling. The patients were then advised to feel their feet on the floor, their back, and their hands and to go through their whole body in thought and to find out which muscles are tensed or cramped and which are already quite loose and relaxed. After that, the trainer invited the patients to take a deep breath in and then breathe out again slowly. The patients were advised to let their breath flow naturally and to observe how their stomach is slightly lifted by inhalation and lowered by exhalation. The trainer invited the patients to feel the air coolly flowing in through the nose and flowing out - heated through the body - again. The patients were notified that the exercises would start right now and were asked to pay close attention to the sensations during the tensing and subsequent relaxation of the muscles. Furthermore, it was explained that it wasn't simply a question of strongly tightening the muscles, they had to feel the differences between tension and relaxation. It was stated that it is important to breathe well while stretching the muscles. The patients were advised to not tense the muscles until the trainer says "now" to ensure that the tension is held no longer than seven seconds.

#### First part of the exercise

The first part of the exercise was introduced with the instruction to focus the attention first on the right hand and the right forearm. The trainer advised the patients to squeeze their right hand into a fist and to note the sensations of tension in the hand and forearm. With the next exhalation, the patients were asked to relax and to pay attention to the difference between tension and relaxation and to perceive what feelings develop in the hand and forearm. The patients were advised to monitor these feelings of relaxation. Afterwards, the trainer asked the patients to focus their attention on the right upper arm, to bend their elbow with their hand open and to feel the tension there, to hold the tension and then, with the next exhalation, to let the tension go and relax again. The trainer asked the patients to pay attention again to the difference between the tension before and the relaxation after. They were furthermore asked to perceive how feelings of relaxation can spread with the relaxation of tension. It was recommended to follow this feeling. After that, the trainer advised the patients to let the right arm rest and to turn their attention to the left hand. Subsequently, the patients were advised to ball the left hand into a fist and to observe the sensations felt with the tension. With the next exhalation, they were instructed to let go and relax again and once more to pay attention to the differences between the tension and the relaxation. It was recommended to deepen the feeling of relaxation with each exhalation more and more. Afterwards, the patients were guided to focus their attention on the left

upper arm and to bend the elbow at the command of the trainer. The tension of the muscles in the left upper arm had to be perceived and with the subsequent exhalation, the patients were just as before advised to let go of the tension and relax. Once again, the patients were asked to take heed of the differences between the tension before and relaxation after. The patients were advised to let all the tension flow out of their arm and to relax the arm with each exhalation more and more.

### Second part of the exercise

The second part of the exercise began with the advice for patients to draw attention to their faces, or rather on their forehead and to crinkle their forehead by raising their eyebrows at the command of the trainer. The patients were asked to observe the tension in the forehead and scalp and to hold the tension for a moment. With the next exhalation, the patients were told to let go of the tension and relax again. The trainer instructed patients to let the forehead be like a smooth, empty surface and advised them to pay attention again to the difference between the tension before and the relaxation after. Subsequently, the trainer instructed the patients to turn their attention to their eyes. They were then instructed to squeeze the eyes together slightly and wrinkle their nose. The patients were reminded to feel the tension in the entire upper half of their face and to hold onto the tension for a moment. With the next exhalation, patients were instructed to let go of all tension and relax again. The patients were asked to observe how a feeling of relaxation arises and to deepen this feeling with each subsequent breath more and more. Afterwards, the patients had to focus on the jaw muscles. They were instructed to press their teeth and lips together while pressing the tongue against the palate. The patients were once more reminded to feel the tension and to hold it for a moment, until with the next exhalation they had to release it and relax. It was again recommended to pay attention to how a feeling of relaxation arises, to follow this feeling and to let the relaxation deepen with each exhalation. The trainer asked the patients to leave the face quite relaxed and calm and to draw attention to the muscles in the neck. Here, the patients were instructed to tighten the neck and neck muscles by tilting the head forward when sitting or by lifting it from the mat when lying down at the command of the trainer. The patients were reminded to feel the tension in the neck and to hold it for a moment. With the next exhalation, the trainer asked the patients to let go of the tension and to relax again. It was furthermore recommended to observe the resultant relaxation and to follow this feeling and to strengthen it with each breath more and more.

### Third part of the exercise

The third part of the exercise was introduced with the instruction to focus attention on the shoulders and to draw the shoulder blades back when the trainer said “now”. The patients were asked to pay attention to the tension in the shoulders and in the entire upper back. After the tension was held for a moment the trainer advised the patients to let go of the tension and to relax with their next exhalation. It was recommended to let the shoulders sink down completely relaxed and to release all tension from the shoulders, so that a pleasant feeling of relaxation would spread out. The trainer advised the patients to follow this relaxed feeling and to deepen it with every breath. Afterwards, the patients were instructed to direct their attention to their lower back. It was then recommended to make a hollow in their back at the command of the trainer. The patients had to feel the tension in the lower back and to hold it for a moment. With the next exhalation, the patients were asked to let go and relax again and to pay attention to the difference between tension and relaxation. The patients were encouraged to notice how the muscles of the back relax more and more with each exhalation. Thereafter it was recommended to focus the attention on the belly and to tighten the abdominal muscles at the command of the trainer. The patients were advised to pay attention to the feeling of tension, to hold onto it for a moment and to relax again with the next exhalation. Patients were again advised to pay attention to the difference between the tension before and the relaxation after. They were advised to focus on the feeling of relaxation and to deepen it with each exhale.

### Fourth part of the exercise

The fourth and last part of the exercise was introduced with the advice to focus attention on the buttocks and to squeeze the buttocks together at the command of the trainer. The patients were asked to pay attention to the tension and to hold it for a moment.

They were asked to release all tension with the next exhalation and relax again. Once more, the trainer asked the patients to feel the difference between tension and relaxation and advised the patients to follow the feeling of relaxation and deepen it with each subsequent breath. Afterwards, the patients had to focus their attention on their thighs. The trainer asked the patients to press the heels of both feet into the ground and to tighten the thigh muscles. The patients had to observe the tension while holding it for a moment. Subsequently, the trainer asked the patients to release all tension and to relax while perceiving how feelings of relaxation unfold. Next, patients had to focus their attention on the lower legs and to lift the heels of both feet at the command of the trainer. The trainer

then recommended feeling the tension in the calf muscles. Afterwards, the patients had to let go of the tension, to relax and to pay attention to the difference between tension and relaxation. The trainer advised the patients to follow the feeling of relaxation and to deepen it with each breath more and more.

### Recovery

The recovery part was subsequently introduced with the information that the patients would now have to concentrate just on the pleasant feeling of relaxation, to follow this feeling and to try to deepen it with each exhale. The trainer asked the patients to let this pleasant feeling flow into every part of their body: into the arms and hands, into every single finger, in the scalp, in the eyes, in the jaw and cheeks, in the neck, in the shoulders, down the entire back, in the abdomen, in the buttocks, thighs, into the feet and into the toes. It was recommended to let oneself be deeper and deeper with peace and relaxation as far as it is pleasant and as far as one wants to. The patients were asked to enjoy that state of peace and relaxation for a short while all by themselves. The trainer recommended embracing this pleasant feeling of peace and relaxation, to internalize it and to carry it out into the rest of the day.

### Recall

The part of recall was introduced with the instruction to prepare oneself for the end of the exercise. It was therefore recommended that the patients told themselves that the exercise will end immediately. Afterwards, the patients were asked to slowly tighten both hands, angle their arms, stretch themselves, to breathe a few times vigorously and then to open their eyes if they felt ready.

After every PMR session, the patients had time to share their experiences while relaxing with each other and the trainer. Furthermore, all patients were provided an exercise log and were encouraged to exercise outside the intervention time. To aid in this, patients were supported with a handout of the long form of PMR which was taught during the intervention time and, in addition, a short form of PMR which can also be done either in a ritualized or informal way. The short form of PMR provided via the handout was as follows:

- Bending both elbows to the body, banging both hands to fist.
- Face all contracted, made small, lips and teeth together, tongue on the palate, pulling head forward.
- Tightening the shoulders backwards, making a slight hollow back and tensing the abdominal wall.
- Pressing both heels into the ground, tightening the lower legs and thighs, squeezing the buttocks together.

Both interventions, the abridged MSC training and the PMR training, lasted six weeks, were carried out every Tuesday at the same time and place (from 1 pm) and every single intervention lasted 75 minutes in total. The interventions took place in a large group room with lots of windows and a friendly atmosphere. The room was large enough so that every patient had enough space for unfolding and to make it comfortable for them. The patients were informed at the beginning of every session that they are allowed to leave the room at any time in case they felt unpleasant or overwhelmed, under the condition that they will seek therapeutic consultation, or respectively come to the trainer to talk about the reason for their feelings after the intervention time. All patients were provided with an audio CD which contained the related exercises, accompanied by relaxation music. The audio CDs were recorded through the concerning trainer, to guarantee that there was no dissonance with the voice that they had become accustomed to. The effectiveness of comfortable background music in regards to creating and attempting a mindful state was already recommended through, and postulated in, previous studies (Kabat-Zinn, 2009; Salzberg & Goldstein, 1996; Tang et al., 2007). Furthermore, a handout for practicing on their own and an exercise log to capture the additional practice was given to all patients. The patients were encouraged through their trainer to practice the respective method in addition to the regular intervention time. For this reason, they were instructed on how to deepen their practice during their rehabilitation stay and also how to further practice at home.

## **2.12. Statistical analysis**

To estimate the required sample size for the current investigation, a G-power analysis software (G\* Power 3: A flexible statistical power analysis program for the social, behavioural and biomedical sciences) developed by Faul, Erdfelder, Lang, and Buchner (2007) was used. In a previous study, where a small group (n=21) was investigated

concerning a change in self-compassion, there was a group difference between pre- and post- test of 0.89 points on the SCS (Neff & Germer, 2013). Cautiously estimated, it was assumed that a minimum of 85 patients per group would be required to detect a mean difference between groups in total SCS score of half of a total standard deviation (Cohen's  $d=0.5$ ) with a predicted power of .90 (two-tailed independent samples t-test calculation). Sociodemographic variables were analyzed via descriptive statistics and differences between groups were analyzed via  $\chi$ -square tests and t-tests for independent samples. To meet the aim of the research independent sample t-tests were used to compare between-group changes in SCS, BSI-18, SF-36 as well as the single items (subjective feeling of happiness and nicotine use) at six and 24 weeks. As dependent variables, the change scores from baseline to week six and week 24 were used. "Group" was used as the independent variable. The  $\alpha$ -level at the beginning of the analysis was set to .05. Because of the large amount of multiple comparisons, a Bonferroni correction ( $p<.002$ ) was applied at the end of the calculations. To analyse within-group changes over time, Anova for repeated measures was used. As only patients who completed the six-week evaluation were included in the analysis, the analysis after six weeks can be counted as acted out "per-protocol". Conscious of possible dropouts at the 24-week follow up, due to the fact that the third assessment was accomplished via letter, it was decided to replace potential missing data with the change scores at week six. Therefore, a similar study design was taken as an example (Wang et al., 2010) where zero changes in scores were assumed for patients who did not complete the follow up.

### 3. Results

From December 2015 to November 2016, 271 inpatients in total received information about the current investigation on the first day of their arrival at the Sonnenpark Rehabilitation Clinic. All of those 271 inpatients were assessed for eligibility and diagnosed via the International Classification of Diseases (ICD-10, Chapter F, WHO (1992)) through an independent psychiatrist. The inclusion criterion was a minimum age of 18 years and the only exclusion criterion was an acute psychotic episode. Patients diagnosed with disordered substance abuse had to ensure abstinence through regular testing and an abstinence contract. Concerning the inclusion and exclusion criteria, all patients were eligible for study participation.

After the information on the current investigation was given to the patients, 22 of them declined to participate (Fig.1). Therefore, a total of 249 patients gave informed consent and were afterwards randomly assigned to the concerned colour groups. During the time of investigation, a total of 110 patients were allocated to the control group (PMR) and a further 139 patients were allocated to the intervention group (MSC). After six weeks of rehabilitation stay, there were 49 patients altogether that were lost by the time of the post-test. A total of 24 patients in the control group and 25 patients in the intervention group were lost to the second assessment due to a premature termination of their rehabilitation stay. Therefore, a total of 200 patients who completed pre- and post-tests were included in the per-protocol analysis after six weeks of rehabilitation (114 in the intervention group and a further 86 in the control group). 24 weeks after the rehabilitation stay was finished, a total of 73 patients (36.5%), of whom 29 had been in the control group and 44 had been in the intervention group, took part in the follow-up assessment. Therefore, the response rate for the follow-up at 24 weeks was 38.6% for the intervention and 33.7% for the control group.

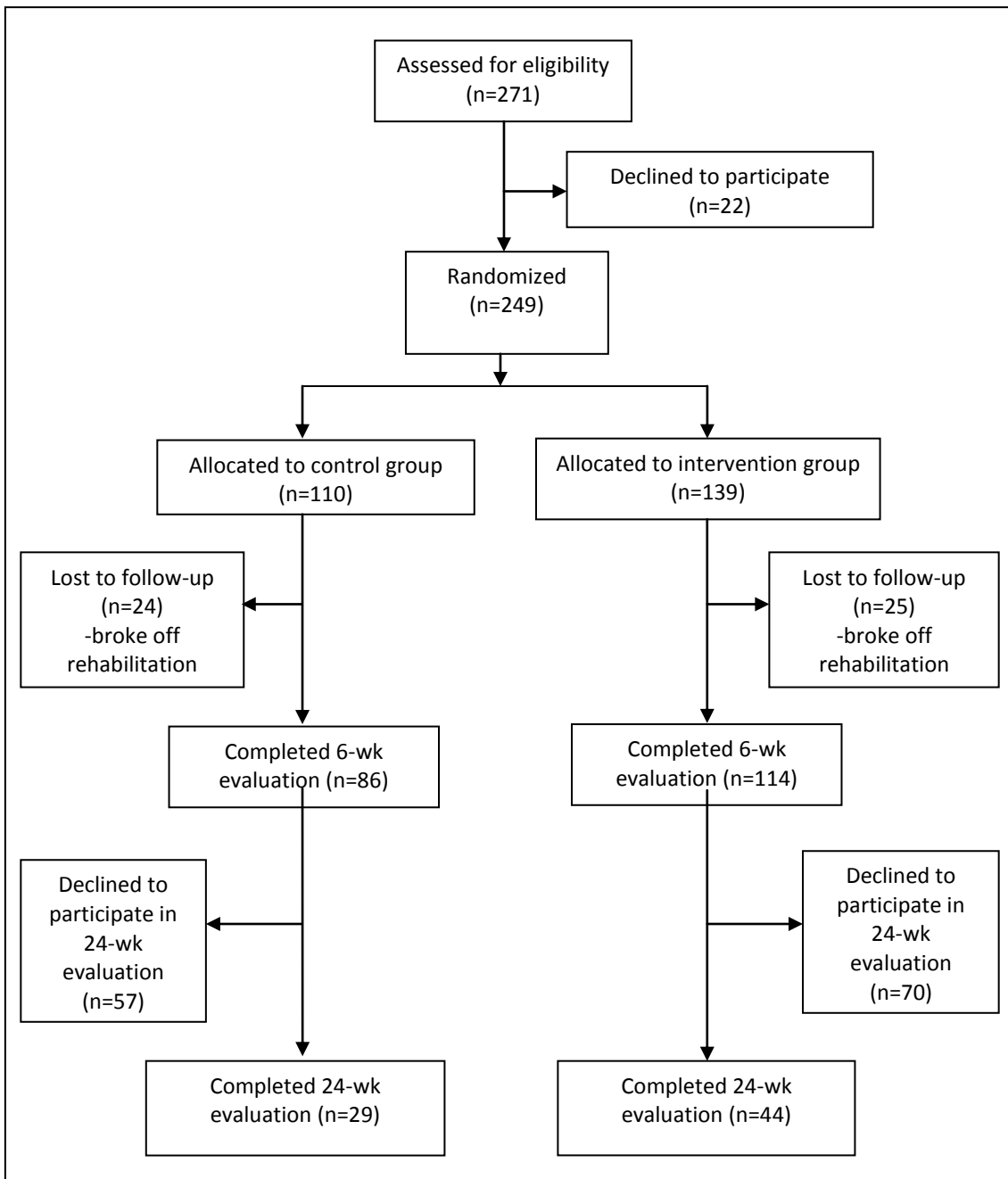


Figure 1. Screening, randomization and completion of 6-week and 24-week evaluation.

### 3.1. Baseline characteristics of the patients

Baseline characteristics displayed in Table 1 are comprised of all data that were captured at the day of arrival to the rehabilitation centre. Apart from the psychiatric diagnosis, t-test for independent samples, respectively  $\chi$ -square tests revealed that there were no differences between the groups with regard to baseline characteristics.

### 3.2. Sociodemographic data

The mean age of the patients was 48 years ( $M=48.4$ ;  $SD=8.56$ ). There were no differences between groups detected ( $t(198)=0.87$ ;  $p=0.38$ ).

Altogether, the study population comprised 129 (64.5%) women and 71 (35.5%) men. Both sexes were equally divided up between the study groups ( $\chi^2=0.57$ ;  $p=0.45$ ).

Of the 200 investigated patients, 95 (47.5%) patients were currently employed. The remaining 105 (52.5%) patients were either retired or released from their profession for reasons of recovery. There were no differences between groups detected concerning the division of employed and unemployed patients in the study groups ( $\chi^2=1.92$ ;  $p=0.16$ ).

High school or higher education was found in 99 (49.5%) patients; the remaining 101 (50.5%) patients had a lower education level. There were no differences between groups detected ( $\chi^2=0.03$ ;  $p=0.87$ ).

A total of 121 (60.5%) patients reported being married or in a relationship. The remaining 79 (39.5%) patients were single, divorced or widowed. Regarding the relationship status, there were no differences between groups detected ( $\chi^2=0.00$ ;  $p=0.99$ ). A sum of 139 (69.5%) patients reported having children, the remaining 61 (30.5%) had none. There were no differences between groups detected concerning potential offspring ( $\chi^2=1.72$ ;  $p=0.19$ ).

Concerning religious affiliation, a total of 140 (70%) patients reported belonging to a religious community whereas the remaining 60 (30%) had no religious affiliation. There were no differences between groups detected ( $\chi^2=0.14$ ;  $p=0.71$ ) for religious affiliation. In detail, Christianity was the most common confession reported amongst the patients with a total of 127 (63.5%) patients (76 [66.7%] patients in the MSC group vs. 51 patients [59.3%] in the PMR group). The second most common confession was Islam with a total of five (2.5%) patients (one [0.9%] patient in the MSC group vs. four [4.7%] patients in the PMR group), followed by “other” confessions with a total of four (2.0%) patients (one [0.9%] patient in the MSC group vs. three patients [3.5%] in the PMR group).

Furthermore, three (1.5%) patients reported their religion as Buddhist (two [1.8%] patients in the MSC group vs. one [1.2%] patient in the PMR group) and one (0.5%) patient was Hindu (one [0.9%] patient in the MSC group vs. zero [0.0%] patients in the PMR group). Concerning the distribution of religions in the study groups, there were no significant between groups differences detected ( $\chi^2=5.85$ ;  $p=0.32$ ).

### 3.3. Previous experiences

Concerning previous experiences with mindfulness techniques, a total of 97 participants (48.5%) reported having previous experience (e.g. yoga, meditation, MSC or any other mindfulness course) whereas 103 (51.5%) patients had no such previous experience. There were no differences between groups detected concerning previous experiences with mindfulness techniques in general ( $\chi^2=0.14$ ;  $p=0.71$ ).

In detail, 74 (37%) patients had already experienced meditation (41 [36%] patients in the MSC group vs. 33 [38.4%] patients in the PMR group), a further 52 (26%) patients had previous experience with yoga (28 [24.6%] patients in the MSC group vs. 24 [27.9%] patients in the PMR group) and a total of 55 (27.5%) patients previously had experience with mindfulness courses in general (29 [25.4%] patients in the MSC group vs. 26 [30.2%] patients in the PMR group). None of the patients had already known MSC. Regarding previous experiences with relaxation techniques (e.g. PMR), 75 (37.5%) had such experiences in the past. The remaining 125 (62.5%) had never undertaken experience with relaxation techniques in the past. There were no differences in the distribution of patients with previous experiences concerning relaxation techniques detected ( $\chi^2=1.33$ ;  $p=0.51$ ). In detail, 75 (37.5%) patients reported having previous experience with PMR (48 [42.1%] patients in the MSC group vs. 27 [31.4%] patients in the PMR group).

Of those with previous experience of either a mindfulness and/or a relaxation technique, the mean frequency of practice was approximately twice a month ( $M=1.56$ ;  $SD=1.86$ ) and the technique had been known for at least six months ( $M=2.85$ ;  $SD=3.05$ ) on average. There were no differences between groups detected concerning the frequency ( $\chi^2=4.20$ ;  $p=0.65$ ) or the duration ( $\chi^2=2.98$ ;  $p=0.94$ ) of the already known practice.

Regarding the practice frequency of an already known technique, viewed in detail, 44 (22%) of the patients already practiced a relaxation and/or mindfulness technique less than once a month (28 [24.6%] patients in the MSC group vs. 16 [18.6%] patients in the PMR group), 14 (7.0%) patients practiced twice a month (six [5.3%] patients in the MSC group

vs. 8 [9.3%] patients in the PMR group), twelve (6.0%) patients practiced weekly (five [4.4%] patients in the MSC group vs. 7 [8.1%] patients in the PMR group), 23 (11.5%) patients practiced multiple times a week (12 [10.5%] patients in the MSC group vs. 11 [12.8%] patients in the PMR group) and 21 (10.5%) patients reported to practice daily (14 [12.3%] patients in the MSC group vs. seven [8.1%] patients in the PMR group).

Concerning the duration of an already known technique, the following picture emerges: a total of 23 (11.5%) patients already knew certain mindfulness or relaxation techniques for less than three months (15 [13.2%] patients in the MSC group vs. 8 [9.3%] patients in the PMR group), four (2.0%) patients already knew a certain technique for more than three months (two [1.8%] patients in the MSC group vs. two [2.3%] patients in the PMR group) and seven (3.5%) patients knew about a certain technique for six months (four [3.5%] patients in the MSC group vs. three [3.5%] patients in the PMR group). A further 21 (10.5%) patients reported that a certain technique was known to them for one year (13 [11.4%] patients in the MSC group vs. eight [9.3%] patients in the PMR group), 14 (7.0%) patients knew that technique for two years (eight [7.0%] patients in the MSC group vs. six [7.0%] patients in the PMR group), 16 (8.0%) patients reported knowing such a technique for three years (11 [9.6%] patients in the MSC group vs. five [5.8%] patients in the PMR group), five (2.5%) patients knew it for five years (two [1.8%] patients in the MSC group vs. three [3.5%] patients in the PMR group) and a total of 29 (14.5%) patients admitted to previous knowledge of a mindfulness or relaxation technique for more than five years (15 [13.2%] patients in the MSC group vs. 14 [16.3%] patients in the PMR group).

### **3.4. Health related variables**

The investigated overall BMI of the study population ( $M=23.43$ ,  $SD=5.23$ ) deviates slightly ( $t(199)= -6.13$ ;  $p=.00$ ) from the normal population (Nie, Gwozdz, Reisch, & Sousa-Poza, 2017).

Concerning nicotine use, 87 (43.5%) patients reported consuming approximately 7 cigarettes per day ( $M=7.26$ ;  $SD=9.92$ ), whereas the remaining 113 (56.5%) reported being non-smokers. There were no differences between groups detected concerning the amount of smokers and non-smokers in the groups ( $\chi^2=0.03$ ;  $p=0.87$ ) and the amount of cigarettes consumed through the smokers ( $t(198)=0.76$ ;  $p=0.45$ ).

A total of 56 (28%) reported drinking alcohol and the other 144 (72%) reported total abstinence. Concerning alcohol consumption, there were no differences between groups detected ( $\chi^2=0.86$ ;  $p=0.35$ ).

Regarding drug use, three (1.5%) patients used drugs whereas the other 197 (98.6%) abstained from drugs. This feature was equally displayed through the patients over the study groups ( $\chi^2=0.12$ ;  $p=0.73$ ).

A broad range of different diagnoses were recorded in the study groups. Most of the patients (157 (78.5%)) were diagnosed with more than one (two or more) disorder and are therefore regarded as having a comorbid disorder. Mood disorders (ICD-10: F30-F39) were the most common diagnosis of the patients (Table 1) which were recorded in 152 (76%) patients in total. There was no statistically relevant difference between the groups detected ( $\chi^2=0.05$ ;  $p=0.83$ ). The second most common disorders were variously neurotic, stress-related and somatoform (ICD-10: F40-F48); they were observed in 113 (56.5%) patients. Regarding potential differences between the study groups, there were no differences found ( $\chi^2=0.48$ ;  $p=0.49$ ). Another set of commonly recorded diagnoses which were recorded in 62 (31%) patients were mental and behavioural disorders due to psychoactive substances (ICD-10: F10-F19). This feature was not equally distributed throughout the groups ( $\chi^2=5.14$ ;  $p=0.02$ ). A total of 42 (21%) patients were diagnosed with the additional diagnosis “burn out” (Z73.0). Throughout the study groups, there were no differences detected concerning this diagnosis ( $\chi^2=3.15$ ;  $p=0.07$ ). Of the 200 patients, 28 (14%) exhibited personality and behavioural disorders (ICD-10: F60-F69). There were no differences found between the groups ( $\chi^2=2.66$ ;  $p=0.10$ ). Six (3%) of the patients were diagnosed with behavioural syndromes associated with physiological disturbances and physical factors (ICD-10: F50-F59). This feature was equally distributed throughout the groups ( $\chi^2=1.41$ ;  $p=0.23$ ). Schizophrenia, schizotypal and delusional disorders (ICD-10: F20-F29) were also recorded in six (3%) patients and there were no differences found between the groups concerning this feature ( $\chi^2=1.41$ ;  $p=0.23$ ). Three (1.5%) patients were diagnosed with organic, including symptomatic, mental disorders (ICD-10: F00-F09). There was a difference concerning the distribution of patients carrying this feature in groups ( $\chi^2=4.04$ ;  $p=0.04$ ). The ICD-10 diagnosis developmental disorders (F80-F89), behavioural and emotional disorders beginning in childhood and youth (F90-98) and unspecified mental disorders (F99) were not represented in the study population.

The medication displayed in Table 1 is the medication administered at the rehabilitation centre after psychiatric screening. There were no differences between groups detected

concerning medication. From 200 patients, a total of 23 (11.5%) were provided with anticonvulsants ( $\chi^2=1.94$ ;  $p=0.16$ ). Furthermore, altogether 174 (87%) patients took antidepressants ( $\chi^2=0.12$ ;  $p=0.73$ ). Within the substance class of muscle relaxants, six (3%) patients were administered medication ( $\chi^2=1.75$ ;  $p=0.19$ ). Benzodiazepines were taken by 29 (14.5%) patients ( $\chi^2=0.36$ ;  $p=0.55$ ). A total of 63 (31.5%) patients took antipsychotics ( $\chi^2=0.00$ ;  $p=0.98$ ). Of the substance class anxiolytics 37 (18.5%) patients ( $\chi^2=0.00$ ;  $p=0.97$ ) in total took such drugs. Hypnotics were taken in by a total of 31 (15.5%) patients ( $\chi^2=0.28$ ;  $p=0.60$ ). With anti-epileptics, a total of nine (4.5%) patients were supplied ( $\chi^2=0.61$ ;  $p=0.44$ ). A total of 48 (24%) patients were provided with analgesics ( $\chi^2=0.21$ ;  $p=0.65$ ). From the 200 patients in total, 15 (7.5%) patients were provided homeopathic treatments ( $\chi^2=0.62$ ;  $p=0.43$ ).

Concerning dietary habits, there were 40 (20.0%) patients who ate diets with a lot of meat, a further 42 (21.0%) patients admitted to eating little meat. A total of 112 (56.0%) patients reported having diets with meat and also rich in fruits and vegetables and 6 (3.0%) patients stated eating a vegetarian diet. There were no significant differences between groups detected ( $\chi^2=1.85$ ;  $p=0.60$ ).

### **3.5. Baseline characteristics of outcome variables**

Concerning the relevant outcome variables, the baseline assessment revealed a mean SCS score from  $M=2.56$ ;  $SD=0.58$ . There were no differences between groups detected ( $t(198)=0.30$ ;  $p=0.76$ ).

For the subscale Self-Kindness, the overall mean was  $M=2.45$ ;  $SD=0.81$  and there were no differences concerning this feature in the study groups ( $t(198)= -0.41$ ;  $p=0.68$ ) detected. The subscale Self-Judgment yielded no differences between the study groups ( $t(198)= -0.30$ ;  $p=0.76$ ). The overall mean for the subscale Common Humanity was  $M=2.61$ ;  $SD=0.75$  and there was no difference between the groups detected ( $t(198)= -0.31$ ;  $p=0.75$ ). For the subscale Isolation, the overall mean was  $M=3.38$ ;  $SD=0.94$  and the t-test for independent samples recorded no differences between the groups ( $t(198)= -0.31$ ;  $p=0.75$ ). Analysis revealed a mean score for all patients regarding the subscale Mindfulness of  $M=2.70$ ;  $SD=0.76$ . There were no differences found between the groups ( $t(198)= -0.66$ ;  $p=0.51$ ). There was an overall mean score of  $M=3.55$ ;  $SD=0.72$  detected for the subscale Over-Identification. Concerning potential differences between the groups, analysis recorded a statistically relevant difference ( $t(198)= -2.41$ ;  $p=0.02$ ).

The overall mean score for the SF-36 Physical Component Scale was  $M=44.05$ ;  $SD=9.59$ . T-test for independent samples revealed no differences between the study groups ( $t(198)=0.23$ ;  $p=0.82$ ). Regarding the SF-36 Mental Component Scale, the mean score for both groups was  $M=31.06$ ;  $SD=10.76$ . The statistical analysis revealed that there were no relevant differences between either group ( $t(198)=0.03$ ;  $p=0.98$ ).

The overall mean for the subscale Physical Functioning was  $M=70.20$ ;  $SD=24.76$  and there was no difference concerning this feature between the study groups ( $t(198)=0.47$ ;  $p=0.63$ ). For the subscale Role Limitations due to Physical Health a mean from  $M=39.0$ ;  $SD=40.15$  was found. There was no statistically relevant difference found between the groups ( $t(198)=0.08$ ;  $p=0.94$ ). Regarding the subscale Role Limitations due to Emotional Problems, there was an overall mean score from  $M=29.0$ ;  $SD=38.0$  found in the study population and there was no difference between the groups detected ( $t(198)= -0.60$ ;  $p=0.55$ ). Concerning the subscale Energy/Fatigue the overall mean score was  $M=30.93$ ;  $SD=20.21$ . The independent samples t-test revealed no significant differences between the groups ( $t(198)=0.85$ ;  $p=0.39$ ). The subscale Emotional Well-Being revealed a mean score from  $M=41.70$ ;  $SD=19.37$ . There were no differences between the groups detected ( $t(198)=0.22$ ;  $p=0.83$ ). The mean score of the subscale Social Functioning was  $M=53.38$ ;  $SD=29.33$  and this feature was equally distributed in the groups ( $t(198)= -0.44$ ;  $p=0.66$ ). For the subscale Pain a mean score of  $M=57.20$ ;  $SD=29.61$  was found. Concerning this subscale, no differences between the groups were found ( $t(198)= -0.95$ ;  $p=0.34$ ). The subscale General Health yielded a mean score from  $M=46.05$ ;  $SD=16.07$  of the study population. There were no differences detected between the groups ( $t(198)=0.80$ ;  $p=0.42$ ).

Concerning the GSI, the mean score amounted to  $M=5.07$ ;  $SD=2.51$  and there was no statistically significant difference found between the groups ( $t(198)=0.70$ ;  $p=0.48$ ).

Regarding the subscale Somatization, the overall mean for the study population was  $M=1.33$ ;  $SD=0.86$  and there was no group difference found ( $t(198)=1.38$ ;  $p=0.17$ ). For the subscale Depression an overall mean score of  $M=1.88$ ;  $SD=1.06$  was found. There was no difference found between the groups ( $t(198)= -0.09$ ;  $p=0.93$ ). There was an overall mean score concerning the subscale Anxiety of  $M=1.86$ ;  $SD=0.96$ . and there were no statistically relevant differences between the groups ( $t(198)=0.68$ ;  $p=0.50$ ). The overall mean score for subjective feeling of happiness was  $M=3.79$ ;  $SD=2.09$ . There were no differences between groups detected ( $t(198)=0.67$ ;  $p=0.49$ ).

Table 1. Baseline characteristics of the study participants

Variable	MSC Group n= 114	PMR Group n=86
<b>Sociodemographic data</b>		
Age <i>M (SD)</i>	47.9 (8.3)	49.0 (8.9)
Female sex <i>f(%)</i>	71 (62.3%)	58 (67.4%)
Standing in profession/working <i>f(%)</i>	59 (51.8%)	36 (41.9%)
High school or higher education <i>f(%)</i>	57 (50.0%)	42 (48.9%)
In relationship/married <i>f(%)</i>	69 (60.5%)	52 (60.5%)
Children <i>f(%)</i>	75 (65.8%)	64 (74.4%)
Religious affiliation <i>f(%)</i>	81 (70.3%)	59 (68.7%)
<b>Previous experiences</b>		
Previous experience with mindfulness techniques <i>f(%)</i>	54 (47.4%)	43 (50.0%)
Previous experience with relaxation techniques <i>f(%)</i>	48 (42.1%)	27 (31.4%)
Frequency of known practice <i>M (SD)</i> 1=<once/month, 2=twice/month, 3=weekly, 4=multiple times/week, 5=daily	1.56 (1.92)	1.56 (1.80)
Duration of known practice <i>M (SD)</i> 1=<3 months, 2=>3 months, 3=6 months, 4=1 year, 5=2 years, 6=3 years, 7=5 years, 8=>5 years	2.83 (2.98)	2.86 (3.14)
<b>Health related variables</b>		
BMI <i>M (SD)</i>	23.46 (5.1)	23.40 (5.4)
No. of patients smoking <i>f(%)</i> / amount of cigarettes per day <i>M (SD)</i>	49 (43.0%) / 6.8 (9.1)	38 (44.2%) / 7.9 (10.9)
Alcohol <i>f(%)</i>	29 (25.4%)	27 (31.4%)
Drugs <i>f(%)</i>	2 (1.8%)	1 (1.2%)
<b>Dietary habits <i>f(%)</i></b>		
A lot of meat	22 (19.3%)	18 (20.9%)
Little meat	23 (20.2%)	19 (22.1%)
With meat and rich in fruits and vegetables	64 (56.1%)	48 (55.8%)

Vegetarian	5 (4.4%)	1 (1.2%)	
<b>(ICD-10) Diagnosis <i>f</i>(%)</b>			
F00-F09 Organic, including symptomatic, mental disorders	0	3 (3.5%)	
F10-F19 Mental and behavioural disorders due to psychoactive substances	28 (24.6%)	34 (39.5%)	
F20-F29 Schizophrenia, schizotypal and delusional disorders	2 (1.8%)	4 (4.7%)	
F30-F39 Affective disorders	86 (75.4%)	66 (76.7%)	
F40-F48 Neurotic, stress-related and somatoform disorders	62 (54.4%)	51 (59.3%)	
F50-F59 Behavioural syndromes associated with physiological disturbances and physical factors	2 (1.8%)	4 (4.7%)	
F60-F69 Personality and behavioural disorders	12 (10.5%)	16 (18.6%)	
Z73.0 Burn Out	29 (25.4%)	13 (15.1%)	
<b>Medication <i>f</i>(%)</b>			
Anticonvulsants	10 (8.8%)	13 (15.1%)	
Antidepressants	100 (87.7%)	74 (86.0%)	
Muscle relaxants	5 (4.4%)	1 (1.2%)	
Benzodiazepines	18 (15.8%)	11 (12.8%)	
Antipsychotics	36 (31.6%)	27 (31.4%)	
Anxiolytics	21 (18.4%)	16 (18.6%)	
Hypnotics	19 (16.7%)	12 (14.0%)	
Anti-epileptics	4 (3.5%)	5 (5.8%)	
Analgesics	26 (22.8%)	22 (25.6%)	
Homeopathic	10 (8.8%)	5 (5.8%)	
<b>Baseline characteristics of outcome variables</b>			<b>Cronbach's <math>\alpha</math></b>
SCS total <i>M (SD)</i>	2.55 (0.6)	2.57 (0.5)	.90
SCS Self-Kindness <i>M (SD)</i>	2.47 (0.9)	2.42 (0.7)	.80
SCS Self-Judgment <i>M (SD)</i>	3.46 (0.8)	3.42 (0.8)	.75
SCS Common Humanity <i>M (SD)</i>	2.62 (0.7)	2.59 (0.7)	.70

SCS Mindfulness <i>M (SD)</i>	2.73 (0.8)	2.66 (0.7)	.70
SCS Isolation <i>M (SD)</i>	3.40 (0.9)	3.35 (1.0)	.76
SCS Over-Identification <i>M (SD)</i>	3.65 (0.6)	3.41 (0.8)	.60
SF-36 Physical Component Scale <i>M (SD)</i>	43.91 (9.7)	44.22 (9.5)	
SF-36 Mental Component Scale <i>M (SD)</i>	31.04 (10.9)	31.09 (10.6)	
SF-36 Physical Functioning <i>M (SD)</i>	69.47 (25.4)	71.16 (24.0)	.92
SF-36 Role Limitations due to Physical Health <i>M (SD)</i>	38.82 (40.7)	39.24 (39.6)	.84
SF-36 Role Limitations due to Emotional Problems <i>M (SD)</i>	30.41 (39.6)	27.13 (35.9)	.77
SF-36 Energy/Fatigue <i>M (SD)</i>	29.87 (20.9)	32.33 (19.4)	.80
SF-36 Emotional Well-Being <i>M (SD)</i>	41.44 (20.3)	42.05 (18.1)	.79
SF-36 Social Functioning <i>M (SD)</i>	54.17 (29.1)	52.33 (29.8)	.95
SF-36 Pain <i>M (SD)</i>	58.94 (30.6)	54.91 (28.2)	.88
SF-36 General Health <i>M (SD)</i>	45.31 (15.9)	47.03 (13.9)	.68
BSI-18 GSI <i>M (SD)</i>	4.96 (2.6)	5.21 (2.4)	.91
BSI-18 Somatization <i>M (SD)</i>	1.25 (0.9)	1.43 (0.9)	.77
BSI-18 Depression <i>M (SD)</i>	1.89 (1.1)	1.87 (1.0)	.85
BSI-18 Anxiety <i>M (SD)</i>	1.82 (0.9)	1.91 (0.9)	.82
Subjective Feeling of Happiness <i>M (SD)</i>	3.70 (2.1)	3.91 (2.0)	

Note: *M*= mean, *SD*= standard deviation, *f*=frequency.

### 3.6. Changes in primary and secondary outcomes: Between-group differences

Mean changes from baseline, as well as between-group differences in primary (SCS) and secondary (SF-36, BSI-18, subjective feeling of happiness and nicotine use) outcomes are displayed in Table 2.

As shown in Table 2, there was a significant improvement of the MSC group in regards to the SCS total score at six weeks (+0.35 points [95% confidence interval [CI], 0.25 – 0.44]), whereas the PMR group did not improve at all (0.00 points [95% CI, -0.91 – 0.90]); the mean between-group difference was -0.35 points ([95% CI, -0.48 – -0.2];  $p < 0.001$ ). At week 24, there was a further improvement detected in the MSC group concerning the SCS total score. Whereas the PMR group again remained constant (0.00 points [95% CI, -0.12 –

0.10]), the change from the baseline to week 24 in the MSC group was +0.50 points [95% CI, 0.40 – 0.60]). The mean between-group difference was -0.50 points ([95% CI, -0.66 – -0.35]) and statistically significant ( $p < 0.001$ ). After Bonferroni correction for multiple testing was applied these results remained significant ( $p < 0.002$ ).

There were meaningful between-groups differences (MSC group: +0.59 points [95% CI, 0.44 – 0.75]; PMR group: +0.19 points [95% CI, 0.05 – 0.33]) concerning the SCS subscale Self-Kindness at week six (-0.40 points [95% CI, -0.62 – -0.19];  $p < 0.001$ ), as well as at week 24 (mean between-group difference :-0.51 points [95% CI, -0.71 – -0.30];  $p < 0.001$ ) where the MSC group had a mean change from baseline from +0.73 points (95% CI, 0.59 – 0.87) and the PMR group had a mean change from baseline from +0.22 points (95% CI, 0.07 – 0.36). This result remained significant even after a Bonferroni correction ( $p < 0.002$ ).

Concerning the SCS subscale Self-Judgment, the MSC group reached -0.14 points (95% CI, -0.28 – -0.01) after six weeks, whereas the PMR group had -0.45 points (95% CI, -0.59 – -0.30). The between groups difference of 0.30 points (95% CI, 0.09 – 0.51) was significant ( $p = 0.004$ ). Nevertheless, this result did not remain significant after Bonferroni correction ( $p > 0.002$ ). At 24 weeks, the MSC group had a mean change from baseline in the SCS subscale Self-Judgment from -0.62 points (95% CI, -0.77 – -0.48), whereas the PMR group had a mean change from baseline from -0.15 points (95% CI, -0.29 – -0.02). Analysis revealed a significant between group difference ( $p < 0.001$ ), which remained noteworthy even after a Bonferroni correction ( $p < 0.002$ ) was applied.

There was a significant between-groups difference found amongst the MSC (0.45 points [95% CI, 0.29 – 0.60]) and the PMR group (0.06 points [95% CI, -0.09 – 0.21]) at week six concerning the SCS subscale Common Humanity (-0.39 points [95% CI, -0.60 – -0.17];  $p < 0.001$ ). Those between group differences remained constant at week 24 (-0.42 points [95% CI, -0.65 – -0.29];  $p < 0.001$ ), where the MSC group had a change from 0.47 points ([95% CI, 0.33 – 0.62) from the baseline and the PMR group had a change from 0.05 points ([95% CI, -0.13 – 0.22) from baseline in the SCS subscale Common Humanity. These results remained significant ( $p < 0.002$ ) even after Bonferroni correction.

Concerning the SCS subscale Mindfulness, there was a significant mean between groups difference (-0.34 points [95% CI, -0.55 – -0.13];  $p = 0.001$ ) at week 24 between the MSC group (0.42 points [95% CI, 0.29 – 0.56]) and the PMR group (0.08 points [95% CI, -0.08 – 0.24]) which remained significant after Bonferroni correction ( $p < 0.002$ ). There was a significant between groups difference from 0.47 points [95% CI, 0.24 – 0.70];  $p < 0.001$ )

between the MSC group (-0.52 points [95% CI, -0.67 – -0.37]) and the PMR group (-0.05 points [95% CI -0.22 – 0.13]) concerning the SCS subscale Isolation at week six. Those between group differences remained significant at week 24 (0.71 points [95% CI, 0.45 – 0.96];  $p<0.001$ ) where the MSC group had -0.72 points (95% CI, -0.89 – -0.55) and the PMR group had a -0.01 point (95% CI, -0.21 – 0.19) change from the baseline. These results were also significant after Bonferroni correction ( $p<0.002$ ).

Concerning the SCS subscale Over-Identification, there was a significant between-group difference at week six (0.39 points [95% CI, 0.20 – 0.58];  $p<0.001$ ) where the MSC group changed -0.50 points (95% CI, -0.61 – -0.38) from baseline and the PMR group changed -0.10 points (95% CI, -0.27 – 0.06) from baseline (significance after Bonferroni correction:  $p<0.002$ ).

There was a significant between-group difference at week six (8.85 points [95% CI, 1.22 – 16.49];  $p=0.02$ ) concerning the SF-36 subscale Pain, where the MSC group had 0.07 points (95% CI, -4.71 – 4.84) and the PMR group had 8.92 points (95% CI, 2.74 – 15.11) changes from baseline. At week 24, the between-group difference [95% CI, 1.22 – 16.49];  $p=0.02$ ) between the MSC group (0.07 points [95% CI, -4.71 – 4.84] and the PMR group (8.92 points [95% CI, 2.74 – 15.11]) remained exactly the same. However, these results did not remain significant after Bonferroni correction ( $p>0.002$ ).

At six weeks, there was an increased amount of subjective happiness found in the MSC group (+1.81 points [95% CI, 1.42 – 2.19]) compared to the PMR group (+1.04 points [95% CI, 0.58 – 1.52]). Those mean between-group differences in the change from baseline to week six was -0.76 points ([95% CI, -1.36 – -0.16] and analysis revealed that that difference is significant ( $p=0.013$ ). This result did not remain significant after Bonferroni correction ( $p>0.002$ ) however. All other analysis was not significant (see Table 2).

However, in previous research (Gaiswinkler, & Unterrainer, 2016), where 362 yoga practitioners were examined due to different levels of yoga immersion (marginal yoga immersion=111 participants, moderate yoga immersion=120 participants, or high yoga immersion=131 participants) and further compared to a control group of 93 gymnastics practitioners in regards to their psychiatric symptom burden, there were significant between-group differences observed ( $p<0.01$ ). Yoga practitioners that were highly immersed into their practice exhibited the lowest means for the GSI ( $M=6.71$ ;  $SD=6.93$ ), Somatization ( $M=2.12$ ;  $SD=2.76$ ), Depression ( $M=1.76$ ;  $SD=2.40$ ) and Anxiety ( $M=2.82$ ;  $SD=2.76$ ) in comparison to practitioners that were only marginally (GSI:  $M=13.61$ ;

$SD=11.27$ , Somatization:  $M= 3.48$ ;  $SD=3.74$ , Depression:  $M=4.71$ ;  $SD=4.96$ , Anxiety:  $M= 5.42$ ;  $SD=3.97$ ) or moderately immersed (GSI:  $M=10.70$ ;  $SD=8.29$ , Somatization:  $M= 2.91$ ;  $SD=2.78$ , Depression:  $M=3.37$ ;  $SD=3.61$ , Anxiety:  $M=4.42$ ;  $SD=3.46$ ) into their yoga practice, or gymnastics practitioners (GSI:  $M=14.15$ ;  $SD=8.56$ , Somatization:  $M=3.89$ ;  $SD=3.55$ , Depression:  $M=5.27$ ;  $SD=4.51$ , Anxiety:  $M= 4.99$ ;  $SD=3.29$ ). When further compared with the results at week six of the rehabilitation inpatients of the current study, there were additional significant between-group differences observed. Compared to highly immersed yoga practitioners, there was a significant between-group difference detected in GSI ( $t(199)=-14.42$ ;  $p<0.001$ ), Somatization ( $t(199)=-15.92$ ;  $p<0.001$ ), Depression ( $t(199)=-4.44$ ;  $p<0.001$ ) and Anxiety ( $t(199)=-18.94$ ;  $p<0.001$ ). Significant between-group differences in all relevant parameters were also found between the group of rehabilitation inpatients and moderately immersed yoga practitioners, marginally immersed yoga practitioners and gymnastics practitioners.

Table 2. Changes in primary and secondary outcomes\*

Variable	Mean changes from baseline (95% CI)		Between-group difference (95% CI)		
	MSC Group n=114	PMR Group n=86	MSC Group vs. PMR Group	<i>p</i> **	$\eta^2$
<b>SCS total</b>					
Week 6	0.35 (0.25 – 0.44)	-0.00 (-0.91 – 0.90)	-0.35 (-0.48 – -0.21)	<0.001#	.08
Week 24	0.50 (0.40 – 0.60)	-0.00 (-0.12 – 0.10)	-0.50 (-0.66 – -0.35)	<0.001#	.16
<b>SCS Self-Kindness</b>					
Week 6	0.59 (0.44 – 0.75)	0.19 (0.05 – 0.33)	-0.40 (-0.62 – -0.19)	<0.001#	.09
Week 24	0.73 (0.59 – 0.87)	0.22 (0.07 – 0.36)	-0.51 (-0.71 – -0.30)	<0.001#	.14
<b>SCS Self-Judgment</b>					
Week 6	-0.45 (-0.59 – -0.30)	-0.14 (-0.28 – -0.01)	0.30 (0.09 – 0.51)	0.004	.03
Week 24	-0.62 (-0.77 – -0.48)	-0.15 (-0.29 – -0.02)	0.47 (0.26 – 0.67)	<0.001#	.07
<b>SCS Common Humanity</b>					
Week 6	0.45 (0.29 – 0.60)	0.06 (-0.09 – 0.21)	-0.39 (-0.60 – -0.17)	<0.001#	.08
Week 24	0.47 (0.33 – 0.62)	0.05 (-0.13 – 0.22)	-0.42 (-0.65 – -0.29)	<0.001#	.10
<b>SCS Mindfulness</b>					
Week 6	0.22 (0.10 – 0.35)	0.12 (-0.02 – 0.27)	-0.10 (-0.29 – 0.90)	0.29	.01
Week 24	0.42 (0.29 – 0.56)	0.08 (-0.08 – 0.24)	-0.34 (-0.55 – -0.13)	0.001#	.08
<b>SCS Isolation</b>					
Week 6	-0.52 (-0.67 – -0.37)	-0.05 (-0.22 – 0.13)	0.47 (0.24 – 0.70)	<0.001#	.05
Week 24	-0.72 (-0.89 – -0.55)	-0.01 (-0.21 – 0.19)	0.71 (0.45 – 0.96)	<0.001#	.13
<b>SCS Over-Identification</b>					
Week 6	-0.50 (-0.61 – -0.38)	-0.10 (-0.27 – 0.06)	0.39 (0.20 – 0.58)	<0.001#	.01
Week 24	-0.73 (-0.86 – -0.59)	-0.07 (-0.24 – 0.11)	0.66 (0.43 – 0.87)	<0.001#	.08
<b>SF-36 Physical Component Scale</b>					
Week 6	2.30 (0.98 – 3.61)	2.19 (0.55 – 3.82)	-0.11 (-2.18 – 1.95)	0.92	.00
Week 24	0.36 (-1.17 – 1.88)	1.93 (0.30 – 3.57)	1.57 (-0.66 – 3.82)	0.17	.01

<b>SF-36 Mental Component Scale</b>					
Week 6	6.68 (4.53 – 8.83)	6.71 (4.26 – 9.16)	0.03 (-3.21 – 3.27)	0.98	.00
Week 24	4.92 (2.81 – 7.03)	5.49 (2.93 – 8.05)	0.57 (-2.70 – 3.84)	0.73	.00
<b>SF-36 Physical Functioning</b>					
Week 6	2.50 (-1.07 – 6.07)	2.33 (-2.17 – 6.82)	-0.17 (-5.81 – 5.46)	0.95	.00
Week 24	-0.53 (-4.18 – 3.12)	2.03 (-2.50 – 6.57)	2.56 (-3.16 – 8.28)	0.37	.01
<b>SF-36 Role Limitations due to Physical Health</b>					
Week 6	11.18 (3.14 – 19.23)	15.41 (5.37 – 25.45)	4.22 (-8.42 – 16.87)	0.51	.00
Week 24	7.02 (-1.66 – 15.69)	14.53 (5.40 – 23.67)	7.51 (-5.16 – 20.19)	0.24	.01
<b>SF-36 Role Limitations due to Emotional Problems</b>					
Week 6	12.57 (4.01 – 21.14)	17.05 (7.83 – 26.27)	4.48 (-8.15 – 17.11)	0.48	.00
Week 24	12.57 (4.01 – 21.14)	17.05 (7.83 – 26.27)	4.48 (-8.15 – 17.11)	0.48	.00
<b>SF-36 Energy/Fatigue</b>					
Week 6	14.04 (9.70 – 18.37)	11.98 (6.86 – 17.10)	-2.06 (-8.71 – 4.59)	0.54	.00
Week 24	8.99 (4.90 – 13.08)	9.88 (4.63 – 15.13)	0.89 (-5.62 – 7.40)	0.78	.00
<b>SF-36 Emotional Well-Being</b>					
Week 6	11.82 (8.00 – 15.65)	10.65 (6.60 – 14.70)	-1.17 (-6.78 – 4.43)	0.68	.00
Week 24	8.46 (4.91 – 12.00)	8.56 (4.02 – 13.10)	0.10 (-5.53 – 5.74)	0.97	.00
<b>SF-36 Social Functioning</b>					
Week 6	8.00 (2.35 – 13.66)	8.87 (3.14 – 19.23)	0.86 (-8.28 – 10.00)	0.85	.00
Week 24	0.77 (-5.27 – 6.81)	9.33 (1.95 – 16.66)	8.54 (-0.85 – 17.92)	0.07	.01
<b>SF-36 Pain</b>					
Week 6	0.07 (-4.71 – 4.84)	8.92 (2.74 – 15.11)	8.85 (1.22 – 16.49)	0.02	.00
Week 24	0.07 (-4.71 – 4.84)	8.92 (2.74 – 15.11)	8.85 (1.22 – 16.49)	0.02	.00
<b>SF-36 General Health</b>					
Week 6	15.48 (12.46 – 18.50)	11.74 (9.02 – 14.47)	-3.73 (-7.92 – 0.44)	0.08	.00
Week 24	10.88 (7.05 – 14.71)	6.86 (3.69 – 10.03)	-4.02 (-9.18 – 1.15)	0.12	.00

<b>BSI-18 GSI</b>					
Week 6	-1.16 (-1.51 – -0.81)	-1.16 (-1.69 – -0.63)	0.00 (-0.61 – 0.60)	0.99	.00
Week 24	-0.96 (-1.33 – -0.59)	-0.88 (-1.39 – -0.36)	0.08 (-0.53 – 0.70)	0.78	.00
<b>BSI-18 Somatization</b>					
Week 6	-0.24 (-0.36 – -0.11)	-0.33(-0.51 – -0.14)	-0.09 (-0.30 – 0.12)	0.40	.00
Week 24	-0.17 (-0.31 – -0.03)	-0.18 (-0.39 – 0.02)	-0.11 (-0.25 – 0.22)	0.92	.01
<b>BSI-18 Depression</b>					
Week 6	-0.49 (-0.65 – -0.34)	-0.42 (-0.63 – -0.22)	0.07 (-0.18 – 0.33)	0.56	.00
Week 24	-0.39 (-0.54 – -0.23)	-0.30 (-0.52 – -0.09)	0.09 (-0.17 – 0.33)	0.52	.00
<b>BSI-18 Anxiety</b>					
Week 6	-0.43 (-0.57 – -0.29)	-0.41 (-0.61 – -0.21)	0.02 (-0.21 – 0.25)	0.88	.00
Week 24	-0.40 (-0.55 – -0.25)	-0.39 (-0.58 – -0.19)	0.01 (-0.22 – 0.25)	0.91	.00
<b>Subjective Feeling of Happiness</b>					
Week 6	1.81 (1.42 – 2.19)	1.04 (0.58 – 1.52)	-0.76 (-1.36 – -0.16)	0.013	.02
Week 24	1.35 (0.90 – 1.80)	1.12 (0.64 – 1.60)	-0.23 (-0.90 – 0.42)	0.48	.00
<b>Number of Cigarettes</b>					
Week 6	-1.44 (-2.28 – -0.60)	-2.27 (-3.61 – -0.92)	-0.83 (-2.33 – 0.67)	0.28	.00
Week 24	-1.39 (-2.35 – -0.44)	-1.17 (-2.64 – 0.29)	-0.22 (-1.45 – 1.89)	0.80	.00

Note.  $\eta^2$ =partial  $\eta$  squared;

\*All values are means, with the 95% confidence intervals;

\*\* Group differences in change scores were analysed by means of an independent sample t-test.

# These results remained significant after Bonferroni correction for multiple testing ( $p < .002$ ).

### **3.7. Changes in primary and secondary outcomes: Within-group differences**

The overall mean for the total SCS score at week six was  $M=2.87$  ( $SD=0.74$ ) and  $M=2.95$  ( $SD=0.73$ ) at week 24. Concerning the subscales of the SCS, the overall mean for Self-Kindness was  $M=2.87$  ( $SD=0.74$ ) at week six and  $M=2.95$  ( $SD=0.73$ ) at week 24, for Self-Judgment, the overall mean at week six was  $M=3.13$  ( $SD=0.77$ ) and  $M=3.02$

( $SD=0.79$ ) at week 24, for Common Humanity  $M=2.88$  ( $SD=0.74$ ) at week six and  $M=2.90$  ( $SD=0.73$ ) at week 24, for Mindfulness  $M=2.88$  ( $SD=0.76$ ) at week six and  $M=2.98$  ( $SD=0.73$ ) at week 24, for Isolation  $M=3.06$  ( $SD=0.95$ ) at week six and  $M=2.97$  ( $SD=0.91$ ) at week 24 and for the subscale Over-Identification, the overall mean at week six was  $M=3.22$  ( $SD=0.70$ ) and  $M=3.11$  ( $SD=0.73$ ) for week 24.

Regarding the SF-36 Physical Component Scale, the overall mean at week six for both study groups was  $M=46.29$  ( $SD=9.16$ ) and  $M=45.08$  ( $SD=9.29$ ) for week 24. The overall mean for the Mental Component Scale was  $M=37.76$  ( $SD=11.99$ ) at week six and  $M=36.23$  ( $SD=12.32$ ) at week 24. Concerning the subscales of the SF-36, the overall mean for Physical Functioning was  $M=72.63$  ( $SD=25.68$ ) at week six and  $M=70.78$  ( $SD=25.65$ ) at week 24, for Role Limitations due to Physical Health  $M=52.00$  ( $SD=43.87$ ) at week six and  $M=49.25$  ( $SD=42.97$ ) at week 24, for Role Limitations due to Emotional Problems  $M=43.50$  ( $SD=44.61$ ) at week six and  $M=43.50$  ( $SD=44.61$ ) at week 24, for Energy/Fatigue  $M=44.08$  ( $SD=22.59$ ) at week six and  $M=40.30$  ( $SD=22.40$ ) at week 24, for Emotional Well Being  $M=53.02$  ( $SD=21.78$ ) at week six and  $M=50.20$  ( $SD=22.73$ ) at week 24, for Social Functioning  $M=61.75$  ( $SD=28.48$ ) at week six and  $M=57.81$  ( $SD=29.13$ ) at week 24, for Pain  $M=60.90$  ( $SD=29.95$ ) and  $M=60.90$  ( $SD=29.95$ ) at week 24 and the overall mean for General Health was  $M=59.93$  ( $SD=15.96$ ) at week six and  $M=55.20$  ( $SD=15.37$ ) at week 24.

Concerning the BSI-18, the overall mean for GSI at week six was  $M=3.91$  ( $SD=2.75$ ) and  $M=4.15$  ( $SD=2.74$ ) for week 24. Concerning the subscales of the BSI-18, there was an overall mean of  $M=1.05$  ( $SD=0.89$ ) captured for week six and an overall mean of  $M=1.15$  ( $SD=0.92$ ) for week 24 in the subscale Somatization. Furthermore, at week six, there was an overall mean for both groups concerning the subscale Anxiety of  $M=1.43$  ( $SD=1.93$ ) and a mean of  $M=1.46$  ( $SD=1.04$ ) for week 24. In the subscale Depression, there was a mean of  $M=1.42$  ( $SD=1.08$ ) detected at week six and  $M=1.53$  ( $SD=1.08$ ) at week 24.

Concerning the single item subjective feeling of happiness, the overall mean at week six was  $M=5.27$  ( $SD=2.45$ ) and  $M=5.04$  ( $SD=2.40$ ) at week 24.

Respecting the number of patients smoking and the average number of cigarettes consumed, the overall mean at week six was  $M=5.47$  ( $SD=8.29$ ) with 78 (39%) patients smoking and  $M=5.96$  ( $SD=8.83$ ) with 81 (40.5%) patients smoking at week 24. The means and standard deviations of the respective primary and secondary outcomes divided by the study groups at week six and at week 24 are shown in Table 3.

Table 3. Primary and secondary outcomes at week six and week 24

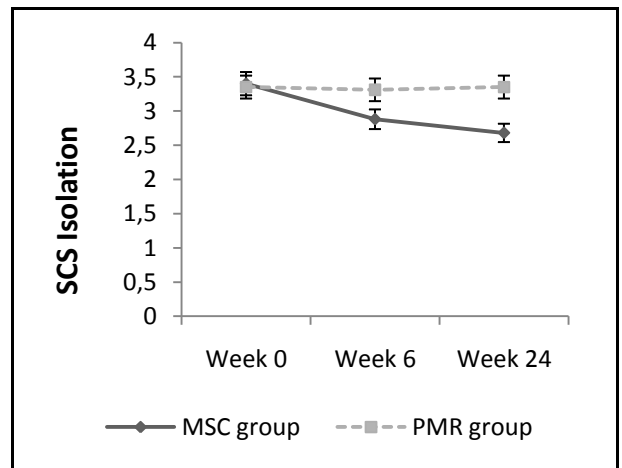
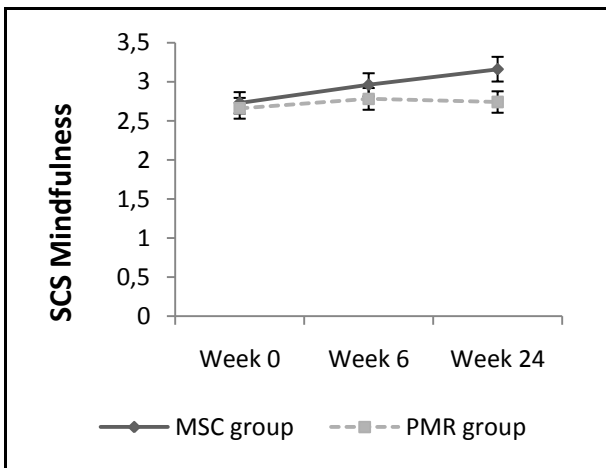
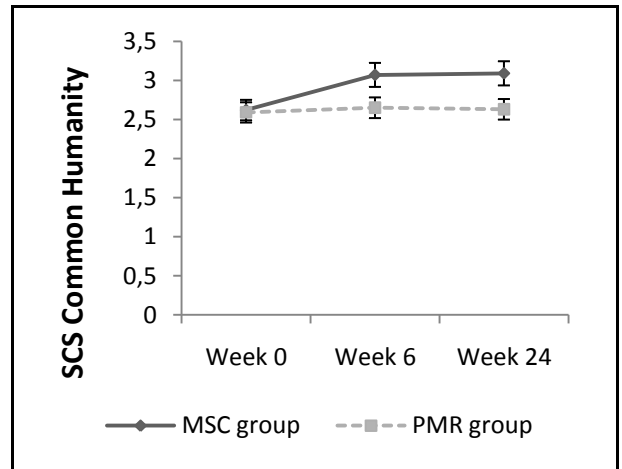
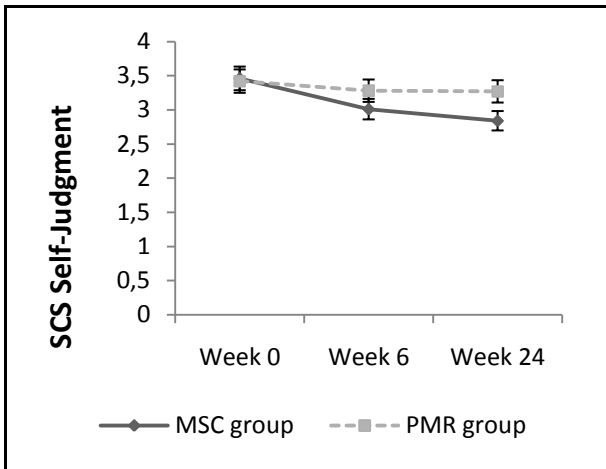
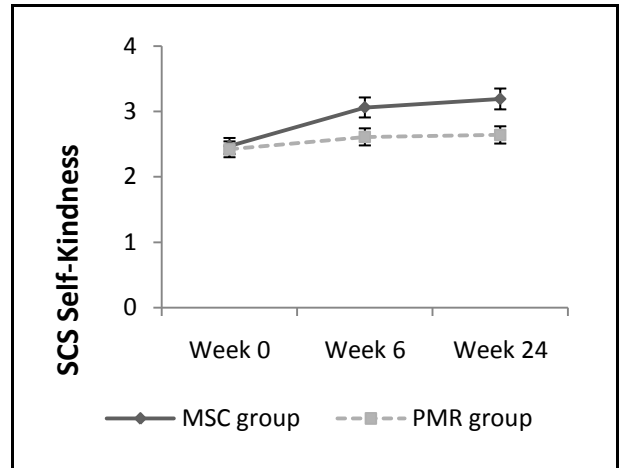
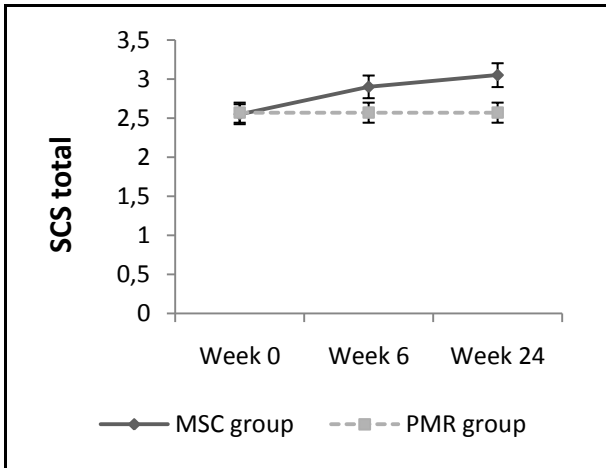
Variable	MSC n= 114	PMR n=86	Cronbach's $\alpha$
<b>SCS total</b>			
Week 6 <i>M (SD)</i>	2.90 (0.52)	2.57 (0.62)	.91
Week 24 <i>M (SD)</i>	3.05 (0.53)	2.57 (0.58)	.92
<b>SCS Self-Kindness</b>			
Week 6 <i>M (SD)</i>	3.06 (0.66)	2.61 (0.76)	.74
Week 24 <i>M (SD)</i>	3.19 (0.64)	2.64 (0.72)	.74
<b>SCS Self-Judgment</b>			
Week 6 <i>M (SD)</i>	3.01 (0.72)	3.28 (0.80)	.71
Week 24 <i>M (SD)</i>	2.84 (0.73)	3.27 (0.81)	.76
<b>SCS Common Humanity</b>			
Week 6 <i>M (SD)</i>	3.07 (0.69)	2.65 (0.74)	.70
Week 24 <i>M (SD)</i>	3.09 (0.62)	2.63 (0.77)	.68
<b>SCS Mindfulness</b>			
Week 6 <i>M (SD)</i>	2.96 (0.69)	2.78 (0.83)	.75
Week 24 <i>M (SD)</i>	3.16 (0.63)	2.74 (0.78)	.72
<b>SCS Isolation</b>			
Week 6 <i>M (SD)</i>	2.88 (0.83)	3.31 (1.05)	.82
Week 24 <i>M (SD)</i>	2.68 (0.79)	3.35 (0.92)	.80
<b>SCS Over-Identification</b>			
Week 6 <i>M (SD)</i>	3.16 (0.62)	3.31 (0.80)	.56
Week 24 <i>M (SD)</i>	2.93 (0.64)	3.34 (0.77)	.63
<b>SF-36 Physical Component Scale</b>			
Week 6 <i>M (SD)</i>	46.21 (9.15)	46.41 (9.22)	.
Week 24 <i>M (SD)</i>	44.27 (9.22)	46.16 (9.33)	.

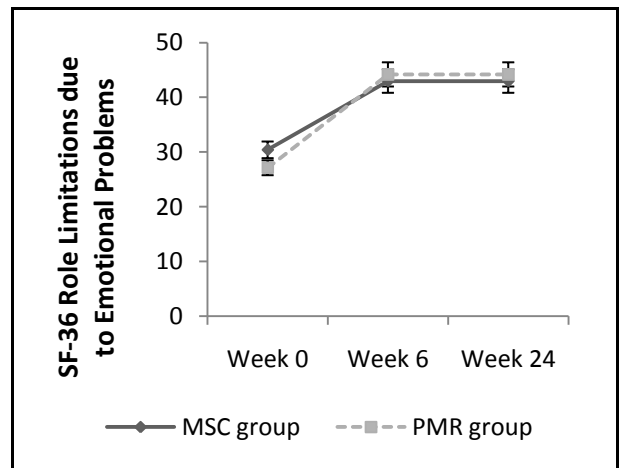
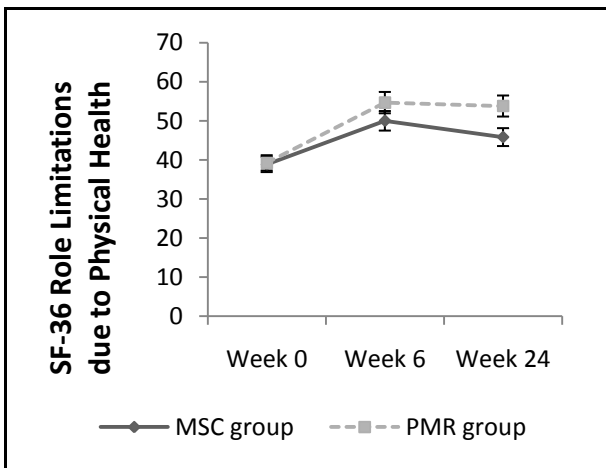
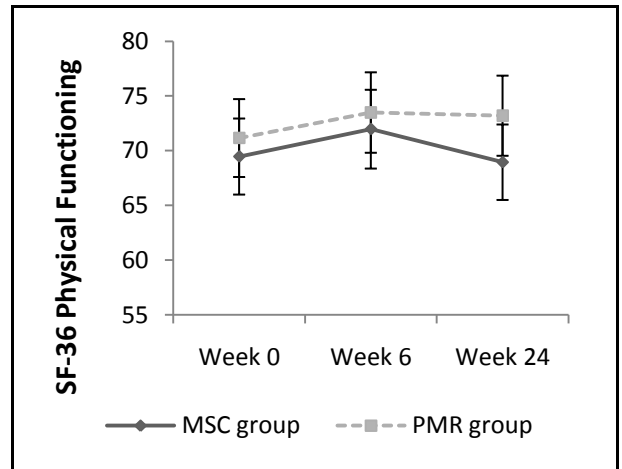
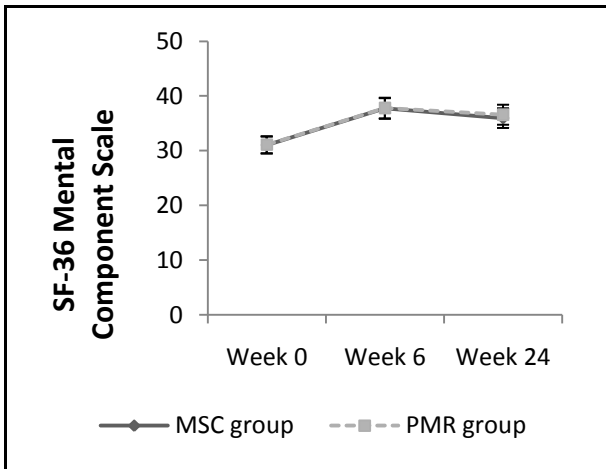
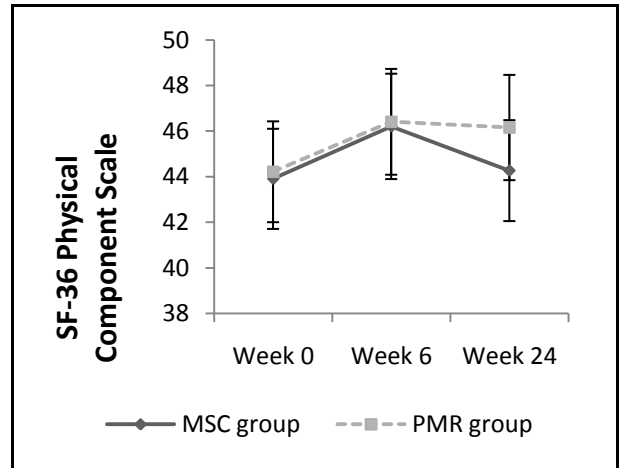
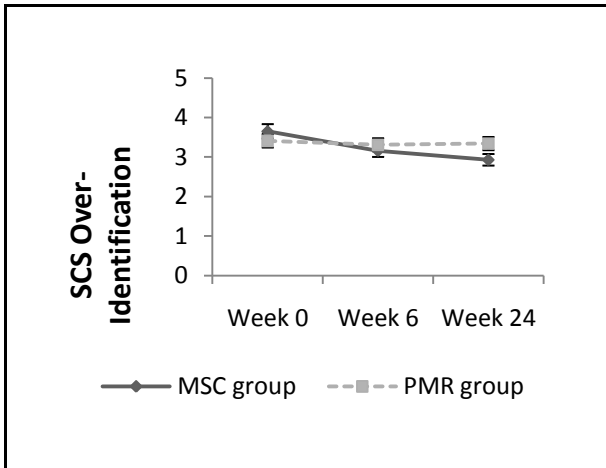
<b>SF-36 Mental Component Scale</b>			
Week 6 <i>M (SD)</i>	37.72 (11.52)	37.80 (12.67)	.
Week 24 <i>M (SD)</i>	35.96 (12.18)	36.58 (12.56)	
<b>SF-36 Physical Functioning</b>			
Week 6 <i>M (SD)</i>	71.97 (26.50)	73.49 (24.67)	.93
Week 24 <i>M (SD)</i>	68.95 (26.28)	73.20 (24.72)	.92
<b>SF-36 Role Limitations due to Physical Health</b>			
Week 6 <i>M (SD)</i>	50.00 (44.62)	54.65 (42.96)	.90
Week 24 <i>M (SD)</i>	45.83 (44.49)	53.78 (40.68)	.87
<b>SF-36 Role Limitations due to Emotional Problems</b>			
Week 6 <i>M (SD)</i>	42.98 (45.60)	44.19 (43.52)	.91
Week 24 <i>M (SD)</i>	42.98 (45.60)	44.19 (43.52)	.88
<b>SF-36 Energy/Fatigue</b>			
Week 6 <i>M (SD)</i>	43.90 (22.21)	44.30 (23.22)	.86
Week 24 <i>M (SD)</i>	38.86 (21.68)	42.21 (23.32)	.87
<b>SF-36 Emotional Well Being</b>			
Week 6 <i>M (SD)</i>	53.26 (20.77)	52.70 (23.16)	.87
Week 24 <i>M (SD)</i>	49.89 (22.05)	50.60 (23.73)	.88
<b>SF-36 Social Functioning</b>			
Week 6 <i>M (SD)</i>	62.17 (28.09)	61.19 (29.14)	.93
Week 24 <i>M (SD)</i>	54.93 (29.45)	61.63 (28.43)	.92
<b>SF-36 Pain</b>			
Week 6 <i>M (SD)</i>	58.68 (30.54)	63.84 (29.07)	.89
Week 24 <i>M (SD)</i>	58.68 (30.54)	63.84 (29.07)	.90
<b>SF-36 General Health</b>			
Week 6 <i>M (SD)</i>	60.79 (16.98)	58.78 (14.51)	.78
Week 24 <i>M (SD)</i>	56.18 (16.51)	53.90 (13.71)	.60

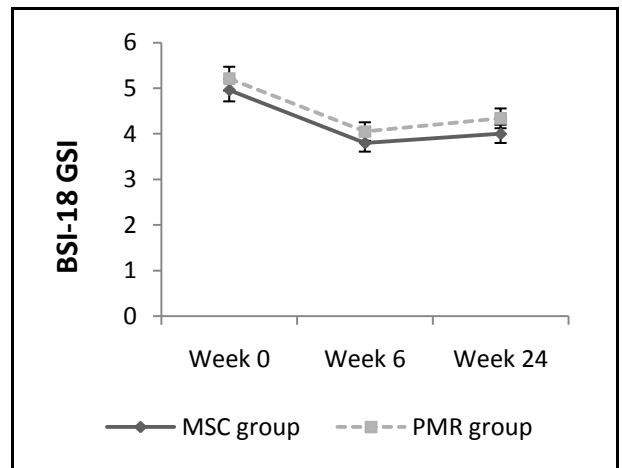
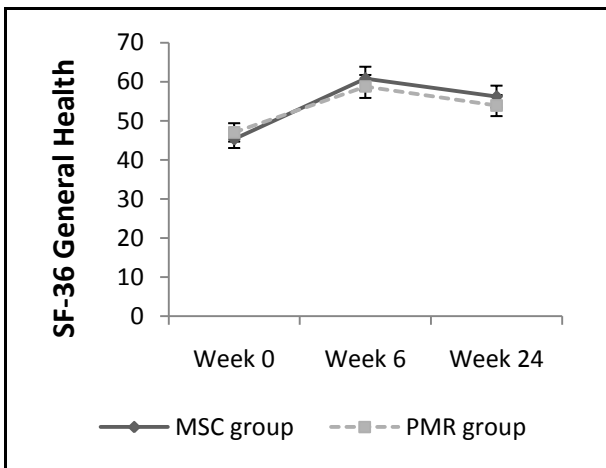
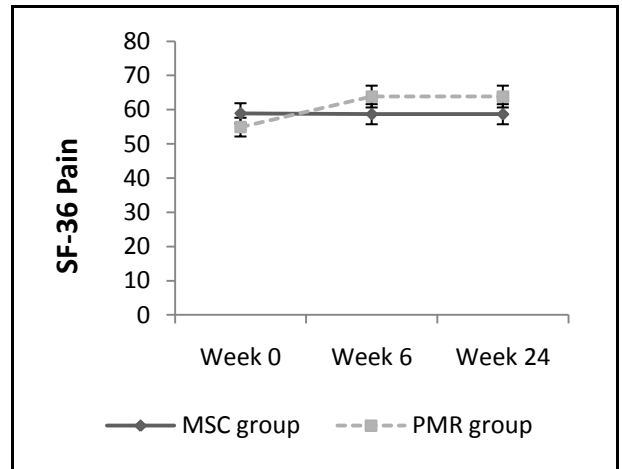
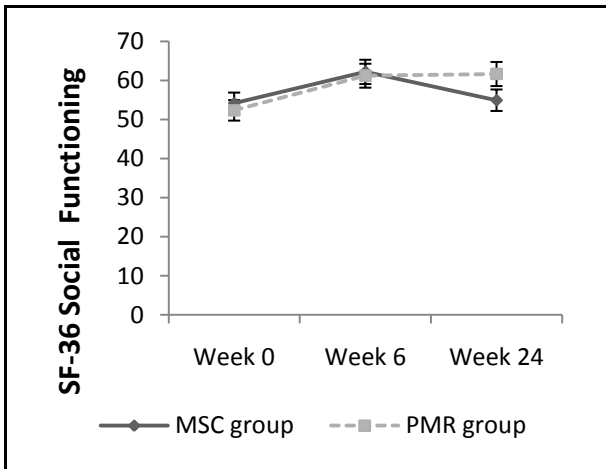
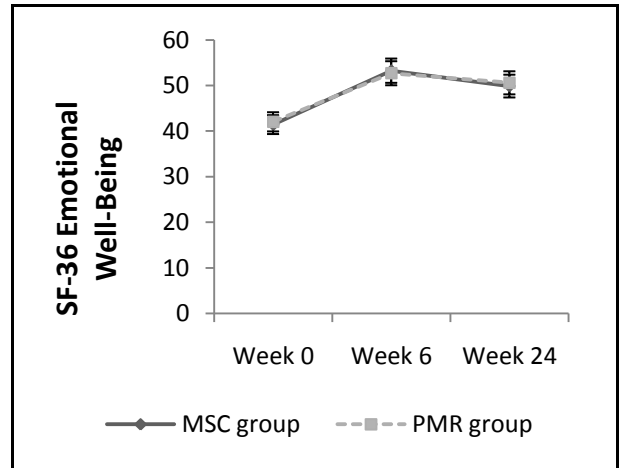
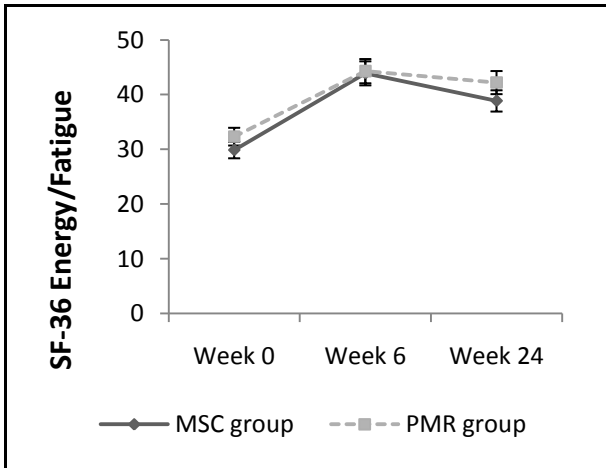
<b>BSI-18 GSI</b>			
Week 6 <i>M (SD)</i>	3.80 (2.59)	4.05 (2.96)	.95
Week 24 <i>M (SD)</i>	4.00 (2.58)	4.34 (2.95)	.94
<b>BSI-18 Somatization</b>			
Week 6 <i>M (SD)</i>	1.02 (0.85)	1.10 (0.95)	.86
Week 24 <i>M (SD)</i>	1.08 (0.82)	1.24 (1.02)	.85
<b>BSI-18 Depression</b>			
Week 6 <i>M (SD)</i>	1.39 (1.04)	1.45 (1.14)	.91
Week 24 <i>M (SD)</i>	1.50 (1.06)	1.57 (1.12)	.89
<b>BSI-18 Anxiety</b>			
Week 6 <i>M (SD)</i>	1.39 (0.96)	1.50 (1.12)	.90
Week 24 <i>M (SD)</i>	1.42 (0.98)	1.52 (1.12)	.90
<b>Subjective Feeling of Happiness</b>			
Week 6 <i>M (SD)</i>	5.51 (2.17)	4.95 (2.32)	
Week 24 <i>M (SD)</i>	5.05 (2.38)	5.02 (2.44)	
<b>No. of patients smoking/ amount of cigarettes</b>			
Week 6 <i>f(%) / M (SD)</i>	46 (40.4%) / 5.36 (8.03)	32 (37.2%) / 5.60 (8.66)	
Week 24 <i>f(%) / M (SD)</i>	46 (40.4%) / 5.40 (8.23)	35 (40.7%) / 6.70 (9.56)	

*Note:* *M*= mean, *SD*= standard deviation, *f*=frequency

The analysis of within group-differences via Anova with repeated measures detected no significant difference concerning the SF-36 subscales Physical Functioning and Pain (Fig. 2). Apart from that variables there were significant improvements in all other primary and secondary outcomes for both study groups over time detected.







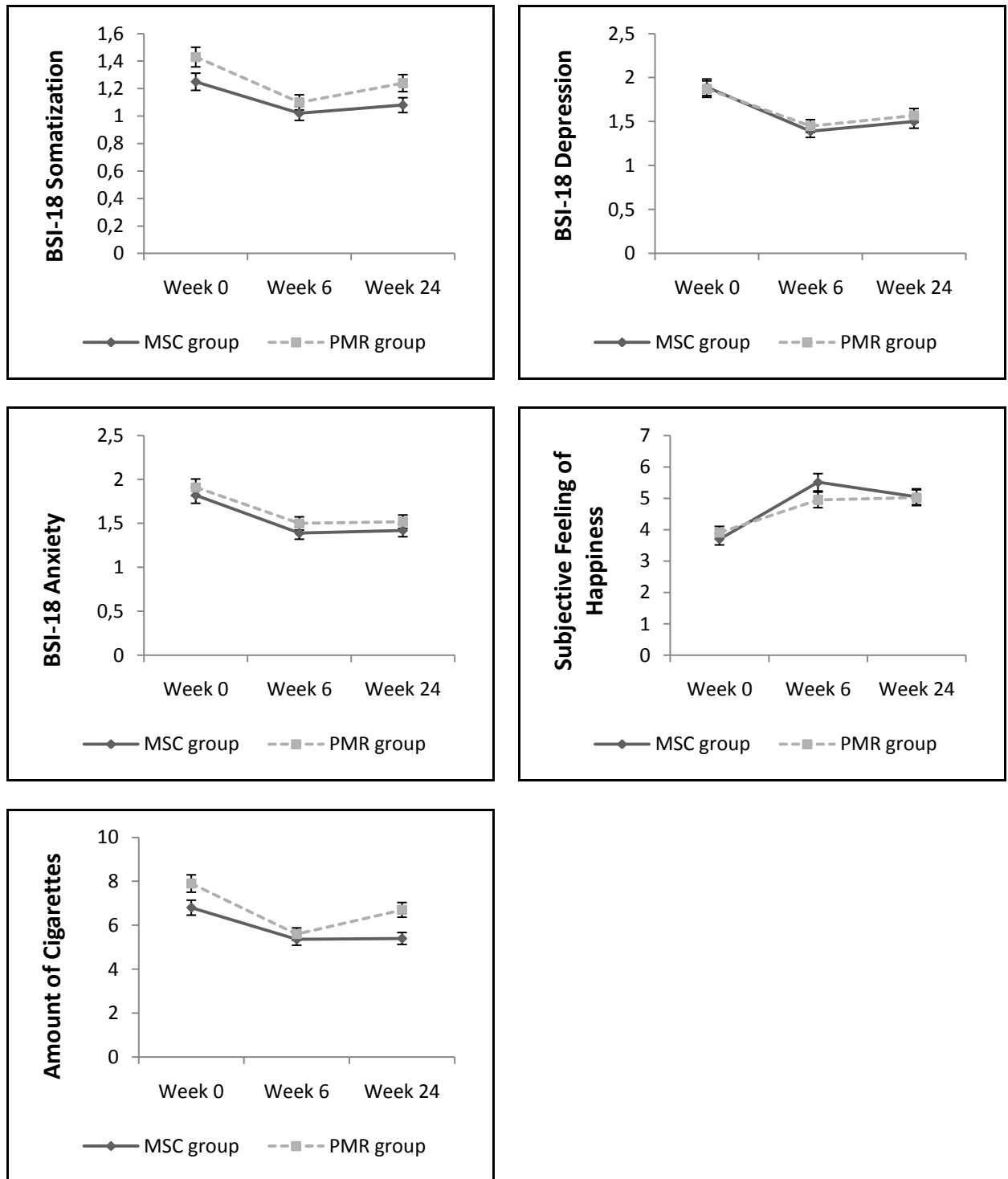


Figure 2. Within-group changes in primary and secondary outcomes. Results of Anova with repeated measures.

Note: SCS total:  $F(2,197)=19.65, p<0.001, \eta^2=.17$ ; SCS Self-Kindness:  $F(2,197)=41.17, p<0.001, \eta^2=.30$ ; SCS Self-Judgment:  $F(2,197), p<0.001, \eta^2=.22$ ; SCS Common Humanity:  $F(2,197)=11.69, p<0.001, \eta^2=.11$ ; SCS Mindfulness:  $F(2,197)=11.40, p<0.001, \eta^2=.10$ ; SCS Isolation:  $F(2,197)=16.09, p<0.001, \eta^2=.14$ ; SCS Over-Identification:  $F(2,197)=26.16, p<0.001, \eta^2=.21$ ; Physical Component Scale:  $F(2,197)=10.49, p<0.001, \eta^2=.10$ ; SF-36 Mental Component Scale:  $F(2,197)=33.04, p<0.001, \eta^2=.25$ ; SF-36 Physical Functioning:  $F(2,197)=2.75, p=0.06, \eta^2=.03$ ; SF-36 Role Limitations due to Physical Health:  $F(2,197)=8.56,$

$p < 0.001$ ,  $\eta^2 = .08$ ; SF-36 Role Limitations due to Emotional Problems:  $F(2,197) = 21.40$ ,  $p < 0.001$ ,  $\eta^2 = .10$ ; SF-36 Energy/Fatigue:  $F(2,197) = 30.24$ ,  $p < 0.001$ ,  $\eta^2 = .24$ ; SF-36 Emotional Well-Being:  $F(2,197) = 21.22$ ,  $p < 0.001$ ,  $\eta^2 = .24$ ; SF-36 Social Functioning:  $F(2,197) = 7.34$ ,  $p = 0.001$ ,  $\eta^2 = .07$ ; SF-36 Pain:  $F(2,197) = 5.40$ ,  $p = 0.02$ , not significant after Bonferroni correction,  $\eta^2 = .03$ ; SF-36 General Health:  $F(2,197) = 84.61$ ,  $p < 0.001$ ,  $\eta^2 = .46$ ; BSI-18 GSI:  $F(2,197) = 28.49$ ,  $p < 0.001$ ,  $\eta^2 = .22$ ; BSI-18 Somatization:  $F(2,197) = 17.07$ ,  $p < 0.001$ ,  $\eta^2 = .15$ ; BSI-18 Anxiety:  $F(2,197) = 25.57$ ,  $p < 0.001$ ,  $\eta^2 = .20$ ; BSI-18 Depression:  $F(2,197) = 25.64$ ,  $p < 0.001$ ,  $\eta^2 = .20$ ; Subjective Feeling of Happiness:  $F(2,197) = 44.22$ ,  $p < 0.001$ ,  $\eta^2 = .31$ ; Nicotine Use (Amount of Cigarettes):  $F(2,197) = 12.75$ ,  $p < 0.001$ ,  $\eta^2 = .11$ .

The values shown are unadjusted means; I bars indicate 95% confidence intervals.

### 3.8. Intervention-related variables

Concerning the frequency and the duration, as well as the mode and the preference of the potential additional practice at week six and week 24, there were some differences observed.

#### Week six

Overall study groups, a total of 149 (74.5%) patients stated to practice in addition to the intervention time. 92 (80.7%) patients in the MSC group had additional practice, whereas only 57 (66.3%) patients from the PMR group admitted to practice in addition to the usual intervention time ( $\chi^2 = 5.37$ ;  $p = 0.02$ ).

Concerning the mode of practice, there was no difference between the groups detected ( $\chi^2 = 5.51$ ;  $p = 0.06$ ). A total of 120 (60.0%) patients practiced in an informal way (any time when needed) and 29 (14.5%) patients practiced in a ritualized (same time/place) way. Within the study groups, 75 (65.8%) patients in the MSC group and 45 (52.3%) patients in the PMR group stated to practice in an informal way, while 17 (14.9%) patients in the MSC group and 12 (14.0%) patients in the PMR group practiced in a ritualized way.

Regarding the frequency of practice, there were significant differences between groups detected ( $\chi^2 = 13.63$ ;  $p = 0.01$ ). From those 149 patients practicing beyond the intervention time, a total of 29 (14.5%) patients reported that they practiced daily (24 [21.1%] patients in the MSC group vs. 5 [5.8%] patients in the PMR group). An additional 54 (27%) patients in total reported practicing multiple times a week (34 [29.8%] patients in the MSC group vs. 20 [23.3%] patients in the PMR group). A total of 47 (23.5%) patients practiced more often than once a week (25 [21.9%] patients in the MSC group vs. 22 [25.6%] patients in the PMR group) and a further 19 (9.5%) patients in total stated they practiced

less often than once a week (9 [7.9%] patients in the MSC group vs. 10 [11.6%] patients in the PMR group).

Concerning the duration of the additional practice, the differences between the groups were significant ( $\chi^2=18.42$ ,  $p=0.00$ ). A total of 33 (16.5%) patients admitted to practicing more than 15 minutes (12 patients [10.5%] in the MSC group vs. 21 [24.4%] patients in the PMR group). An additional 59 (29.5%) patients in total stated they practiced 10-15 minutes (37 patients [32.5%] in the MSC group vs. 22 [25.6%] patients in the PMR group) and 57 (28.5%) patients reported they practiced less than 10 minutes (43 [37.7%] patients in the MSC group vs. 14 [16.3%] patients in the PMR group).

Regarding the trust in the teacher, there were no differences between the groups detected ( $t(198)=0.81$ ;  $p=0.42$ ). The overall mean for both study groups was  $M=7.14$  ( $SD=3.15$ ). Within the groups, there was a mean of  $M=6.98$  ( $SD=2.97$ ) for the MSC group and  $M=7.35$  ( $SD=3.39$ ) for the PMR group with regards to the trust in the respective trainer.

Concerning the favour for the practice, there were significant differences between the groups detected ( $t(198)=-3.18$ ;  $p=0.00$ ). There was an overall mean of  $M=6.69$  ( $SD=3.14$ ) detected for the study groups. In the MSC group, the mean for practice favour was  $M=7.18$  ( $SD=2.77$ ) and for the PMR group, there was a mean of  $M=5.79$  ( $SD=3.42$ ) detected.

#### Week 24

24 weeks after the rehabilitation stay ended, a total of 136 (68%) patients stated they still practiced the learned technique (87 [76.3%] in the MSC group vs. 49 [57%] in the PMR group). These difference between groups were significant ( $\chi^2=8.43$ ;  $p=0.00$ ).

From those 136 practicing patients, 108 (54%) patients practiced in an informal way and 28 (14.0%) patients practiced in a ritualised way. Within the study groups, 72 (63.2%) patients in the MSC group practiced informal and 15 (13.2%) patients stated to practice in a ritualised way. In the PMR group, there were 36 (41.9%) patients who reported to practice in an informal way and 13 (15.1%) patients that practiced in a ritualised way ( $\chi^2=9.98$ ;  $p=0.00$ ).

Concerning the frequency of practice, there was a difference between the groups detected ( $\chi^2=11.45$ ;  $p=0.02$ ). A total of 26 (13.0%) patients overall reported to practice daily (20 [17.5%] in the MSC group vs. six [7.0%] patients in the PMR group). An additional 43 (21.5%) patients stated to practice multiple times a week (28 [24.6%]

patients in the MSC group vs. 15 [17.4%] patients in the PMR group). A total of 38 (19.0%) patients stated to practice more often than once a week (21 [18.4%] patients in the MSC group vs. 17 [19.8%] in the PMR group) and 29 [14.5%] patients reported to practice less than once a week (18 [23.7%] patients in the MSC group vs. eleven [12.8%] patients in the PMR group).

Regarding the duration of the practice, there was a significant difference between the groups ( $\chi^2=18.30$ ;  $p=0.00$ ). Overall in the study groups there were 27 (13.5%) patients who stated that they practiced longer than 15 minutes (eleven [9.6%] in the MSC group vs. 16 [18.6%] patients in the PMR group), a further 56 (28.0%) patients stated that they practiced 10-15 minutes (35 [30.7%] patients in the MSC group vs. 21 [24.4%] in the PMR group) and 53 (26.5%) patients reported practicing less than 10 minutes (41 [36.0%] patients in the MSC group vs. 12 [14.0%] in the PMR group).

Concerning which practice was preferred at week 24, there was a difference between the groups detected ( $t(198)=-3.69$ ;  $p=0.00$ ). The overall mean was  $M=6.16$  ( $SD=3.40$ ) for both study groups. Within the study groups there was a mean of  $M=6.91$  ( $SD=3.07$ ) detected for the MSC group and a mean of  $M=5.17$  ( $SD=3.57$ ) for the PMR group.

## 4. Discussion

The purpose of this study was to get a first insight into the effectiveness of an abridged version of the original MSC training (Germer, 2009; Neff & Germer, 2013) in psychiatric rehabilitation and to compare that effectiveness with the usual treatment, PMR (Jacobson, 1929). As far as we are aware, this is the first study which attempts the employment of (an abridged version of) MSC in the context of inpatient rehabilitation treatment.

### 4.1. Outcome

The findings of the current investigation resulted, as expected, in an enhanced amount of the SCS total score in the MSC group in comparison to the PMR group after six weeks training during the rehabilitation stay. Not surprisingly, all subscales of the SCS showed better values for the MSC group in comparison to the PMR group. 24 weeks after the rehabilitation stay has ended, participants got the respective questionnaires again by letter to test the durability of the response.

There, the SCS total score further increased in the MSC group, whereas the PMR group remained at exactly the same score. At the 24 week follow-up assessment, no significant difference between the MSC group and the general population was detected in regards to the SCS total score ( $p > 0.05$ , (Neff, 2003a)). Although the applied Bonferroni correction used for the analysis was very strict ( $p < 0.002$ ) the between group differences concerning the MSC and the PMR group remained significant.

As expected, significant between-group differences concerning the subscales of the SCS could also be detected. Patients in the MSC group achieved higher scores than the PMR group which remained significant after Bonferroni correction regarding the SCS subscale Self-Kindness at week six, as well as at week 24. In regards to the SCS subscale Self-Judgment, the between group difference with lower scores for Self-Judgment in the MSC group at week six did not remain significant after Bonferroni correction. At week 24 there was no more significant difference found between the intervention and the control group. Analysis of the SCS subscale Common Humanity led to a significant difference between groups at week six, as well as at week 24 where the MSC group achieved higher scores than the PMR group. This difference was robust against Bonferroni correction for multiple testing. In the SCS subscale Mindfulness, no differences between groups could be detected at week six. Nevertheless, a significant difference between groups, favouring the

MSC group over the PMR group in regards to the SCS subscale Mindfulness, occurred at week 24 and was still significant after Bonferroni correction. The SCS subscale Isolation revealed significantly lower scores for the MSC group in comparison to the PMR group at week six as well as at week 24 and these results were still significant after Bonferroni correction. Regarding the SCS subscale Over-Identification, there were significant between group differences which were robust against Bonferroni correction at week six, as well as at week 24. The scores in the MSC group concerning the SCS subscale Over-Identification were significantly lower than in the PMR group.

Contrary to our assumptions, there were no significant differences found between the MSC and the PMR group with respect to the Physical and Mental Component of the SF-36. Regarding the SF-36 subscales, there were no differences between groups found concerning Physical Functioning, Role Limitations due to Physical Health, Role Limitations due to Emotional Problems, Energy/Fatigue, Emotional Well-Being, Social Functioning or General Health. Just in the SF-36 subscale Pain, where the MSC group reached a significantly lower score than the PMR group, there were significant differences found between the groups at week six and at week 24, although these differences did not remain significant after Bonferroni correction.

In contrast to the assumptions of the hypothesis, there were no differences detected between the groups concerning the GSI of the BSI-18 or its subscales Somatization, Anxiety and Depression.

Nevertheless, there were increased feelings of subjective happiness observed in the MSC group at week six in comparison to the PMR group. Regardless, this result did not remain significant after Bonferroni correction for multiple testing and could not be repeated at week 24, where both groups converged with regards to their amounts of happiness again.

Furthermore, there were no differences at any time between groups with regards to nicotine use detected.

Yet, regarding the within-group differences over time, there were significant improvements in both study groups found in all subscales of the SCS, even though the MSC group had a greater improvement over time naturally. As the improvements of the PMR group were very small, those ameliorations had no effect on the SCS total score, where no significant improvement for the PMR group could be detected.

Concerning within-group differences in the SF-36, both groups had improved scores in the Mental as well as in the Physical Component scale of the SF-36. All respective

outcome measures except two subscales of the SF-36, namely the Physical Functioning subscale and the Pain subscale, showed a significant improvement over time. There were no significant improvements found from pre- to post-treatment and in follow-ups regarding the SF-36 subscale Physical Functioning. In addition, there was no significant improvement found within the groups over time concerning the SF-36 subscale Pain that could have resisted the Bonferroni correction. Therefore, no improvements could be detected in either of those subscales over time. Nonetheless, other SF-36 subscales, namely Role Limitations due to Physical Health, Role Limitations due to Emotional Problems, Energy/Fatigue, Emotional Well-Being, Social Functioning and General Health, contained significant ameliorations within the groups. Compared to the general population (Ware, 1994), the scores for both groups in regards to the Physical Component scale were increased ( $p < 0.05$ ) at week six but not at week 24 ( $p > 0.05$ ). Concerning the Mental Component of the SF-36, values of the study participants were decreased ( $p < 0.05$ ) compared to the general population (Ware, 1994) at all assessment points.

With regards to the BSI-18, both groups exhibited less psychiatric symptom burden (GSI), less Somatization, Anxiety and Depression after six weeks of rehabilitation but the parameters worsened slightly at week 24 again. However, when the GSI values of the study participants were compared with the general population (Spitzer et al., 2011), there was no significant difference found between the study population and the general population after six weeks of treatment and at the 24-week follow-up ( $p > 0.05$ ). Moreover, compared to previous research (Gaiswinkler & Unterrainer, 2016) where healthy yoga and gymnastics practitioners were examined, the study population scored significantly lower on the GSI, as well as on all subscales of the BSI-18, after six weeks of rehabilitation than highly immersed yoga practitioners ( $p < 0.001$ ).

A within-group difference concerning the subjective feeling of happiness for both groups could be detected over time, in addition to a reduction in number of cigarettes consumed per day.

Finally, the hypothesis that an abridged and shortened form of MSC training also leads to an improvement concerning self-compassion and its components can be verified. Furthermore, both groups ameliorated in the SF-36 Physical Component scale and all parameters of the BSI-18 compared to the general population and had even better BSI-18 outcomes than highly immersed yoga practitioners. Nevertheless, the hypothesis that the MSC group might exhibit more improvements concerning quality of life (SF-36) and psychiatric symptoms (BSI-18) than the PMR group must be rejected. Previous research on

this topic found that self-compassion is negatively associated with psychopathological symptoms, namely depression, anxiety and stress (MacBeth & Gumley, 2012). Self-compassion (as well as mindfulness) was mentioned as being the mediating factor in Mindfulness Based Cognitive Therapy with regards to depression (Kuyken et al., 2010). Participants with high scores in self-compassion during the concerning intervention had significantly lower depression outcomes (Kuyken et al., 2010). This could not be verified in the current investigation as there were significant improvements found in both study groups over time but no robust between-group differences could be detected concerning psychopathology. Nevertheless, going along with the hypothesis, the MSC group exhibited more subjective happiness than the PMR group at week six. A positive relationship between self-compassion and happiness has already been reported for Buddhist practices (Rāhula, 1974; Salzberg & Kabat-Zinn, 2004) and is therefore not surprising and, indeed, corroborates the hypothesis. Furthermore, it was discovered in previous studies that the training of MSC brought relief to people suffering from steady ruminations as well as acting harsh towards themselves (Longe et al., 2010; Raes, 2010). This new attitude towards one's own suffering gained through an improvement of self-compassion could have led to a greater amount of subjective happiness. The MSC group did not tend to have fewer psychopathological problems but they may have gained a different relationship and understanding to their problems (MacBeth & Gumley, 2012), as it is also the focus in cognitive behavioural schools such as Acceptance and Commitment Therapy (ACT, Hayes, Strosahl and Wilson, 1999), Mindfulness Based Cognitive Therapy (MBCT, Segal, Williams & Teasdale, 2002), Dialectical Behavior Therapy (DBT, Linehan, 1993) and Compassion Focused Therapy (CFT, Gilbert, 2005, 2010). Furthermore, there was also an increased subjective feeling of happiness detected in previous studies with yoga practitioners (Gaiswinkler, Unterrainer, Fink, & Kapfhammer, 2015).

#### **4.2. Further considerations**

Regarding the statistical analysis, most baseline characteristics were well balanced between the groups at the beginning of the interventions and the groups were therefore easy to compare. Apart from the SCS subscale Over-Identification, there were no significant differences between the study groups at the pre-test assessment in primary and secondary outcomes. The feature Over-Identification was significantly higher and distinct at the pre-test in the MSC group than in the PMR group. Because the testing of the total

SCS score revealed no differences between the groups at the pre-test it was decided to neglect that small difference. Moreover, the difference that was detected in the MSC group made less of an impact due to the aim of the research than if that difference would have disadvantaged the PMR group. One between-group difference at the pre-test assessment consisted in baseline characteristics of the patients. There was a significant between-group difference with regards to the diagnosis of organic, including symptomatic, mental disorders (ICD-10: F00-F09) since there were only three patients in total carrying this feature allocated to the PMR group and none to the MSC group. Another between-group difference was the distribution of the diagnosis of mental and behavioural disorders due to psychoactive substances (ICD-10: F10-F19) as there were more patients with this diagnosis in the PMR group rather than the MSC group. Because the allocation to the study groups was done in a randomized way, unfortunate coincidences were likely to occur. This circumstance might limit the generalizability of the current findings slightly but as ability to consent was given for all participating patients, this fact seems to be negligible.

When regarding the between-group differences concerning SCS and its subscales in favour of the intervention group, one has to keep in mind that there were differences between groups at the post-test assessment at week six concerning the additional practice of the learned method (either MSC or PMR). Patients in the MSC group had a lot more additional practice than patients in the PMR group. This increased amount of additional practice is likely to have had a tremendous impact on the current findings, as a positive association between various parameters of psychological well-being and the frequency and duration of a regular (meditation) practice is well known (Baer et al., 2012; Gaiswinkler, & Unterrainer, 2016).

Furthermore, favour for the practice was significantly more pronounced in MSC practitioners than in PMR practitioners. This finding was underlined by the personal statements of participants in the MSC group, which were far more enthusiastic and marked by appreciation of the practice than those of the PMR group participants. This subjective impression of the clinical staff seems to be only partly reproduced by the scores of the quantitative measures.

The fact that the within-group difference of the subscales Mindfulness and Self-Judgment of the SCS was only significant after 24 weeks but not after six weeks could be attributable to the fact that some aspects of MSC need a little time before they show their effect, especially when one takes into account that the original MSC training usually lasted eight weeks instead of six (Neff & Germer, 2013). Additionally, a reason for the non-

significant between-group difference at week six regarding the SCS subscale Self-Judgment may be that this subject is one which is addressed in detail throughout psychotherapy regardless, in contrast to more pertinent aspects such as Self-Kindness or Common Humanity where the MSC group reached constantly higher scores than the PMR group.

The missing between-group difference concerning the Physical and the Mental Component Scale of the SF-36 and its subscales, and the GSI of the BSI-18 and its subscales, might be attributable to the fact that it was necessary to implement a shortened and slightly abridged form of the original MSC training for clinical practicality. Regarding the missing within group differences concerning the SF-36 subscale Physical Functioning and Pain, one has to bear in mind that the Sonnenpark Rehabilitation Centre has its focus more on psychosocial facets rather than in physical functioning. Furthermore, it is important to note that even if there were no between-group differences detected concerning the SF-36 and the BSI-18, it can be assumed that patients in the MSC group gained another perspective towards their symptom burden, underlined by the higher scores in SCS at week six and week 24 and the increased subjective feeling of happiness at week six.

As already postulated by Tang et al. (2015), variables like a change in lifestyle, diet and expectations might be confounded with meditation training. While lifestyle in general was covered mostly by the questionnaires used for the study, and diet (nutrition habits) was investigated through the sociodemographic questionnaire where we found out there were no differences between the groups, expectancy towards or an intention for the training of MSC or PMR could unfortunately not be evaluated due to the nature of the investigation. As such, the authors further recommend care be taken with which variables are controlled for when evaluating meditation in general since some variables might be “integral aspects of the meditation training” (Tang et al., 2015). In the current investigation such variables (additional practice, favour for the practice, trust in teacher) were summarized as “intervention-related variables”. Therefore, intervention-related variables were regarded as confounding variables due to meditation. Thus, covariates of additional practice were not taken into account because differences in additional practice were to be expected and led naturally to the different outcomes e.g. had a tremendous impact on the outcomes.

As reported by MacBeth and Gumley (2012), most treatment studies which used self-compassion as an outcome measure were not able to concretize whether a higher score in self-compassion might be linked to a decreased symptom burden after treatment. As both study groups in the current investigation increased independently from one another with

regards to quality of life (measured via the SF-36) and decreased concerning symptom burden (measured via the BSI-18), the increase in self-compassion can only be attributable to the abridged MSC intervention. Finally, it has to be said that the study design should have been able to successfully extract the effect of the MSC training rather than possible interferences.

### **4.3. Limitations**

Due to reasons of clinical practicality, the generalizability of the findings in the current investigation contains some important limitations. Reasons of practicality led to the situation that it was not possible to implement the original MSC training into the treatment schedule of the Sonnenpark Rehabilitation Centre. The first and most important reason was that the rehabilitation stay at the Sonnenpark Rehabilitation Centre is funded through the Austrian national health insurance. Thus, the rehabilitation stay is limited to six weeks in total. The original MSC training (Neff & Germer, 2013), however, is conceptualized for a duration of eight weeks with each session lasting 150 minutes (one session per week plus one day special retreat). Furthermore, a session with 150 minutes duration would have been impractical due to the strict treatment schedule of the Sonnenpark Rehabilitation Centre and in addition, would have not been reasonable for the patients. Therefore, every session lasted 75 minutes and was held six times in total. The generalizability of the current findings is therefore limited substantially. Unfortunately, it is not possible at this juncture to say whether the results would have been more convincing or not if the original, full MSC training had been applied. Nevertheless, previous research already successfully investigated the effects of shortened self-compassion programs (Shapira & Mongrain, 2010; Smeets, Neff, Alberts, & Peters, 2014).

An important limitation of the current study is that randomization was not done in an ideal way. Due to the fact that the Sonnenpark Rehabilitation Centre has a strict treatment schedule which is planned precisely, randomization was done for whole incoming groups instead of for every single patient. Reasons of practicality in a clinical context led to the necessary adaptations of the study design; otherwise an investigation would have not been possible. This fact might limit the reliability of the current findings.

Another detrimental factor limiting the generalizability of the results was the great decrease in the sample size at the follow-up assessment during week 24, as shown in Fig.1. Therefore, the results at week 24 may be distorted since missing values were kept constant

from week six if they were missing at week 24. Thus the sample size at week 24 remained the same with regards to the calculations. Thinking through the possibilities about how this situation could best be handled, it would have been an opportunity to do calculations involving only the actual patients who were still in attendance at week 24, which could have been a problem due to issues of self-selection of the few responding patients and a great loss of power for the calculations. An estimation of the missing data through analysis of regression or calculating a best or worst-case scenario would have also been conceivable. Finally, mainly for clinical reasons of applicability and because this was the most neutral actionable estimation, it was decided to follow the solution of a comparable study (Wang et al., 2010) and to replace missing data at week 24 with the values at week six. The reliability of the current investigation, therefore, has to be regarded as limited.

A further limitation of the current investigation was the missing recording of adverse events in the life of the patients during treatment. A standard adverse-event case report, such as those used in similar studies (Keller et al., 2000; Wang et al., 2010) would have provided the ability to obtain more information about the developmental process of the patients.

Furthermore, it might be possible that the social component was more pronounced in the MSC training than in the PMR training. The training of MSC contains plenty of interpersonal exercises. Although those aspects of the MSC training were reduced to a minimum due to clinical practicality, some of them (e.g. exchanges about body sensations and feelings during the meditation) still remained in the training. As already seen from previous studies (Cohen, 2004; Richard M Lee & Robbins, 1998), the feeling of being part of a peer group and the positive experience of social bonding can lead to increased psychological well-being. Although both groups received training in a group setting with a teacher where the amount of social interaction between group and teachers was about the same, it might be that the MSC group had a more pronounced social interaction.

It was already mentioned in previous studies (Tang et al., 2015) that when a control intervention is used, it is important that the investigator makes certain that the social interactions between the group and teachers, amount of home exercise, physical exercise and psycho-education should be comparable. Those issues were mostly covered by the study design, although the MSC group possibly concentrated more on their mind while the PMR group concentrated more on their body. Nevertheless, both groups had social interaction with the trainer, were encouraged to practice outside the intervention time and received a psycho-education.

Furthermore, both interventions took place in the same room and at the same time and both groups were provided with handouts and audio-CDs with relaxation music and exercises spoken by the respective trainer. However, previous studies already used relaxation training as an active control condition in comparison to meditation training (Jain et al., 2007; Tang et al., 2009; Tang et al., 2007). Therefore, the choice to use PMR as a control intervention seemed acceptable, although it is notable that there is a certain difference concerning the MSC intervention and the PMR control intervention which lies in the nature of the respective practices. Whereas MSC sessions are based on each other, revealing more complex strategies to gain self-compassion over time, PMR sessions are always the same, leading to a natural trainings effect. In a previous study where the efficacy of integrative body mind training was tested against muscle relaxation, the authors claimed that while an integrative body mind training addresses more facets of mindfulness meditation like relaxation, breathing adjustment, mental imagery and mindfulness training in general, the training of PMR has its focus solely on relaxation (Tang et al., 2007). Therefore, it can be assumed that the training of MSC contains more components than the training of PMR which might be a fact that should be kept in mind for future studies. It might lead to more convincing results if the control intervention is some sort of fake meditation (e.g. placebo meditation) intervention like in previous research where the control group received meditation training without proper meditation instructions (Zeidan, Johnson, Gordon, & Goolkasian, 2010). With regards to this, an extraction of the effects only attributable to the meditation training would therefore be best.

Another limitation of the current study is the fact that all items raised in the current investigation, except diagnosis and medication, were based on self-report. The use of self-reported data in meditation studies has already been criticized by MacBeth and Gumley (2012). The opinion of the authors that it would be helpful to develop an interview which could be connected to the self-report, such as with the Adult Attachment Scale, is a commendable one. Further knowledge about the clinical applicability of an abridged version of the MSC training might be facilitated through the additional use of semi-structured interviews. Nevertheless, such an interview is unfortunately not available at the moment.

There were slightly more women investigated than men in the current investigation (64.5%). It is known from previous studies, that men report higher scores in self-compassion than women (Neff, 2003a; Neff et al., 2005). As there was no between-group

difference concerning the distribution of sexes in the study groups, this circumstance seems to be negligible for the current investigation.

One circumstance concerning sex differences that might be of interest is the fact that the MSC teachers were male whereas the PMR instructor was female. Previous research already investigated possible gender bias concerning the instructing person (Bennett, 1982; MacNell, Driscoll, & Hunt, 2015). Participants seemed to expect more warmth and intimacy in verbal and nonverbal communication from a female instructor, whereas such traits like immediacy in communication were less expected from male instructors and then in return more appreciated when acted out against expectation (MacNell et al., 2015). Therefore, it might be possible that the different gender of the instructors led to some gender bias in the study groups. Nevertheless, the MSC instructors which were available at the respective investigation period were male whereas the most experienced available PMR instructor was female. This decision was merely guided by practical reasons. In future investigations, it could be important to be mindful of any possible gender bias due to the instructors.

Regardless, it is important to note that a (self-) compassionate attitude was acted out towards the whole rehabilitation centre. (Self-) compassion has become a basic principle at the Sonnenpark Rehabilitation Centre, since the leading medical doctor is a certified MSC teacher, spreading the message of MSC to all employees. Therefore, it can be assumed that both instructors, the PMR as well as the MSC instructors, exhibit the same (self-) compassionate attitude.

Nevertheless, the mean score for the trust given to the PMR trainer was slightly higher than that for the MSC trainer, whereas favour for the practice was slightly higher in MSC practitioners than in PMR practitioners, although these differences were not significant. However, the role of the trainer should be further investigated in future studies as already mentioned in previous research on this topic (Tang et al., 2007).

For future studies, it could be helpful to keep a record of changes in medication from previous pharmacological treatment to treatment proposed and given at the rehabilitation centre. A change in medication might have had a tremendous impact on psychological measures.

Furthermore, it would have been advantageous if previous experiences with psychotherapeutic treatment had been raised, because consultation from treating psychotherapists revealed that a lack of experience may lead to less compliance with the MSC intervention. Feedback also included the fact that it is often part of the

psychotherapeutical process to learn to decline and say “no” in general. This might have had a tremendous effect on the reduced response rate at the follow-up.

Additionally, the consideration that MSC might be contraindicated with patients suffering from panic attacks or anxiety disorders in general was expressed by respective psychotherapists. Here it is important to note that previous research already criticized the application of mindfulness meditation in general to people suffering from psychiatric diseases (Farias & Wikholm, 2015). Nevertheless, the vast amount of literature supporting the hypothesis that mindfulness meditation approaches such as MSC lead to an enhanced psychological well-being in people suffering from psychiatric issues is more predominant and supported through the current findings (Allen & Leary, 2010; Barnett & Shale, 2012; Burstein et al., 1999; Neff, 2003b, 2012; Neff et al., 2007; Schanche et al., 2011; Thompson & Waltz, 2008; Van Dam et al., 2011; Vettese et al., 2011).

Thus, it was notable that after the MSC intervention most patients needed time to process the recently experienced content. It was perceived as supporting if the MSC intervention took place before the individual psychotherapeutic meeting. The oral feedback given through the patients to their psychotherapists also included the fact that even after those often stirring interventions there was still a need for support for a lot of patients. Others in turn had the urge to rest and recuperate after the intervention. The need for a psychotherapeutic meeting subsequently depended, from the point of view of the treating psychotherapists, on the individuals' overall stability, as well as on the cohesion within the corresponding group. If a great cohesion existed, the group was able to pick up those who were overwhelmed through the intervention and then therefore lead to greater group cohesion in return. It has to be further examined if it makes sense to expose a patient with posttraumatic stress disorder or a patient with generalized anxiety disorder to a group consisting of relatively foreign people. With regards to this, it is important to state that not every meditation technique fits for every person and furthermore people react differently to meditation (Tang et al., 2015; Tang et al., 2007). For future studies it would therefore be recommended to find out for each patient individually the best fitting approach to enhance mindfulness and self-compassion.

#### **4.4. Conclusion**

The current investigation underlies some important limitations which exist mostly due to clinical practicality that one has to bear in mind when planning an investigation in a

clinical context. Nonetheless, the current investigation was the first randomized controlled trial using (an abridged version of) MSC in the context of inpatient treatment and provided satisfying results. The preliminary findings suggest the clinical applicability of an abridged (shortened in time and adapted concerning interpersonal exercise) MSC program for psychiatric inpatients. Patients undergoing a six-week abridged MSC intervention exhibited significantly improved scores concerning self-compassion and its components, namely alterations regarding self-kindness, common humanity and mindfulness and decreases in subscales such as self-judgment, isolation and over-identification compared to a group of patients practicing the well-established PMR. Therefore, it can be assumed that patients in the MSC group cared more for themselves in a self-compassionate way and were also happier after the rehabilitation stay than the PMR group. Because there were no differences detected either in physical or mental components, or in psychiatric symptoms between the MSC and the PMR group, the implementation of MSC in psychiatric rehabilitation can therefore be recommended. Regarding the vast amount of literature underlining the importance of mindfulness based techniques in patient treatment (Barnett & Shale, 2012; Burstein et al., 1999; Van Dam et al., 2011) and considering the fact that PMR is such an established treatment method, it seems edifying that abridged MSC training is definitely not inferior to this well-known practice but on the contrary, might even lead to a more compassionate contact with oneself. In future research the focus should lie on a further validation of these initial, quite promising, findings by implementing the MSC program in its original length into psychiatric treatment.

Nevertheless, by taking into consideration the fact that interpersonal exercise might be overwhelming for psychiatric patients an abridged version of MSC, such as that used in the current investigation, should be used and is strongly recommended.

## 5. Bibliography

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## 6. Appendix

### 6.1. Core Meditations of MSC

#### Loving breathing:

Choose a sitting position that supports your muscles and allows you to remain without strain during the entire exercise. Try to keep the back straight and upright, the shoulders can fall loosely backward down and the chin can be pulled gently towards the chest.

Inhale a few times gently and deeply in and out and release all unnecessary tension. Gently close your eyes or open your eyes slightly when this is more comfortable for you. If you want, place a hand for a moment on your heart (or elsewhere) to remind you that you turn to yourself and your experience now with loving attention.

Focus your attention now on your breath. Linger with attention at the place where breathing is most noticeable. Perhaps at the nasal openings, the abdominal wall, the chest, or perhaps a gentle movement of the entire body can be felt. Investigate the breathing in your body and feel your breath for a while. Perhaps you can turn to your breath the way you would do it to a beloved child or to a pet, with curiosity and tenderness.

Your mind will often be distracted and will not remain with the sensations of the breath. Do not worry about how often your thoughts digress. Accompany your attention simply gently back to your breath whenever you notice that the mind has migrated. Just as you would love to bring back a small child or a young puppy again and again when he ran away.

Realize how the breath brings life into your body and nourishes you - regardless of whether you are watching it or not. Leave the breathing entirely to your body - there is nothing you need to do. The body breathes you. Feel how the breath provides the whole body and moves with a soothing rhythms that comes and goes like the waves of the ocean. If you like, let the breath gently weigh you. Leave yourself completely to your breath. Perhaps you can become your breath, gently blended and cared for.

After a while, remove the attention from the breath and let everything that occurs in the awareness be exactly as it is. Just for this moment.

With friendly perception, ask yourself: "What is now?"

Then open your eyes slowly and gently.

#### Metta meditation:

Take a comfortable stance while sitting or lying down. Close your eyes or leave them slightly open. Take a few deep breaths to arrive in your body and at the present moment. If you want, you can put a hand on your heart or where it has a soothing effect on you and reminds you to turn to yourself and your experience not only with awareness, but with loving awareness.

Take a little time to get inside your body, feel what is there. Let all sensations, thoughts, or feelings simply come and go. After a while, you perceive your breath where you feel it most clearly. When your attention drifts, pay attention to the gentle movement that your breath provokes.

While you breathe, you allow yourself to be conscious in a gentle way of how it feels to be right now in that body. Then you offer yourself words or phrases that fit to your needs exactly at this moment. Words that are easy for you - simple, clear, sincere and friendly. If you already have phrases that mean something to you, then use them. An example for the traditional "Metta sentences" would be:

*"May I be healthy.*

*May I be happy.*

*May I be safe and secure.*

*May I live in ease."*

If you are struggling and need some compassion, perhaps you also have phrases such as:

*"May I be free from suffering."*

Try to find words that will do you good right now.

If you notice that your attention is digressing, re-enter into your body and return to your sentences.

Finally, linger with your attention still in your body in the knowledge that you can return to your sentences at any time.

Gently open your eyes.

### To give and to receive compassion

Choose a comfortable sitting position, close your eyes and breathe in and out a few times deep and relaxed. Allow yourself to feel the sensations intensively during inhalation and exhalation. Perceive how your breath nourishes your body when you inhale and relaxes your body when you exhale.

Let your breath flow naturally. Stay with your attention with the sensations during inhalation and exhalation. If you like, put a hand on your heart or anywhere else on your body to remember that you turn to yourself and your experience with a loving awareness.

Now turn your attention to your inspiration, let the sensations be enjoyed by inhaling, one breath after another. Realize how your inhalation nourishes every single cell and let the exhalation happen naturally. If you like, you can associate a word with each inhalation, for example "love", "compassion", "easiness", or "peace". Or imagine that you breathe in warmth or light and give yourself something that is good for you at this moment.

Now think of someone whom you would like to share your warmth with. Either someone you love or a person who has just been struggling with difficulties in his life and needs a sense of empathy. Let a clear picture of the person emerge before your mind's eye.

Focus your attention now on the exhalation. Feel how your body exhales and send the person with each exhalation warmth and benevolence. If you like, you can also associate a loving word with each exhalation, or imagine how to send something benevolent to the person with each exhale. Now feel how your body inhales and exhales. You inhale for yourself and exhale for the other person.

*"An inhalation for me, an exhalation for you."*

*"One for me, one for you."*

However you may feel, allow your feelings to simply be there and connect with the intention of breathing benevolent for yourself and someone else. Let the breathing flow in and out, like gentle waves of the ocean. Perhaps you can become a part of this uninterrupted, boundless stream of inhalation and exhalation. If you like, you can focus a little more on yourself or the other person depending on what seems appropriate to you. As you exhale, you can also send love and compassion to other people, groups, or the world in general. Gently open your eyes.

### Body scan with compassion

This exercise is best performed on the floor, unless you would fall asleep too easily. Lie on your back and let your arms lie sideways beside the body. The legs lie stretched away from each other approximately shoulder-width apart. Place a hand on the heart area to remember to kindly deal with yourself. Feel the warmth of your hand and take three deep, relaxing breaths. Then place the arm next to the body. Now focus your attention on the toes of your left foot and see what you feel there. Perhaps you feel warmth, cold, moisture, drought? Linger while feeling the body sensation. Maybe it feels comfortable, maybe you feel pain or maybe you do not feel anything. Let every sensation be exactly as it is. Are there unpleasant sensations in one place? Then you may make this place soften in the mind, e.g. by imagining that you wrap yourself with a warm towel. You can also turn to the site with a compassionate attitude and say words like, "There's something hurting there, that's all right."

Let the attention wander from the toes of the left foot, continue to the soles, and then to the whole foot. Now turn to your feet with an inner feeling of gratitude. With this small support surface, you can carry and hold the body all day long. Our feet do hard work, but we usually give them too little attention. If your feet feel good right now, you can simply be grateful for the fact that you do not feel pain there. If your thoughts digress, which will inevitably be the case after a few seconds, you simply return to your body sensations with your attention. If you lose yourself in a particular body position in judgments or unpleasant associations, put a hand on your heart, gently breathe in and out, and return to your body sensations. If it is particularly difficult to stay at a specific part of your body, contact another part of the body. Let the exercise run gently and lovingly. After facing the sensations in the left foot with sympathetic awareness, turn to the rest of the body regions up to the apex of the head. Example of the order:

Toes of the left foot- left sole- whole left foot- ankle- shinbone and calf- knee- thigh- hip- whole left leg- toes of the right foot- right sole- whole right foot- ankle- shinbone and calf- thigh- hip- whole right leg- belly-strip area-bottom- lower back- upper back- chest- leftshoulder- left upper arm- elbow- forearm- hand- finger- the whole left arm and the left hand- right shoulder- right upper arm-elbow- hand- finger- whole right arm and right hand- neck- nape- chin- lips-mouth- cheeks- nose- eyes- ears- forehead- whole face and the whole back of the head- apex head.

As you move your attention from one body region to the next, focus your awareness on the sensations that appear from moment to moment. Keep an attitude of gratitude to the individual parts of the body. Think about the hard work your stomach needs to digest your food. To the strength that your neck is used to hold up your head and how to provide, guide and delight your eyes and ears all day. When you have given loving attention to every part of your body, place your hand on your heart again and give your whole body to the end of the exercise a "shower" full of gratitude and affection. Then gently open your eyes.

## **6.2. Informal exercises of MSC**

### Self-compassion break

If you feel stressed or when difficult feelings occur, try to track where you can feel these discomfort in your body. In which parts is it noticeable the most? Connect with the discomfort at those spot, where you can feel it as a bodily sensation. Now tell yourself the following:

*“This is a moment of suffering”*

This is mindfulness. Maybe other sentences/formulations fit better for you. Some possibilities would be: “This hurts.”, “Ouch.”, “This is stress.” Now tell yourself:

*“Sorrow is part of the human experience”*

This is an expression of common humanity. Other possibilities would be: “Other people feel the same like me.”, “I am not alone.”, “We all experience difficult times in our lives.”

Now place your hands upon your heart, fell the warmth and the gentle pressure of your hands or chose a calming touch which fits for you and is able to calm you down. Say to yourself:

*“May I be kind to myself.”*

For a more personal expression, ask yourself: “What is it, that I would like to hear now the most?” Examples would be:

*“May I accept myself the way I am.”*

*“May I give myself the compassion that I need.”*

*“May I learn to accept myself the way I am.”*

*“May I forgive myself.”*

*“May I be safe and secure.”*

Whenever you experience difficulties finding the right words, recall a similar situation of a close friend or a loved person. What would you tell him or her? Perhaps you can give those words to yourself. For a variation there is also a general sentence of Mindful-Self Compassion:

*“Sorrow and joy are part of life. May I be kind to myself.”*

### Gentle touch

To comfort and care for ourselves if we feel bad, it often helps to give yourself a hug or to put a hand upon your heart and to feel the warmth. Perhaps this may sound weird or embarrassing to you but your body does not know that. Our body reacts to physical contact the same way in which a baby reacts to the hug of his mother. Our skin is a highly sensitive organ. Science reveals that physical touch leads to a distribution of oxytocin, which conveys a feeling of safety and therefore has a soothing effect when difficult emotions occur; it reduces cardiovascular stress. Reason enough to simply try it out. Perhaps you are willing to try to put your hands on your heart multiple times a day for a week if you feel discomfort.

Breathe in and out two to three times consciously if you feel stressed. Place your hand upon your heart gently and feel the gentle pressure and the warmth of your hand. If you want to, you can also put both hands upon your heart. You can also try out how it feels if you put both hands upon your heart and feel the difference between one or both hands upon your heart. Feel the touch of your hand on your chest. If you like to, you can make

small circling movements on your chest. Feel the natural movement and the lifting and lowering of your chest while you inhale and exhale. Stay with this exercise as long as you wish to.

For some people, it may be unpleasant to put their hands upon their chest. If this appears to you, simply try out in which region of your body you perceive a gentle touch as comforting and soothing.

Examples can be: To put your hand on your cheek, hold the face with both hands, gently stroke the arm, hug the arms in front of the chest and gently hug yourself, small circling up and down movements on the chest, place a hand on the belly, place one hand on the belly and the other one on the heart, to put your hands on your lap.

Perhaps you will be able to make this exercise a habit, to help you comfort yourself and to remember how easy it can be to treat yourself in a loving way.

### Self-compassion in everyday life

The goal of the present intervention is a life characterized by mindfulness and self-compassion in everyday life. This means being conscious of oneself when you are under stress or suffering (mindfulness), and then to encounter this experience with affection and kindness (self-compassion). It is best to do this if we know exactly what is good for us to be able to remember in difficult situations.

- Body: let the body soften.

Ask yourself what is doing you physically well (for example fitness, massages, a hot bath, a cup of tea)? Perhaps you have new ideas how to relief tension and stress in your body?

- Mind: promote calmness.

What can you do for your mind, especially if you experience stress (e.g. to meditate, to watch a funny movie, to read an inspirational book)? Perhaps you would like to try out a new strategy that makes it easier for you to let your thoughts come and go?

- Emotions: care and comfort.

How can you comfort yourself (e.g. to pet a dog, to write diary, to cook)? Is there something new that you would like to try?

- Relationships: get in contact with others.

What makes you really enjoy contact to others (e.g. meeting with friends, to write a birthday card, to play a game)? Would like to invest in those relationships)? Which possibilities are there?

- Spirituality: regard your own values.

How do you nurture yourself in a spiritual way (e.g. to pray, to go for a walk in the forest, helping others)? If you have neglected your spiritual site: is there something that you would like to do more often?

### Mindfulness in everyday life

Mindfulness can be exercised at any moment during your daytime - while you brush your teeth, go from the car park to the office, eat breakfast or every time your mobile phone rings.

Choose one of these daily activities, such as morning coffee or tea, brushing your teeth or taking a shower. Perhaps you want to look for something you always do earlier in the day before you are taken up by the daily tasks of life.

Select a sensory perception that you are looking into, for example, the taste of the coffee or the tea or the sensation when the water comes into contact with the body when showering. Be conscious of this experience and enjoy it. When the thoughts digress, put your attention back to the sensations. Stay with friendly, loving awareness at the activity until it is completed.

### Enjoy with all senses

The goal of a walk is to experience as many pleasant things as possible successively and slowly. Use all the senses: seeing, smelling, hearing, feeling ... maybe even tasting.

How many happy, beautiful or inspiring things can you discover while you are walking? Enjoy the fresh air, the warming sun, a beautiful leaf, the shape of a stone, a smiling face, the song of a bird, the feeling of the earth beneath your feet.

If you see something pleasing or pleasurable, let yourself be pampered with it, enjoy it to the fullest. Feel a delicate leaf or the texture of a twig if you want. Imagine this experience as if it were the only thing that existed in this world.

If you are ready to discover something new, release this item, go on and wait until you discover something else that is pleasant and soothing to you.

Be like a honeybee flying from one flower full of nectar to the next. If an experience has satisfied you, go to the next one. Take your time and enjoy it.

### **6.3. PMR intervention**

#### Introduction

“Take the most comfortable position possible and make sure you relax.

Make sure you sit or lie comfortably.

When you sit, the back is leaned against, the feet stand firmly and securely on the floor, arms and hands rest loosely in the lap -the head has a pleasant position.

When lying, make sure that your back is comfortable on the support.

The legs are stretched and are lying side by side, the feet slightly outward, the hands slightly angled sideways beside you.

The head has a pleasant position so that it does not threaten to roll either to the left or to the right.

Focus your attention now inside, on your body.

If it is pleasant for you, close the eyes or look at a point in front of your feet or on the ceiling.

Feel your feet on the floor, your back, your hands.

Go through your body in thought and sneeze to find out which muscles are tensed or cramped and which are already quite loose and relaxed.

If you have the desire, then take a deep breath in and then breathe out again slowly.

Just let your breath flow and observe how your stomach is slightly lifted by inhalation and lowered as you exhale.

Perhaps you can also feel the air coolly flowing in through the nose and flowing out - heated through the body- again.

We'll start right now with the exercises.

Please pay close attention to your sensations during tensioning and subsequent relaxation of the muscles.

It is not a question of strongly tightening the muscles, but only on the fact that you feel the differences between tension and relaxation.

Breathe well while stretching the muscles.

Please do not tense the muscles until I say "now". "

### First part of the exercise

"Focus your attention first on your right hand and your right forearm.

Bend your right hand to the fist - "now".

Observe the sensations of the tension in the hand and forearm.

With the next exhalation, you can go back and relax.

Pay attention to the difference between tension and relaxation now.

Pay attention to what feeling develops in the hand and forearm, a slight tingling perhaps, a feeling of heaviness or warmth.

Follow this feeling.

Now go to the right upper arm with your attention.

Bend your elbow with your hand open - "now".

Feel the tension in the right upper arm, hold the tension, hold another moment and then with the next exhalation let go again and relax.

Pay attention again to the difference between the tension before and the relaxation now.

Take care, as with the relaxation of the tension, feelings of relaxation can spread.

Follow this feeling.

Let the right arm rest relaxed and turn your attention to the left hand.

Bale the left hand to fist- "now".

Observe the sensations of the tension.

Hold a moment.

With the next exhalation you let go again and relax.

Pay attention again to the difference between the tension before and the relaxation now.

Deepen the feeling of relaxation with each exhalation more and more.

Now go with your attention to the left upper arm.

Bend the elbow -"now".

Observe the tension of the muscles in the left upper arm.

With the next exhalation, let go and relax. Once again, the difference between the tension before and the relaxation is now perceptible.

Let all the tension out of your arm flow out and relax the arm with each exhalation more and more.

With every exhalation, the muscles of the left upper arm, the left forearm, and the hand become more and more relaxed."

### Second part of the exercise

"Point your attention now to your face, first on the forehead.

Place your forehead in folds by raising the eyebrows - "now".

Observe the tension in the forehead and scalp.

Hold a moment.

With the next exhalation you let go again and relax.

Let the forehead be like a smooth, empty surface.

Pay attention again to the difference between the tension before and the relaxation now.

Now turn your attention to your eyes.

Squeeze your eyes slightly together and flush your nose - "now."

Feel the tension in the entire upper half of the hemisphere.

Hold a moment.

With the next exhalation you let go again and relax.

Observe again how with the relaxation of the tension a feeling of relaxation arises and deepen this feeling with each breath more and more.

Now go to the jaw muscles.

Press the teeth and the lips together and press the tongue up against the palate "now".

Feel the tension.

Hold a moment.

With the next exhalation you let go again and relax.

Pay attention to how a feeling of relaxation begins with the relaxation of tension.

Follow this feeling.

Let the relaxation deepen with each exhale.

Leave the face quite relaxed and calm and go with your attention to the muscles in the neck and neck.

Tighten neck and neck muscles by tilting your head forward when you are sitting or by lifting it from the mat when you are lying down. -"now".

Feel the tension in the neck and neck.

Hold a moment.

With the next exhalation you let go again and relax.

Observe again the relaxation of the tension and the emerging relaxation.

Follow the feeling of relaxation and stiffen it with each breath more and more.”

### Third part of the exercise

Focus your attention on your shoulders.

Press the shovel backwards "now".

Pay attention to the tension in the shoulders, in the entire upper back.

Hold a moment.

With the next exhalation you let go again and relax.

Let your shoulders sink down completely relaxed.

Release all tension from your shoulders.

A pleasant feeling of relaxation spreads out.

Follow this feeling and deepen it with every breath.

Please direct your attention to your lower back.

Make a light hollow cross "now".

Feel the tension in the lower back.

Hold a moment.

With the next exhalation you let go again and relax.

Pay attention to the difference between tension and relaxation.

Notice how the muscles of the back relax more and more with each exhalation.

Walk with your attention now further to borne to your belly.

Tighten abdominal muscles - "now".  
Pay attention to the feeling of tension.  
Hold a moment.

With the next exhalation you let go again and relax.  
Again, clearly the difference between the tension before and the relaxation can now be seen.

Let the abdominal muscles become loose.  
Follow the feeling of relaxation and deepen it with each exhale.”

Fourth part of the exercise

“Now go on with your attention to the buttocks.  
Squeeze the buttocks together "now".  
Pay attention to the tension.  
Hold a moment.  
With the next substitute you let go again and relax.  
Once again, you can feel the difference between tension and relaxation.  
Follow the feeling of relaxation and deepen it with each breath more and more.

Now turn your attention to your thighs.  
Press the heels of both feet into the ground and tighten the thigh muscles "now".  
Watch the tension.  
Hold still for a moment.  
With the next exhalation you let go again and relax.  
Watch how feelings of relaxation unfold.  
Follow these feelings with each exhale.

Go to the lower legs with your attention.  
Lift the heels of both feet "now".  
Feel the tension in the calf muscles.  
Hold a moment.  
With the next exhalation you let go again and relax.

Pay attention to the difference between tension and relaxation.

Follow the feeling of relaxation and deepen it with each breath more and more. "

### Recovery

“Now just concentrate on the pleasant feeling of relaxation.

Follow this feeling and try to make it deeper and deeper with each exhale.

Let this pleasant feeling flow into every part of your body: into the arms and hands, into every single finger, in the chest and scalp, in the eyes, in the jaw and cheeks, in the neck, in the shoulders, down the entire back, in the abdomen, in the buttocks, thighs, into the feet and into the toes.

Let yourself be deeper and deeper with peace and relaxation as far as you want and it is pleasant for you.

Enjoy this state of peace and relaxation for a short while all by yourself.

Embrace this pleasant feeling of peace and relaxation to keep it in and carry it out into the rest of the day. "

### Recall

“Please now say to yourself that you will end the exercise immediately.

Slowly tighten both hands, angle your arms, and stretch yourself.

Breathe a few times vigorously and then open your eyes.”

All interventions were translated by the doctoral candidate.