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An examination of the theoretical basis for the underlying processes of mindfulness in the treatment of depression and chronic pain

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Abstract

The current paper examined the theoretical basis for the underlying processes of mindfulness, as proposed in Teasdale's ICS and Shapiro's model of mindfulness. Both models were applied to the area of MBCT and depression followed by an expansion of the models to comprise the effects of MBSR in the area of chronic pain. In order to achieve the latter objective, both models were applied to Nicholas model of chronic pain, which served as a natural setoff for expanding the models within a cognitive framework. Although the two models can be criticised for being too theoretical and difficult to verify, they were overall found to provide a good account for the underlying processes of change in the area of MBSR and chronic pain. This constitutes a significant contribution to the theoretical field of mindfulness since the ICS and Shapiro's model have not previously been applied specifically to the area of chronic pain. MBSR has shown promising results in chronic pain populations and the paper provides a review of representative research. Limitations are discussed and suggestions are made for future research. According to the ICS the positive effects of MBSR and MBCT are due to a meta-cognitive state, which occurs during mindfulness. Shapiro's concept of re-perceiving is similar to this, and although the theories differ in some areas, they are generally argued to be compatible. Parallels were drawn between the mechanisms of change found in the ICS and Shapiro's model, and three other theoretical processes, which appear to share a number of commonalities. All of these processes involve a more observing and distanced view of experience, which is argued to lead to the suspension of interpretation, less automatic responses, increased freedom, increased control, and reduced suffering. These different concepts might essentially refer to the same change process and mindfulness is argued to potentially comprise the essence of this process. Tentative conclusions are made, but further development and testing of models is needed before more certain conclusion can be made. The paper provides a discussion in relation to the differences between Western and Eastern conceptions of mindfulness as well as a discussion of the limitations of looking at mindfulness only from a cognitive perspective. Tentative suggestions are made towards the development of a theory of mindfulness within a humanistic perspective.

1.0 Introduction and motivation for choice of topic

My experiences with mindfulness, during my internship at the Cancer Council in Hillerød (CCH) in 2010, evoked an interest in what it is, that makes mindfulness work. Mindfulness is the awareness that arises when we turn our attention to the present moment in a nonjudgmental manner (Kabat-Zinn, 1994). It is a very simple technique and yet it has such a powerful potential. I participated in a 9 week mindfulness program as an assistant to the teacher who was also my supervisor during the internship. The program included 15 participants who had either recovered from cancer or was still diagnosed. Many of the participants suffered from some kind of chronic pain and their testimonies, by the end of the program, were quite eye-opening to me. Although not all participants were able to perform the meditation exercises, a large proportion reported that mindfulness had enriched their lives through increased general wellbeing and several reported reduced physical pain.

Mindfulness was first introduced to Western psychology in the late 70's by Kabat-Zinn (1982) who developed the treatment program of Mindfulness-Based Stress Reduction (MBSR) for the treatment of chronic pain patients. Mindfulness has since gained increased interest among clinical psychologists and a range of mindfulness based interventions have started to emerge (Baer, 2006). One of these is Mindfulness-Based Cognitive Therapy (MBCT), which is based on the principles of MBSR. MBCT was developed specifically for the treatment of depression (Segal, Williams & Teasdale, 2002) and integrated elements from cognitive therapy (CT) with mindfulness (Baer, 2003).

Much research has looked at the positive effects of mindfulness-based interventions in a wide range of disorders such as depression, stress, and chronic pain and mindfulness has consistently been found to reduce various psychological symptoms (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). I have however only been able to find two theories, which comprise a model of the underlying psychological processes of mindfulness and these theories are still in their developing stages (Shapiro & Carlson, 2009; Shapiro, Carlson, Aston & Freedman, 2006; Teasdale, 1999b; Teasdale & Barnard, 1993). One of these models was developed by Teasdale and Barnard (1993; Teasdale, 1999b) who integrated mindfulness into the existing theory of Interacting Cognitive Subsystems (ICS) and applied it to MBCT in the treatment of depression. The second model was developed by Shapiro and Carlson (2009) who put forward a theory of mindfulness, which provides a more general account of the underlying mechanisms of change involved in mindfulness. To my knowledge, these are the only two existing models of how mindfulness works.

A high rate of comorbidity has been found among chronic pain patients and depression is a common problem in this population (Baer, Robinson, Katon, Kroenke, 2003; Fishbain, Cutler,

Rosomoff et al., 1997; Gatchell, 1996; Melzack & Wall, 1982; Nicholas, Coulston, Asghari, & Malhi, 2009). I thus want to assess the underlying processes of mindfulness both in relation to depression and chronic pain and since Teasdale's model was developed specifically to capture the psychological processes underlying MBCT in the treatment of depression (Teasdale, 1999b), I will start by discussing both models in relation to MBCT and depression. This will provide a strong foundation for the analysis and discussion of the underlying processes of mindfulness, which is needed in order to move on to a more tentative discussion of how the ICS and Shapiro's model can be applied to the effects of MBSR in the treatment of chronic pain. Since depression and chronic pain have been found to be highly related, the analysis, of the underlying processes of MBCT and depression, serves as a natural starting point for discussing the extent to which the two models can be applied to the processes of MBSR and chronic pain (Baer et al., 2003; Fishbain et al., 1997; Gatchell, 1996; Nicholas et al., 2009). In the course of doing this I make use of Nicholas' (2005) model of how chronic pain can become a problem. I want to focus my thesis on MBSR and MBCT since they offer clear definitions of mindfulness-based treatment approaches and each target one of the two psychological disorders of interest (Baer, 2006).

Since mindfulness is becoming more popular and has consistently been found to alleviate symptoms in both depression and chronic pain (Baer, 2003; Grossman, et al., 2004), it is imperative to explore the underlying psychological processes of change, which make mindfulness work, in order to gain knowledge about how these interact with psychological functioning. Depression and chronic pain are currently two of the biggest societal health problems and, as a psychologist, the importance of dealing with these conditions cannot be overestimated.

The World Health Organisation (WHO) lists depression as one of the leading causes of global disability and depression is estimated to be the 2nd leading contributor globally to the burden of disease in the age group 15 to 44 years (WHO, 2011). Psykiatrifonden estimates that 15% of the Danish population will suffer from depression at some point in their life and at any one time about 200.000 Danes are affected by depression, making it the third most common psychiatric diagnosis only surpassed by anxiety and substance abuse. Depression is a debilitating condition, which reduces social as well as work related functioning. It increases the risk of suicide and causes distress not only in the person affected, but in their relatives as well. Depression furthermore constitutes a big societal health cost due to depression related sick days (Psykiatrifonden, 2011)

In Denmark 19% of the population, or the equivalent of 700.000 – 800.000 people, are estimated to suffer from some form of chronic pain condition (Kristiansen, 2008; Statens Institut for Folkesundhed, 2005). Chronic pain has been found to constitute one of the biggest societal health costs worldwide. The WHO examined a range of populations and found a weighted mean predominance of chronic pain across countries to consist of 40% of women, 31% of men, 25% of children under the age of 19. Furthermore, 50% of elderly over the age of 65 were affected by chronic pain (Ospina & Hartsall, 2002) and chronic pain has been found to be the most common reason for consulting a physician (Bair et al., 2003).

Since mindfulness was introduced to Western psychology through cognitive psychology (Siegel, Germer & Olendski, 2010) I will analyse the mechanisms of change in mindfulness from a cognitive perspective. One of the advantages of choosing this perspective is the emphasis cognitive psychology has on empirical findings. This emphasis potentially strengthens the validity of cognitive theories and interventions utilised in the paper.

2.0 Problem formulation, delineation of the thesis, and conceptual clarification

The current chapter provides an overview of the paper's organisation. The problem formulation is presented along with a brief description of how I will go about addressing each question. The next section outlines the structure of the paper along with its rationale, which is followed by a clarification of key concepts and their theoretical framework. Finally, the research question is positioned in relation to the broader scholarly literature.

2.1 Problem formulation

- What is the theoretical basis for the underlying processes of Mindfulness-Based Cognitive Therapy (MBCT) in the treatment of depression?
- What are the effects of Mindfulness-Based Stress Reduction (MBSR) in chronic pain patients?
- To what extent can the theories of MBCT be applied to the positive effects of MBSR in the treatment of chronic pain?

The first question in the problem formulation is addressed through a thorough analysis of Teasdale's model of Interacting Cognitive Subsystems (ICS) (Teasdale, 1999b; Teasdale & Barnard, 1993) and Shapiro's model of mindfulness in relation to MBCT and depression (Shapiro & Carlson, 2009). The second question is attended to through a detailed review of 3 representative empirical studies in the area of MBSR and chronic pain along with a detailed critique of the studies' reliability and validity. The last question is met through a tentative application of the ICS and Shapiro's model to the area of MBSR and chronic pain. The paper utilises Nicholas' (2005) model of how chronic pain can become a problem and discusses the extent to which the two models of mindfulness can provide an account for the underlying processes of change in the area of MBSR and chronic pain.

2.2 Structure of the dissertation

The three questions in the problem formulation are answered sequentially and chapter 3, 4, and 5 thus answer one question each. Introductions and summaries are provided at the beginning and at the end of each chapter and central authors are presented before each theory in order to improve

comprehension. Hence, the two models of mindfulness are analysed in relation to depression in chapter 3, which is followed by a review of representative research in the area of MBSR and chronic pain in chapter 4. Chapter 5 presents a discussion in which the two models of mindfulness are applied to Nicholas model of chronic pain. The rationale, for first discussing the two models of mindfulness in relation to depression and then moving on to a discussion of the two models in relation to Nicholas model of chronic pain, is based on the argument that depression and chronic pain are interrelated and somewhat interdependent, which has also been confirmed by research (Nicholas, Coulston, Asghari & Malhi, 2009). The extent to which the two models of mindfulness can be applied to account for the positive effects of MBSR, in the treatment of chronic pain, is discussed and examples from my internship at the CCH are presented in chapter 5 in order to illustrate points and make the theoretical content more tangible.

Due to the history of mindfulness as part of Buddhist psychology (Nyanaponika, 1962), mindfulness can be thought of as independent from any Western psychological school of thought and chapter 5.5 provides a discussion of the limitations of looking at mindfulness only through the perspective of cognitive psychology. I will provide a critique of the adaptation of mindfulness into Western psychology and discuss the validity of removing the construct of mindfulness from its Buddhist context and adopting it into Western cognitive psychology. Furthermore, mindfulness can be argued to have just as much, if not more, in common with other Western psychological schools of thought. I have chosen to focus my argument on the resemblance between mindfulness and humanistic psychology in chapter 7.0 Future directions, where tentative suggestions are made towards the development of a theory of mindfulness within a humanistic perspective.

Level of analysis

The following four levels of phenomenon analysis were presented by Scott Lilienfeld who is a professor of psychology at Emory University in Atlanta: Molecular (e.g. neurotransmitters), physiological (e.g. brain structures), psychological (e.g. cognitions), and socio-cultural or contextual (e.g. social support) (Lilienfeld, 2007). In order to delineate the theories and research findings included in this paper, I have chosen to focus on psychological theories, models, and findings. Since the aim of the paper is to analyse the underlying psychological processes of mindfulness, the section of empirical findings primarily focuses on psychological findings in relation to chronic pain. Molecular, physiological, and socio-cultural aspects are not included, which is discussed further in chapter 5.5 Limitations.

2.3 Delineation of the thesis and conceptual clarification

The theoretical standpoint for the current paper is based on cognitive psychology, which relies on the belief that psychology, in principle, can be explained through the use of quantitative, positivist, and scientific methods (Costall & Still, 1987) and the following concepts are grounded within the same framework in the current paper.

Depression

The concept of depression covers clinical, primary, non-psychotic unipolar depression, which includes the diagnoses of major depressive disorder, dysthymic disorder, and depressive disorder not otherwise specified (American Psychiatric Association [DSM-IV-TR], 2000).

In the current paper depression refers to “major depressive disorder” unless otherwise is specified and the majority of literature used in the paper is based on the DSM-IV. The symptoms and criteria for diagnosis of depression are presumed known to the reader, but in summary depression is said to be characterised by the following symptoms: Depressed mood, diminished interest in all or most activities, significant weight loss or gain, changes in sleep patterns, loss of energy, feelings of worthlessness, diminished ability to concentrate, and recurrent suicidal ideation (DSM-IV-TR, 2000).

Chronic pain

The distinction between acute and chronic pain is traditionally based upon an arbitrary interval of time from onset. The two most common markers are 3 and 6 months from the initiation of pain and chronic pain might also be defined as pain that extends beyond the expected healing time (Turk & Okifuji, 2001).

Chronic pain is associated with higher rates of comorbidity in the form of depression and anxiety (Pruimboom & van Dam, 2007). Sleep disturbance and insomnia are also common due to illness symptoms and side effects of medication (Ferini-Strambi, 2011) and chronic pain may contribute to reduced physical activity (Pruimboom & van Dam, 2007). Chronic pain has further been found to impact on cognition and reduce patients’ ability to concentrate and complete tasks as well as impair memory, mental flexibility, and verbal skills (Kreitler & Niv, 2007).

Cognitive theory and therapy

Concepts from cognitive theory and therapy will be included to the extent it is needed in order to explain cognitive elements of treatments and models utilised in this paper. The paper draws on writings from the founder of cognitive therapy, Aaron T. Beck, in order to explain relevant elements. The discussions throughout the paper are based on the assumption that the reader has a basic understanding of cognitive theory and references to CT primarily relate to classical writings of cognitive therapy in the treatment of depression (Beck & Alford, 2009; Beck, Rush, Shaw & Emery, 1979) with the aim of illustrating the roots of cognitive based approaches utilised in this paper. Some of the older literature distinguishes between cognitive therapy and cognitive-behavioural therapy. This distinction is however without significance, in the current paper, since the concepts are used interchangeably throughout literature today.

The concept of cognition

The concept of cognition is central to the focus area of this paper and since the definition varies throughout the literature I will, in this section, clarify how it is used in the current paper. I have not been able to find a definition of cognitions in Teasdale's writing. For this reason I base my understanding of cognitions, on Aaron T. Beck's definition, since Beck is the founder of cognitive therapy. Beck defines cognitions as any mental activity that has a verbal content, which includes ideas, judgments, self-instructions, self-criticisms, and verbal articulations. Beck uses the concept of cognitions to describe the following contexts: The content of thoughts, the course of information processing, and the structures of information processing. Beck further uses the concept of cognition in relation to both conscious and unconscious thoughts (Beck, 2005; Beck & Alford, 2009).

In agreement with Ingram and Kendall (1986) the current dissertation distinguishes between 4 levels of cognitions:

1. Cognitive structure: Information storage and how it is organised in long term memory.
2. Cognitive content: The information which is stored in the cognitive structures.
3. Cognitive operations: The processes by which information is coded, stored, and retrieved.
4. Cognitive products: Conscious thoughts and beliefs caused by the interactions between structures, content and operations.

1) and 2) together constitute *cognitive schemas*, which is discussed further in chapter 3.

2.4 Positioning the research question in relation to the broader scholarly literature

Mindfulness

In order to provide the reader with a background for the concept of mindfulness an introduction into the Buddhist understanding of human existence and suffering is offered. It is important to note, that Buddhism does not qualify as a religion the way religion is defined traditionally; as the belief in God or gods within a formalised system of worship and faith (Religion, 2007). The myth of Buddha holds, that he was a human being with an extraordinary insight, and hence not a god. Buddha's first formal writings include The Four Noble Truths, which explain the existence of human beings along with suffering from a Buddhist standpoint: 1) human existence involves suffering, 2) the discrepancy between how things are, and how we want them to be creates this suffering, 3) suffering can be reduced or removed by changing one's attitude towards unpleasant experiences, and 4) 8 strategies for ending suffering exist (the Noble 8-Fold Path) whereof mindfulness constitutes the seventh step (Germer, 2005).

Thus, in the context of a Buddhist psychological tradition, suffering arises when discrepancy between how we want things to be, and how they actually are, exists. Suffering is furthermore reinforced when the individual clings to psychological phenomena and views them as indisputable

truths. Hence the path to psychological freedom, according to Buddhist psychology, is obtained through letting go of the identification with one's thoughts and feelings and instead see them as part of the mind's never ending process of construction (Fulton & Siegel, 2005). Buddhist psychology views this attempt to flee suffering as an impossible endeavour and as counterproductive. Humans have been conditioned to try to avoid unpleasantness even though unpleasant experiences are part of our inescapable existential reality. Hence, Buddhist psychology is about embracing life with all its pleasant, unpleasant, and neutral elements (Kabat-Zinn, 1994).

The structure of mindfulness works on two levels; both as a *philosophy of life* and as a *meditation practice*. Mindfulness practice can be divided into formal and informal practice. Formal practice is that of meditation where a specific time period is set aside regularly and systematically for the purpose of cultivating mindfulness. Besides sitting or lying meditation there is also walking meditation, which is particularly useful when feeling anxious or distracted by intrusive flashbacks and memories. Walking meditation entails for example slowing down all movements of walking and focussing on the sensations experienced through contact between the soles of one's feet and the ground. The informal practice allows all aspects of everyday life to become a part of meditation practice, which means that everyday tasks are carried out from a mindful viewpoint (Baer, 2003).

The word mindfulness is an English translation of the Pali word, "*sati*", which means attention, awareness, and remembering. The meaning of remembering in "*sati*" is not about past memories, but about remembering to be aware and pay attention to the present moment with the aim to peacefully tolerate life as it happens (Kabat-Zinn, 1990). In Western psychotherapy suffering is generally viewed as a symptom of psychological imbalance which stands in contrast to the view of Buddhist psychology, which regards suffering as an outcome of lack of insight in how the mind works (Germer, 2005). Dr. Jon Kabat-Zinn introduced mindfulness in the treatment of the chronically ill in the 70's, and founded mindfulness-based stress reduction (MBSR) at the University of Massachusetts (Kabat-Zinn, 1982), which has been followed by the development of a variety of mindfulness-based clinical treatments, such as acceptance and commitment therapy (ACT) and mindfulness-based cognitive therapy (MBCT) (Baer, 2006).

Mindfulness can be thought of as a practical effort to gain insight by reaching an understanding of the mind, reorganising it, and setting it free by relating differently to the content of the mind, which inevitably will contain pleasant, unpleasant and neutral stimuli (Germer, 2005). Transformation and change thus arises when insight, about the function of the mind, is gained. Mindfulness is the awareness that exists when we turn our attention to the present moment in a nonjudgmental manner. Equal value and attention is placed on what is happening moment by moment as the experience unfolds (Kabat-Zinn, 2003).

The concept of mindfulness is associated with that of attention, which is a general psychological concept denoting the ability to focus on a given object and the ability to control the changing

focus of attention between various objects over time (Shapiro et al. 2006). In mindfulness, attention is associated with a particular way of observing internal and external stimuli. The aspects of *intention* and *attitude* are further tied to the basic function of cognitive attention. Hence, mindfulness entails a certain quality of attention, which is guided by the practitioner's intention such as for example reducing stress or developing compassion combined with a specific attitude towards the experience, which might be characterised compassion, acceptance, curiosity, and kindness (Baer, 2006; Shapiro & Carlson, 2009).

Mindfulness meditation is categorised as an insight meditation (Vipassana) as opposed to concentration meditation (Samatha). Insight meditation involves a widening of attention to include all elements of the external and internal experience with a particular nonjudgmental attention. In summary, mindfulness can thus be defined as an attentive observation of the mind from moment to moment, with a particular attitude and intention, which is thought to facilitate insight (Bodhi, 2005). The aim of mindfulness is thus to develop the capacity for direct experience of all phenomena, which is facilitated through insight into the construction of the mind. The observation of stimuli, and its cognitive appraisal, is thought to lead to the recognition that thoughts and our relation to thoughts are separate from each other (Kabat-Zinn, 1990).

In Buddhist psychology the subjectivity of the mind is characterised by transparency, which with adequate practice makes it possible to observe one's own mind and reduce suffering through increased insight. The self is thus understood as a fluctuating process consisting of momentary experiences as opposed to the Cartesian understanding of the self as a stable and bounded entity (Germer, 2005). Buddhist psychology thus operates with a *minimal self*, as opposed to a *narrative self*, which involves attributing meaning to experiences in order to form cohesive stories (Brown, 2009).

This continuing process of meaning attribution was termed "selfing" by Kabat-Zinn (1994). He argues, that selfing implies trying to freeze the world around us and ourselves in order to sustain the formation of a stable *self*, rather than accepting the mind as a process, which is not defined by a core essence. Selfing is a consequence of humans' unavoidable tendency to construct the world from a self-centered perspective. This tendency leads to a limited view of the world, which reduces the individual's experiences, because we aim to create a pleasant, meaningful, and coherent narrative (ibid.). In contrast to the Western narrative self the *minimal self* in Buddhist psychology implies cutting off the constant process of meaning attribution in favour of a more basic and immediate dimension of experience, where the individual becomes an active recipient of what is brought to attention by consciousness without the added cognitive appraisals (Brown, 2009)

In Western cultures there is a tendency to regard suffering as something, which should be avoided and we tend to run from negative emotions and only pay voluntary attention to positive experiences. Buddhist psychology advocates that suffering is prolonged through the avoidance of

attending to painful experiences (Kabat-Zinn, 1994), which might seem counterintuitive to the mainstream Western understanding. In spite of this dominant view research in the area of Buddhist psychology and meditation practices, such as mindfulness, has grown over the last decades and the research findings point to the many positive effects of mindfulness (Baer, 2003; Grossman et al., 2004).

The current paper utilises the only two theories of mindfulness, which I have come across. The theory of interacting cognitive subsystems (ICS) has been applied specifically to the area of mindfulness and depression (Teasdale & Barnard, 1993) and Shapiro's model of mindfulness was developed with the aim of providing a more general account of mindfulness (Shapiro & Carlson, 2009). My hypothesis is that Shapiro's model can also successfully be applied specifically to the area of mindfulness and depression, which is why I discuss both models in relation to depression in chapter 3. My hypothesis is further that both models can be expanded to comprise a specific understanding of the effects of mindfulness on chronic pain patients. This hypothesis is supported by research, which has found chronic pain and depression to be closely related (Bair, Robinson, Katon, et al., 2003; Fishbain, Cutler, Rosomoff et al., 1997; Williams, Jones, Shen, et al. 2004) and the expansion of the models to comprise chronic pain as well, thus seems natural. To my knowledge, the ICS is the only model of mindfulness, which has been applied specifically to any psychological problem and the current paper thus adds, to the current field of mindfulness literature, an application of Shapiro's model to depression as well as an application of both the ICS and Shapiro's model specifically to the area of mindfulness and chronic pain. Since theories of mindfulness are still in their infant stages the current paper can only provide tentative conclusion. The paper does however make significant contributions to the scholarly field of mindfulness, since much research has investigated *whether* mindfulness works on various populations (e.g. depression and chronic pain) (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004), but only few have looked at *how* and *why* it works. This is important because it helps shed light over how the mind works and how health is improved.

3.0 Theoretical basis for the mechanisms of change in MBCT in relation to depression

This section presents an analysis of the mechanisms of change involved in mindfulness. To my knowledge, only two theoretical models have been put forward regarding the processes of change in mindfulness; Shapiro's model of mindfulness as proposed by Shapiro, Carlson, Astin, and Freedman (2006; Shapiro & Carlson, 2009) and Teasdale's model of Interacting Cognitive Subsystems (ICS) developed by Teasdale and Barnard (1993; Teasdale, 1999b). Since mindfulness was introduced to the area of Western psychology through cognitive psychology, and since the first model of mindfulness presented in this paper was applied specifically to the area of MBCT and depression (Teasdale & Barnard, 1995), I choose to analyse both models from a cognitive

perspective in relation to MBCT and depression. I begin the chapter with a short presentation of Aaron T. Beck and cognitive theory along with a discussion of the cognitive concept of schemas.

3.1 MBSR and MBCT

Mindfulness-Based Stress Reduction (MBSR)

Although MBSR is not utilised until chapter 4, a presentation and definition is provided here due to the heavy influence of MBSR in the development of Mindfulness-Based Cognitive Therapy (MBCT) (Baer, 2006), which is discussed in relation to depression in this chapter.

MBSR was developed by Jon Kabat-Zinn who is a professor of medicine and the founder of The Stress Reduction Clinic. He focussed his work in the area of integrating Buddhist teachings into Western science and the use of meditation in the treatment of stress, anxiety, pain, and illness. He developed the MBSR, in the 70's at the University of Massachusetts Medical School, which involves an 8-week group program consisting of 2½ hours weekly classes along with a single all-day class (Kabat-Zinn, 1990). Although the intervention is based on Buddhist principles, Kabat-Zinn stresses, that the program is not spiritually based, and he argues that the program is open to people from all different backgrounds. MBSR is based on the principle of mindfulness, which Jon Kabat-Zinn defines as moment-to-moment non-judgmental awareness characterised by an acceptance towards all elements of life experience through a dispassionate, non-evaluative, and sustained moment-to-moment awareness of thoughts, imagery, emotions, physical sensations, and perceptions (Kabat-Zinn, 2003). MBSR is a structured group program based on a systematic procedure, which was originally developed for the treatment of chronic pain (Kabat-Zinn, 1982). MBSR has also shown benefits in relation to immune system functioning, anxiety, depression, aversion, stress, and general wellbeing (Baer et al., 2003; Fishbain et al., 1997; Gatchell, 1996). The approach assumes that increased awareness provides a truer perception of experiences, reduces negative affect, and improves coping and well-being (Grossman, Niemann, Schmidt & Walach, 2003).

Mindfulness-Based Cognitive Therapy (MBCT)

MBCT is a psychological intervention which blends elements from cognitive therapy with the technique of mindfulness. It was founded by Zindel Segal, Mark Williams and John Teasdale, who based MBCT on MBSR. MBCT was specifically developed for the treatment of depression and prevention of relapse and, like MBSR, the aim of MBCT is to accept all element of experience with the added goals of correcting cognitive distortions, expanding awareness, and enhance ability to respond to things as opposed to reacting to them. MBCT has the same duration as MBSR along with a weekly assignment to be completed outside of session (Segal, Williams & Teasdale, 2002).

3.2 Cognitive therapy

Since the theoretical concept of schemas plays a central role in the development of MBCT I will provide an overview of the concept here along with a presentation of Aaron T. Beck and cognitive therapy (CT). Limitations of CT and the meaning of schemas are discussed as well as how dysfunctional schemas contribute to depression.

Beck's cognitive therapy (CT)

The definition of schemas varies throughout the literature, but since MBCT is based on Aaron T. Beck's CT, I will focus on Beck's definition of schemas here. Aaron T. Beck is a retired professor of psychiatry from the University of Pennsylvania. He is regarded as the founder of CT and his theories have primarily been used in the treatment of depression. He has further developed a range of self-report measures for the assessment of depression and anxiety (Wills, 2009).

According to Beck, depression is due to irrational negative worldviews. He argues, that depression is maintained through negative cognitions in three areas, which together constitute the depressive triad. The depressive triad is made up from negative cognitions about the self, the world, and the future. According to Beck's Cognitive Model the antecedents of depression are thoughts and images, which can be accessed directly and consciously. CT is thus initiated by engagement in conversation with the patient about their ruminative thoughts (Beck, 2005). Although CT has primarily been applied in the treatment of depression, it has also shown good results in the treatment of anxiety disorders, stress, schizophrenia, and chronic pain (Beck & Alford, 2009; Beck et al., 1979; Nicholas, Coulston, Asghari et al., 2009).

Criticism of CT

- Although CT is undoubtedly effective, other researchers have questioned Beck's Cognitive Model's capacity to adequately account for these effects (Teasdale & Barnard, 1993). Some of the arguments are that CT is not uniquely more effective than "non-cognitive" therapies, which have also been found to reduce negative thinking. This suggests that the effects of CT are achieved through some other mechanism than the direct targeting of negative thoughts.
- Beck's cognitive model proposes that thoughts or images are the immediate link in emotion production. However, clients in therapy are often found to experience emotional reactions without being able to identify any corresponding negative automatic thought.
- The approach of meeting irrational automatic thoughts with rational and intellectual arguments in CT is often ineffective in changing the emotional response, which suggests that emotions are not produced directly by thoughts and images, as CT proposes, and that in fact dissociation exists between thoughts and feelings.
- The adoption and integration of non-cognitive elements into CT has become more prevalent (e.g. guided imagery) on the basis that it works. This has been argued to threaten the validity of CT as the discrepancy between CT and the cognitive model increases and

since the cognitive model cannot account for the effects of these non-cognitive therapeutic techniques. (The cognitive model is explained further in the chapter 3.3 Schemas).

The ICS provides an alternative explanation for the effects of cognitive therapy, which overcomes some of these obstacles. I will discuss the ICS model further in relation to depression in chapter 3.4 and in relation to chronic pain in chapter 5.2 (Teasdale & Barnard, 1993).

3.3 Schemas

The theoretical concept of schemas is central to CT and the development of MBCT, which is why the concept is discussed in this section. The meaning of schemas in general and dysfunctional schemas in particular is discussed, as well as how they contribute to depression.

The concept of schemas is defined in various ways throughout the literature, but since the current paper looks at MBCT from the perspective of Beck's CT, I will make use of the definition of schemas provided by Beck et al. (1979). Beck's definition is however also subject to change throughout his writings and I have thus chosen a definition from one of his early writings in which he defines schemas as a relatively stable structure, which forms the foundation of interpretations in relation to a specific cluster of situations (ibid.).

Schemas are thought to develop early in life through interactions between the child and the environment. Schemas are formed on the basis of representations of general patterns of experiences (Beck et al., 1979), but are also argued to have a genetic and biological disposition, which determines the direction of schema development (Clark, Beck & Alford, 1999). Beck refers to schemas in the context of dysfunctional assumptions, attitudes, and beliefs (Beck & Alford 2009; Beck et al., 1979). The concept of schemas is thus applied both in the context of fundamental cognitive structures and in relation to the content of these structures. Beck defines schemas as a structure for screening, coding, and evaluating stimuli. It is the mode by which the environment is organised and systematised into its many psychologically relevant categories. According to Beck et al. (1979) this categorisation constitutes the fundament for human orientation towards the world and enables the individual to create meaning from experience.

Beck's cognitive model is based on the assumption that humans are actively engaged in forming their experience as opposed to the view of humans as passive entities who react reflexively to stimuli or social reinforcement (McCracken, 2005). Negative and unhelpful schemas are based on beliefs generated from previous experiences and correspond to subjective representations of the current situation. Schemas thus assist in creating meaning of experience, and schemas might tell something about an individual's ability to function in spite of adversity. Schemas thus become filters through which new related experiences are processed (Beck, 2005; Cioffi, 1991).

Different stimuli activate different meaning-relevant schemas and thus provide a conceptual framework for how the experience is understood. Schemas are thus very influential in how

internal (e.g. memories) and external stimuli in the environment are experienced and they are generally of an unconscious nature (Wills, 2009). All individuals have a multitude of schematic models relating to different types of situations and schemas can be categorised into negative, positive, and neutral. Schemas are enduring and Beck argues that schemas work as filters through which schema-consistent information is assimilated to fit with the schema. On the contrary schema-inconsistent experiences are more likely to be ignored or forgotten (Beck et al., 1979). According to Beck (2009) dysfunctional schemas are more rigid and inflexible and dominate more adaptive types of information processing when active.

Beck (2009) proposes three levels of schema abstraction and generality, which influences how experiences are understood. *Simple schemas* relate to the most specific level, which manages single objects and very specific ideas. *Intermediary schemas* relate to beliefs, assumptions, and rules, which are applied in the evaluation of the self and others. Intermediary schemas are generally broader and more personal than simple schemas. The rules of intermediary schemas might involve “should” or “must” and are strongly linked to personal goals and values, which impact on individual adaptation and play an important role in the development of depression and other emotional disorders. They are oftentimes maladaptive and automatic, which means, that they require no cognitive effort to apply (Clark, Beck & Alford, 1999). Finally, *core beliefs* constitute the broadest level of generality and are oftentimes overgeneralised and more global than the other schema categories. Core beliefs are expressed through absolute statements referring to the self and thus contribute to the self-concept. In depressed clients such core beliefs might for example be: “I am useless/a failure/dumb/unlovable” and so on. Core beliefs have further been separated into two categories relating to either survival or attachment, which together constitute two basic aspects of human adaptation (Clark, Beck & Alford, 1999). Negative core beliefs relating to survival entail schemas of helplessness, inferiority, incompetence and feelings of powerlessness. Negative core beliefs relating to attachment involve evaluations about the extent to which one is loved. Since core beliefs such as “I am worthless/useless/a failure” have such an important impact on mental health, and because people are usually not conscious about their core beliefs, cognitive based therapies often deal with bringing the negative core beliefs to the patient’s awareness (Beck, 2005), which is discussed further in relation to MBSR and MBCT throughout the paper

In his later writings Beck has modified his theory of schemas and introduced the concept of modus. Primal modes constitute a cluster of mutually connected schemas related to the following categories; cognitive-conceptual, affective, physiological, behavioural, and motivational schemas (Clark & Beck, 1999). Primal modes deal with basic or immediate issues related to evolutionary needs of survival such as procreation, safety, preservation, dominance, and sociability (Beck, 1996). Each primal mode targets a goal-directed or compensatory strategy. One example of a primal mode is depression, which is characterised by a loss or deprivation mode involving a perceived or genuine threat of one’s fundamental resources (cognitive-conceptual schema) along

with a subjective state of sadness (affective schemas), fatigue (physiological schemas), feelings of helplessness and loss of interest in activities (motivational schemas), and a response strategy characterised by withdrawal and inactivity (behavioural schemas). All of these schemas are interconnected and intertwined and the primal loss mode activation in depression is thus a very comprehensive state. Similarly, other psychological problems (e.g. anxiety, stress, or chronic pain) are also constituted by a number of durable, interconnected, and interdependent schemas (ibid.).

Discussion of the concept of schemata

Beck changes his definition of schemas throughout the literature and the way cognitive theory is described is generally ambiguous when it comes to the definition of key concepts. Beck uses the concept of schemas synonymously with the concepts of cognitive structure, basic assumptions, and dysfunctional attitudes. The concept of schemas is also applied to the underlying levels of cognitive structures (Beck, 2005; Beck & Alford, 2009; Beck et al., 1979). Schemata is commonly applied both to the structure and content of the cognitive structure, which constitutes a problem in the measurement of various levels of schemas, since the content and structure of cognitions become mixed up. Segal (1988) argues that the content of cognitions is accessible through self-report measurements. He further argues that this is not the case for the structure of schemas since this is a theoretical construct. Clark and Beck (1999) do not describe the relationship between structure and content of schemas. The structure of schemas can be speculated to be more durable and harder to change, but it is not possible to test such speculations empirically since the structures are not accessible through introspection (Elmsted, 2007).

When Clark and Beck (1999) talk about schemas as latent, it is not clear whether they refer to the structure, the content, or both and it is not explicated whether the consequence of latency is inactivity or just reduced dominance. This ambiguity can potentially cause problems in the empirical assessment and measurement of dysfunctional schemas. Beck only writes little about the development of schemas and in order to gain an understanding of the background of schemas it is worth looking into other theories, which offer a more extensive understanding of how dysfunctional schemas are developed such as Young, Beck, and Weinberger (1993). Bowlby's (1996) attachment theory and concept of internal working models can also be applied to cognitive theory as a complimentary understanding of how schemas develop. These unanswered questions potentially pose a threat to the validity of the models utilised in the current paper, since they are all based on concepts from CT.

Beck has been criticised for neglecting the role of emotions in his theory (Teasdale & Barnard, 1993), which is probably why he later developed the concept of modus where affective schemas are mentioned explicitly. However, both cognitive theory and cognitive therapy focus attention on the relationship between dysfunctional cognitions and psychological problems (Beck & Alford, 2009). Although empirical research has supported this relationship I argue the importance of not presenting cognitions as the only probable cause of depression. Several other factors may cause

depression and I find that the focus on cognitions in Beck's cognitive theory is limited, and possibly even misleading, potentially leaving the reader with the impression that negative thinking is the *only* cause of depression.

3.4 Teasdale's Model of Interacting Cognitive Subsystems (ICS)

The current chapter provides an overview of the ICS in relation to MBCT in the treatment of depression. A thorough analysis of the underlying processes and structures is provided along with an explanation and discussion of related concepts and mechanisms of change. Conclusions are summarised by the end of the chapter and limitations of the model are discussed in Chapter 5.5 Limitations.

The Interacting Cognitive Subsystem (ICS)

The model of ICS is presented in this chapter as it offers a theoretical framework of how MBCT works, and contrary to CT, the ICS provides a framework for understanding the effectiveness of non-cognitive therapeutic techniques. The ICS was developed by John D. Teasdale who also cofounded MBCT. Teasdale specialised his research in the area of cognition and brain sciences and focussed much of his work on understanding the cognitions behind depression. The model was originally developed in the area of cognitive science by Barnard (1985) and provided an explanatory account which 1) addressed the different qualities of various types of information, 2) included emotion, and 3) allowed for an incorporation of cognitive-affective interaction into a more general and comprehensive model of information processing. Teasdale and Barnard (1993) collaborated and adapted the model to capture the role of negative cognitions during depression. Since then Teasdale has expanded the model to include a conception of the underlying processes of mindfulness as well, and according to Teasdale (1999b) the ICS can be applied to account for all aspects of information processing.

The ICS focuses on meaning created through information processing. Two qualitatively different types of meaning exist and both types are created from the information received by our senses. The information is coded and stored where after the information is processed and meaning is created from the experience. Firstly, a more tangible and specific meaning is formed, which involves knowledge about object relations and can be communicated explicitly through language (e.g. "strawberries are red"). The information is subsequently processed on a more generic and holistic level, which cannot be explained directly. This level involves an implicit and automatic level of meaning, which is comparable to feelings and intuition (Teasdale, 1999a; Teasdale & Barnard, 1993).

The first level of the ICS is termed the *Propositional* subsystem, which involves semantic entities (concepts) and the relation between them (Teasdale & Barnard, 1993). The propositional subsystem has also been referred to as explicit or declarative knowledge in other writings (Teasdale, 1999a). The second level of meaning is termed the *Implicational* subsystem, which

constitutes the most generic level of representation and captures and integrates recurring co-occurrences in the patterns across all other representational and sensory codes. The implicational subsystem extracts, integrates, and represents prototypical patterns recurring across all other codes and *schematic* models of experience are constructed from this information (Teasdale, 1996).

The meaning of these schematic models of experience is highly dependent on its wider propositional context and is thus not possible to express in one propositional context. An example might be a situation where A says to B "Stay here". The propositional meaning of this sentence is "I want you to stay here" but the statement's implicational meaning and truth value cannot be assessed without additional information about the wider context in which it occurs. Tone of voice, body language, and sensory elements further add to the implicational meaning and the variety of contexts can lead to considerably different meanings of this simple statement. These elements are captured as a whole, at a holistic level of the implicational subsystem, which is qualitatively different from the meanings captured in the propositional subsystem (Teasdale & Barnard, 1993).

The cognitive architecture of the ICS

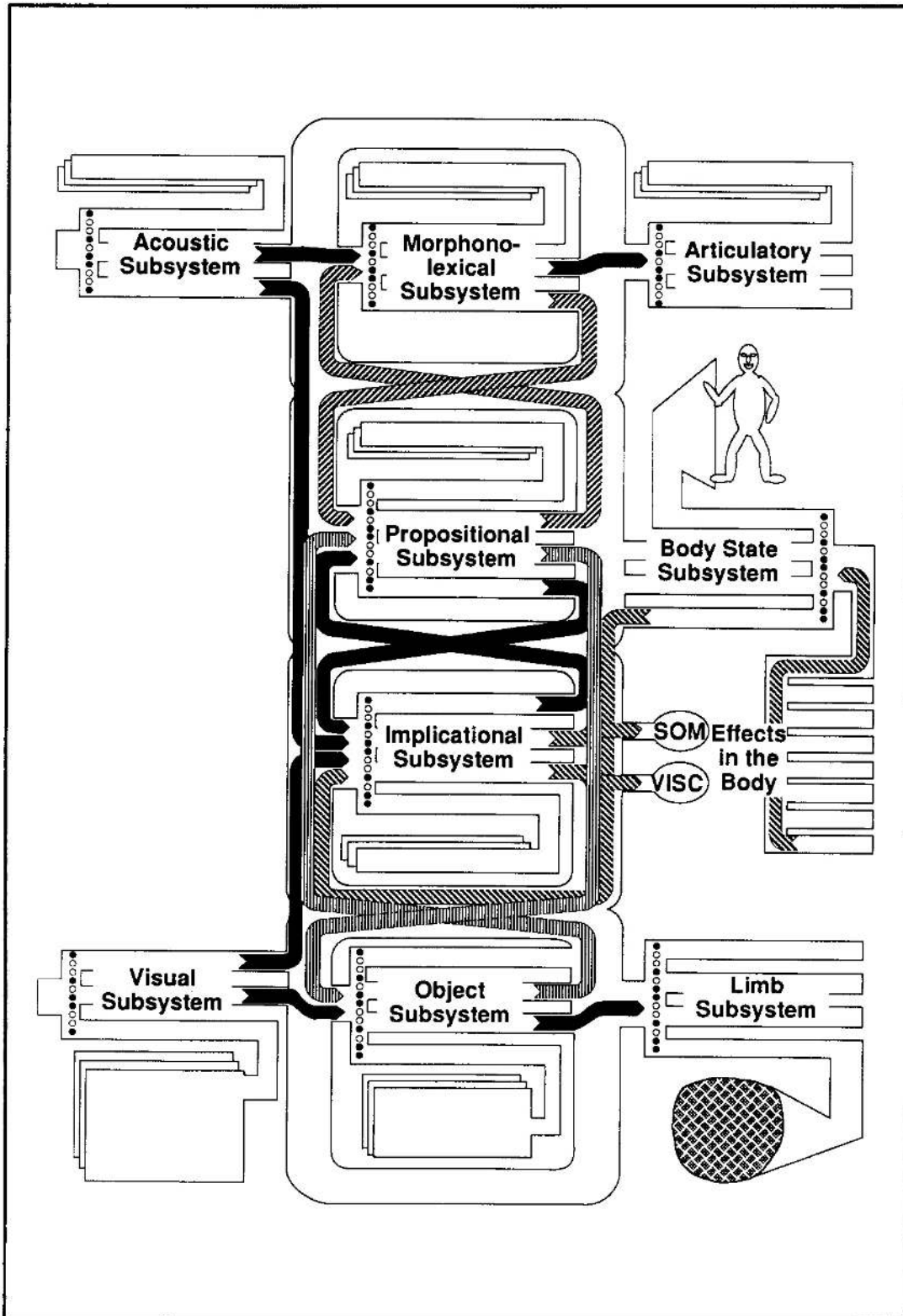


Figure 1: The production of emotion and the interaction between the nine subsystems of the ICS. Reprinted from Teasdale and Barnard (1993, p. 59).

As presented in figure 1, the ICS is divided into 9 subsystems, whereof two constitute the propositional and implicational meaning codes. Besides the two meaning codes, three sensory coding systems exist, which represent visual, acoustic, and body-state sensory input. Different elements of information, received through our senses, are stored in one of these different coding systems depending on what aspect of the experience they represent. This is followed by intermediate coding, which represents repeated patterns of sensory input. The intermediate structural codes are divided into morphonolexical code, involved in encoding of abstract structural descriptions and relationships in sound (e.g. words), and the object code, which encodes abstract structural entities and relationships in vision. Finally, there are two effector codes; the articulatory system involved in speech output and the limb system involved in physical movement. Information is transformed in the exchange between systems and each transformational subsystem is only able to process one stream of data at one time. (Teasdale & Barnard, 1993; Teasdale, Segal & Williams, 1995).

After the intermediate coding, information is transformed to a higher level of processing first in the propositional subsystem and later in the implicational subsystem where new meaning and interpretations of the experience arise. These broad and holistic meanings are generated from recurring, general patterns of the experienced and are as such prototypes of experiences, which are also called *schematic models*. The schematic models represent holistic interpretations, which are not possible to separate from their semantic context and the implicational subsystem, cannot be accessed directly (Teasdale & Barnard, 1993).

According to Teasdale (1996, 1999a) emotions are directly linked to the implicational subsystem and the propositional subsystem contributes indirectly to the construction of emotion due to the reciprocal relation between the two systems. The maintenance of negative affect depends on the extent to which these systems regenerate the implicational meaning, which is presented in figure 2, p. 22. The modification of emotions thus involves a change in schematic models related to the emotional content of the implicational subsystem.

Since the propositional subsystem is not directly connected to emotional content, it is possible to process emotion-related meaning at an unemotional or intellectual level through this subsystem. The propositional level can thus be thought of as a symbolic level of representation, which does not necessarily lead to feeling an association with the content or feeling the need to react on it (Teasdale & Barnard, 1993). Similarly, propositional meanings can be acquired vicariously through the verbal inputs of others. This means that propositional meaning can be conveyed through language such as books or verbal messages of other people's experiences, without the person directly experiencing the meaning themselves (*ibid.*).

ICS' perspective on mechanisms of change in MBCT as applied to depression.

The following section provides a detailed account of the underlying processes of MBCT in the treatment of depression. Teasdale relates his theory of ICS to mindfulness in general and not to MBCT specifically (Teasdale et al., 1995; Teasdale, 1999b). This is probably due to the fact, that MBCT was still under development when Teasdale's articles on ICS and mindfulness were first being published. However, since the primary component of MBCT is mindfulness, my argument is that the ICS can be applied specifically to MBCT as well.

Due to the qualitative difference in propositional and implicational meanings, Teasdale (1999b) argues that different forms of interventions are required in order to alter these and create change. He compares the mental state of mindfulness to a meta-cognitive mode, in which generic schematic models such as "thoughts are not facts" are activated from memory. This enables the practitioner to treat thoughts as mental events rather than facts. Teasdale argues that this facilitates a mode in which thoughts subjectively can be experienced simultaneously both as thoughts and as mental events. What is meant by this is that the meta-cognitive state of MBCT involves thoughts about thoughts before and after they occur, as opposed to experiencing thoughts as thoughts as they occur. Thoughts as mental events are thus seen as fragments, which provide informational content about the propositional meanings, which influence the implicational meanings (ibid.).

Teasdale (1999b) argues that the meta-cognitive state of mindfulness involves a distancing and de-centering attention in which one relates to thoughts as fragments of experience, which can be viewed as hypotheses to be tested. MBCT thus cultivates the capacity for entering the being modus with a detached and inclusive awareness where the implicational subsystem is in buffered mode. The intentional control of attention in mindfulness establishes a type of alternative information processing configuration, which disrupts the existing depressive interlock configuration. This is achieved through the instructions during MBCT to note the content of thoughts, feeling, and sensory input, while awareness is continually brought back to the focus of attention (e.g. the breath). This ongoing focus in the present serves as an anchor, which limits the extent to which one is immersed by the entanglement of thoughts and feelings (ibid).

As mentioned earlier, emotions are connected to the Implicational subsystem and alterations of emotional responses thus rely on changes in the implicational schematic models (Teasdale, 1999a). As presented in figure 2, according to ICS the propositional and implicational levels of meaning are connected by feedback loops. Depressive schematic models are transformations produced through this feedback loop and, according to the ICS, it is necessary to address all these transformations as they appear on the implicational level in order to understand and change depression (Teasdale, 1999b). Persistence of depression is thus due to the regeneration of depressogenic implicational schematic models and the goal of therapy is thus to replace the production of such models with the production of more adaptive models. If the depression is caused by ongoing environmental hardships, this is achieved by intervening on the level where the models are maintained (e.g. through marital therapy if depression is associated with enduring

relationship crisis). However, not all depression is maintained by chronic aversive environmental events and the ICS has proposed a theory addressing how depression arises in the absence of aversive circumstances and how this type of depression is helped through mindfulness (Teasdale, 1999b; Teasdale & Barnard, 1993).

According to the ICS the maintenance of depression, in the absence of environmental difficulties, is called *the depressive interlock configuration* and involves the regeneration of depressogenic schematic models, as presented in figure 2, which is maintained by a dysfunctional sensory and a cognitive loop. The depressive interlock configuration creates a vicious cycle in which the negative implicational meanings feed on negative body-state feedback caused by depression as well as negative propositional meanings caused by negative automatic cognitions (Teasdale & Barnard, 1993). According to Teasdale (1999b) the meta-cognitive mode of MBCT provides an informational context in which fragments of implicational codes are treated as mental events as opposed to facts. This causes the establishment of a substitute procession configuration since each transformational subsystem is only able to process one stream of data at one time. The establishment of such substitute processing configuration interrupts the existing depressive interlock and involves a synthesis of new schematic models, which are different to the depressogenic models. As the reproduction of depressogenic models is reduced, the interlock is no longer maintained and depression is reduced. As an intervention MBCT thus involves a redeployment of the resources, which maintain the depressive interlock configuration, to the processes of other data streams (ibid).

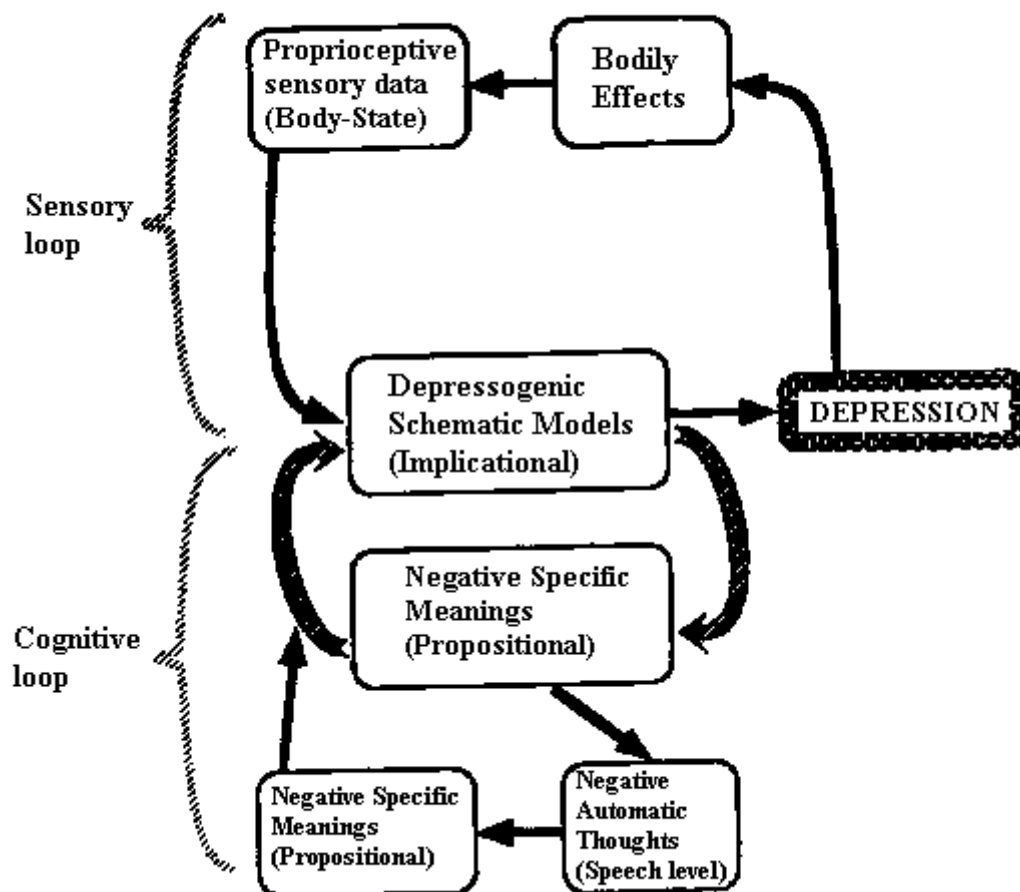


Figure 2: Depressive Interlock Configuration. How the depressed state is maintained through a self-perpetuating cycle between the propositional and implicational subsystem. Reprinted from Teasdale (1999b).

Teasdale and Barnard (1993) further argue that depression depends on the integrity of the total processing configuration and number of integrated feedback loops of depressive interlock making the total configuration particularly vulnerable at a number of points. Consequently, techniques, which target specific meanings, negative thoughts, or sensory inputs, have also been found to benefit depressive conditions. This might explain positive effects of physical exercise in reducing depression. According to ICS such improvements would be interpreted as disruption of the depressive interlock configuration through alterations in the Body-state feedback.

Brief disruption to the depressive interlock configuration is however not enough to alleviate depression in the long term. When the depressive interlock has been operating for some time it is likely to revert back to its old pattern after the brief interruption of a distracting task. This

tendency is termed *tenacity* by Teasdale and Barnard (1993) and is the result of recent depressogenic-related schematic meanings being reintegrated into the circulating stream of data, which maintains the depressive interlock. This in turn causes the depressive state to re-establish. Brief distractions from depression are thus short lived and, according to the ICS, the treatment of depression requires a “re-population” by non-depressogenic schematic models, which is achieved through extended processing and synthesis of schematic models unrelated to depression (Teasdale, 1997). MBCT facilitates this re-population through the previously mentioned redeployment of resources to other data streams during the meta-cognitive state of MBCT, which in turn interrupts the depressive interlock configuration (Teasdale et al., 1995; Teasdale, 1999b).

The extent to which this redeployment of resources, to the synthesis of new schematic models, is possible depends on the level of emotion-related processing. Segal, Williams & Teasdale (2002) proposes three levels of emotion-related processing: *mindless modus*, *doing modus*, and *being modus*. Mindless modus involves close identification and entanglement with one’s own emotional reactions with only little attention and reflection directed at inner processes. Doing modus involves a verbal discursive level of attention in which one passes from one activity to another without reflecting on it. Being modus is associated with an awareness of emotions, sensations, and thoughts along with the ability to reflect and take in the experience on an intuitive level. Being modus is comparable to the meta-cognitive state of mindfulness and according to Teasdale engagement in being modus provides the best platform for lasting emotional change (Teasdale, 1999a).

The ruminative and pondering cognitive strategies involved in depression, where one thinks *about* their thoughts, contribute to the perpetuation and maintenance of the depressive interlock configuration. According to Teasdale (1999a) thinking *about* thoughts and feelings is related to the mindless modus and thus is not effective in changing depressive affect. Research has found vulnerability to depression to correlate positively with level of ruminative processing style (Nolen-Hoeksema & Morrow, 1991) and from this perspective, the aim of interventions in relation to depression is to reduce the ease by which one enters the ruminative processing cycles, which maintain the depressive interlock configuration.

Teasdale (1999a) makes a distinction between direct mode and buffered mode in his description of the three types of modus and their processes in ICS. Direct mode is characterised by an ongoing processing of entities data and the input is processed “on line”. In buffered mode the person does not respond to the ongoing flow of data. Instead a transformational process occurs; the newly arrived data input is accumulated in a temporary memory storage or buffer. By responding to the broader pattern of accumulated data, processing becomes more sensitive to overall patterns in the data and the response becomes more informed by the broader context as opposed to guided by previous habitual patterns generated by fragments of data and their associations. Only one of the ICS subsystems can be active at one time in buffered mode, and the information processed in this subsystem will have a dominating influence on processing in the whole system (Teasdale &

Barnard, 1993). The subjective experience will thus depend on which of the subsystems is in buffered mode. Three types of information processing configurations exist in ICS: With the propositional subsystem predominantly in buffered mode, with the implicational subsystem in buffered mode, or with neither the propositional nor the implicational subsystem in the buffered mode. Teasdale (1999a) further argues that change of implicational schematic models occurs through integration of new and old elements in implicational codes. Such integration requires that the processes of transformation work in a manner, which is sufficiently broad to accommodate both old and new elements. This is only possible when the implicational subsystem is in buffered mode since the direct mode only allows for few data on-line, which is not sufficient to accommodate a database with the capacity to form new schematic models.

ICS' perspective on mechanisms of change in cognitive therapy

The aim of the following section is to briefly clarify the diverging views CT, as proposed by Aron T. Beck (Beck et al., 1979), and the ICS have on the maintenance and treatment of depression as well as the ICS' account of how cognitive therapy works on depression.

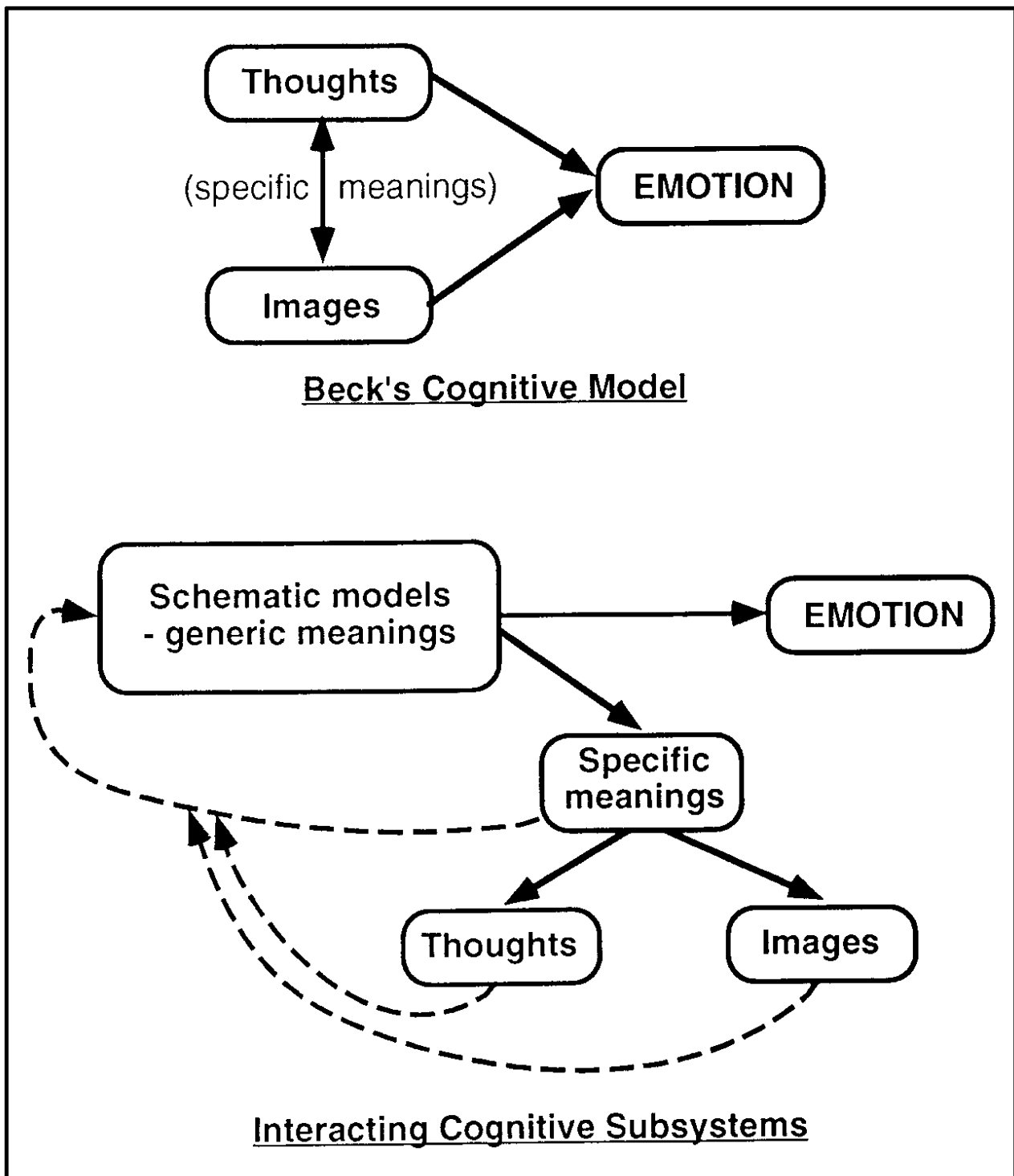


Figure 3: The contrasting positions of Beck's cognitive model and the ICS regarding the role of thoughts and images in emotion production. Reprinted from Teasdale and Barnard (1993, p. 173)

As presented in figure 3, the ICS suggests that the maintenance of depression depends on the total self-regenerating processing configuration, where Beck's cognitive model holds that thoughts and images are solely responsible for emotions and that one's affective state is changed just by

altering those thoughts (Teasdale, 1993). Aaron T. Beck's daughter, Judith Beck, has however added and emphasised the importance of working with emotions related to dysfunctional cognitions in later writings (Beck, 2006). According to Teasdale (1999b) negative thoughts can serve as useful markers of the implicational depressive schematic model, from which they stem, and possibly even represent the total processing configuration of which they constitute one branch. The changing of these thoughts may also change the total processing configuration to which they are connected, but this is not guaranteed. He further argues that the very action of acting on an intention to deal with depression might lead to the synthesis of schematic models associated with "taking control" which might take the place of schematic models related to helplessness and hopelessness and thus work against the maintenance of the depressive interlock configuration.

In the intervention of CBT this is done through replacing self-related depressive schematic models maintaining depression with more adaptive self-related schematic models. Hence, the disruption of the interlock configuration is achieved through replacement of depressogenic models with more adaptive models, both at the propositional and implicational level, which in turn reduces depression (Teasdale, Segal & Williams, 1995).

In summary, the ICS provides a theoretical framework of MBCT, which includes noncognitive aspects of information processing. The ICS is divided into 9 subsystems, whereof 2 are involved in meaning processing; the propositional subsystem, which involves more tangible semantic concepts and the implicational subsystem, which involves more generic and schematic meanings. The schematic models are dependent on their wider propositional contexts and are generated from recurring prototypical patterns of experience. Emotions are directly linked to the implicational subsystem and modification of emotions thus involves a change in schematic models. The state of mindfulness is comparable to a meta-cognitive mode, in which mental events are seen as fragments. This provides meta-cognitive insight that thoughts are not necessarily facts and in turn alters meaning at the implicational level. The meta-cognitive mode replaces the production of depressogenic schematic models with more adaptive models, which interrupts the existing interlock and reduces depression. According to the ICS the maintenance of depression, in the absence of environmental difficulties, is called the depressive interlock configuration and involves the regeneration of depressogenic schematic models.

Teasdale proposes the following three modes; *mindless modus*, *doing modus*, and *being modus*. The depressive state, in which one thinks about one's thoughts, is argued to operate in mindless modus involving close identification with emotions. Mindfulness is argued to operate in being modus associated with an expanded capacity for awareness and being modus is associated with lasting emotional change. Lasting emotional change is further argued to occur when the implicational subsystem is in buffered mode, which occurs during mindfulness. This mode provides a process, which is sufficiently broad to accommodate for an integration of information where newly arrived data input is accumulated and the person responds to a broader pattern of

information, which allows for the transformation and generation of new schematic models. In the absence of appropriate re-population, with more adaptive schematic models, tenacity might occur. Tenacity involves the reintegration of recent implicational memories into the circulating stream of data maintaining the depressive interlock, which in turn re-establishes the depressive state.

3.5 Shapiro’s model of mindfulness.

The current chapter provides a thorough analysis of Shapiro’s model of mindfulness. The model was developed to capture the fundamental processes of mindfulness and I will in this section apply it to the area of MBCT in relation to depression.

Shauna L. Shapiro is a professor of counselling psychology at Santa Clara University. She focuses her research in the area of mindfulness meditation and the integration of mindfulness into the science of psychology. She has co-authored *The Art and Science of Mindfulness* in which she puts forward her model of mindfulness. The model is founded within the framework of cognitive psychology and is based on Kabat-Zinn’s (1990) definition of mindfulness, which involves intentionally paying attention to the present moment while adopting a nonjudgmental attitude. Shapiro et al. emphasise that the three elements of intention, attention, and attitude together constitute the basis for change in mindfulness (Shapiro & Carlson, 2009). This section presents an analysis of the mechanisms of change involved in Shapiro’s model and applies the model to the underlying processes of MBCT in depression. Conclusions are summarised by the end of the chapter and limitations of the model are discussed in Chapter 5.5 Limitations.

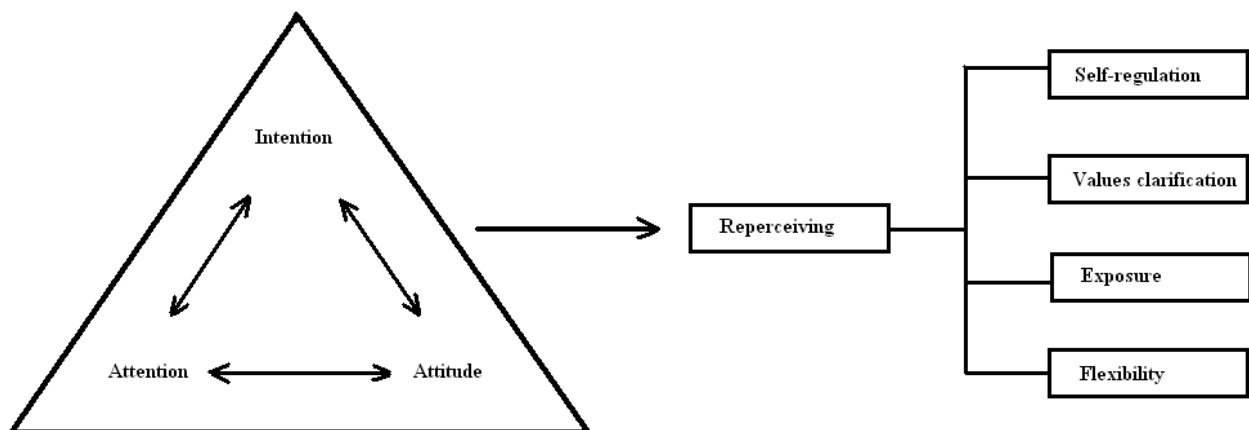


Figure 4: Theoretical model of the mechanisms of change in mindfulness. Adapted from Shapiro and Carlson (2009) and reprinted from (Kommedal, 2009).

Intention, attention, and attitude

The aspect of *intention* is a central component in meditation, which involves one’s reasons for meditating. These express the practitioner’s motivation and objective and Kabat-Zinn argues that

some kind of personal vision is crucial in order to cultivate growth and change (Kabat-Zinn, 1990). According to Buddhist psychology the intention of mindfulness is to gain insight and awakening. The objective is to become free from suffering and feel compassion with all living creatures (Nyanaponika, 1962). Shapiro emphasises that the intention of practitioners might change and vary throughout the course of intervention. Intentions might for example start with a focus on reducing one's own depression and, as suffering is reduced, change into the intention of reducing other people's suffering, for example by treating other's more empathically (Shapiro & Carlson, 2009). Furthermore, intention might also involve the intention from moment to moment while practicing mindfulness, which involves meeting the present experience with an attitude of acceptance and non-judgment. The intention of the practitioner can influence the quality of the mindfulness exercises, which is why mindfulness exercises oftentimes involve instructions which encourage the practitioner to pay attention to their intention and adjust it to match the aim as it is proposed by Buddhist psychology (Kabat-Zinn, 1990). It is important to differentiate between intention and striving as intention in the context of mindfulness refers to a direction and not a goal (Shapiro & Carlson, 2009). In the treatment of depression, this intention gives direction to thoughts (e.g. mood improvement and decrease negative cognitions).

The *second* fundamental aspect of mindfulness is *attention*. In mindfulness attention involves being present in the moment by observing internal and external experiences as they arise. This requires a suspension of the various ways of interpreting experience and instead replacing it with an attention, which captures the content of the internal and external world as it arises moment by moment. This helps interrupt the depressive cycle of rumination, which involves worries about the past and future. Mindfulness cultivates a specific type of attention, which is discerning and nonreactive by nature (Shapiro & Carlson, 2009). It focuses attention on the present moment and deliberately continues to return attention to the present whenever thoughts drift away. This particular attention helps the practitioner realise that thoughts are transient which consequently reduces identification with thoughts as well as feelings of depression (Shapiro et al., 2006).

The *third* fundamental element of mindfulness regards the practitioner's *attitude* during attention to the present moment. The attitude during mindfulness is characterised by acceptance, patience, openness, non-judgmental, non-striving, curiosity, and loving kindness (Shapiro & Carlson, 2009). Kabat-Zinn (1999b) calls this the "*affectionate attention*" and instructions of MBCT usually encourage acceptance and openness towards any thoughts and feeling, which might arise during meditation practice. This stands in stark contrast to the themes of failure, loss, worthlessness, and rejection, which have been found to characterise depressed thinking (Beck & Alford, 2009). The attitude in MBCT is thus likely to interrupt the negative thought patterns, which sustain depressed moods (Shapiro & Carlson, 2009). Instructions of MBCT furthermore encourage patience as opposed to striving towards reaching a goal, while engaging in practice with an attitude as if it was the first time of practicing mindfulness, which is called "the beginner's mind" by Kabat-Zinn (1990). This attitude reduces unrealistic expectations of improvement when practicing MBCT since

the practitioner does not expect a quick fix. Difficulties during MBCT become disconnected from past experiences of failure, which in turn reduces depressive thoughts and feelings (Segal, Williams & Teasdale, 2002).

Shapiro and Carlson (2009) argue that these three elements of attention, attitude, and intention together constitute a continually interacting process. This process enables the practitioner to observe the content of thoughts and one's reactions more objectively, which in turn enables the practitioner to secede from the content of thoughts and the experiences attached to these cognitions (Shapiro et al., 2006). This can lead to a clearer and more objective approach to cognitions and experiences, which makes it easier to realise that thoughts are not necessarily truths, and that our thoughts are not necessarily us. This process involves a fundamental change in perspective which was termed *reperceiving* by Shapiro and Carlson (2009). Figure 4 summarises the theoretical model of mindfulness as presented by Shapiro and Carlson (2009). According to this model reperceiving is the key meta-mechanism of change, which facilitates the other mechanisms of change.

Reperceiving can be thought of both as a meta-mechanism and a developmental process (Shapiro & Carlson, 2009). As a metamechanism mindfulness enables the practitioner to disidentify from the contents of our consciousness such as thoughts, emotions, and judgments. Mindfulness instead increases the ability to view experience with greater clarity and objectivity. Reperceiving thus involves a more distanced witnessing of experienced as opposed to the entanglement with thoughts and feelings, which occurs by default in mindless moments. This is similar to the notion of Goleman (1980) who suggests that meditation involves acknowledging the distinction between the phenomena which is perceived and the mind which perceives the phenomena.

Shapiro argues that the process of reperceiving leads directly to the following 4 mechanisms of change: 1) self-regulation and self-management, 2) values clarification, 3) cognitive, emotional, and behavioural flexibility, and 4) exposure. According to Shapiro's model of mindfulness, these four additional mechanisms of action lead to the positive change in symptoms of depression as well as other psychological disorders such as anxiety and stress (Shapiro & Carlson, 2009).

Self-regulation and self-management

Self-regulation is the process by which systems maintain strength of functioning and adaptation to changes in the environment. This process is based on feedback loops, which are enhanced by the intention and attention, which in turn create health. Figure 5 presents a model, which was put forward by Shapiro and Schwartz (2000) demonstrating how mindfulness leads to improved health through improved self-regulation. The model holds that the intention and attitude in mindfulness lead to a more accepting and non-judgmental attention, which leads to a stronger connection with the body and mind. This in turn leads to greater insight into information about the mind and body. During MBCT this might shed light over information about how cognitions, bodily sensations, and emotions are connected, which was previously unknown to the practitioner. This information

enables the individual to regulate the body and mind according to this newfound information. This involves a more conscious and active self-regulation as well as a more unconscious regulation, which improves the body's capacity to regulate itself. Good self-regulation thus maintains stability and order, and improves the mind and body's ability to adapt to changes in the environment (Shapiro & Carlson, 2009). Shapiro and Schwartz argue that these factors lead to reductions in depressive symptoms as well as improvements in mental as well as physical health (Shapiro & Schwartz, 2000).

Intention → attention → connection → regulation → order → health

Figur 5: Illustration of how health is improved through the intention and attention of mindfulness. Reprinted from Kommedal (2009).

According to Shapiro et al. (2006) recovery depends on the mind's and body's capacity to self-regulate. If the body is not able to self-regulate, disregulation occurs, which might worsen symptoms. An example of psychological disregulation is when an individual identifies with the thoughts they have about a problem they are experiencing. This increases the risk of engaging in automatic reactions, which, in the case of depression, might involve avoiding social interactions, binge eating, or cutting (Klonsky, 2007; Segal, Williams & Teasdale, 2002; Smith, Marcus, Lewis, Fitzgibbon & Schreiner, 1998). These behaviours might in turn aggravate self-regulation further and contribute to a continued worsening of the problem (Shapiro & Carlson, 2009).

The process of re-perceiving improves the capacity to accommodate experiences and react less automatically. By reducing the control thoughts have on people's lives, re-perceiving can break the habit of inapt automatic reactions and make the individual better able to respond and self-regulate. Research has found depressed people to have a negative bias towards the world, which causes them to favour negative memories and predictions about the future (Ingram, Miranda & Segal, 1998). MBCT is argued to reduce this disregulation and strengthen mental health through the process of re-perceiving (Shapiro & Carlson, 2009). Figure 5 illustrates this process from intention to attention followed by improved connection, which lead to regulation and finally stability and better health (Shapiro et al., 2006; Shapiro & Carlson, 2009). This model was supported by a study conducted by Brown and Ryan (2003) who found a correlation between level of self-reported mindfulness and capacity for self-regulation in terms of behaviour and emotions.

Values clarification

According to Shapiro and Carlson (2009) the process of observing one's thoughts and feelings through re-perceiving involves an improved connection with the self. The improved awareness of thoughts and feelings tells the individual something about what is important in their life and clarifies values. Values are oftentimes imposed by our culture, society, and family. An individual might thus take the importance of certain values for granted without reflecting on how these values relate to who we are as individuals. According to Shapiro et al. (2006) re-perceiving can help

us connect with deeper values and increase awareness of the automatic control of imposed values. This model is supported by Brown and Ryan (2003) who found a correlation between level of mindfulness and correspondence between behaviour and personal values/interests. The aim of MBCT is to expand awareness and accept all element of experience (Segal, Williams & Teasdale, 2002). According to Shapiro et al. (2006) clarity and awareness are enhanced through reperceiving, which expands awareness of how personal values, societal values, and personal reactions interact. This expanded awareness provides an added insight, which makes it possible to respond to experiences on a more informed basis as opposed to reacting to them. This in turn reduces depressive symptoms because values and reactions based on values are no longer taken for granted as truths about the world (Shapiro & Carlson, 2009).

Cognitive, emotional, and behavioural flexibility.

Shapiro and Carlson (2009) furthermore argue that reperceiving facilitates the capacity to accommodate unpleasant experiences, thoughts, and feelings and respond to these in a more adaptive and flexible manner as opposed to rigid reactivity resulting from being overly identified with the experience of the present moment. Individual freedom to choose between various responses, as opposed to reacting in an automatic fashion, is gained through increased insight into the processes of one's mind and behaviour. On the contrary, strong identification with the elements of experience (e.g. cognitions, physical sensations, and emotion) makes engagement in automatic reactions more likely. This is supported by research in which the processing of new information was found to be influenced and, in some cases, distorted by already existing expectations and beliefs (Borkovec, 2002). Learning is thus to some extent dependent on the ability to disidentify from prior experiences. In the case of depression automatic reactions, based on prior experiences, are likely to amplify the depressive state (Segal, Williams & Teasdale, 2002). MBCT breaks this cycle of depression through increased insight into the construction of experiences in the mind. The insight and identification of how cognitions, emotions, and sensations interact to create depression makes it possible to challenge and over time deconstruct depression (Shapiro & Carlson, 2009).

MBCT provides a different view of the present moment, which offers greater consciousness and flexibility and less automaticity, reactivity, and entanglement with thoughts and feelings. MBCT and the process of reperceiving are argued to facilitate the capacity to distance oneself from the ongoing internal commentary about experiences encountered (Shapiro and Carlson, 2009). MBCT enables the person to experience the present situation as it arises and separate it from the thoughts and emotions triggered by prior conditioning and experiences. This in turn enables the person to not act on reactionary thoughts and emotions and instead choose a more helpful behaviour (Shapiro & Carlson, 2009; Shapiro et al., 2006).

Exposure

In Shapiro's model of mindfulness exposure refers to the exposure to one's own thoughts and feelings (Shapiro & Carlson, 2009). Much research has documented the positive effects exposure treatment has on a variety of disorders (Joseph & Gray, 2008; Marks, 1979). Reperceiving works as a counter to habitual avoidance and denial of unpleasant emotional experiences and it enables the person to experience emotions and cognitions with greater objectivity and less reactivity. Segal, Williams, and Teasdale (2002) argue that the direct exposure, which takes place during MBCT, facilitates an understanding of thoughts, feelings, and bodily sensations as impermanent and less frightening, which leads to enhanced tolerance of unpleasant thoughts and feelings. This insight in turn facilitates a global desensitisation through the extinction of avoidance behaviours and automatic fear responses (Shapiro & Carlson, 2009). In the case of depression, this means that the individual is less likely to believe catastrophising thoughts such as "no one likes me" or "I am worthless", which in turn enables the individual to respond to thoughts in a more adaptive way and not engage in avoidance behaviours, such as not asking others for help, or declining social invitations (Segal, Williams, & Teasdale, 2002).

In summary, Shapiro's model of mindfulness emphasises the three elements of intention, attention, and attitude. 1) *Intention* involves the practitioner's motivation and objective for meditating, which give direction to meditation. In accordance with Buddhist psychology, these involve the gain of insight and compassion and to become free from suffering. 2) *Attention* during MBCT involves observing internal and external experiences as they arise, which requires a suspension of ongoing interpretation. This attention is discerning and nonreactive by nature and helps the practitioner realise that thoughts are transient, which interrupts the depressive cycle of rumination and reduces identification with thoughts. 3) The *attitude* during MBCT is characterised by acceptance, patience, openness, non-judgment, non-striving, curiosity, and loving kindness towards any thoughts and feelings, which arise during meditation practice. Difficulties during MBCT are disconnected from past experiences of failure, which in turn contributes to the interruption of negative thought patterns sustaining depression.

The three elements mentioned above together constitute the continually interacting process of *reperceiving*, which involves a fundamental change in perspective. Reperceiving can be described as a metamechanism, which enables the practitioner to observe the content of thoughts and reactions more objectively and disidentify from elements of experience. Reperceiving adds clarity and objectivity to experience and reduces the entanglement involved in depression. This is facilitated through the following 4 mechanisms of change during MBCT: 1) self-regulation and self-management based on greater insight about the connection between body and mind, 2) clarification of personal values through improved awareness of thoughts and feelings 3) cognitive, emotional, and behavioural flexibility through an increased capacity to accommodate unpleasant experiences and respond to these in a more flexible manner, and 4) exposure to thoughts and feelings during MBCT, which facilitates an understanding of thoughts, feelings, and bodily

sensations as impermanent. This potentially leads to enhanced desensitisation towards experience along with extinction of avoidance behaviours.

4.0 Research in the area of MBSR and chronic pain

This chapter focuses on research in the area of MBSR and chronic pain. Firstly, an argument is put forward regarding the importance and significance of conducting research in the area of MBSR and chronic pain. This is followed by a review of 3 representative studies in the field. The question of whether any generalisations can be drawn from this review is tied to another question relating to the validity of the study findings examined in this paper (Gall, Borg & Gall, 1996). Hence, a thorough scrutiny, of the methodologies and research methods used in the studies, was carried out. The aim of the current chapter is to integrate and synthesise research outcomes related to MBSR and chronic pain and the review generally focuses on studies of high methodological quality and validity in order to form an integrated picture of current knowledge in the field.

4.1 The significance of studying mindfulness in the treatment of chronic pain

Chronic pain is a common problem today in Western countries and as much as 20% of the population suffers from some kind of chronic pain rising to 50% in the older age population (Ospina & Hartsall, 2002). Because medicine in many cases loses its effect over time, there is a growing interest in alternative forms of pain relief. This tendency has been strengthened through recent research demonstrating the link between psychological factors and the perception of physical pain (Gatchell, 1996). Some of the psychological factors, which have been documented to influence pain perception, are affective state and level of anxiety (Baer et al., 2003; Fishbain et al., 1997). For this reason, psychological methods such as mindfulness have begun to draw interest in the context of treating somatic pain. Furthermore, studies on patients suffering from various types of pain have revealed the difference, which psychological interventions make, in reducing the level of self-reported pain and general disability (Grossman, Niemann, Schmidt, & Walach, 2004). In some instances the psychological state of patients even seemed like a better predictor of perceived pain, than the pathological findings in relation to the pain (Gardner-Nix, 2010, p. 369).

Since pain is inevitably a part of the human condition it is interesting to look into the practice of mindfulness as it accepts the premise of pain as a natural and unavoidable part of life (Kabat-Zinn, 1990). Mindfulness however also opens a possibility that pain does not necessarily have to be in the way of a satisfying life and that suffering in relation to chronic pain can be reduced (Kabat-Zinn, 1994). As we will see in chapter 5, pain is made up of somatic, emotional, and cognitive factors and the traditional view of pain relief, as a solely physiological endeavour, is thus no longer justified (Nicholas et al., 2000). The traditional one-dimensional way of approaching the treatment of somatic pain has left many patients in despair, since the traditional medical approaches did not

lead to the expected relief. Chronic pain patients are often told that they will have to learn to live with their pain, but little guidance is given as to how. When symptoms are reported outside the normal anatomical nerve system patients have commonly been met with the view that the pain is “all in their head” (Gardner-Nix, 2009).

Data analysis, interpretation, and evaluation

MBSR is one of the most widely used mindfulness-based treatments in the area of chronic pain, which is why I choose to concentrate specifically on this (Kozak, 2008). Since my focus is on *what* makes mindfulness work and not *whether* it works, the research examined focuses on studies where MBSR was found to reduce psychological symptoms and help chronic pain patients. During data evaluation relevant information was extracted from the articles and evaluated. The type of data extracted was guided by the problem formulation and articles were read hermeneutically. Thus, focus was on research outcomes, which were extracted by studying the results sections and conclusions of the articles. Furthermore, methodology sections were examined and factors, which present a risk to the quality of outcomes, are analysed and discussed.

The significance of the current literature review is supported through its contribution to knowledge production and knowledge development. The review illuminates broader structures, interactions, and generalisability in the field and conclusions rise above the findings of each individual study (Cooper, 1989). Tentative conclusions are presented based on a thorough assessment of the research findings in the three studies.

4.2 Effects of MBSR in relation to chronic pain: Review of 3 studies

The current chapter presents some of the major empirical research findings in the area of MBSR and chronic pain. The results are analysed and discussed to uncover the psychological effects and processes of change associated with MBSR in the treatment of chronic pain. The 3 studies presented are deemed representative of research in the area of MBSR and chronic pain and I have chosen to focus on a limited number of studies, rather than listing a multitude of findings from different studies. This approach enables a thorough assessment of the quality of the research findings and provides the reader with a transparency upon which my conclusions can be assessed. This in turn potentially strengthens the validity of conclusions made in the current paper. Methodological strengths and limitations of the studies are highlighted and discussed in section 4.3 and suggestions are offered on how research designs can be improved in order to strengthen reliability and validity of results. Conclusions are summarised by the end of the chapter.

Due to differences in competence, inclination, and discipline the individual experience of mindfulness, and the ability to focus attention, varies considerably. Thus the study of mindfulness becomes one of individual differences and is often based on self-report measures and momentary mindful states (Baer, 2010).

Study 1

As presented earlier, Jon Kabat-Zinn is the founder of MBSR and a pioneer in the field of mindfulness-based interventions in the treatment of chronic pain patients (Kabat-Zinn, 1982). He conducted a study investigating how mindfulness meditation affects the self-regulation of chronic pain in patients suffering from various types of chronic pain such as lower back pain, neck pain, shoulder pain, and headache (Kabat-Zinn, Lipworth & Burney, 1985). MBSR was still in its infant stages, when the study was conducted, and in this article the program is called the Stress Reduction and Relaxation Program (SR&RP). The program included 90 patients who had been diagnosed with a pain condition, which had not been improving, for at least 6 months. Patients were referred by their physician and each participant was initially interviewed and informed about the program. The focus of the program was primarily educational and required a high degree of discipline in relation to daily meditation practice for stress and pain coping. Participants were given audiotapes with meditation exercises and were required to engage in formal meditation for 45 minutes, 6 days a week. Courses were lead by experienced meditation instructors who had meditated for many years. Participants were assigned to one of five consecutive 10-week cycles, of the SR&RP in 1980 and 1981, with completion rates varying between 80 to 90%. The treatment groups were compared to a control group, in which participants only received traditional medical treatments involving nerve blocks and antidepressants (n = 21). The study was designed as a descriptive comparison and lacked randomisation. Both conditions included the placebo effect of enthusiastic referral to either program and high expectations of pain relief. Participants in both conditions were given a number of self-report questionnaires prior to program initiation and after ending the program:

1. The McGill-Melzack Pain Rating Index (PRI), which measures present-moment pain.
2. The Body Parts Problem Assessment (BPPA) Scale, which measures how problematic various body parts are viewed by the patient.
3. The Table of Levels of Interference (TLI), which measures how pain affects normal life activities.
4. The three-colour Body Pain Map (BPM), which assesses changes in pain distribution, intensity, and frequency.
5. Medically oriented symptom checklist (MSCL), which was used to monitor total number of symptoms in the past month.
6. Profile of Mood States, which contributed to participants Total Mood Disturbance (TMD) score.
7. Hopkins Symptom Checklist (SCL-90-R), which assesses psychological symptomatology and combines the scores on various symptoms to generate each participant's General Severity Index (GSI)
8. A Summary Outcome Questionnaire was used, after the program had ended, to a representative score of the average degree of change in 10 central symptoms, such as pain

frequency, severity, drug use, activity levels, coping, and so on with 0 indicating “no change” and 5 indicating “great improvement”.

Indices 1 to 5 tapped into some of the same symptoms and were not completely independent of one another. Data analysis was conducted in SPSS, where matched t-tests were run in order to calculate difference in improvement over time between the experimental and control conditions.

The overall outcome of the study was a moderate to great improvement in status of pain and overall health. The GSI showed great reductions on all psychological parameters in the experimental groups. Anxiety, depression, present moment pain, body image, self-esteem and activity levels were all significantly improved in the experimental condition, while no significant changes were found on the same parameters in the control group. Furthermore, the usage of drugs decreased in the mindfulness group. Comparable positive results were found within all pain types and within both genders. The control group did not yield any significant results overall.

Kabat-Zinn et al. (1985) conducted a number of follow-up studies in the following 15 months and found that the results stayed stable over this period. In a follow-up questionnaire study 4 years later Kabat-Zinn, Lipworth, Burney and Sellers (1987) still found an improvement in psychological and medical symptoms. It is however important to note, that response rates varied from 53-70% and the participants responding to the questionnaires were likely to be the ones who benefitted the most (Gardner-Nix, 2010, p. 371).

Study 2

The second study I want to examine was conducted by Kaplan, Goldenberg and Galvin-Nadeau (1993) who looked at the impact of MBSR on patients suffering from fibromyalgia. Fibromyalgia is a condition, which manifests itself as extreme sensitivity to pain. It is characterised by widespread pain, fatigue, and problems with sleep. The illness is chronic and resistant to treatment (Gardner-Nix, 2009).

Normally, during injury and the experience of pain, the body releases natural painkillers in the form of stress-induced analgesia (for example endorphins), which relieves the immediate pain. This is why pain is usually felt very intensely at first and diminishes shortly after. Besides this the brain also releases the hormone dopamine, which provides feelings of pleasure. In the case of chronic or prolonged stress the brain is no longer able to continue the supply of internal opioids and might lose its ability to produce dopamine (Gardner-Nix, 2010). This might have serious consequences for the individual for example in the form of chronic pain, such as fibromyalgia, because the body's natural system for dealing with pain is no longer functioning. In contrast to other stress-related conditions, such as reduced immune-system functioning, cardiovascular diseases, and depression, fibromyalgia is thought to be caused by unusually low levels of cortisol, where the other conditions are caused by an overproduction of stress hormones. The low levels of cortisol found in patients suffering from fibromyalgia can possibly be interpreted as the body's

inability to respond to stress and pain the way it normally would (Gardner-Nix, 2009, p. 65). Studies have found female foetuses to be more affected by maternal stress and this might explain the higher prevalence of fibromyalgia among women. This connection suggests that fibromyalgia might be caused by abnormal development in the brain, which in turn leads to heightened sensitivity to stress along with disturbances in sleep in adult life. Consequently the immune system and the body's ability to repair itself is suspended causing sore muscles and joints as well as increased susceptibility to various illnesses and infections (Ibid, p. 67).

Kaplan, Goldenberg and Galvin-Nadeau (1993) sent out letters to 300 randomly selected fibromyalgia patients who were followed by a rheumatologist. The letters included an invitation to enrol in an MBSR program and the first 77 patients who enrolled in the program were included in the study. Prior to the start of the program patients were screened for psychiatric illnesses and asked to participate in a structured clinical interview (SCID), which provided information about any current or past psychiatric diagnoses according to DSM-III-R criteria (Spitzer, Williams & Gibbon, 1987). Some patients however declined due to additional costs or other unstated reasons, which resulted in only 59 patients completing the program. Patients were informed that the program would require 50 minutes of homework per day and each patient completed the following 7 questionnaires prior to the first session and by the end of the 10-week program:

1. A 100-mm visual analog scales (VAS) measuring overall wellbeing, pain, sleep, fatigue, and feeling refreshed in the morning. The VAS has commonly been used in fibromyalgia therapeutic trials and has shown high sensitivity to change.
2. A medical Symptom Checklist (MSCL) consisting of 31 items. The researchers only included symptoms which were found cause problems on a daily basis.
3. The General Severity Index (GSI) of the SCL-90 consisted of 90 items and was used as a global measure of psychological distress.
4. The Coping Strategies Questionnaire (CSQ) was only used for the measurement of patient ability to control and decrease perceived pain.
5. The Fibromyalgia Impact Questionnaire (FIQ) is a 10-item questionnaire, which measures health status and functional disability.
6. Fibromyalgia Attitude Index (FAI) is a 15-item scale, adapted from the Arthritis Helplessness Index.
7. Overall Assessment (OA) of Outcome Questionnaire is a 10-item questionnaire.

The program went for 10 weeks and participants met once a week for 2 hours in groups of 7-12 participants. The study included 2 therapists, who had been trained to follow the same standardised treatment program. Initial sessions involved both therapists and included a post session meeting in order to enhance consistency in the program. Patients were instructed to meditate twice daily and were provided audiotapes with instructions of different types of meditation each lasting 20 minutes. Participants were encouraged to keep a journal of their

process and sessions included meditation, a group discussion, presentation by therapists of new material, and homework.

The results of the study found an overall positive change on all the questionnaires administered. Most improvements were modest and 30 out of the 59 patients showed at least a 25% improvement on at least half of the instruments. No significant difference was found between patients who responded well and patients who responded less positively, on parameters such as sex, education, age, or symptom duration and patients who responded well were found to match the overall fibromyalgia population on the same criteria. 90% of participants reported that the program had given them valuable information and was of significant help in coping with their condition (Kaplan, Goldenberg & Galvin-Nadeau, 1993).

Study 3

The third study examined was conducted by Rosenzweig, Greeson, Reibel, Green, Jasser, and Beasley (2009) who looked at the role of home meditation practice in the variation of treatment outcomes for chronic pain conditions. The study was conducted through a prospective cohort design to assess changes in bodily pain. Participants were recruited through local medical clinics and advertisement in the media. All participants participated in an interview prior to enrolment in the MBSR program and the interview included questions regarding medical history and course expectations. The study consisted of 133 participants whereof 51 presented with chronic neck and/or back pain. Other pain conditions included migraines, arthritis, fibromyalgia, and various other conditions of low prevalence. The majority of participants were women (n=111) and the mean duration of self-reported pain was 12.1 years. 93% of participants were Caucasian, 67% reported a college degree or postgraduate education, and 54% were employed.

The intervention involved a standard 8-week MBSR program and participants were taught by professionally trained instructors who were long-term meditators themselves. A variety of mindfulness meditation techniques were taught and participants were provided with cd's and audiotapes and were instructed to practice 20-25 minutes of formal meditation at home, 6 days a week, as well as practice informal mindfulness throughout daily activities. Classes had a weekly duration of 2½ hours and were divided between meditation, group discussions, and mindfulness skill-building activities. The course additionally included a 7-hour weekend training day in the 6th week.

Two standardised assessment instruments were administered prior to program participation and after the intervention had ended.

1. Medical Outcomes Study Short-Form 36 Health Survey (SF-36) is widely used in allopathic outcome studies and assesses the health related quality of life (HRQoL). It has been found to have high validity and reliability in several chronic illness populations (Ware, Kosinsky & Gandek, 1993). It contains 36 items regarding both physical and mental functioning and

well-being on the following 8 health concepts; physical functioning (PF), role limitations due to physical health problems (RP), bodily pain (BP), general health perception (GH), vitality/fatigue (VT), social functioning (SF), role limitations due to emotional problems (RE), and mental health status (MH). In addition the two summary scales of The Physical Component Summary and The Mental Component Summary are also calculated.

2. Symptom Checklist-90-Revised (SCL-90-R) has also been found to be a valid and reliable instrument, which is sensitive to changes in psychological distress. It includes 90 items and consists of 9 dimensions of symptoms including anxiety, depression, and somatisation along with the summary score of Global Severity Index, which combines information on the symptoms of distress reported.

The researchers further looked at the role of meditation practice in the home and assessed this through participant journals in which date, time, duration, and comments about formal home practice were recorded. Informal mindfulness practice was not measured. The study thus consisted of a repeated measures design and paired t-tests were analysed using SPSS.

Participants showed a HRQoL substantially below average at the beginning of the study and showed high levels of psychological distress on average. 100 participants completed 6 or more of the 8 sessions and the results for this group showed good improvements overall. However, improvements were, to a large extent, dependent on type of chronic pain condition, with arthritis patients responding the best and migraine patients improving the least. The chronic pain sample, as a whole, demonstrated significant decreases in distress during MBSR training with a mean GSI score reducing by 33% and SCL-90-R subscale scores for ANX, DEP, and SOM reducing by 39%, 30%, and 21%, respectively. A significant association was found between self-reported weekly home meditation and reductions in overall psychological distress, somatisation symptoms, and self-rated general health. Greater home practice was further associated with increased reductions in role limitations, due to emotional problems, and increased improvement in social functioning. No association was found between self-reported home meditation and other subscales, such as depression or anxiety (Rosenzweig et al., 2009).

In summary, the three studies generally showed moderate to great improvements on parameters such as overall health, status of pain, and activity levels as well as psychological symptoms such as anxiety, depression, self-esteem, and social functioning. Great differences in results were found between experimental and control groups and MBSR was found to help patients cope with their condition and decrease distress. The first study further found a reduction in drug intake in the experimental group. The review included a broad variety of chronic pain conditions and, although results varied, MBSR showed positive results in all population. The only follow-up study examined showed stable results over a 4-year period.

4.3 Validity and reliability of the reviewed studies

The current chapter highlights some of the common limitations of studies in the area of MBSR and chronic pain. The studies' internal validity depends on the degree to which we can be certain that the effect was caused by the MBSR intervention. The studies external validity or generalisability depends of the degree to which the findings are not just limited to the experimental sample, but can be generalised to the overall population. Extraneous and confounding variables such as uneven sample sizes, lack of random assignment, lack of matching, and poor constancy might compromise the study's internal and external validity. These threats to validity are examined further in the following.

As is the case with most research in the area of mindfulness, the 3 studies examined, were conducted quantitatively in a between-groups repeated-measures design (Kabat-Zinn, Lipworth & Burney, 1985; Kaplan, Goldenberg & Galvin-Nadeau, 1993; Rosenzweig et al., 2009). In this design the groups of participants are tested before and after the intervention or control condition and the effect is usually measured via questionnaires. It is thus relevant to look at the limitations of this design as a research method.

There are some general extraneous variables, which apply to questionnaires. Questionnaires are at higher risk of producing participant error than designs which involve more commitment. Participants might race through the questions (Christensen, 2004) or have a response set where they for instance tend to agree or disagree with everything in the questionnaire or they might feel pressured to have an opinion where none exists (Colman, 1995). One way of reducing participant error is to vary the questions so that all topics in the questionnaire are equally likely to be influenced if participants feel tired, anxious, bored, etc. Participant effects can also be minimised by disguising the measure of the DV so that it is not so obvious to the participants what the study is about. Clearly, this was not done in the current studies, since the aim of reducing pain was evident to participants. Due to this, participants might have answered in accordance with the researcher's hypothesis, which is called *the participant bias*. This is where participants answer according to what they think the experiment is about, or according to what they think they are expected to answer, instead of giving their true response (Weiten, 2004). Participants might for example have overrated their level of improvement in order to fulfil the researchers' hypothesis.

Another way to minimise participant effect is to use multiple operationalism, which was done by the first and second studies examined. The confidence of the study increases if all measures show the same result (Miller & Salkind, 2002). In the study of mindfulness, this can for example be done by combining questionnaires with interviews and thereby match results from the interviews with the results from the questionnaires. Unfortunately this is expensive, which is probably why this combination has not been used in the reviewed research. It is however a direction for future research, which would add confidence to the findings.

Another possible extraneous variable, in the reviewed research, is the measurement error. This is the tendency to respond in an erroneous way due to fatigue, stress, etc. It is impossible to avoid measurement error completely, but since reliability increases when measurement error decreases (Christensen, 2004) it is important to minimise the effect of these factors as much possible. The current studies do not state the context in which questionnaires were answered and whether participants were given optimal circumstances for answering the post-intervention measures.

Since mindfulness studies cannot be conducted in an isolated laboratory, the level of constancy and control in these experiments is low. This can be aided by controlling for participants mental state at the beginning of the questionnaire. None of the studies explicate whether this was done, and the results might thus be due to elevated mental states caused by other factors than the intervention such as for example team spirit or the added attention from the researchers (Christensen, 2004).

Another problem with the studies is that the research topic makes random assignment very difficult, since participants assigned to the MBSR condition are usually volunteers. Patients with very acute pain are less likely to sign up since they might prefer a more traditional medical intervention. Furthermore, women are overrepresented in pain clinics, which might be due to women being more willing to report pain than men (Gardner-Nix, 2010, p. 375) and the participants might thus not be representative of the general chronic pain population. It can further be speculated that patients signing up for MBSR have a bigger pre-acquired knowledge and openness towards mindfulness, which might present a confounding variable (ibid.). It is thus not possible to completely determine whether the results are due to intergroup differences or if the results are attributable to the MBSR intervention.

For the same reasons, it is difficult to match the participants of the different groups in order to make them more similar, which was also not done in the current studies. Hence, in many cases the only thing we know for sure, is that all participants suffered some kind of chronic pain, but besides that the experimental and control groups might have been completely different (Keppel & Wickens, 2004). There is hence a chance that the results were influenced by initial differences between the groups and not by the MBSR intervention. A recommendation for future research would thus be to match the groups on anything that does not interfere with the research topic, for example age, education, psychological health, gender, etc. This process is called *precision matching* (Miller & Salkind, 2002). Due to the added cost of this procedure researchers often choose to only match on the DV such as for example initial level of pain.

Further, extraneous variables can be limited through using a sufficient number of participants, with larger samples leading to extraneous variables causing less influence (Aron & Aron, 2003). The studies examined all have relatively small sample sizes, which reduces statistical power and the reliability of effect size estimates since small samples are more sensitive to extreme scores. The validity of inferences made from these samples about the general chronic pain population is

thus questionable, since the samples are not adequately large and because the demographic characteristics of samples do not match the general population (Christensen, 2004). Participants in these studies were primarily well-educated, employed, Caucasian women, and in order to determine the generalisability of the studies, new studies must represent other demographic characteristics to a broader extent. It is possible that different samples (e.g. unemployed males) would yield different results and for the current paper, this means, that conclusions based on these studies are only tentative and that larger scale studies conducted on samples, which to a larger extent match the population, are needed, in order to test the generalisability of conclusions (Miller & Salkind, 2002).

There was a fairly high drop out in the 3 studies, which is common due to the condition of participants. Participants might not have the energy to follow the program, or they might feel that the treatment does not improve their condition as fast as they would like. It is thus important to look at whether the data of these participants is included in the results and look for commonalities in the participants who did not complete the study. Such commonalities might reveal which demographic groups benefit the least from MBSR. Any confounding variables, which cannot be controlled for in the assignment of participants can instead be tested by incorporating it as an IV in the study (Christensen, 2004). All 3 studies examined possible commonalities of dropouts and thereby raised the validity of findings. No significant difference was found between dropouts and participants who completed the MBSR program and the details about dropouts were thus not included in the current review.

All the factors examined above are possible causes of biased results not showing a valid picture of the effect of MBSR. Conclusions based on these findings are thus tentative and need further testing before generalisability can be determined. Similarly, both the findings in the reviewed studies and my choice of studies reviewed are influenced by the researcher's choice of focus. The current paper is thus biased by my own focus and choice of what data and information to include and what to leave out (Miller & Salkind, 2002). For this reason, the method and process, by which the current paper's conclusions were reached, are stated explicitly, in order to make it possible for the reader to evaluate my methods against my results.

In summary, most MBSR studies, in the treatment of chronic pain, have been conducted quantitatively in between-groups repeated-measures designs utilising questionnaires. Some of the limitations in the reviewed designs were lack of constancy and control, lack of random assignment, lack of disguised measures, and inadequate sample sizes. Effects attributed to MBSR might thus have been caused by other factors, such as intergroup differences, and participant error might have occurred. The use of multiple operationalism, in all three designs, increased validity and confidence that the studies actually measured what they aimed to measure. Measurement error might have occurred compromising the studies' reliability and follow-up information was only collected in one study. There is thus a need for future longitudinal randomised studies in which participants are matched and where the above mentioned limitations are targeted. More follow-

up information is needed in order to assess the long-term effects of MBSR. These preliminary conclusions potentially point research in new directions and serve as suggestions for generation of new scientific knowledge in the area of MBSR and chronic pain.

5.0 MBSR in the treatment of chronic pain: A discussion

In the current chapter chronic pain is discussed from a cognitive perspective in relation to depression, which is followed by a presentation of a cognitive model illustrating how chronic pain can lead to suffering. The 2 models of mindfulness presented in chapter 3.4 and 3.5 are applied to the chronic pain model in order to understand the positive effects of MBSR, in the treatment of chronic pain, as reviewed in chapter 4. Examples from my internship at the CCH are provided throughout the chapter in order to illustrate central themes and enhance comprehension.

Cognitive theory in relation to chronic pain

Both cognitive theory and cognitive therapy are based on the cognitive-behavioural model, which focuses on the individual's subjective experience. In relation to chronic pain, the subjective experience of an individual is thought to be influenced by individual attitudes, beliefs, and expectations besides the nociceptive stimuli, which precede pain (Gardner-Nix, 2009; Shapiro & Carlson, 2009; Turk, Meichenbaum & Genest, 1983; Young, 2004). These negative expectations, emotions, and attitudes are, according to cognitive theory, likely to exacerbate the emotional stress and feelings of helplessness related to the physical pain. The cognitive model, as presented in chapter 3.3, p. 13, also recognises environmental and physiological factors' influence (e.g. physical pathology) on how pain is experience and physiological factors are thought to influence cognitions, feelings, and behaviour as well (McCracken, 2005).

According to the cognitive model, illness- and symptom-related schemas develop on the basis of past experiences and medical history and correspond to subjective representations of chronic pain. Schematic beliefs thus assist in creating meaning of experience, and pain schemas might tell something about an individual's ability to function in spite of chronic pain (Beck, 2005; Cioffi, 1991). When facing chronic pain, the patient is likely to draw causal and consequential inferences about the painful sensation based on existing schematic references (Beck, 2005). Poor adaptation to chronic pain is for example likely to occur when the individual draws on schemas, which hold the belief that physical pain is an acceptable and justified reason for disengaging in physical activity (e.g. occupational or sports) (Williams & Thorn, 1989).

The relationship between chronic pain and depression

Physical pain can be understood both in terms of how it is felt and interpreted as well as its neurobiological development and origins. Since somatic experiences are usually attached to a core affective experience, they cannot be reduced only to their neurological processes. Somatic

experiences are connected to subjective feelings of pleasure or discomfort and as Barrett notes these feelings often have an intentional or cognitive element, where meaning is assigned to the feeling and situation (Barrett, Bliss-Moreau, Duncan, Rauch & Wright, 2007).

Chronic pain has been found to be an antecedent to depression and depression has similarly been found to be a consequence of chronic pain. Comorbidity is often found in chronic pain populations who often suffer from additional psychological disorders such as depression, stress, or anxiety (Bair, Robinson, Katon, et al., 2003; Fishbain, Cutler, Rosomoff et al., 1997). Although the proportion of chronic pain patients found to suffer from depression varies throughout the literature, most studies report a proportion in the mid-range of 40 to 60% and other studies have found a symptom overlap between chronic pain patients and patients with depression (Bair, Robinson, Katon, et al., 2003; Williams, Jones, Shen, et al. 2004). Comorbidity has further been linked to a more impaired quality of life when only one of the disorders is targeted in treatment (Gatchel, 1996; Nicholas, Coulston, Asghari et al., 2009; Williams et al., 2004).

Similarly, Nicholas, Coulston, Asghari, and Malhi (2009) found elevated levels of depression in chronic pain populations as compared to the general population. Scores of depression were however lower, than in populations diagnosed with a mood disorder. Depression was further linked to increased physical disability, lower pain self-efficacy beliefs, and lower self-reported social support. These results were found after controlling for age, sex, and duration of pain and severity of depressive symptoms was not associated with pain severity and pain distress. Kabat-Zinn (1984) similarly found chronic pain to be accompanied with severe mood disturbances such as depression, reduced self-esteem, irritability, and anxiety. These findings suggest that depressive symptoms play an important role in how chronic pain affects an individual's life. As presented in chapter 3, mindfulness has been found to reduce depressive symptoms and I will thus start by discussing the likely consequences of reducing depressive symptoms in chronic pain patients through MBSR.

5.1 Nicholas' model of chronic pain

The chronic pain model utilised in this chapter was developed by Professor Michael Nicholas (Nicholas, 2005) who is employed at the Pain Management Research Institute in Australia. Nicholas is a clinical psychologist who has worked in the field of chronic pain since 1980. He specialises his work in research and education, in the area of cognitive-behavioural pain management programs for chronic pain patients, at the University of Sydney and Royal North Shore Hospital. He has published numerous scientific journals and book chapters, on the psychological aspects of chronic pain, and has written a widely recognised book on chronic pain called "Manage Your Pain" (Nicholas, Molloy, Tonkin, & Beeston, 2000).

Nicholas has contributed to the integration of psychological principles into the existing cross-disciplinary pain management programs and his research documents the risk factors of chronic

pain associated with absence from work. This has led to the development of psychologically-based pain management interventions, which are based on cognitive-behavioural treatments for chronic pain patients (Nicholas, Molloy, Tonkin et al., 2000).

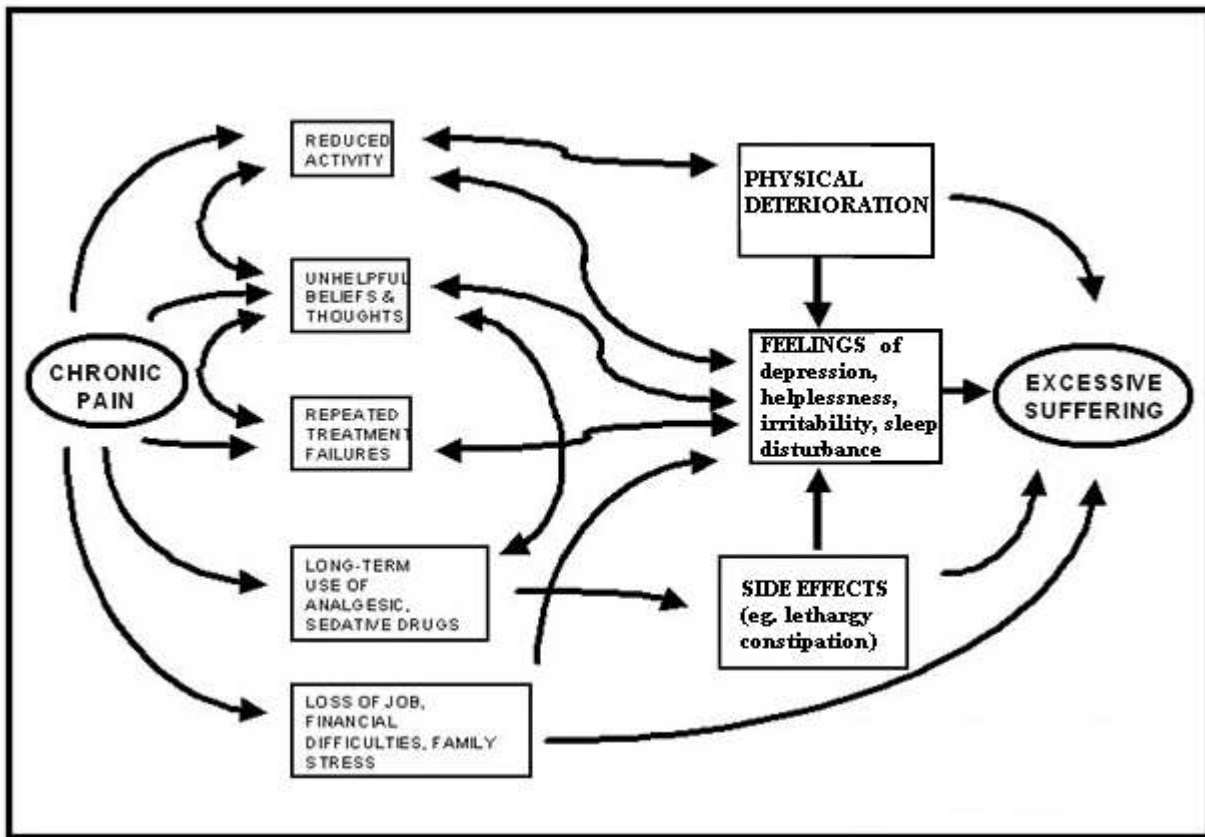


Figure 6: Nicholas cognitive model of how chronic pain can become a problem and lead to excessive suffering. Adapted from Nicholas (2005).

Figure 6 offers an overview of the factors, which contribute to chronic pain related suffering. It includes psychological factors, in the form of cognitions and emotions, as well as physiological, medical, occupational, experience-based, social, and motivational factors associated with chronic pain and shows how suffering occurs through the interaction between these factors. The model has, to my knowledge, not previously been applied to MBSR and chronic pain although an expansion of the model, to comprise the processes of mindfulness, seems natural. A probable reason for this might be, that theories about mindfulness are still in their preliminary stages (Shapiro & Carlson, 2009), and more theoretical models are likely to develop in the coming years.

Since Nicholas model of chronic pain is rooted in cognitive theory (Nicholas, Molloy, Tonkin et al., 2000), it provides a good starting point for understanding MBSR and chronic pain in a cognitive perspective. I will thus discuss how the 2 models of mindfulness presented in chapter 3 can be combined with Nicholas model of chronic pain in order to understand the positive effects of MBSR in the treatment of chronic pain as presented in chapter 4.

5.2 An application of the ICS to the area of MBSR and chronic pain

The following two chapters expand the ICS and Shapiro's model of mindfulness to include an understanding of MBSR and discuss the underlying processes of the empirical results reviewed in chapter 4. I want to apply the two models to the area of MBSR and chronic pain and discuss how MBSR interacts with the factors presented in figure 6. As I go along, I will make use of examples from my internship at the CCH in order to illustrate central themes.

As presented in chapter 3.4, the ICS includes the influence of cognitive as well as non-cognitive factors (e.g. interaction between body-state and affective factors) and is argued to be applicable to all aspects of information processing (Teasdale & Barnard, 1993). The ICS has been expanded to comprise an understanding of the underlying processes of mindfulness and Teasdale relates his theory of ICS to mindfulness in general and not to MBCT or MBSR specifically (Teasdale, 1999b). However, since the primary component of MBSR is mindfulness, my argument is that the application of ICS to MBSR, in the treatment of chronic pain, is both appropriate and valid.

As described in chapter 3.4, the ICS divides the process of meaning making into two subsystems of coding and the theory holds that different meanings are created through these two types of information processing. I want to focus my discussion on the implicational subsystem, in relation to MBSR and chronic pain, since this is where emotional and intuitional meaning is thought to develop (Teasdale, 1999b; Teasdale & Barnard, 1993). The implicational level composes the most generic level of meaning representation, in which recurring patterns and co-occurrences, across all other representational and sensory codes, are captured and integrated. Schematic models of experience are thus constructed from these prototypical patterns of experience at the implicational level (Teasdale, 1996; Teasdale & Barnard, 1993).

As mentioned earlier, depressive implicational models are presented in individuals with depression and they develop through an abstraction from multiple experiences with depressive themes (Teasdale & Barnard, 1993). Specifically, aversiveness, uncontrollability, and anticipated persistence were found to support and maintain depressive schematic models. Not only is this interesting in relation to depression, as it sheds light over which experiences increase the risk of developing depressive worldviews, the findings are also interesting in relation to the question of how mindfulness helps reduce chronic pain. Teasdale and Barnard's (1993) findings might contribute to an understanding of why depressive symptoms are prevalent among chronic pain patients and in turn, why MBSR shows positive effects in the chronic pain population. Chronic pain meets the criteria of an aversive stimulus, which is perceived as uncontrollable, since the cause of chronic pain is oftentimes unknown, and, owing to the chronic nature of the pain, the timeframe of the condition is usually uncertain. Chronic pain thus meets the criteria proposed by Teasdale and Barnard (1993) associated with increased risk of developing depression and it is thus not

surprising that a large proportion of chronic pain patients have been found to suffer from depressive symptoms (Baer, Robinson, Katon, Kroenke, 2003; Fishbain, Cutler, Rosomoff et al., 1997; Gatchell, 1996; Melzack & Wall, 1982; Nicholas, Coulston, Asghari & Malhi, 2009).

As presented in figure 6, chronic pain patients are up against a range of aversive factors, such as long-term use of analgesic sedative drugs, which cause side-effects and amplify feelings of depression. Further, intense feelings of hopelessness, helplessness, irritability, and depression increase the risk of reduced activity and loss of occupational as well as leisure activities. This in turn leads to increased physical deterioration along with financial and social stress, which emphasise the depressive interpretations of the world (Gardner-Nix, 2009; McCracken, 2005; Shapiro & Carlson, 2009; Turk, Meichenbaum & Genest, 1983). Although chronic pain patients face all these aversive factors, as well as chronic pain every day, depressive schemas, such as “I am worthless” or “no one likes me”, cannot be attributed directly to chronic aversive environmental events. Such worldviews are more likely caused by the depressive interlock configuration, which is presented in chapter 3.4 (figure 2, p. 22). The depressive interlock configuration involves the regeneration of depressogenic schematic models (Teasdale & Barnard, 1993) and all of the factors presented in figure 6 can be argued to contribute to this maintenance and increase in suffering (Nicholas, Coulston, Asghari et al., 2009). In this chapter I will use the term of depressive interlock configuration to cover not only feelings of depression, but also persistent depression-related feelings, such as anxiety, irritability, hopelessness, and helplessness, which are also commonly associated with chronic pain (Bair, Robinson, Katon, et al., 2003; Fishbain, Cutler, Rosomoff et al., 1997; Nicholas, Coulston, Asghari, 2009).

In accordance with Nicholas model of chronic pain and the ICS, implicational meanings might involve schemas of helplessness, made up by a number of propositional meanings. At the CCH it was common to hear patients talk about the uncertainty of their pain condition, loss of job, and loss of participation in social activities. These factors are also presented in figure 6 and according to the ICS the implicational subsystem combines these propositional contexts at a holistic level. The implicational meaning arising is qualitatively different from the propositional meanings from which it is generated. Feelings of depression and helplessness might arise from this integration at the implicational level, and loss of job and uncertainty about duration of pain are attributed an added emotional component. Loss of job can for example become synonymous with feelings of worthlessness and hopelessness. The implicational meaning can thus be argued to be more than the sum of the underlying propositional meanings (Nicholas, Coulston, Asghari, 2009; Teasdale, 1999a; Teasdale & Barnard, 1993).

As presented in chapter 3.4 (figure 1, p. 18) the propositional and implicational subsystems only constitute 2 out of a total of 9 subsystems between which information is exchanged and transformed. Different elements of information are stored in each coding system and each subsystem can only process one stream of information at one time (Teasdale & Barnard, 1993; Teasdale, Segal & Williams, 1995). In figure 6, the recurring prototypical patterns of experience

involved in the development of implicational meaning are shown in the boxes, which represent experience-based factors such as repeated treatment failures, loss of job, financial difficulties, and family stress. These schematic models both represent stressors in the present, as well as worries about the past and future. They are products of holistic interpretations of experience and cannot be separated from their semantic context and contextual interpretation (Teasdale & Barnard, 1993). Since these schematic models are linked directly to emotions, the maintenance of negative affect depends on the extent to which the reciprocal relationship between the propositional and implicational subsystem regenerate the implicational meaning. The problem of chronic pain thus depends on the maintenance of chronic pain related implicational and propositional meanings based on the factors presented in figure 6. My argument is thus, that changing some of these factors would potentially change meanings at the implicational level and in turn interrupt the depressive interlock configuration and reduce suffering.

If the depressive interlock has been operating for an extended period of time it takes more than a brief disruption to break the vicious cycle of tenacity. Tenacity was described in chapter 3.4, p. 22 as a process by which the depressive interlock is re-established through the reintegration of depressogenic implicational codes in the circulating stream of data (Teasdale & Barnard, 1993). Tenacity is illustrated in figure 6 via the reciprocal relationship between subsystems, such as the unhelpful beliefs and cognitions (propositional subsystem), feelings of depression (implicational subsystem), and reduced activity (body-state subsystem).

Teasdale (1999b) compares the mental state of mindfulness to a meta-cognitive mode, which enables the practitioner to treat thoughts as mental events rather than facts, which was explained in greater detail in chapter 3.4, p. 20. The meta-cognitive state of MBSR thus provides the chronic pain patient with insight that thoughts are not necessarily facts. Teasdale argues that MBSR facilitates a shift from knowing something to feeling it, which indicates a change at the implicational level. A chronic pain patient might for example have a persistent feeling of hopelessness (implicational meaning), which is coupled with, and feeds on, the following propositional meaning; “the fact that I do not work means that I am worthless”. Although the patient might know that this thought is not necessarily true, it still *feels* true because it is coupled with a feeling of hopelessness (ibid.). During MBSR thoughts as mental events are experienced as fragments, which can be uncoupled from emotion. This sheds light over the propositional meanings, which the implicational meaning feeds on and opens a possibility for testing the validity of thoughts as hypotheses about the world. According to Teasdale (ibid.) it is this meta-cognitive process which leads to change during MBSR.

Uncoupling thoughts and emotions breaks the cycle of the depressive interlock configuration, as presented in figure 2, p. 22, since the implicational subsystem (feelings) in part relies on propositional meanings (thoughts) (Teasdale, 1999b). In relation to chronic pain, entering the meta-cognitive mode of MBSR might illuminate how the implicational meaning of “I am worthless” is tied to the emotional content of deep sadness. This implicational meaning is constituted by a

range of body-state inputs of physical pain and propositional meanings (Teasdale & Barnard, 1993) such as “chronic pain is difficult to treat”, “I have been in pain for months”, “I do not have a job”, “I spent most of my time alone” and so on. According to the ICS the effects reviewed in chapter 4.2, are due to the process by which MBSR uncouples emotional content from thoughts through the meta-cognitive state of mindfulness, which in turn produces change in relation to the patients’ emotional responses (implicational level) (Teasdale, 1999b).

According to the ICS the propositional and implicational subsystems are reciprocally connected by feedback loops. Negative affective schematic models are transformations produced through this feedback loop and in order to change maladaptive schemas it is necessary to address all these transformations as they occur at the implicational level (Teasdale & Barnard, 1993). Persistence of feelings of depression and helplessness, in relation to chronic pain, is thus due to the regeneration of depressogenic implicational schematic models. The meta-cognitive state of MBSR provides a platform for addressing these transformations and replacing the production of unhelpful implicational models with the production of more adaptive models. During this meta-cognitive state an informational context is provided for treating thoughts as mental events rather than facts (Teasdale, 1999b).

The meta-cognition, which occurs during MBSR, can be thought of as a substitute processing configuration. The substitute processing configuration interrupts the existing depressive interlock configuration, which, in the case of chronic pain patients, might be characterised by depression, anxiety, stress or other psychological symptoms. A distanced and de-centered type of attention arises during the meta-cognitive state of MBSR, which provides the patient with the mental capacity for testing elements of negative implicational meanings rather than automatically treating them as truths. A patient might for example view the thought “I am worthless” both as an automatic thought and as a fragment to be tested (Teasdale, 1999b). The alternative information processing configuration is established through this process of noting the content of thoughts, feelings, and sensations while remaining in the present. During my internship at the CCH, this was exemplified by a participant who shared, that MBSR helped her get a better overview of her thoughts and feelings, which enabled her to reduce feelings of irritability and frustration of not being able to perform the same at work as she used to. Through meditation she became more aware that the negative feelings were coupled with fear of not being good enough and fear of rejection from her colleagues, friends, and family. She was then able to test this hypothesis and experienced a reduction in feelings of irritability and frustration as she realised that her fear of rejection, and losing regard from people around her, was unwarranted.

The explained above, the substitute processing configuration during MBSR reduces the reproduction of negative implicational models and interrupts the maintenance of the existing depressive interlock configuration. This process thus involves a synthesis of new and more adaptive schematic models which reduces the psychological symptoms presented in figure 6 (Teasdale, 1999b). This can be explained as a re-population by non-depressogenic schemas, which

is needed in order to break the existing depressive interlock configuration. This re-population is facilitated by MBSR through the redeployment of resources to other data streams. As described in chapter 3.4, p. 23 MBSR operates in being modus, which facilitates the redeployment of resources to the synthesis of new non-depressogenic models. Before entering being modus during MBSR, patients are likely to be operating in mindless modus or doing modus, which involves close identification with emotions and low levels of reflection. In these states emotions and reactions are taken for granted as truths about the self and the world and they thus become difficult to change (Teasdale & Barnard, 1993). The patient's awareness of emotions, sensations, and thoughts is thought to increase when being modus is entered, because being modus provides a ground for reflection and lasting emotional change (Teasdale, 1999a). Similarly, several patients at the CCH reported realising that certain activities and emotions did not have to be associated. They experienced this as an uncoupling of thoughts and emotions in situations that would usually trigger sadness and worry. Instead patients learned that feeling physical pain did not necessarily have to be coupled with negative emotions. MBSR seemed to reduce the extent to which patients were taken over by negative emotions by uncoupling the emotion from their thoughts and experiences in the present moment.

This is supported by Teasdale (1999b) who argues that MBSR facilitates having the implicational subsystem in buffered mode which causes newly arrived data input to be accumulated temporarily in a memory storage or buffer. During MBSR chronic pain patients thus become able to respond to the broader patterns of experience rather than react instantly. During MBSR patients are distanced from the elements of experience, which provides them with a better overview of how thoughts, emotions, and sensations are interconnected. As described in chapter 3.4, p. 23 having the implicational subsystem in buffered mode involves a transformation, which is sufficiently broad to accommodate an integration of new and old elements in implicational codes (Teasdale, 1999a; Teasdale & Barnard, 1993) MBSR can be argued to facilitate having the implicational subsystem in buffered mode and during MBSR chronic pain patients thus become able to view their present experience in a larger perspective, which takes into account a larger number of the factors whereof some are presented in figure 6 (Teasdale, 1999b).

The ICS further includes a proprioceptive subsystem which provides feedback from bodily sensations related to body language such as posture and facial expression. Teasdale and Barnard (1993) argue that this feedback makes direct contributions to the implicational meanings processed. Negative body language thus contributes to development of negative affective content in the form of generic implicational schemas such as for example negative expectations about the future. Hence, in the context of chronic pain, one could argue that the body language produced from ongoing chronic pain and rumination about the pain persistence likely contributes to the persistence of the depressive interlock configuration. This process entails worrying and catastrophising thoughts about what the chronic pain means involving cognitive implicational content such as "this will never end", "I will always be miserable because of this pain" or "suffering

from chronic pain makes me worthless” coupled with intense negative emotions such as fear, stress, loneliness, and anger. Teasdale and Barnard (ibid.) similarly argue that the maintenance of implicational meanings depends on the integrity of the total processing configuration and number of integrated feedback loops from the 9 subsystems. This helps explain the positive effects that non-cognitive factors can have on the chronic pain condition. As presented in figure 6, lack of physical exercise, for example, contributes to the problem of chronic pain, and it can thus be speculated that increased physical exercise has the potential to reduce chronic pain related suffering. From the ICS’s perspective this occurs due to a positive feedback stream from the body-state subsystem, which in turn contributes to the disruption of the existing depressive interlock configuration (Teasdale, 1997; Teasdale & Barnard, 1993).

Finally, patients engaged in mindless modus (e.g. before entering the MBSR) are likely to think about their depressive thoughts and fears and, according to the ICS, this ruminative way of dealing with experiences is only likely to strengthen and exacerbate the depressive interlock configuration. In figure 6, this is what accounts for the movement from unhelpful beliefs and thoughts to feelings of depression and helplessness. Nicholas thus argues that what causes chronic pain to become a problem is the interaction between a number of psychological factors (Nicholas, Coulston, Aghari et al., 2009). This is similar to the Buddhist view that suffering arises from how we *feel* and *think* about experience and not from what actually is (Germer, 2005; Kabat-Zinn, 1994). Suffering is thus greatly reduced by changing feelings and emotions about one’s chronic pain experience, which is also illustrated in figure 6. This further assists in explaining the positive effects of MBSR as presented in chapter 4 (Kabat-Zinn, Lipworth & Burney, 1985; Kaplan, Goldenberg & Galvin-Nadeau, 1993; Rosenzweig et al., 2009).

In summary, the ICS can be applied to all aspects of information processing and this chapter provided a discussion of how the ICS can account for the interactions between the psychological factors of chronic pain and MBSR. The discussion focused on the implicational subsystem and how implicational schematic meanings are altered through the meta-cognitive state of MBSR. The existing depressive interlock configuration, which is thought to cause chronic pain to become a problem, is maintained through the factors presented in figure 6, which are combined and together regenerate depressogenic models at the implicational level. Implicational meanings can thus not be separated from their contextual interpretation. The meta-cognitive mode of MBSR provides a platform for viewing thoughts as mental events as opposed to facts or truths. This further provides a basis for realising how implicational meanings are constituted by a range of propositional meanings as well as feedback from the other subsystems such as the body-state and proprioceptive subsystems. During the meta-cognitive state of MBSR it thus becomes possible to test implicational meanings and move away from the close identification with emotions involved in mindless and doing modus and instead enter being modus. This uncoupling of emotions from thoughts and experience facilitates the establishment of an alternative information processing configuration, which involves a synthesis of new and more adaptive schematic models. With the

implicational subsystem in buffered mode chronic pain patients become able to distance themselves from the elements of experience and respond to the broader patterns rather than react instantly. This is argued to reduce the psychological symptoms, involved in chronic pain, and provide a basis for lasting emotional change.

5.3 An application of Shapiro's model to the area of MBSR and chronic pain

As presented in chapter 3.5 (figure 4, p. 27) according to Shapiro and Carlson (2009) the mechanisms of change in mindfulness occur on the basis of a specific intention, attention, and attitude. According to this model, the intention involved in mindfulness is characterised by the individual's motivation and objective for meditating. It includes a personal vision, which in the case of chronic pain might involve gaining insight about the pain experience and reduce suffering.

It is important however to distinguish this intention from striving, since the intention to reduce pain-related suffering should not be understood as a goal, but rather as a direction for meditation during MBSR. As presented in figure 6 chronic pain is closely related to other problems such as unhelpful thought patterns, stress, and depression and these factors contribute to chronic pain related suffering. Taking this into account, it is not surprising that MBSR shows promising results on chronic pain patients since mindfulness has consistently been found to reduce a variety of psychological symptoms (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). According to Shapiro and Carlson (2009) reduction in pain-related suffering is thus achieved via reductions in cognitive and emotional factors, which is in consensus with Nicholas model, where the movement or transformation from chronic pain to suffering depends on a number of cognitive and emotional factors (Nicholas et al., 2000).

During MBSR chronic pain patients are encouraged to meet the moment to moment experience with an attitude of acceptance and non-judgment. Participants are asked to focus on something in the present (e.g. the breath or music) and whenever distractions in the form of physical, cognitive, and emotional content arises, the elements of experience are noted, and attention is brought back to the present (Kabat-Zinn, 1990; 2003). Chronic pain patients might for example note the location of their pain along with a deep sense of despair and the ongoing mental commentary e.g. "it keeps hurting, I cannot stand this pain, it will never get better, I might as well give up". Many of the participants at the CCH found it extremely hard to remain in the present and accommodate all aspects of experience with acceptance and kindness. According to Shapiro this special attitude, by which sensations are noted and accepted, is one of the three key factors which form the foundation for psychological change during MBSR (Shapiro & Carlson, 2009).

The second fundamental aspect of mindfulness is *attention* and, in the context of chronic pain, this involves being present in the momentary experience of pain along with observing other internal and external stimuli as they arise. As mentioned in chapter 3.5, p. 28 this requires a suspension of the interpretation of experience. During my internship at the CCH I saw how difficult this was for

patients who had become accustomed to equalling painful experiences with hopelessness, helplessness, and feelings of giving up. Shapiro and Carlson (2009) argue that when such interpretations are replaced by an attention which instead captures the content of internal and external elements of the present experience, the cycle of rumination and depression is broken because the focus shifts from worries about the future and past to a focus on what goes on right now. This discerning and nonreactive attention, which is constantly brought back to the present experience, makes it possible for the MBSR practitioner to realise how physical sensations, thoughts, and emotions are interconnected and how these interconnections contribute to the construction of meaning and interpretations attributed to experience (Shapiro & Carlson, 2009; Shapiro et al., 2006).

According to Shapiro the third fundamental element of mindfulness relates to the practitioner's *attitude* during meditation. The attention during MBSR is characterised by an attitude of acceptance, patience, openness, non-judgment, non-striving, curiosity, and loving-kindness (Shapiro & Carlson, 2009). Shapiro's theory holds that unhelpful cognitions and feelings of depression are altered through this particular attitude in which negative thoughts and feelings are welcomed and contained in a mental atmosphere characterised by acceptance and kindness towards one's experience and oneself (ibid.; Shapiro et al., 2006). One of the patients who participated in the mindfulness course at the CCH explained it as an expansion in the capacity to meet one's experiences and oneself with kindness. Where she had previously rejected negative thoughts and distracted herself with other activities she would now contain the elements of experience during meditation while anchoring herself in the present (e.g. via the breath).

According to Shapiro and Carlson (2010) the three elements of attention, attitude, and intention interact with each other and enable the practitioner to observe experience more impartially. This clearer view of experience involves a distancing, which makes it possible to evaluate thoughts and feelings more objectively instead of automatically viewing them as truths about oneself and the world (Shapiro et al., 2006). As presented in chapter 3.5 (figure 4, p. 27) this process was termed *reperceiving* by Shapiro and Carlson (2009) and is argued to serve as a metamechanism, which enables patients to disidentify from the content of experience. In relation to Nicholas model of chronic pain (figure 6), reperceiving can thus be argued to reduce the patient's level of entanglement and identification with thoughts and feelings, which in turn potentially breaks the downward spiral of reduced activity, physical deterioration, loss of job, financial difficulties, and so on. Reperceiving provides greater clarity and objectivity to experience and patients who engage in MBSR are thus better able to make choices, which benefit their lives and reduce suffering (Shapiro & Carlson, 2009; Nicholas et al., 2009).

Shapiro further argues that the process of reperceiving leads directly to 4 mechanisms of change: 1) Self-regulation and self-management, 2) values clarification, 3) cognitive, emotional, and behavioural flexibility, and 3) exposure (Shapiro & Carlson, 2009). They are argued to reduce a broad range of psychological symptoms, which, in relation to the problem of chronic pain, might

be unhelpful beliefs and thoughts along with feelings of depression, helplessness, and stress as presented in figure 6 (Nicholas et al., 2009). I will in the following discuss how each of these 4 mechanisms of change can be applied to Nicholas model of chronic pain (Nicholas, 2005).

Self-regulation and self-management

According to Shapiro and Schwartz (2000) the way the self is regulated and managed influences the patient's ability to function and adapt to changes in the environment. The feedback-loops presented in chapter 3.5 (figure 5, p. 30) are influenced by the quality of intention and attention, which in turn affects health. The particular intention and attention described above is argued to facilitate health because the attention and intention involved in mindfulness enables the patient to see how experience is constructed from interconnected sensations, cognitions, and emotions, which in turn increase insight into how the mind and body are connected (Shapiro & Carlson, 2009; Shapiro & Schwartz, 2000). Chronic pain patients engaged in MBSR thus gain insight into how cognitions, bodily sensations, and emotions are connected, which provides the patient with a new acquired freedom to self-regulate. This self-regulation occurs both at a conscious and active level as well as a more unconscious bodily level, which both serve to maintain order and stability between mind and body and adapt to changes in the environment (Shapiro & Carlson, 2009).

The body's ability to recover depends on the mind and body's capacity to self-regulate. In the case of dysregulation symptoms might worsen. One sign of dysregulation is over-identification with thoughts and emotions, which leads to automatic reactions because thoughts and feelings experienced are taken as truths (Shapiro et al., 2006). As presented in figure 6, in the situation of chronic pain, such reactions might involve reduced social as well as occupational activity, which might further aggravate the patient's ability to self-regulate. This can lead to a downward spiral in which avoidance behaviours intensify symptoms and worsen the problem.

Reperceiving is argued to reduce the control thoughts have over patients' lives and since thoughts and feelings are highly responsible for the excessive suffering involved in living with chronic pain (as presented in figure 6), reducing such thoughts will likely decrease suffering and enable the patient to change some of the negative factors, which sustain the problem (Shapiro & Carlson, 2009; Shapiro et al., 2006). At the CCH, some of the patients expressed that engaging in mindfulness made it possible for them to perform daily activities and that, despite the pain, daily chores did not feel overwhelming to the same extent that they used to.

Self-regulation and self-management are thus central elements of mindfulness because they allow the patient to better adapt to their chronic pain condition (Shapiro & Carlson, 2009). This involves an ability to regulate emotion and modify the expression of affect. Especially the capacity to regulate negative emotions serves several adaptive functions to mental health and cultivates adaptive psychological and social functioning (Barrett, Gross, Christensen & Benvenuto, 2001; Brown & Cordon, 2010, p. 70). The importance of such adaptation is vital since the consequences of poor adaptation are overwhelming and extensive (Nicholas et al., 2009; Shapiro & Carlson,

2009). This is illustrated in figure 6 where physiological, emotional, cognitive, and social aspects of chronic pain are presented as highly interrelated and interdependent.

Values clarification

Reperceiving is argued to facilitate the patient's insight and connection with themselves through values clarification. Through the observation of thoughts and feelings the patient becomes aware of what it is they value in life. The patient becomes aware of which values are imposed by culture or family and which are deeper personal values. Societal values are oftentimes taken for granted and reperceiving is argued to enable the patient to evaluate the control such values have over their life (Shapiro & Carlson, 2010). Reperceiving thus enhances clarity of how personal and societal values interact with personal reactions. This expanded personal awareness and insight into one's own values provides an increased freedom to respond differently, which in turn reduces depressive symptoms because values, and reactions prompted by values, are no longer taken for granted (Ibid; Shapiro & Schwartz, 2000).

During my internship at the Cancer Council in Hillerød I met a woman who took part in the 9 week mindfulness course. She told her story about how she in spite of receiving her cancer diagnosis felt the pressure to clean her house and fulfil all her normal duties the way she used to before she got ill. After practicing mindfulness for a few weeks, she came to the realisation, that she did not do this to benefit herself, but rather to meet a societal standard, which equates a well-presented home with decency and success. She realised that taking care of her health would involve cutting down on house work in order to make time for relaxation, which was a more important priority than meeting her usual cleaning standard. This is an example of values clarification.

The process of values clarification involved in MBSR thus enables the patient to connect with personal values at a deeper level. According to Shapiro and Carlson (2009) this improved connection helps to reduce feelings of depression and irritability, because connecting with personal values and rejecting unhelpful societal or family values strengthens congruency between what one does and believes. Chronic pain patients are thus able to let go of some of the pressure to perform according to societal standards and instead modify expectations to suit their own needs and limitations.

Cognitive, emotional, and behavioural flexibility

The third mechanism of change, facilitated by the process of reperceiving, is the capacity to accommodate uncomfortable experiences, thoughts, and feelings and respond to these in a more flexible and adaptive way (Shapiro & Carlson, 2009). As presented in figure 6, chronic pain can involve a large number of related problems, and if these problems are not dealt with, there is an increased risk that they might lead to excessive suffering (Nicholas et al., 2009).

The mechanism of flexibility involves a move away from rigid reactivity and over-identification with some of these problems, such as negative thoughts and feelings. As with the previously mentioned mechanisms of change, flexibility is attained through increased insight into how elements of experience are connected and how one's mind is constructed. Shapiro and Carlson (2009) further argue that learning depends on the ability to disidentify and distance oneself from prior experiences and predictions about the future, based on these prior experiences. As presented in figure 6 such predictions might be based on repeated treatment failures and the insight acquired through MBSR enables patients to challenge and potentially deconstruct unhelpful patterns of thinking and feeling through reduced automaticity, reactivity, and entanglement with emotions and cognitions. MBSR thus assists in expanding patients' awareness, which facilitates a more flexible way of dealing with the world (Ibid; Shapiro et al., 2006).

Exposure

As mentioned in chapter 3.5 MBSR facilitates a form of exposure, to one's own thoughts and feelings, which is comparable to other types of exposure treatments (Shapiro & Carlson, 2009). Reperceiving is thus argued to counteract habitual avoidance and denial of unpleasant emotional experiences. As presented in figure 6, in the context of chronic pain, such avoidance behaviours might involve reduced social and occupational activity and reactions such as irritability might also be a sign of denial, as the patient might find it difficult to accept their new limitations.

During MBSR the patient is instructed to observe and note cognitions and emotions as they arise and the patient is thus exposed to their own thoughts and feelings. This exposure is argued to lead to a desensitisation towards unpleasant thoughts, feelings, and bodily sensations. During MBSR chronic pain patients are thus more likely to experience that elements of experience are not permanent and that experience changes when one remains present in it (Segal, Williams & Teasdale, 2002). This desensitisation potentially contributes to the extinction of avoidance behaviours and automatic fear responses and the patient is more likely to resume social and occupational activities (Nicholas et al., 2009, Shapiro & Carlson, 2009).

The positive effects of MBSR in the treatment of chronic pain patients, as presented in chapter 4, can thus in part be explained through the exposure-like properties of reperceiving, which occur during MBSR (Shapiro & Carlson, 2009). The extinction of habitual fear and avoidance responses in turn increases chances of reengaging in social, occupational, and physical activities. As presented in figure 6 these behaviours play an important role in chronic pain related suffering, and changing these likely increase general well-being and quality of life (ibid; Nicholas et al., 2009).

In summary, according to Shapiro's model of mindfulness, the positive effects of MBSR presented in chapter 4 occur on the basis of the specific intention, attention, and attitude during MBSR. According to Shapiro, these three elements enable chronic pain patients to realise how elements of experience are interconnected and constructed. Intention during MBSR is characterised by the individual's objective for meditating, such as reducing chronic pain related suffering. The attention

during MBSR is discerning and nonreactive by nature and involves a suspension of the interpretation of experience. The attitude during MBSR is characterised by acceptance and non-judgment. Intention, attention, and attitude together facilitate the process of *reperceiving*, which serves as a metamechanism characterised by a more distanced and disidentified relationship with the chronic pain experience. *Reperceiving* arguably leads to four mechanisms of change: self-regulation, values clarification, flexibility, and exposure. These four mechanisms of change potentially enable the patient to deconstruct the cognitive and emotional elements of chronic pain and facilitate more adaptive ways of dealing with their condition.

5.4 The process of mindfulness

The current chapter discusses the process of mindfulness as proposed by Teasdale (1999b) and Shapiro and Carlson (2009). The two theories of mindfulness have a number of factors in common and I want to discuss these in relation to similar therapeutic processes mentioned throughout the literature.

Both the ICS and Shapiro's model of mindfulness argue that suffering is created through the interpretation of experience rather than from reality itself. Shapiro's model of mindfulness centers on the process of *reperceiving* where the ICS talks about mindfulness as a *meta-cognitive state* (Shapiro & Carlson, 2009; Teasdale, 1999b). Although the two theories make use of different terminologies, both theories argue that mindfulness alters the cycle of rumination and the processes described in the two theories are very similar. Both are characterised by meta-cognition, which is argued to provide a platform for viewing elements of experience more objectively and both theories hold that this objectivity makes it possible for practitioners to deconstruct and change how the world is experienced. Furthermore, both theories argue that how the world is experienced cannot be separated from the individual's contextual interpretation. The deconstruction of experience is argued to occur through a suspension of the interpretation of experience and, in both theories, the mental state of mindfulness is described as discerning, distanced, nonreactive, and disidentified. In both theories the disidentification during mindfulness involves an uncoupling of emotions from thoughts and a more objective view of experience (Shapiro & Carlson, 2009; Teasdale, 1999b).

The theories are thus quite compatible although they differ in some areas. The ICS for example describes mindfulness as a kind of alternative information processing configuration, which interrupts the existing configuration and instead repopulates the implicational subsystem with more adaptive schematic models (Teasdale, 1999b). Shapiro's model does not have any direct parallels to this concept, but instead proposes four mechanisms of change, which are argued to arise from the process of *reperceiving* (Shapiro & Carlson, 2009; Shapiro et al., 2006).

As argued above, the meta-cognitive state of ICS and the process of *reperceiving* in Shapiro's model are very similar and it is thus interesting to look closer at these concepts. Both theories

argue that psychological symptoms and suffering are reduced through the distanced and non-reactive state of mindfulness, which alters psychological and cognitive aspects of experience (Shapiro & Carlson, 2009; Teasdale, 1999b). Similarly mindfulness has been described as a disidentification with any permanent sense of self and as an observation that is in essence explorative and non-biased (Martin, 1997). Both concepts of re-perceiving and meta-cognition can be linked to other psychological concepts, which also involve fundamental changes in perspective.

The first overlapping concept I want to discuss is the process of *deautomatisation*, which was proposed by Deikman (1982). Deikman argued that psychotherapy involves the establishment of an observing self, which enables the person to observe elements of experience. This in turn involves an undoing of the automatic processes, which control cognitions and perception. Deautomatisation relates to an increased awareness and control, which results in reducing the automatic response and reaction to thoughts and feelings as they arise and instead engage in a more accommodating response. This is very similar to Teasdale and Shapiro's understandings of mindfulness as a detached form of observation, which allows for less automatic reactions (Shapiro & Carlson, 2009; Teasdale, 1999b). In line with the concepts of re-perceiving and meta-cognition, deautomatisation is thought to undo automatic reactions to experience and Deikman (1982) argues that deautomatisation is the core ingredient of therapeutic change and deautomatisation is thus argued to be responsible for the similar effects of seemingly diverse therapies.

The second overlapping proposal included in this chapter is Bohart's (1983) concept of *detachment*. Bohart argues that many types of psychotherapy involve a process of gaining distance and adopting a phenomenological attitude towards experience. He further argues that this process involves an expansion of attentional space, which enables the individual to step back from experience. This process is similar to the ways re-perceiving and meta-cognition during mindfulness are described (Teasdale, 1999b; Shapiro & Carlson, 2009). Letting go of attachment is related to shifting from very dependent attachments to objects or persons, involving thoughts such as "I cannot survive without that person" or "my happiness depends on owning that object" to forming less absolute attachments. Buddhist psychology emphasises that very dependent attachments can lead to suffering if they are not fulfilled and less absolute attachments are thus more desirable (Shapiro & Carlson, 2009).

The third overlapping proposal is termed *decentering* and was put forward by Safran and Segal (1990). Decentering involves changing one's experience by stepping out of the immediate experience. This facilitates an observation of one's own reactions and it thus becomes possible to delay reactions and distinguish between reality and how reality is constructed. Decentering is further argued to increase acceptance and objectivity towards the content of experience, which involves a disentangling from what is experienced in the present moment (Safran & Segal, 1990).

As argued above, the concepts of re-perceiving, meta-cognitive state, deautomatisation, detachment, and decentering are very similar and can be argued to be different terminologies,

which essentially cover the same process. This is interesting because it opens for a possibility, that there is a common factor, which accounts for a change process, which contributes to therapeutic results across a variety of traditional psychotherapies as well as mindfulness-based therapies. All of the concepts mentioned above involve an attention, which rises above self-awareness and which is disidentified from any one perspective. They all involve an attentional freedom, which enables the person to examine elements of experience and implement alternative strategies (Bohart, 1983; Deikman, 1982; Safran & Segal, 1990; Shapiro & Carlson, 2009; Teasdale, 1999b). It is thus possible that mindfulness essentially constitutes this fundamental process of change, which is also involved in other psychological interventions. Mindfulness might be the essence of this change process.

In summary, although the processes of re-perceiving and the meta-cognitive state in the ICS differ in some areas, they are generally argued to be compatible and have many factors in common. Parallels were drawn to three similar processes, which also involve fundamental changes in perspective; deautomatisation, detachment, and decentering. All of these processes involve a more observing and distanced view of experience which is argued to lead to less automatic responses, increased freedom, increased control, and reduced suffering. They are all argued to provide a platform for a more objective view of experience along with the suspension of the ongoing interpretation of experience and agree that suffering is created through the interpretation of experience. They are all characterised by an attention which is discerning, distanced, nonreactive, and disidentified by nature and which is argued to lead to the reduction of psychological symptoms. These terminologies might thus essentially cover the same factor and account for the same change process across a variety of psychological interventions. It can thus be argued that mindfulness comprises the essence of this change process in its simplest and purest form.

5.5 Limitations

This section examines some of the limitations of the theories and models utilised in this paper. This discussion is provided in order to highlight apparent areas for improvement, which will be discussed further in Chapter 5.6 Future Directions.

In Shapiro's model of mindfulness I want to question the support for making the distinction between the following four mechanisms of change; self-regulation, values clarification, exposure, and flexibility as presented in chapter 3.5, p. 29. I find them to have large overlaps and be very similar in some areas. For example, according to Shapiro, self-regulation involves an improved capacity to adapt to experience (Shapiro et al., 2006; Shapiro & Carlson, 2009) and in my view this is very similar to the third mechanism of change, which involves flexibility to accommodate for elements of experience. Both are argued to lead to less identification with thoughts and emotions and reduced reactivity. Similarly, the first three mechanisms of change can be argued to rely on the fourth mechanism, which involves exposure to thoughts and feelings. One can, for example,

only become aware of deeper personal values by connecting with, and thus being exposed to, one's thoughts and feelings. In my opinion, it would thus be more appropriate to present exposure to thoughts and feelings as a premise for the other mechanisms of change. Shapiro further places greater emphasis on individual attitude and intention during MBSR than does the ICS (ibid; Teasdale, 1999b).

Both the ICS and Shapiro's model of mindfulness can be criticised for being too theoretical, which makes them difficult to verify empirically. The models provide overall and very general explanatory accounts, which do not present any specific testable hypotheses. For example, in the ICS, the concepts of direct and buffered modes are not very precise and thus cannot be verified or falsified (Teasdale & Barnard, 1993). Teasdale thus does not meet the principle of parsimony as proposed by Kazdin (2003). Parsimony is the principle that one should make use of the simplest explanation available. Parsimony has applications within science and guides how data is understood (ibid.). Furthermore, both models primarily focus on factors concerned with the individual and can thus be criticised for not including socio-cultural factors (Barnard & Teasdale, 1993; Shapiro & Carlson, 2009; Teasdale, 1999b).

In my view, another questionable aspect of the ICS is the role of the proprioceptive subsystem, as described in chapter 5.2, p. 51. Teasdale argues that the proprioceptive subsystem has the potential of breaking the depressive interlock configuration, when posture and body-language changes (Teasdale, 1996; Teasdale & Barnard, 1993). I however find it unlikely that changes in posture alone has the potential to alleviate depression.

Finally, I find Teasdale's (1999b) description of the meta-cognitive state during mindfulness to be unclear in some areas. As presented in chapter 3.4, p. 20, Teasdale for example argues that the meta-cognitive state involves thoughts about thoughts before and after they occur, which is argued to facilitate the disruption of the depressive interlock configuration. As presented in the same chapter, p. 23, Teasdale also argues that depression is characterised by thoughts about thoughts, which is thought to occur during mindless modus (Teasdale & Barnard, 1993; Teasdale, 1999b). I have not found anywhere in Teasdale's writings, where he clarifies why thoughts about thoughts are argued to be adaptive during mindfulness, but argued to be dysfunctional during mindless modus. Furthermore, Teasdale (1999b) argues that implicational meanings such as "thoughts are not facts" are accessed during the meta-cognitive state of mindfulness, as presented in chapter 3.4, p. 20, but I have not been able to find any explanation as to why the meta-cognitive state of mindfulness should be more likely to facilitate access to these implicational meanings rather than others.

The method of Western mindfulness has been criticised for cultivating something, which is different from mindfulness in its original Buddhist context. Christopher, Christopher and Charoensuk (2009) conducted a study on Thai Theravada Buddhist monks investigating the validity of the Mindfulness Attention Awareness Scale (MAAS). The MAAS is a 15-item scale designed to

assess the core attributes of mindfulness, but although the scale has been validated with various populations and has been shown to have strong psychometric properties (Carlson & Brown, 2005; MacKillop & Anderson, 2007) Christopher, Christopher and Charoensuk (2009) found American college students to score higher, than the Thai monk sample, on several facets of MAAS mindfulness. This suggests that there might be some central differences between Eastern and Western conceptions of mindfulness. This threatens the compatibility of Western mindfulness with Buddhist context and the fact that theories such as the ICS and Shapiro's model include factors from Buddhist psychology (Shapiro & Carlson, 2009; Teasdale, 1999b) might thus not be valid. The basis for this paper might thus be incomplete if the literature reviewed and theories utilised are possibly based on mistaken assumptions.

The choice of looking at mindfulness only from a cognitive perspective poses some limitations. The adoption of mindfulness into cognitive psychology has resulted in a focus on cognitions and changes in cognitions during mindfulness practice. This is, in my view, problematic, since mindfulness in its Buddhist context is non-interfering and has an aim of accepting experience as it is, as opposed to changing it. Regardless of theoretical differentiation between intention and striving (Shapiro & Carlson, 2010) the goal, during MBCT-practice, easily becomes to change and reduce symptoms. This stands in stark contrast to mindfulness in Buddhist psychology, where change is thought of as an inevitable ongoing process, but not a goal as such (Germer, 2005; Kabat-Zinn, 1994). Similarly Beck (2005) argues that schemas serve as a necessary compass for making sense of experience, which stands in opposition to the suspension of interpretation, which occurs during mindfulness (Kabat-Zinn, 1994). As presented in chapter 2.4, p. 9, Brown (2009) argues that mindfulness involves a minimal self, which implies a suspension of the constant process of meaning attribution in favour of a more basic and immediate dimension of experience without the added cognitive appraisals. In other words, this definition of mindfulness does not seem very compatible with Beck's theory of schemas as necessary for a meaningful life, which supports the notion, that CT might not be the best theoretical framework for understanding mindfulness. This is discussed further in Chapter 7.0 Future directions.

As stated in the introduction the focus of the current paper was on the psychological aspects of mindfulness. However, some research has found mindfulness to reduce level of perceived pain in chronic pain patients (Baliki et al., 2006; Brown & Jones, 2009; Gardner-Nix, 2010; Morone, Greco & Weiner, 2007), but the models and theories utilised in this paper can only provide limited accounts of how this is possible. The paper focussed on reductions in suffering rather than reductions in perceived pain, although the factor of how somatic pain is felt is very central to the area of mindfulness in chronic pain patients (Gardner-Nix, 2010). Mindfulness has for example been found to improve immune system functioning, which might contribute to reductions in pain (Gardner-Nix, 2009, p. 60). However, some disagreement exists about whether mindfulness does in fact have the potential to reduce physical pain and Psychologist Peter la Cour from Rigshospitalet's Pain Clinic for example stated, in an email exchange with me on the 31st of January

2011, that “the common observation in the pain clinic is that mindfulness does not change pain itself, but rather changes all the factors around the pain, which makes the pain easier to cope with”. However, if the research presented above is valid and mindfulness does in fact potentially change the physiology of chronic pain, then an expansion of theories is needed in order to provide an account of how changing the mind can change the body. The ICS does include some physiological factors, but mainly focuses on how feedback from the body impacts the mind and how this in turn affects behaviour (Teasdale & Barnard, 1993). Similarly, Shapiro’s model does only involve psychological factors and can thus not help clarify physiological healing (Shapiro & Carlson, 2009; Shapiro et al., 2006).

Furthermore, the choice of not including socio-cultural aspects in the discussion of MBSR and MBCT in the treatment of depression and chronic pain might also pose a limitation since social and cultural factors have been found to play a central role in both illnesses (Costello, 2009; Grossman et al., 2004; Nicholas et al., 2009; Segal, Williams & Teasdale, 2002). Level of social support might for example influence level of engagement in treatment as well as results.

In summary, a number of limitations were listed regarding the ICS and Shapiro’s model of mindfulness. Furthermore, recent research suggests that the Western conception of mindfulness might be fundamentally different to the Eastern conception of mindfulness. This threatens the validity of Western mindfulness literature as well as the theoretical basis for this paper. The choice of looking at mindfulness solely from a cognitive perspective poses a risk of overemphasising cognitive change and not staying true to the principles of Buddhist psychology. Finally, due to the focus on psychological factors, the paper did not provide an account for the socio-cultural and physiological effects of mindfulness. In order to do this, an expansion of theories is needed.

6.0 Conclusion

The current paper examined the theoretical basis for the underlying processes of mindfulness, and the ICS and Shapiro’s model of mindfulness were both found to be applicable to the area of MBCT and depression. Both models were furthermore easily applied to Nicholas model of how chronic pain can become a problem. Since all three models mentioned above were developed within a cognitive perspective they were easily fused, which opens a potential for development and expansion of theories in the future. Such expansion might also involve the inclusion of socio-cultural factors since they play central roles in both depression and chronic pain, but the ICS and Shapiro’s model are currently primarily directed at factors concerned with the individual.

The application, of the 2 models of mindfulness to Nicholas model of chronic pain, constitutes a significant contribution to the theoretical field of mindfulness since it is not only important to know that MBSR works on chronic pain, but it is just as important to look into why and how it works. Both models of mindfulness are still in their preliminary stages and can be criticised for

being too theoretical and not appropriately testable. Similarly, the fusion made between the two models of mindfulness and Nicholas model of chronic pain is only a tentative application, which needs further development and testing before any certain conclusions can be drawn from it.

Research, in the area of MBSR and chronic pain, has generally shown moderate to great improvements on a variety of psychological symptoms. Future studies might however require a higher degree of constancy, randomisation, matching, larger sample sizes, and more follow-up studies in order to control for confounding variables and improve validity of results. Some research has found the Western conception of mindfulness to divert considerably from the Eastern conception, and it is thus relevant to question whether the proposed Eastern fundament for Western mindfulness is in fact valid, which also questions the theoretical basis for this paper. Further the choice of looking at mindfulness solely from a cognitive perspective poses a risk of neglecting non-cognitive aspects of mindfulness, such as compassion. Mindfulness can be argued to have just as much in common with other psychological perspectives such as humanistic psychology and client-centered therapy. The processes leading to personal change within mindfulness and client-centered therapy appear to have a number of commonalities, and a humanistic theory of mindfulness can thus potentially account for aspects, which have not been taken into account by the existing cognitive theories.

Both the attention in the meta-cognitive state of the ICS and the attention during re-perceiving in Shapiro's model are characterised by disidentification and desensitisation from experience and although they differ in some areas, they are generally argued to be compatible. Parallels were drawn to three similar processes; deautomatisation, detachment, and decentering. All of these processes involve a more observing and distanced view of experience, which is argued to lead to the suspension of interpretation, less automatic responses, increased freedom, increased control, and reduced suffering. These different concepts might thus essentially refer to the same change process across a variety of psychological interventions, and mindfulness might potentially comprise the essence of this process in its simplest form. This opens for the possibility that the same change process might be responsible for therapeutic change in otherwise seemingly diverse therapeutic interventions, and mindfulness is potentially the simplest way of accessing this change process. Future research will have to investigate this further, which will possibly change Western perspective on what it is that causes psychological growth and change.

7.0 Future directions

The current chapter draws some parallels between mindfulness and humanistic psychology and puts forward an argument for the development of new theories of mindfulness. In chapter 4.3 some suggestions were made regarding future directions in relation to empirical research and in

this chapter I move on to discuss the need for looking at the processes of mindfulness from other perspectives than that of cognitive psychology.

Since mindfulness did not develop within the field of cognitive psychology, my argument is that mindfulness has just as much, if not more, in common with other traditions within Western psychology, such as existential or humanistic psychology. As discussed in chapter 5.5, looking at mindfulness only from a cognitive perspective poses a risk of overemphasising the role of cognitive change and underemphasising other aspects of mindfulness. I will focus my discussion on similarities between mindfulness and humanistic psychology and make tentative suggestions regarding a humanistic understanding of the underlying processes of mindfulness.

Carl Rogers was one of the founders of humanistic psychology and developed the approach of person-centered therapy. According to Rogers some of the necessary conditions for personal growth and change involve unconditional positive regard and empathic understanding on behalf of the therapist (Rogers, 1957). It can, however, be argued that mindfulness provides the same conditions without the presence of a therapist.

One of the very central elements of mindfulness, which Shapiro's model and the ICS do not touch on, is the role of compassion. The ability of self-compassion is mentioned throughout the literature and is thought to develop through mindfulness practice (Gardner-Nix, 2009; Kabat-Zinn, 2009; Siegel et al., 2010). It has been defined as the ability to feel empathy for the self and others along with the intention to alleviate suffering of the self and others (Siegel et al., 2010). In mindfulness, compassion develops through learning to relate to oneself with compassion and kindness. Meeting oneself with kindness makes it possible to observe the disruptive and destructive effects of self-judgment and enhance an attunement, which promotes a love for oneself (Siegel, 2007).

In client-centered therapy the therapist meets the client with unconditional positive regard and empathy, which is very similar to the kindness, compassion, and acceptance directed at oneself during mindfulness. According to client-centered therapy it is necessary for the therapist to meet the client with unconditional positive regard and empathy in order for the client to develop authenticity. Authenticity is comprised by the two factors of *congruency*, which relates to the ability to provide consistency between what is felt, and the way we are and *transparency*, which relates to communicating and displaying the emotions one experiences (Rogers, 1957). As mentioned in chapter 3.5, p. 30-31, mindfulness has been found to increase correspondence between behaviour and personal values (Brown & Ryan, 2003; Shapiro & Carlson, 2009), which can be argued to be very similar to the congruency described by Rogers (1957). It is thus possible that mindfulness provides the conditions necessary for cultivating congruency and transparency without the need for a working alliance with a therapist. In mindfulness, congruency and transparency might be cultivated through the expansion of awareness and through compassion and acceptance of all elements of one's experience.

Similarly, Shapiro, Schwartz and Bonner (1998) found mindfulness to both increase empathy towards the self and others and empathy towards others was largely dependent on empathy towards oneself. Shapiro and Carlson (2009) further argues that the shift in perspective, which occurs during mindfulness (reperceiving), leads to the development of empathy since separating one's feelings, thoughts, judgments, and needs from the experience, enables the individual to shift perspective to that of other people and not automatically assume that others have the same needs as oneself. In spite of these findings Shapiro and Carlson (2009) have not included the factors of empathy or compassion in their model of mindfulness. This is possibly due to the cognitive focus in their theory and it is thus necessary to consult other perspectives in order to provide an account for the role of these factors. The role of empathy is central to humanistic psychology and client-centered therapy (Gawin, 2008) and it would thus be interesting to develop a model of mindfulness within a humanistic perspective. Such theory would include and emphasise other aspects of mindfulness, such as empathy and compassion, and provide a different account of how mindfulness leads to personal change and growth.

Some other suggestions for future directions would be to develop new models of mindfulness, or expand the ICS and Shapiro's model, to comprise more socio-cultural factors, since they play central roles in both depression and chronic pain (Costello, 2009; Grossman et al., 2004; Nicholas et al., 2009; Segal, Williams & Teasdale, 2002).

In summary, mindfulness can be argued to have just as much in common with other psychological perspectives and theories of mindfulness should not be limited to a cognitive perspective. Parallels were drawn between concepts of mindfulness and client-centered therapy, such as compassion, unconditional positive regard, and empathy. The processes leading to personal change within mindfulness and client-centered therapy appear to have a number of commonalities, and a humanistic theory of mindfulness can thus potentially account for aspects, which have not been taken into account by the existing cognitive theories. Furthermore, future theories might include socio-cultural factors to a higher degree since these play central parts in both depression and chronic pain.

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