

Cultivating helper qualities: Immediate and long-term impacts of mindfulness training for medical and psychology students

A prospective randomized controlled study and qualitative exploration

Ida Solhaug

A dissertation for the degree of Philosophiae Doctor – 2016

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Preface and Acknowledgements

In 2004, during my time as an undergraduate psychology student, two of my fellow students and I travelled to India for two months. In the middle of a desert in Rajasthan, we took part in a 10-day silent meditation retreat. Every day, from four in the morning until ten in the evening, we were instructed to sit still and concentrate on present-moment sensational experience: the tip of the nose for three days, and the whole body for seven days. We were instructed to observe what our minds did during this practice. When ruminating over past and future, or trying to avoid, control, or hold on to some aspects of experience, we were invited to let go of such habits kindly and return to present-moment experience repeatedly and ‘befriend it’, just as it was.

The impact of this strange, intensive practice stunned me. I felt less dictated by mental chatter and emotional reactions; the present-moment sensations of colours, sounds, smells, tastes, and touches stood out with greater clarity; deep, unconditional joy visited me; and I felt closer to others and more in touch with my values and life aspirations.

Of course, these effects faded in returning to everyday life. However, some questions arose from these experiences that I have continued exploring ever since, both personally and professionally. How does repeated cultivation of kind, receptive, present-moment awareness relate to mental health and well-being, qualities of relationships, ways of living, and ways of coping with challenges?

Through the present work, I have been fortunate enough to be able to pursue these questions in a scientific setting, drawing upon an already existing body of research examining mindfulness-based interventions. I wish to express my gratitude to the many people who have made this scientific journey both possible and so inspiring.

I credit the Health Authority Region North for funding this research.

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Lastly, I am so grateful to my partner and soulmate, Jonas Jakobsen. Your generosity, kindness, humour, and insight means so much to me. Thank you, Aksel and Selma, for filling so many of our moments with love, delight, surprise, and gratitude.

List of Papers

Paper I: M. de Vibe, I. Solhaug, R. Tyssen, O. Friborg, J. H. Rosenvinge, T. Sørлие, A. Bjørndal. Mindfulness training for stress management: A randomised controlled study of medical and psychology students. *BMC Medical Education* 2013; 13: 107. doi: 10.1186/1472-6920-13-107. <http://biomedcentral.com/1472-6920/13/107>

Paper II: I. Solhaug, M. de Vibe, O. Friborg, T. Sørлие, R. Tyssen, A. Bjørndal, J. Rosenvinge. Long-term mental health effects of mindfulness training: A four-year follow-up. Revised manuscript re-submitted, *Behavioral Research and Therapy*.

Paper III: I. Solhaug, T. E. Eriksen, M. de Vibe, H. Haavind, O. Friborg, T. Sørлие, J. Rosenvinge: Medical and Psychology Student's Experiences in Learning Mindfulness: Benefits, Paradoxes, and Pitfalls, *Mindfulness* 2016; 7: 838. doi: 10.1007/s12671-016-0521-0.
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Summary in English

This thesis explored the immediate and long-term impact of participating in a 7-week mindfulness-based stress reduction intervention on medical and psychology students, using both quantitative and qualitative research methods.

A significant proportion of healthcare professionals experience distress, stress-related burnout, and low quality of life. Relative to the general population, health care professionals also show higher rates of substance abuse and suicide. Stress-related health problems have been linked to patient dissatisfaction, worse patient outcomes, and increased rates of professional error. Distress, burnout, and stress can occur early in the educational process, and medical and psychology students report increasing levels of stress and mental distress during educational training. Mindfulness training has received increased interest within the field of healthcare education because of its proposed double benefits in providing strategies for self-care to prevent stress and burnout, and for boosting qualities central to the helper-patient interaction.

We conducted a randomized controlled trial involving 288 students from two Norwegian universities to evaluate short-term efficacy of the mindfulness-based intervention, using self-report questionnaires that measured psychological health. In addition, we examined the long-term impact of the intervention and potential mechanisms of action by analysing 2- and 4-year follow-up data. We also employed a qualitative, phenomenological approach to exploring participants' stories and experiences in learning mindfulness.

Results indicate that the intervention was effective in reducing mental distress and increasing subjective well-being and self-reported mindfulness disposition. Gains were significant only for women. No effects were observed for burnout. Intervention gains were reported with respect to mental distress, mindfulness, and coping strategies for 4 years regardless of gender. All effect sizes were small to moderate. The duration and frequency of practicing formal mindfulness exercises (e.g. sitting meditation) predicted short-term levels of distress and long-term levels of self-report mindfulness disposition, and changes in mindfulness disposition partially mediated long-term intervention effects on mental distress and coping strategies. However, the duration and frequency of engagement in formal practices were low and decreased with time. The qualitative findings indicated diverse intention in and understanding of learning mindfulness. Some students perceived of mindfulness as a means to improve concentration or achieve relaxation, whilst others reported increased sensitivity and tolerance towards their own state of mind and increased relational presence. The study highlighted the value and also

complexity in learning mindfulness, particularly with respect to developing mindfulness attitudes (i.e. acceptance, non-striving and non-reactivity).

Further research is required to increase understanding of the components central to beneficial outcomes. However, the detection of effects after four years indicate that mindfulness training could potentially enhance adaptive coping responses and resilience in the face of future stressors. Integrating mindfulness into higher education holds promise as one way of fostering the personal qualities that future health care workers need to thrive and cope well with stressors.

Oppsummering på norsk

Målet med studiene i denne avhandlingen var å undersøke kort- og langtidsvirkningen av en 7-ukers mindfulness-basert stresshåndteringsintervensjon for medisin- og psykologistudenter. Vi ønsket også å undersøke hvordan studentene erfarte det å delta i intervensjonen.

En betydelig andel helsearbeidere opplever psykisk besvær, lav livskvalitet og stressrelatert utbrenthet som følge av jobbstress, og forekomst av rusmisbruk og selvmord er høyere enn i befolkningen generelt. Stressrelaterte plager hos hjelperen kan føre til flere faglige feil, flere pasientklager og dårligere behandlingsresultater. Psykisk besvær og stress kan oppstå tidlig i utdanningsprosessen, og medisin- og psykologistudenter rapporterer økende besvær og stress utover i studietiden. Interessen for trening i mindfulness – oppmerksomt nærvær – har økt de siste tiårene som metode for å fremme hjelperes egenomsorg og motvirke stress og utbrenthet, og for å styrke hjelperkvaliteter som nærvær og affekttoleranse.

Kort og langtidsvirkninger (2 og 4- års oppfølging) av å delta i en mindfulness-basert stresshåndteringsintervensjon på psykisk helse ble studert i en randomisert kontrollert studie med 288 studenter fra to norske universiteter. Videre brukte vi en kvalitativ, fenomenologisk tilnærming for å utforske studentenes erfaringer med å delta i en slik intervensjon.

Vi fant at intervensjonen reduserte psykiske plager og gav økt velvære og evne til oppmerksomt nærvær. Kortidseffekter var kun signifikante for kvinner, som også rapporterte effekter på studiestress. Ingen effekter ble observert på utbrenthet. Vi fant små langtidseffekter på psykiske plager samt evne til stresshåndtering og oppmerksomt nærvær. På kort sikt var det å praktisere mindfulness hjemme noe som reduserte psykiske plager og på lengre sikt, evne til oppmerksomt nærvær. Endringen i oppmerksomt nærvær kunne forklare hvorfor intervensjonen på lang sikt reduserte psykisk besvær og evne til stresshåndtering, indikert gjennom statistisk mediasjon. Imidlertid praktiserte studentene hjemmeøvelser i liten grad, og praksisen avtok med tiden. De kvalitative funnene viste at studentene hadde ulike oppfatninger av hva oppmerksomt nærvær er. Noen studenter beskrev trening i oppmerksomt nærvær som en metode for å bedre konsentrasjon og oppnå avspenning, mens andre så det som en vei til økt sensitivitet og toleranse overfor egen psykologiske erfaring og tilstedevær i relasjoner. Studien fremhever nytteverdien av det å øve oppmerksomt nærvær, men også utfordringer relatert til å romme vanskelige

tanker, kroppsfornelemelser og følelser og gi slipp på prestasjon under mindfulness-praksisen.

Vi trenger videre forskning for å avdekke de mer spesifikke virkningsmekanismene, men sporbare effekter selv etter fire år tilsier at mindfulness-trening potensielt kan fremme robusthet i møte med stressfaktorer. Metoden bør vurderes tatt inn i studieprogrammene i medisin- og helsefag for å bidra til at fremtidens helsearbeidere kan håndtere stress på en god måte.

Abbreviations

MBIs = Mindfulness-based interventions

MBSR = Mindfulness-based stress reduction

MBCT = Mindfulness-based cognitive therapy

ACT = Acceptance and commitment therapy

DBT = Dialectical behaviour therapy

CBT = Cognitive-behavioural therapy

RCT = Randomised control trial

FFMQ = Five Facet Mindfulness Questionnaire

ACC = Anterior cingulate cortex

PFC = Prefrontal cortex

GHQ-12 = General Health Questionnaire, 12 items

MBI-S = Maslach Burnout Inventory, Student version

SWB = Subjective Well-being

PMSS = Perceived Medical School Stress

MAR = Missing at random

MCAR = Missing completely at random

MNAR = Missing not at random

CFM = Center for mindfulness

MANCOVA = Multivariate analysis of covariance

NNT = Numbers needed to treat

IPA = Interpretative phenomenological analysis

Introduction

Sharing deeply in the lives of patients and committing to help is the privilege of the healthcare professions. However, encountering an extraordinary amount of suffering within contexts of high-performance expectations is demanding. Elevated levels of psychological distress in trainees and healthcare professionals also affect healthcare service users (Regehr, Glancy, Pitts, & LeBlanc, 2014; J. E. Wallace, Lemaire, & Ghali, 2009). Professionalism development requires the provision of safe venues for students and residents to enhance self-care and understanding of feelings, attitudes, needs, and response patterns. The current study examined the potential of one such venue, mindfulness training.

Mindfulness concerns our relationships with experience, ourselves, and others and involves a particular way of being aware and attentive - an openhearted, receptive, and non-judgemental presence. Mindfulness practice aims to foster intimate knowledge of psychological experience and deeper understanding of the causes and conditions that lead to stress and malfunctioning. Finding its roots in ancient spiritual traditions, mindfulness is a relatively recent phenomenon in a Western medical and mental health context. During the last two decades, research in this field has grown exponentially, fuelled by commitment to scientific investigation. However, the mindfulness research field is still young, with many questions unresolved, both in general and in the context of healthcare education. The current investigation was an attempt to broaden the understanding of and evidence-base for mindfulness-based interventions (MBIs).

Psychological Distress in the Helping Profession

During recent decades, increasing attention has been paid to healthcare providers' mental well-being. Psychological impairment affects a significant proportion of healthcare professionals at some point in their careers (Irving, Dobkin, & Park, 2009; Regehr et al., 2014; Wallace et al., 2009), and newly qualified helping professionals could be particularly vulnerable to occupational stress (Craig & Sprang, 2010; Shanafelt, Bradley, Wipf, & Back, 2002; Skovholt & Ronnestad, 2003).

Norwegian academic admission standards for both medicine and clinical psychology study are high, and students are typically resourceful high achievers with high socioeconomic status. However, high workload and personal demands can turn their time at medical or psychology school into a stressful period. Sources of stress include academic achievement worries, clinical performance anxiety, development of a

professional identity, ethical conflict, and exposure to human suffering (Dyrbye, Thomas, & Shanafelt, 2005; Regehr et al., 2014; Skovholt & Ronnestad, 2003).

Norwegian medical students have reported a decline in life satisfaction between the first and third years of study (Kjeldstadli et al., 2006), and a third have mental health problems and treatment needs during their first 3 years as undergraduates (Midtgaard, Ekeberg, Vaglum, & Tyssen, 2008). While similar data regarding Norwegian psychology students do not exist, high levels of psychological distress have also been documented in American and Canadian psychology students (Cushway, 1992; Hudson & O'Regan, 1994; Peluso, Carleton, & Asmundson, 2011). Medical students have been shown to experience higher rates of psychological distress, including depression, burnout, suicidal ideation, and suicide, and a lower quality of life, relative to those of the general population or age-matched peers (Dahlin, Joneborg, & Runeson, 2005; Dyrbye, Thomas, et al., 2010; Dyrbye, Thomas, & Shanafelt, 2006; Givens & Tjia, 2002; Goebert et al., 2009; Hays, Cheever, & Patel, 1996; Maher et al., 2013; Tyssen, Vaglum, Gronvold, & Ekeberg, 2001b). However, some studies have documented similar levels of distress in non-medical undergraduates (Bacchi & Licinio, 2015). Indeed, a meta-analysis concluded that 50% of university students experienced significant levels of stress in the form of anxiety and/or depression (Regehr, Glancy, & Pitts, 2013), and levels of depression tend to increase during study (Bewick, Koutsopoulou, Miles, Slaa, & Barkham, 2010). Moreover, the prevalence of mental distress in Norwegian youths aged 16-24 significantly increased from 1998 to 2012 (Folkehelseinstituttet, 2015).

Once in medical or psychological practice, healthcare professionals experience additional stressors including high caseloads; high performance expectations; time pressure; treatment failure; personal concerns regarding competency; dysfunctional organizational structure; systems in transition; changing roles in the workplace; and difficult interactions with patients, family, and other personnel (Irving et al., 2009; Regehr et al., 2014; Wallace et al., 2009). Medical practitioners face shift work, long working days, and poor sleep habits (Wallace et al., 2009), while mental healthcare professionals report emotional contamination, secondary traumatization, and 'compassion fatigue' resulting from emotional work that is part of therapeutic labour, particularly when working with trauma patients (Bober & Regehr, 2006; Craig & Sprang, 2010; Figley, 2002; Zuardi, Ishara, & Bandeira, 2011).

These demanding factors increase healthcare professionals' vulnerability to the development of physical and emotional exhaustion and stress overload (i.e. burnout, anxiety, low levels of satisfaction with life, sleep difficulties, substance abuse, and

depression; Shanafelt et al., 2015; Tyssen et al., 2009; Wallace et al., 2009). A longitudinal study involving Norwegian doctors reported that mental health problems requiring treatment increased from 11% immediately subsequent to graduation to 17% four years after graduation (Tyssen, Rovik, Vaglum, Gronvold, & Ekeberg, 2004). In addition, 22% reported a need for treatment at 10-year follow up (Tyssen, personal communication). Suicide rates in physicians are estimated to be six times higher than those observed in the general population (Schernhammer, 2005; Wallace et al., 2009), and an estimated 25–60% experience burnout (Regehr et al., 2014; Shanafelt et al., 2012). Levels of burnout observed in mental health professionals are higher relative to those observed in primary healthcare professionals (Imai, Nakao, Tsuchiya, Kuroda, & Katoh, 2004; Zuardi et al., 2011). In addition, levels of traumatic stress in therapists working with victims of interpersonal violence (i.e. rape, wife assault, child abuse, and torture) are higher relative to those observed in therapists with other clients (Craig & Sprang, 2010). High rates of distress are compounded by the fact that healthcare providers and trainees attend to their own needs poorly and are reluctant to seek help from others (Adams, Lee, Pritchard, & White, 2010; Amarasuriya, Jorm, & Reavley, 2015) despite high levels of mental health literacy (Chan, Batterham, Christensen, & Galletly, 2014). According to the Canadian medical association, only 2% of physicians who self-identified as depressed sought help (Wallace et al., 2009).

Consequences of Distress Overload

The consequences of stress overload and psychological distress in medical students include withdrawal from interpersonal contact, less altruistic professional values, unprofessional conduct, and lower graduation rates (Dyrbye, Massie, et al., 2010; Dyrbye, Thomas, et al., 2010; Nelson, Dell'Oliver, Koch, & Buckler, 2001). Further, mental distress and burnout experienced during study predict mental health problems and burnout levels following graduation (Dyrbye, Thomas, Huntington, et al., 2006; Niemi & Vainiomaki, 2006; Tyssen, Vaglum, Gronvold, & Ekeberg, 2001a). Stress-related distress and burnout in healthcare professionals have been linked to increases in medical errors (Fahrenkopf et al., 2008; Shanafelt et al., 2010), poorer memory performance (Rutledge et al., 2009), decreased patient satisfaction with treatment and services, and lower-quality patient care (van den Hombergh et al., 2009; Wallace et al., 2009; West et al., 2006).

The aphorism ‘the doctor is the drug’ (Balint, 1972) refers to the therapeutic power of helper-patient interaction. Clinicians’ empathy and ability to communicate well with patients influence patient satisfaction and treatment compliance, medicolegal risks,

and patient outcomes (Cruz & Pincus, 2002; Greenberg, Elliott, Watson, & Bohart, 2001; Lambert & Barley, 2001; Neumann et al., 2011; Raket et al., 2009). Empathy requires clinicians to engage with their own subjective experience when facing patients' suffering and take patients' perspectives while simultaneously avoiding becoming overwhelmed (i.e. emotional contagion; Britton et al., 2013). Experiences that healthcare professionals are unable to 'contain' personally (i.e. needs, feelings, reactions, and memories) can affect their ability to manage similar experiences in patients. This could result in engagement in unconsciously motivated behaviours that could be detrimental to the therapeutic process and outcome (Bruce, Manber, Shapiro, & Constantino, 2010).

However, a review of 18 studies indicated a decline in empathy during medical school and residency, particularly in the clinical phases of training (Neumann et al., 2011). Moreover, 'moral judgement competence', a construct related to empathy, has been found to improve in psychology students but worsen in medical students during study (Schillinger, 2006). In medical students, idealistic humanistic values are typically present at the beginning of medical school but may diminish when students are confronted with the clinical reality of illness, suffering, patient death, and limitations in how these challenges are managed within the clinical systems to which they are exposed during training. Such limitations include a lack of adequate role models, fragmented patient-helper relationships resulting from time-limited patient encounters, and a shift in focus from the person to symptoms and diagnoses and from care quality to productivity (Neumann et al., 2011). Moreover, distress (i.e. depression, burnout, and low levels of well-being and quality of life) was identified as a key factor influencing empathy decline (Neumann et al., 2011), and reduced empathy has been associated with an increased risk of future self-perceived error (West et al., 2006).

Psychology students face the inherent complexity and difficulty involved in examining, understanding, and improving patients' emotional lives, and psychotherapy is an ambiguous field that could take years to master (Skovholt & Ronnestad, 2003). The variety in theoretical preferences and therapeutic models could also lead to confusion regarding effective means of providing help (Skovholt & Ronnestad, 2003). Students could react to the stress of overwhelming responsibility by overidentifying with patients, trying to 'keep it all together', or creating too great a distance from patients, and all of these responses hinder empathic relation. A recent study involving Norwegian therapists showed that high self-affiliation in therapists predicted positive patient outcomes (Nissen-Lie et al., 2015), echoing the results of previous research (Constantino, 2000; Henry & Strupp, 1994) indicating that therapists' self-relation affected interaction with patients and

predicted therapeutic outcomes. Interestingly, high, rather than low, self-doubt in the role as a therapists predicted better patient outcomes when combined with high self-affiliation (Nissen-Lie et al., 2015), indicating that being conscious of challenges, uncertainties, and complexities in clinical work, rather than blinded by their own competencies, was characteristic of optimal professional development when balanced with positive self-relation.

However, both medical and psychology training programs tend to emphasize third-person pedagogy and de-emphasize the subjective, ‘first-person’ dimension of the helper (Britton et al., 2013; Hojat et al., 2009; Neumann et al., 2011), downplaying development of the personal qualities central to the art of patient care. Further, this could involve implicit promotion of avoidance of the helpers’ subjective experience including personal suffering (Britton et al., 2013). In summary, neglect of the helper’s subjective dimension could result in poor health, maladaptive coping with stressors, and neglect of valuable therapeutic qualities.

Therefore, learning to cope with stress and exhaustion and enhancing intra- and interpersonal awareness and self-understanding stand out as critical dimensions of professional development (Baker, 2003). The current work was fuelled by a wish to address these concerns and explore the short- and long-term impact of introducing mindfulness training for medical and psychology students.

Conceptualizing Mindfulness

Mindfulness has been described as an enduring trait; a temporary state of awareness; a practice or technique; an intervention; a process; an outcome; a way of living; and even a placeholder for the core Buddhist teachings regarding suffering and its alleviation, or the ‘dharma’ (Vago & Silbersweig, 2012; Williams & Kabat-Zinn, 2011). Agreeing on a definition and operationalization of the term ‘mindfulness’ in empirical science has been a unique challenge because of the concept’s roots in a plurality of contemplative traditions, the difficulty involved in measurement, and its distinction from common usage (Grossman, 2008; Vago & Silbersweig, 2012). Given the centrality of defining mindfulness in the qualitative study described in this thesis and the focus of mechanisms of action in the quantitative work, mindfulness will be situated conceptually before a more detailed description of the theoretically and empirically proposed psychological processes involved is offered.

Mindfulness in Buddhist psychology

The word ‘mindfulness’ is the English equivalent of the Pali word *sati*, which implies awareness, attention, and remembering (Germer, 2013). In conceptualizing mindfulness, some Buddhist scholars emphasize certain aspects of attention, while others highlight the dynamic interplay of several types of factor such as cognitive, emotional, social, and ethical (Grossman & Van Dam, 2011). Buddhist scholars commonly conceive mindfulness as a practice or process implying (a) deliberate awareness of moment-to-moment experience; (b) qualities such as kindness, tolerance, and non-judgement; (c) non-discursive, non-analytical investigation of ongoing experience; and (d) a need for systematic practice for the gradual refinement of the mindful process (Grossman & Van Dam, 2011).

Arriving at a psychological theory of mindfulness in Buddhism is difficult, partly because of the many different approaches within Buddhism, and partly because Buddhism is religion, philosophy, culture, and psychology rolled into one (Sedlmeier et al., 2012). Nevertheless, many authors have attempted to extract the psychological aspects of Buddhism, and aspects of this broad ‘Buddhist psychology’ influence the theoretical foundation of some MBIs (Kabat-Zinn, 2005; Teasdale & Chaskalson, 2011). According to Buddhist psychology, much human suffering is due to the habitual tendency to want things to be different. Humans habitually crave for or cling to some experiences and attempt to push others away, resisting the fact that all experiences change continuously. Further, Buddhist psychology posits that much human suffering comes from the ‘delusion’ of being overly attached to a self-centred perspective, a subtle obsession with our stories about who we are and ought to be, and constant judgement of ourselves and others.

The classic method for cultivating mindfulness typically progresses from the practice of refining attention and awareness (concentration or *samatha* meditation) to practices inducing experiential inquiry and understanding (insight or *vipassana* meditation). Therefore, mindfulness is conceived as a compound of awareness and ‘clear comprehension’; rather than just knowing what is happening at the moment, knowing in a certain way: ‘without grasping, aversion, or delusion’ (Salzberg, 2011, p. 177). Mindfulness is considered an antidote to resistance to change, by allowing fluctuation in psychological experience held in awareness without reactivity (Shapiro & Carlson, 2009). Repetition of this practice is assumed to invite the following insights: (a) everything is impermanent; (b) suffering arises from greed/clinging, hatred/aversion, and

ignorance/delusion; and (c) everything is connected, and nothing is separate. With mindfulness training, one is encouraged to take a step back and observe one's own stories and self-judgement patiently and kindly, without being entirely defined by them. Insight into this tradition could be understood as the gradual understanding of maladaptive clinging to 'me' and 'mine' and being able to see the world and everything that humans have in common. According to Buddhist psychology, such insights promote 'lovingkindness', which implies recognition of the interconnectedness of all beings.

The concepts of mindfulness in Buddhist and contemporary psychology differ on both contextual and content levels (Keng, Smoski, & Robins, 2011). In the Buddhist tradition, the contextual concept of mindfulness is viewed as a component of a larger system of ethics and practices intended to promote 'liberation from suffering' through the development of wisdom and compassion. On a content level, this is achieved by practicing mindfulness against the backdrop of contemplation of key aspects of the Buddha's teachings: suffering, impermanence, 'no-self'/emptiness, interdependence, and interconnectedness. In contrast, the Western contextual conceptualization of mindfulness is largely independent of any specific philosophy or ethical code (Keng et al., 2011). On a content level, Western practice places less emphasis on doctrines such as no-self, emptiness, and impermanence, while the notions of interconnectedness, compassion, and self-compassion have become more widespread.

Mindfulness as a transtheoretical concept

Concepts similar to contemplative conceptions of mindfulness are found in several Western philosophical systems¹. Theorists from many schools of psychotherapy have also discussed the importance of open, receptive awareness in the cultivation of well-being, and it can be argued that the mechanisms of change that form the basis of mindfulness meditation can be found in most Western psychotherapy (Didonna, 2009; Martin, 1997). In psychodynamic and humanistic traditions, enhanced awareness is thought to enable the identification of needs, conflicts, and existential concerns. Cognitive-behavioural therapy (CBT) and mindfulness-based approaches share the goal

¹ For example Husserl's receptive *phenomenological attitude*, which involves 'stepping back' from our habitual, conceptual mode of processing and turning attention towards reality simply as it appears or is given to us (Brown & Cordon, 2009). Setting cognitive elaboration aside does not imply dissociation; rather, it involves the creation of intimacy with conscious experience. Buber's 'I-Thou' concept describes a rich interaction of two subjects characterized by presence, non-striving, and acceptance (Sauer et al., 2013). Both Seneca and Kierkegaard regard human suffering as related to the condition of 'not wanting to be what one is', and the process of overcoming this condition is described as a processual self-appropriation that leads to increased freedom and presence in the given moment (Jakobsen & Solhaug, 2009; Seneca, 1969).

of promoting a more aware and ‘objective’ stance towards thoughts, feelings, and behaviours; however, CBT works through logical disconfirmation and change-based strategies, while MBIs work through acceptance and meta-cognitive approaches (Arch & Craske, 2008; Safran, Segal, Hill, & Whiffen, 1990). Mindfulness-based psychology also overlaps with systemic schools of therapy (Anderson & Goolishian, 1988; Gergen, 1994), in that it proposes that language constructs identities and realities, rather than describing them, and advocates a non-pathologizing, transdiagnostic pedagogy. Further, the importance of the helper’s attention and presence has long been acknowledged. Freud (1958, as cited in Epstein, 1995) advised clinicians to incorporate ‘evenly hovering attention’ and ‘suspend judgement and give impartial attention to everything there is to observe’ when working with patients, Fritz Perls (1969) stated that ‘awareness per se of and by itself can be curative’ (p. 16), and Carl Rogers (1961) underlined the importance of therapists’ ‘unconditional acceptance’ as a foundation for change (p. 283).

Mindfulness as an intervention

Clinical applications and medical research examining meditation can be traced back to the growth of Zen Buddhism in America in the 1950s and 1960s. This growth fuelled interest in the use of meditative approaches in psychotherapy, which influenced the genesis of gestalt therapy, the progression of humanistic therapies (Dryden & Still, 2006), and theoretical development in the margins of psychoanalysis (Engler, 1983; Rubin, 1996; Safran, 2003). Further, in the 1970s, Herbert Benson developed the concept of the relaxation response, and research associated transcendental meditation with reduced physiological arousal (Benson, Rosner, Marzetta, & Klemchuk, 1974; Wallace, 1970).

The application of mindfulness as an intervention for clinical problems emerged in the late 1970s, with Jon Kabat-Zinn's’ mindfulness-based stress reduction (MBSR) program, an eight-week psychosocial group-based educational program originally developed for patients with chronic pain (Kabat-Zinn, 1982). This program was followed by the development of other interventions using mindfulness-related principles and practices. Mindfulness-based cognitive therapy (MBCT) combined MBSR with cognitive therapy to prevent relapse in major depressive disorder (Segal, Williams, & Teasdale, 2002). Other programs closely resembling the structure of MBSR include mindfulness-based relapse prevention for alcohol misuse (Marlatt & Gordon, 1985), mindfulness-based eating awareness training (Kristeller & Hallett, 1999), and mindfulness-based relationship enhancement (Carson, Carson, Gil, & Baucom, 2004). During the 1990s, two

MBIs were developed independently: acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and dialectical behaviour therapy (DBT; Linehan, 1993). Neither of these therapies emphasizes the long, disciplined meditation practice in MBSR and similar programs, but both value the mindfulness principles and importance of mindfulness in everyday life. In this thesis, the umbrella term *mindfulness-based interventions* (MBI) is used to describe the interventions closely resembling the MBSR, and not ACT and DBT.

Definitions of mindfulness in contemporary psychology

Researchers² generally appear to agree that mindfulness consists of two distinct but closely interrelated components (Bishop et al., 2004; Kabat-Zinn, 2005; Linehan, 1993; Marlatt & Kristeller, 1999). The first component reflects moment-to-moment attention to and awareness of internal and external experience. The second component pertains to the quality of attention, characterized by an attitude involving curiosity, experiential openness, acceptance, and non-judgement. However, discrepancies exist (Grossman, 2011). Brown and Ryan (2003) conceptualized mindfulness as a unidimensional construct emphasizing attentional factors. In contrast, Fletcher and Hayes (2005) added two factors to present-moment awareness and acceptance: defusion (i.e. decentering from thoughts) and self-as-context (i.e. disidentification with stories about the self). Further, Kabat-Zinn (2005) and Shapiro, Carlson, Astin, and Freedman (2006) included intention as the third core component of mindfulness: a personal vision for why practicing mindfulness.

In general, the *two*-component conceptualization of mindfulness underlies most self-report mindfulness questionnaires (Sauer et al., 2013). While some questionnaires pertain to these two factors explicitly (Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008; Lau et al., 2006), others pertain to several sub-factors that may nevertheless be allocated to the two latent factors. The Five Facet Mindfulness Questionnaire (FFMQ), used widely and in the current research, is derived from the unification of items from five mindfulness questionnaires within one tool and conceptualization of mindfulness as a general, second-order construct related to five first-order factors/facets (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). These facets include observing, describing,

² From an information processing perspective, Ellen Langer (1989) defined mindfulness as an open receptiveness to new information, a flexibility to take over different cognitive perspectives, and a 'step by step' attitude facilitating concentration on the task at hand (Sauer et al., 2013). However, Langer's conception of mindfulness emphasizes active cognitive operations similar to the concept of creativity as more than what is typical in the MBIs herein.

acting with awareness, and non-reactive and non-judgemental consideration of inner experience (Table 1); the first three pertain to an attentional component, and the other two pertain to an attitudinal component. However, the most widely used mindfulness questionnaire, the Mindful Attention and Awareness Scale, operationalizes mindfulness as a *unidimensional* construct, tapping the ability to be aware of and attentive to present-moment experience (Brown & Ryan, 2003). Further, while most questionnaires conceptualize mindfulness as a dispositional or trait-like quality that can change with practice (Baer, 2011), one measures mindfulness as a state in a given situation (Lau et al., 2006), reflecting pluralism in the conceptualization of mindfulness in the research field.

Table 1. *Example items for Five Facet Mindfulness Questionnaire*

<i>Facet</i>	<i>Example item</i>
Observing	I pay attention to sensations, such as the wind in my hair or sun on my face.
Describing	I am good at finding words to describe my feelings.
Acting with awareness	It seems I am "running on automatic" without much awareness of what I am doing. (R)
Nonjudging of inner experience	I tell myself I shouldn't be feeling the way I'm feeling. (R)
Nonreactivity to inner experience	When I have distressing thoughts or images I am able to notice them without reacting.

Note. R = reverse-scored item (Higher scores represent higher levels of mindfulness)

The complex nature of mindfulness

The operationalization of mindfulness into self-report questionnaires has facilitated examination of the concept across a range of samples and settings. However, the discussion of mindfulness within a 'scientific' vocabulary could fail to communicate its complex nature. These complexities justified the choice to complement quantitative with qualitative methodological approaches in the current research.

Mindfulness practices involve a non-instrumental, dialectical structure (Sauer, Lynch, Walach, & Kohls, 2011) that could differ somewhat from the causal thinking style central to modern medicine and psychology. Rather than striving for symptom alleviation or ranking distance from 'normal', mindfulness practice is conceived of as a way of being in relation to all of experience, whether symptomatic or 'healthy' (Hayes et al., 1999; McCown, 2013). Participants are invited to cultivate a different relationship with symptoms, treating them as something to turn towards and befriend as a common human experience, rather than get rid of. However, as a consequence of such a change in the relationship with symptoms, their impact may change passively (Sauer et al., 2011). For

instance, physical pain could gradually be perceived as a fluctuating sensation when secondary cognitive-emotional reactions to pain are not fuelled but held patiently within one's awareness. Similarly, when afflictive emotions and thoughts are allowed to fluctuate, with reduced attempts at control, modification, or avoidance, they could take on a less threatening and defining character. Mindfulness practices therefore have a dialectical structure (Sauer et al., 2011) through the combination of active and passive components in a complementary manner (i.e. actively and diligently attending to what happens, while simultaneously resisting reaction to unwanted psychological stimuli). A similar dialectic regards defining features such as acceptance and non-judgement. Rather than implying uncritical acceptance of all situations or experiences or refraining from all evaluative cognitions, mindfulness invites a suspension or attenuation of evaluative cognitive or emotional reactions in a given situation (Sauer et al., 2011), i.e. a non-judgement of habitual judgement or acceptance of the struggle to accept affliction when present. This process has been referred to as a 'second order', rather than 'first order', change process aimed at targeting the 'symptom' more directly (i.e. cognitive restructuring techniques targeting 'dysfunctional beliefs'; Hayes & Strosahl, 2004). The extent to and ways in which such subtle nuances and complexities are actually experienced in the process of learning mindfulness is underinvestigated in research (Grossman, 2015); therefore, our qualitative study aimed to examine this issue.

Proposed Psychological Processes at Work

The empirical investigation of mindfulness converges in suggesting that mindfulness cultivation facilitates adaptive psychological functioning in both chronic diseases (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010) and mental illness (Hofmann, Sawyer, Witt, & Oh, 2010; Khoury, Lecomte, Gaudiano, & Paquin, 2013; Vollestad, Nielsen, & Nielsen, 2012) in healthy adults (Chiesa & Serretti, 2009; de Vibe, Bjørndal, Tipton, Hammerstrøm, & Kowalski, 2012; Khoury, Sharma, Rush, & Fournier, 2015; Virgili, 2015), healthcare professionals and trainees (Irving et al., 2009; Lamothe, Rondeau, Malboeuf-Hurtubise, Duval, & Sultan, 2016; Regehr et al., 2014), and college or university students (Bamber & Schneider, 2016; Regehr et al., 2013). MBIs have also been shown to reduce avoidance coping and promote approach coping (Berghmans, Godard, Joly, Tarquinio, & Cuny, 2012; Cousin & Crane, 2015; Witek-Janusek et al., 2008). Meta-analyses have indicated that mindfulness meditation programs are superior to nonspecific controls, psychoeducational interventions, supportive therapies, or

relaxation procedures but no better than pharmacological treatments, physical exercise, or cognitive behavioural therapies in reducing anxiety, depression, pain, and stress (Goyal et al., 2014; Khoury, Lecomte, Fortin, et al., 2013).

The question as to how this overall positive impact might occur has received increased attention. Answering such a question could help to optimize treatment strategies by enhancing active components of interventions, distinguishing them from broader non-specific effects of treatment, and informing theory development and the interpretation of results (Kazdin, 2007). Several mechanisms and psychological processes underlying the beneficial effects of mindfulness training have been proposed, and empirical evidence is emerging in support of some of them (Gu, Strauss, Bond, & Cavanagh, 2015; Keng et al., 2011; van der Velden et al., 2015). Four interrelated and mutually facilitative processes are here reviewed with respect to (a) attention regulation and a shift in relation towards thoughts, emotions, sensations, and ‘oneself’, involving (b) metacognitive awareness, (c) affect tolerance, and (d) self-acceptance.

Attention regulation

Attention regulation has been proposed as a core mechanism underlying the beneficial effects of mindfulness training (Bishop et al., 2004; Brown & Ryan, 2003; Holzel et al., 2011), because of its centrality in performance, learning, and flexible emotion regulation (Mathews & MacLeod, 2005). There is evidence that brain regions relevant to attention regulation show both structural and functional changes following mindfulness training (i.e. the ACC and dorsolateral PFC; Tang, Holzel, & Posner, 2015). Improvements have been observed in various subcomponents of attention including orienting and conflict monitoring in the early phases of meditation and alerting in later phases (Chambers, Lo, & Allen, 2008; Chiesa, Calati, & Serretti, 2011; Jha, Krompinger, & Baime, 2007; Lutz et al., 2009; Malinowski, 2013; Tang et al., 2015; Tang et al., 2007). Moreover, mindfulness training has been associated with increased working memory capacity, increased information processing speed, and reduced task effort (Chambers et al., 2008; Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; A. Moore & Malinowski, 2009), and improvements in sustained attention have been associated with reductions in depressive symptoms (Chambers et al., 2008). Publication bias, small sample sizes, the influence of test effort, and variation in the types of mindfulness practice used reduce the generalizability and validity of these findings (Fox et al., 2014; Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012). Further, null findings have also been reported regarding the effect of MBSR on attention (Chiesa et al., 2011; MacCoon,

MacLean, Davidson, Saron, & Lutz, 2014; Tang et al., 2015). A meta-analytic review comparing meditation programs with active control groups found insufficient evidence of an effect on attention (Goyal et al., 2014), indicating a need for more research exploring the clinical significance of mindfulness practice in attentional function and cognitive abilities.

Metacognitive awareness

When observing the changing content of ones' consciousness (i.e. thoughts, feelings, and sensations), one is no longer totally embedded with or defined by it (Shapiro et al., 2006); this process is referred to using terms such as metacognitive awareness/meta-awareness (Hargus, Crane, Barnhofer, & Williams, 2010; Teasdale, Segal, & Williams, 1995), re-perceiving (Shapiro et al., 2006), defusion (SHayes et al., 1999), and decentring (Fresco, Segal, Buis, & Kennedy, 2007; Safran & Segal, 1990). Combined with increased attention to what is happening and sensed in a given situation, increased meta-awareness is believed to promote stepping out of habitual patterns of cognition, including rumination, worry, and catastrophizing, and reduce the overgeneric encoding of situations and tendency to recall overgeneralized memories (Garland, Gaylord, & Park, 2009; Garland, Gaylord, & Fredrickson, 2011; Williams, Teasdale, Segal, & Soulsby, 2000). Such processes have been shown to be markers of depressive and anxious vulnerability (Lyubomirsky & Nolen-Hoeksema, 1995; Williams et al., 2000). The results of several reviews and meta-analyses support these hypotheses (Chiesa et al., 2011; Davis & Hayes, 2011; Gu et al., 2015; Keng et al., 2011) and indicate that mindfulness training improves metacognitive awareness and autobiographical memory specificity and reduces worry and rumination. Reductions in worry and rumination have been found to mediate the relationship between MBIs and beneficial outcomes (Gu et al., 2015), and structural brain changes following meditation have been observed in areas key to meta-awareness (i.e. frontopolar cortex; Fox et al., 2014). However, the role of top-down versus bottom-up processing in mindfulness is unclear (Chiesa, Serretti, & Jakobsen, 2013; Holzel et al., 2011). Active cognitive regulation and reappraisal (top-down processing) have been observed in meditation novices, who attempt to overcome habitual internal reaction to thoughts and feelings more actively. In contrast, studies involving experienced meditators indicate reduced cognitive control and enhanced sensory processing (bottom-up-processing), indicating that the meta-aware, accepting stance has become more automated (Tang et al., 2015). However, such assumptions are preliminary and prompt further empirical investigation.

Affect tolerance

Mindfulness practice involves fostering greater acceptance and tolerance of discomforting states and resembling a process of exposure, and enhanced emotion regulation has been proposed to underlie many of the beneficial effects of mindfulness training (Brown, Ryan, & Creswell, 2007; Brown & Ryan, 2003; Holzel et al., 2011; Kabat-Zinn, 2005; Linehan, 1993). Empirical evidence largely supports this notion. Mindfulness practice has been found to increase prefrontal activation and diminish activation in amygdala responses (Tang et al., 2015), and structural brain changes indicative of optimal emotion regulation have also been reported consistently (Fox et al., 2014). Experimental data suggest that mindfulness changes the relationship with negative, unpleasant states when they occur (Brown et al., 2007), involving less negative affective reactivity in response to affectively valenced pictures (Arch & Craske, 2006), distinct neural activation in response to sad film clips (Farb et al., 2010), quicker recovery from sad mood induction (Broderick, 2005), greater willingness to remain experientially present to unpleasant stimuli without cognitive reactivity (Eifert & Heffner, 2003; Levitt, Brown, Orsillo, & Barlow, 2004), and reduced emotional interference in cognitive tests (Ortner, Kilner, & Zelazo, 2007). Moreover, intervention studies have found the self-reported mindfulness facet, non-reactivity, to be a statistical mediator underlying the effects of mindfulness interventions on adaptive emotion regulation (Britton, Shahar, Szepsenwol, & Jacobs, 2012; Josefsson, Larsman, Broberg, & Lundh, 2011).

The process of exposure is facilitated by experiencing calm bodily states while encountering feared stimuli (Holzel et al., 2011). Even if mindfulness practice does not aim to induce relaxation, it has been associated with increased parasympathetic tone and reduced sympathetic activity (Holzel et al., 2011), including decreased heart rate, blood pressure, cortisol levels, breathing rates, skin conductance response, and muscle tension, and heightened immunological resistance. Therefore, being in a relaxed physical state when experiencing the arrival of distressing thoughts or emotions could support the act of learning that these cognitive-emotional events can be tolerated and maximize the effects of exposure. Therefore, mindfulness practices yield beneficial outcomes not only through psychological and behavioural mediators but also by enhancing mind-body functioning. (Brown et al., 2007; Holzel et al., 2011).

Self-acceptance

Increased self-compassion and/or self-acceptance has been proposed as a mechanism of change underlying mindfulness interventions (Kuyken et al., 2010; Neff,

2003). Neff (2003) defines self-compassion as consisting of three interacting components: self-kindness in the face of suffering; perceiving one's experience as part of a larger common human experience, rather than isolated and separate; and mindfulness defined as a balanced awareness of one's' painful thoughts and feelings rather than avoidance or overidentification with them (Neff, 2003). The self-kindness dimensions of self-compassion and mindfulness are therefore similar to key humanistic constructs, such as unconditional positive regard and unconditional self-acceptance, but they are more comprehensive, in that they do not focus on the individual but base feelings of self-acceptance on a sense of shared humanity (Barnard & Curry, 2011; Neff, 2003). It is also worth noting the differences between self-compassion and the construct of self-esteem, which rest on positive or negative self-evaluation and operate largely at a level of representational self-concept (Barnard & Curry, 2011). While high self-esteem has been considered almost equivalent to mental health for decades, the downside to the desire for self-esteem (i.e. the contingent, narcissistic, or ego-defensive factors) has been discussed more recently (Crocker & Park, 2004; Neff & Vonk, 2009).

Correlational self-report research has indicated that self-compassion facilitates mental health and resilience (Barnard & Curry, 2011; MacBeth & Gumley, 2012; Neff & Dahm, 2015) and is more strongly negatively correlated with narcissism, self-rumination, anger, and social comparisons and more positively related to positive relationship behaviour and attachment security, relative to global self-esteem (Neff & Vonk, 2009). Students with high self-compassion are more likely to understand new material and less likely to focus on avoiding negative performance evaluation, and report lower degrees of procrastination and academic worry and higher levels of intrinsic motivation, self-efficacy, and adaptive coping relative to those with low self-compassion (Iskender, 2009; Neely, Schallert, Mohammed, Roberts, & Chen, 2009; Neff, Hsieh, & Dejitterat, 2005; Terry, Leary, & Mehta, 2013). Increases in self-reported self-compassion have been observed following MBSR or MBCT training (Birnie, Speca, & Carlson, 2010; Kuyken et al., 2010; Rimes & Wingrove, 2011; Shapiro, Astin, Bishop, & Cordova, 2005; Shapiro, Brown, & Biegel, 2007), and increases in mindfulness have been found to predict increases in self-compassion in therapist trainees (Shapiro et al., 2007). In addition, increases in self-compassion have been shown to predict or mediate stress reduction and reduce depressive symptoms following MBSR and MBCT participation, respectively (Kuyken et al., 2010; Shapiro et al., 2005); this provides preliminary support for self-compassion as a mediator of change in mindfulness interventions.

Previous Research on Mindfulness-Based Interventions for the Helping Profession

When this study was planned in 2008, there was a scarcity of intervention studies examining the effects of MBSR in medical and psychology students. We identified four controlled intervention studies involving medical students, (Astin, 1997; Jain et al., 2007; Rosenzweig, Reibel, Greeson, Brainard, & Hojat, 2003; Shapiro, Schwartz, & Bonner, 1998) and one involving psychology students (Shapiro et al., 2007). They reported significant reductions in mental distress, stress, and mood disturbances and increases in spirituality, empathy, sense of control, and/or relaxation. However, two studies lacked randomization of participants (Rosenzweig et al., 2003; Shapiro et al., 2007), and of the three randomized controlled trials (RCTs), two involved high attrition levels (Astin, 1997; Jain et al., 2007). In addition, we identified two qualitative studies exploring psychology students' experiences with an elective semester-long mindfulness intervention (Christopher, Christopher, Dunnagan, & Schure, 2006; Schure, Christopher, & Christopher, 2008). These studies documented positive physical, emotional, and mental changes and improved interpersonal functioning and therapeutic relations. However, the program included substantial educational material unrelated to standard MBSR protocol. No related qualitative studies involving medical students have been identified to date.

Since planning the study, the number of MBI studies conducted has increased rapidly. In congruence with previous reviews of MBSR research involving healthcare professionals and trainees (Escuriex & Labbe, 2011; Irving et al., 2009), Lamothe et al. (2016) documented improvements in stress, burnout, anxiety, and well-being in 39 MBSR-based studies. Bamber and Schneider (2016) identified 57 studies examining MBIs in college students and reported robust reductions in anxiety and self-reported stress, with inconsistent results regarding physiological stress. However, both reviews noted small sample sizes in many studies, limiting external validity and increasing the possibility of type II errors resulting from low power. Further, few studies involved RCT design, increasing the possible influence of confounding variables.

Meta-analytic reviews have also emerged. A recent meta-analysis of MBSR research involving healthy samples including 2,668 individuals (Khoury et al., 2015) indicated moderate within- and between-group effect sizes for depression, stress, anxiety, distress, burnout, and quality of life. These results are comparable to those of previous meta-analyses examining MBIs in non-clinical samples (Chiesa & Serretti, 2009; Eberth & Sedlmeier, 2012), mixed samples (de Vibe et al., 2012; Khoury, Lecomte, Fortin, et al., 2013), healthcare professionals (Burton, Burgess, Dean, Koutsopoulou, & Hugh-Jones,

2016), and working adults (Virgili, 2015). Healthcare professionals benefitted most from MBSR, followed by the general population and students (Khoury et al., 2015). A similar trend was also observed by Virgili (2015), possibly because higher levels of distress are reported in the helping professions. However, several significant constraints/limitations have been noted (within and across meta-analyses and reviews); some of these are reviewed below.

Long-term effects

Mindfulness interventions are thought to support processes and qualities that have potential lifelong relevance. However, little is known about effects that occur beyond 1 year subsequent to intervention, both in non-clinical (Irving et al., 2009; Khoury et al., 2015; Virgili, 2015) and clinical populations (Bohlmeijer et al., 2010; Demarzo et al., 2015; Khoury, Lecomte, Fortin, et al., 2013). In non-clinical samples (i.e. physicians, university and medical students, and healthy adults), studies with a 12-month follow-up period documented maintained effects on self-reported mindfulness (Amutio, Martinez-Taboada, Hermosilla, & Delgado, 2015; Asuero, Blanco, Pujol-Ribera, Berenguera, & Queralto, 2013; Malarkey, Jarjoura, & Klatt, 2013; Shapiro, Brown, Thoresen, & Plante, 2011) and positive psychological outcomes (i.e. relaxation, subjective well-being, self-compassion, and empathy; Amutio et al., 2015; Shapiro et al., 2011). Effects on measures of stress, distress, and depression decreased in two studies (Malarkey et al., 2013; Shapiro et al., 2011) and were maintained in two others (Asuero et al., 2013; Geary & Rosenthal, 2011). Although promising for potential long-term impacts, several of these studies included small sample sizes ($n < 60$), and to our knowledge, none used a follow-up period beyond 12 months. A few RCTS with clinical samples included longer follow up. Maintained effects were documented for up to 15–24 months in populations with depression or schizophrenia (Chien & Thompson, 2014; Kuyken et al., 2010; Meadows et al., 2014; Segal et al., 2010; Teasdale et al., 2000), while two RCTs involving populations with chronic medical diseases (i.e. breast cancer and early kidney disease) reported loss of or declines in effects at 24- and 32-month follow up (Henderson et al., 2012; Kopf et al., 2014). The latter findings are congruent with those of two meta-analyses indicating that the effects of mindfulness training tended to decrease with time (de Vibe et al., 2012; Sedlmeier et al., 2012).

The roles of gender and study topic

Most participants in mindfulness-based research involving the helping professions are women (i.e. 81% of 2,379 individuals in a review conducted by Lamothe et al., 2016), which could be partly representative of the gender division in the helping professions (Grant, Robinson, & Muir, 2004). However, the role of gender in mindfulness research has seldom been examined. A recent meta-analysis of 31 RCTs involving MBSR research (de Vibe et al., 2012) found only two studies that specifically included gender as a moderator variable and reported equal effects in both genders (Carson et al., 2004; Nyklicek & Kuijpers, 2008). Similarly, another meta-analysis found no systematic impact of gender on the effects of meditation (Sedlmeier et al., 2012). Further, to our knowledge, no previous studies have sought to determine whether MBSR showed differential effects as a function of study type (i.e. medicine vs. psychology) or profession within healthcare vocations.

Coping

Although enhanced coping has been proposed as a central benefit of mindfulness training in healthcare professionals and trainees, to our knowledge, no studies have actually addressed the effect of MBSR on coping in these populations. A few previous MBSR studies have shown reduced disengagement coping in clinical populations (Berghmans et al., 2012; Henderson et al., 2012; Tacon, McComb, Caldera, & Randolph, 2003; Witek-Janusek et al., 2008) and healthy adults (Cousin & Crane, 2015; Walach et al., 2007), while a study involving art students failed to detect this effect (Sears & Kraus, 2009). However, only two of these studies used RCT designs (Cousin & Crane, 2015; Henderson et al., 2012). Pre-post data from the current trial indicated that the intervention increased the use of problem-focused coping (i.e. problem solving and benefit finding), and students with high neuroticism scores showed reduced avoidance coping and greater use of social support (Halland et al., 2015).

The roles of mindfulness disposition and practice

One of the most fundamental assumptions of MBIs is that they lead to increases in mindfulness disposition, and this is the reason why they are effective (Baer, 2011). However, a limited number of studies have evaluated self-reported mindfulness (i.e. 41% in a review conducted by Bamber et al., 2016). When evaluated, reviews converge in indicating that mindfulness training leads to increases in self-reported mindfulness in healthcare professionals/trainees (Lamothe et al. 2016), college students (Bamber et al.,

2016), mixed samples (Keng et al., 2011; Khoury, Lecomte, Fortin, et al., 2013), and clinical samples (Khoury, Lecomte, Gaudiano, et al., 2013); however, for an exception, see Visted, Vollestad, Nielsen, and Nielsen (2015).

The exact relationship between mindfulness disposition and psychological health has been subject to less research. A positive correlation has been observed between changes in self-report mindfulness levels and clinical outcomes in three meta-analyses (Khoury, Lecomte, Fortin, et al., 2013; Khoury, Lecomte, Gaudiano, et al., 2013; Khoury et al., 2015). Further, changes in mindfulness levels have been shown to predict psychological health in therapists in training (Shapiro et al., 2007). However, correlations and predictions do not determine the statistical relationships between interventions, the suggested mechanism of effects, and outcomes. A mediation analysis allows such investigation, is accomplished by studying the indirect effect of an intervention variable (i.e. MBSR vs. control) on an outcome variable (i.e. mental distress) through a mediating variable (i.e. self-report mindfulness), and determines whether the relationship between intervention and outcome becomes less statistically significant when the mediator is added. To increase causal specificity, the change in the mediator variable should be assessed before the change in the outcome (Kazdin, 2007). However, no MBSR-based studies involving the helping professions³ have examined mindfulness as a mediator for change (Bamber & Schneider, 2016; Lamothe et al., 2016). A meta-analysis (Gu et al., 2015) identified 12 RCTs and four quasi-experimental studies that examined self-reported mindfulness as a mediator in psychological outcomes in mixed populations and documented moderate and consistent evidence for mindfulness as a mediator. However, most studies failed to fulfil the timeline criterion, and many used statistical methods of mediation that are not currently recommended (Gu et al., 2015).

Few studies involving the helping professions have addressed the relationship between outcomes and formal mindfulness practice ('dose-response'; Irving et al., 2009), which could be a particularly important issue in populations in which pressure for time can prevent such practice. A recent meta-analysis of 24 reviews with mixed populations documented dose-response relationships in four reviews (Gotink et al., 2015). Sedlmeier et al. (2012) included a broad range of mediation practices in their meta-analysis of

³ Phang, Mukhtar, Ibrahim, Keng, and Sidik (2015) evaluated a short program using elements from cognitive therapy and mindfulness concepts (i.e. 'Mindful Gym') in Malaysian medical students and found that mindfulness mediated intervention-led improvements in several outcomes, but this study was not included in these reviews (Lamothe et al., 2016), probably because of dissimilarities with MBSR-based interventions.

nonclinical adult participants but failed to find an influence of lifetime meditation experience on the obtained effect sizes, and a review conducted by Vettese, Toneatto, Stea, Nguyen, and Wang (2009) concluded that approximately half of the 24 MBSR studies reviewed did not find an association between the extent of participants' practice and outcomes. The results of another meta-analysis were inconclusive (de Vibe et al., 2012), with some authors calling the role of meditation practice as the mechanism for change in MBSR into question (Eberth & Sedlmeier, 2012; Toneatto & Nguyen, 2007).

Mindfulness and interpersonal qualities

Mindfulness practice has repeatedly been proposed to promote qualities central to the therapeutic relationship (Bruce et al., 2010; Davis & Hayes, 2011; Martin, 1997). However, quantitative research examining the relationships between mindfulness and emotional competency and empathy is sparse. Only seven of 39 (18%) MBSR-based studies involving healthcare professionals and trainees measured self-reported empathy (Lamothe et al., 2016), and five documented improvements. The current literature did not examine emotional competency explicitly; however, MBSR appeared to promote helpers' awareness of emotions and emotional acceptance, assessed via mindfulness subscales, which was defined as an indirect measure of emotional competency (Lamothe et al., 2016).

Qualitative studies have more frequently explored interpersonal dimensions. A qualitative review indicated that helpers experienced enhanced interpersonal presence, compassion towards others, and a sense of shared humanity following mindfulness training (Morgan, Simpson, & Smith, 2015). Results of qualitative studies indicate that mindfulness can develop therapists' self-insight and ability to distinguish between their experience and that of clients, be present in clients' suffering, communicate their sense of the client's experience, and help clients to express their emotions and bodily sensations (Aiken, 2006; Newsome, Christopher, Dahlen, & Christopher, 2006; Rothaupt & Morgan, 2007; Schure et al., 2008). These data converge with results of neuroscientific studies indicating that mindfulness practitioners experienced enhanced perceptual clarity and awareness of bodily states (Farb, Segal, & Anderson, 2013; Fox et al., 2014; Tang et al., 2015), which could help to foster empathic responses (Holzel et al., 2011). Further, the capacity to relate to oneself with acceptance has been shown to increase one's capacity to relate to others in the same manner (Constantino, 2000; Neff & Pommier, 2013; Nissen-Lie et al., 2015), and a few studies have found increases in self-compassion in healthcare professionals or trainees following MBSR (Newsome et al., 2006; Shapiro et al., 2005;

Shapiro et al., 2007). Moreover, a controlled, double-blind study reported better client outcomes for meditating counsellor trainees (Grepmaier et al., 2007), and another study documented positive correlations between therapists' self-reported mindfulness and clients' perceptions of the alliance (Wexler, 2006). However, two reviews reported mixed results regarding the relationship between client outcomes and therapists' mindfulness (Davis & Hayes, 2011; Escuriex & Labbe, 2011) and identified one study (Stanley, Reitzel, Wingate, Cukrowicz, Lima, & Joiner, 2006) and three dissertations (Plummer, 2009; Stratton, 2006; Bruce, 2008) that reported inverse or no correlations between therapists' or trainees' levels of self-reported mindfulness and clients' perceptions of therapists' empathy or client outcomes. Therefore, the relationships between healthcare providers' mindfulness, inter-relational qualities, and patient outcomes are not simple and warrant further investigation.

Complexities in learning mindfulness

A recent review of 14 qualitative studies involving healthcare professionals' or trainees' experiences with mindfulness training (Morgan et al., 2015) substantiated the overall positive findings in the quantitative literature and indicated that when healthcare professionals overcome initial challenges with practice, they experience increased personal well-being, self-compassion, and enhanced interpersonal relationships. However, the authors also noted variability in the reception of and engagement with mindfulness training and highlighted the need for future research examining individual differences in participants' motivation for undertaking mindfulness training and how this might impact their experiences and engagement. While a few qualitative studies acknowledged the challenges involved in meditation for particular clinical groups (Dobkin, Irving, & Amar, 2012), little is known about difficulties in meditation in people without pre-existing conditions (Lustyck et al. 2009). Lomas, Cartwright, Edginton, and Ridge (2014) conducted a qualitative study involving a community sample of 20 meditating men and found that meditation was a difficult skill to learn and practice and exacerbated mental health issues in some cases. Further, some studies indicated that observing internal experiences without suffusing the attention with an accepting attitude could exacerbate mental distress (Baer et al., 2006). However, few studies have focused on the complexity involved in cultivating attitudes fundamental to mindfulness training such as acceptance, kindness, non-striving, and compassion (Grossman, 2015; Lomas et al., 2014). The effects of gender and subcultural position have also received little attention in the qualitative literature.

Research Aims

Paper I

The first study's aim was to assess the effects of a 7-week MBSR program for medical and psychology students. Program participation was hypothesized to lead to significant reductions in levels of mental distress, burnout, and study stress and increases in subjective well-being and self-reported trait mindfulness. We also sought to determine whether intervention effects were influenced by gender, university course (psychology vs. medicine), course instructors, course adherence, and self-reported mindfulness practice.

Paper II

The second study's aim was to determine whether the effects of program participation on mental distress, subjective well-being, coping strategies, and mindfulness were maintained in the long term (i.e. over 4 years). We also explored the mechanisms of change (i.e. whether self-reported trait mindfulness acted as a statistical mediator of the long-term effects observed), and the role of home meditation practice as a predictor of the effects.

Paper III

The third study's aim was to examine students' experiences of participating in the intervention and learning mindfulness, with particular emphasis on diversity in understanding mindfulness training and the meaning attributed to program participation with respect to relevance to their current lives and trajectories in becoming helpers. Because of the explorative nature of this qualitative study, no a priori hypotheses were formulated.

Methods

The epistemological offset of this research assumed that a more accurate, nuanced account is provided when a phenomenon is described from different angles or perspectives, by integrating the understanding of universals (group levels) and particulars (individual levels) (Malterud, 2001). Therefore, both quantitative and qualitative research strategies were used. We employed a two-centre RCT assessing the effects of a 7-week MBSR program on 288 medical and psychology students at the Universities of Tromsø and Oslo, respectively. Further, the study assessed the long-term impact of participation in the program by collecting data at 2- and 4-year follow up, respectively. We used

qualitative interviews to examine 22 students' experiences of participating in the intervention.

Randomized Controlled Trial and Longitudinal Follow up (Papers I and II)

Sample and recruitment

In 2009 and 2010, the project managers (IS, MdV) delivered 15-min in-class presentations to medical and psychology students in their first or second terms at the Universities of Oslo and Tromsø, respectively, inviting them to participate in the study. Furthermore, eligible students received an e-mail containing additional information and the opportunity to enrol in the study (Appendix I). There were no exclusion criteria, as the intervention was not therapeutic and aimed to reduce stress. Study registration and informed consent provision occurred electronically before students completed the online questionnaire. Using a Java-based random number generator, the Head Technician at the Norwegian Knowledge Centre for the Health Services in Oslo randomized students to either the intervention or control condition. Only the head technician had access to ID numbers and student identities, and he was not involved in other parts of the study. As each class entered the study at a different time, randomization was performed separately for each class. Stratification was not performed according to gender. Two weeks before the intervention, an email was sent to inform study participants of their group allocation. Participants were asked to complete the questionnaires three times subsequent to the intervention (i.e. 2 weeks, 2 years, and 4 years after the intervention). Students received up to three email reminders to complete the questionnaires. Outcome variables included self-reported symptoms of stress, mental distress, subjective well-being, burnout, coping skills, trait mindfulness, and mindfulness practice adherence. Students received a \$50 book voucher as compensation for the time spent completing the questionnaires.

Participants could withdraw from the study at any time. Students could also contact the program instructors with any queries during the intervention. No reports of adverse effects were received. The study was approved by the Regional Committee for Medical and Health Research Ethics in Norway and the Norwegian Data Inspectorate (Appendix II). The study protocol is available on [Clinicaltrials.org](https://clinicaltrials.org) (NCT00892138).

Completeness of data

At T0 (baseline), five students answered less than 10% of the questionnaire items and were excluded from the study. The dropout level from the pre-post trial was low, as

only 4% dropped out at T1. Additional participants were lost to 2- and 4-year follow up, with mean dropout rates of 19% and 32%, respectively. The reasons for dropout were not provided. The online protocol required students to answer all of the questions on each page before proceeding to the following page. Therefore, there were no missing individual items. Four questionnaires at T2 and six questionnaires at T3 were incomplete, in that the latter parts had not been completed. All participants were included in the effect analyses (Appendix III).

Intervention

Initially, medical and psychology students who did not participate in the study were interviewed for feedback about the feasibility of the intervention. Based on this feedback, the intervention was condensed to accommodate for busy schedules and high academic burden. We therefore developed a 7-week MBSR intervention that was based on the 8-week MBSR program developed by Kabat-Zinn (2005) but shorter in duration (six weekly sessions of 1.5 h, rather than eight sessions of 2.5 h, with a 6-h session in week 7) and less intense (20–30 rather than 45 min of home practice every day). Otherwise, the program was similar to the original in terms of content and progression. The program consisted of three core components: (a) brief didactical teachings covering the phenomenon of mindfulness and the psychophysiology of stress; (b) mindfulness practices in class and at home, supported by CDs and the program manual, and (c) dialogue about experiences with mindfulness training in dyads and the entire group. Appendix IV provides a detailed description of each program session.

Basic mindfulness practice included mindfulness of bodily sensation and sense perception (i.e. breathing, whole body scan, and sounds), mindfulness of thoughts and emotions, and mindful movement (i.e. simple hatha yoga and walking meditation). Further, some mindfulness practices highlighted the attitudinal components of mindfulness more directly (i.e. ‘lovingkindness’ meditation and experiential exercise targeting acceptance towards uncomfortable emotions and sensations). Some mindfulness exercises were dyadic and focused on mindful communication. The aim of cultivating and strengthening students’ capacity to attend to experiences with a non-judgemental, curious, accepting attitude was common to all practices. Students were encouraged to integrate mindfulness in daily life, and practice mindful awareness in stressful situations.

Instructor qualifications. Both principal project managers (IS at Tromsø and MdV at Oslo) had received intermediate-to-advanced training for MBSR instructors from

staff at the Center for Mindfulness (CFM) at the University of Massachusetts Medical School. By 2010, both had previous experience in leading MBSR classes; IS and MdV had co-instructed five and eight MBSR classes, respectively. MdV had practiced mindfulness for 40 years. His co-instructors in three groups in Oslo included a young female psychologist and a male psychology student who had practiced mindfulness for 4 years. IS had practiced mindfulness for 6 years. Her co-instructors in Tromsø included a male psychiatric nurse, who had taken a mindfulness instructor course and practiced mindfulness for 20 years, and a female psychiatric nurse who was also an MBSR instructor (thought by the CFM) and had practiced for 10 years.

Program fidelity and compliance. Program consistency was ensured primarily via close cooperation between the two principal investigators, who led the classes in Tromsø and Oslo (IS and MdV) and had received training in delivering MBSR at the same institution (the CFM). They developed the course program in alignment with the original MBSR program and wrote detailed specifications of the content of each class. In addition, MdV developed a course book with specified home assignments in cooperation with IS, and both developed mindfulness CDs. Further, the principal investigators conferred on a weekly basis when running the first courses. Compliance was measured by noting class attendance and assessing the frequency and duration of formal mindfulness practice and the frequency of informal mindfulness practice (i.e. breath awareness and daily life mindfulness).

Measures

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

Mental health outcome measures. The 12-item General Health Questionnaire (GHQ-12) (Goldberg & Williams, 1988) was used to measure the extent of participants' mental distress. The instrument has been validated extensively and showed good psychometric properties in Norwegian university students (Nerdrum, Rustøen, & Rønnestad, 2006). The GHQ-12 measures discomforting subjective conditions experienced over the preceding few weeks and includes items such as 'Lost sleep over worry', 'Felt unhappy or depressed', 'Felt constantly under strain,' and 'Thought of yourself as a worthless person.' Cronbach's α for the scale was .90 in our sample.

Study stress was measured using the 13-item Perceived Medical School Stress (PMSS; Vitaliano, 1984) Scale. The scale has shown satisfying construct and predictive validity in medical students in Norway (Midtgaard et al., 2008; Tyssen et al., 2001a) and Germany (Kotter & Voltmer, 2013). The scale assesses different sources of study stress such as worry over academic competency and resilience; the perception of the medical school as competitive, cold, and threatening; and worries about finance and accommodation. The term 'medical' was removed from the terms 'medical school' and 'medical training', to accommodate psychology students. One item was adapted for cultural reasons, because it concerned elective periods and clerkship, which are irrelevant in Norway (Bramness, Fixdal, & Vaglum, 1991). Cronbach's α for the scale was .79 in our sample.

Burnout was measured using the 15-item student version of the Maslach Burnout Inventory (MBI-S) (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002). It covers three dimensions: emotional exhaustion, cynicism, and study efficacy. The seven response categories range from 0 (*never*) to 6 (*always*), yielding a total score range of 0 (no burnout) to 90. The MBI-S has been cross-culturally tested in students and has good psychometric properties (Schaufeli et al., 2002). The Norwegian version of the instrument has not been validated formally, and findings based on this measure could have been less reliable. However, principal component analysis showed satisfactory results (de Vibe et al., 2014), and Cronbach's α for the scale was .90 in our sample.

Subjective well-being (SWB) was measured using four items assessing cognitive life satisfaction and positive and negative affect (Moum, Naess, Sorensen, Tambs, & Holmen, 1990). The items have good psychometric properties (Røysamb, Harris, Magnus, Vittersø, & Tambs, 2002). Higher scores reflect increased SWB. Cronbach's α for the scale was .81 in our sample.

Trait mindfulness, coping, and compliance. Mindfulness was measured using the 39-item FFMQ, which has good psychometric properties (Baer et al., 2006). The questionnaire has been validated successfully in a Norwegian student population (Dundas, Vollestad, Binder, & Sivertsen, 2013). The facets and corresponding α values in our study included the ability to 'observe' (Cronbach's $\alpha = 0.78$), 'describe' (Cronbach's $\alpha = 0.89$), 'act with awareness' (Cronbach's $\alpha = 0.88$), and hold an attitude of 'non-judgement' of (Cronbach's $\alpha = 0.92$) and 'non-reactivity' to (Cronbach's $\alpha = 0.73$) inner experience. The five response categories range from 1 (never or very seldom true) to 5 (very often or always true). Higher scores indicate increased mindfulness.

Coping was measured using the 42-item Ways of Coping Checklist consisting of the five coping dimensions ‘problem-focused coping’, ‘seeking social support’, ‘self-blaming’, ‘avoidance’, and ‘wishful thinking’ (Vitaliano, 1985). Because of problems in replicating the original factor structure (Edwards & Baglioni, 1993; Kjeldstadli et al., 2006), principal component analysis was performed. Based on the results of this analysis, only three components were retained (de Vibe, 2014). The first, ‘problem-focused coping’ (Cronbach’s $\alpha = .79$), consisted of 14 items related to cognitive coping (i.e. identifying growth through adversity) and active problem solving. The second, ‘seeking social support’ (Cronbach’s $\alpha = .86$) consisted of nine items related to seeking help and advice, including three reverse-scored items pertaining to hiding one’s feelings and avoiding social contact. The third, ‘avoidance coping’ (Cronbach’s $\alpha = .82$) consisted of 17 items pertaining to blaming oneself, wishful thinking, and avoidance.

Student compliance was measured according to the number of classes attended (0–7), and the extent of home-based mindfulness practice. Mindfulness practice was assessed using three questions regarding the frequency of formal mindfulness exercises and informal mindful breathing and mindfulness in daily activities during the preceding 4 weeks, with six response categories ranging from 0 (*never*) to 5 (*daily*), and one question regarding the typical duration of practicing formal mindfulness exercises during the preceding 4 weeks, with six response categories ranging from 0 (*0 min*) to 5 (*>45 min*; range 0–30).

Covariates and demographic variables

Demographic variables included age, gender, marital status, number of children, study subject (medicine or psychology), study site, and student class. A time variable was calculated using the number of days from intervention completion to T1 questionnaire completion and included as a covariate in the pre-post effect analyses (Paper I).

Data analysis

All statistical analyses were performed using the IBM SPSS 19.0-22.0 statistical package. The randomization of participants ensured that intervention effects were not biased by selection effects. To ensure an unbiased comparison of participants, outcomes for all participants in the trial were analysed, irrespective of adherence or attrition, which is referred to as the intention-to-treat principle (Hollis and Campbell, 1999).

Analysing treatment effects. To evaluate the pre-post effects of the trial (Paper I), multivariate analyses of covariance (MANCOVAs) were performed to examine the multiple dependent variables measured at T1. Baseline measures were included as covariates to reduce unexplained or error variance. Bonferroni correction was applied to the α level to adjust for multiple testing. Class, study site, and university were tested as random factors in multilevel analyses. Missing data were imputed using the last observation carried forward procedure. This is a conservative method for imputation and has a high risk of estimation bias (Gueorguieva & Krystal, 2004). However, as data were missing for only 4% of participants at T1, with equal dropout rates in the intervention and control groups, and per protocol analyses yielded very similar results, estimation bias was deemed negligible.

Mixed-model analyses were performed to evaluate the longitudinal effects of the intervention (Paper II), using the restricted maximum likelihood estimation procedure and an identity covariance matrix. The restricted maximum likelihood estimation method uses all available data and is recommended for use in longitudinal models with missing data (Gueorguieva & Krystal, 2004). Correlations between repeated measures were accounted for by estimating a variance component for random intercepts for each participant. In the presence of significant time \times group interactions, planned comparisons were performed at specified time points, using least squared differences. If non-significant, covariates (age, study site [instructor effect], study field, and student class) were excluded in a backward fashion. To reduce statistical noise and increase the statistical power in the RCT design, the baseline score was included as a covariate (Egbewale, Lewis, & Sim, 2014). Because interaction terms have less power, some researchers recommend increasing the conventional α level of .05 to .1 (Twisk, 2006) to increase power. However, this could inflate type-1 error rates. Therefore, the α level was retained at the standard level of .05, and exact p -values are reported.

Mixed-effects models handle missing data under the assumption that data is ‘missing at random’ (MAR) or ‘missing completely at random’ (MCAR) (Twisk, 2006). If the quality of being missing depends on the missing responses themselves (i.e. being too anxious to complete the anxiety items), data could be defined as ‘missing not at random’ (MNAR). Missing values analysis was performed to examine the longitudinal data (i.e. the General Health Questionnaire [GHQ-12], SWB, coping scales, and the FFMQ) and indicated no statistically reliable deviation from randomness using Little’s MCAR test, $\chi^2 = 118$, $df = 100$, $p = .104$. Independent samples t tests were performed to

determine whether there were patterns of missing data and indicated no differences in baseline measures between dropouts at T3 and completers. Therefore, relying on ‘substantive reasonableness’ (Little & Rubin, 2002), we assumed that data were missing at random.

Size and significance of effects. To assess the magnitude of improvement, effect sizes were estimated to determine the differences in effects between groups. Pre-post Hedges’ *g* effect sizes were calculated by estimating the standardized between-group mean difference based on mean change scores from T1 to T2. For the longitudinal effects, Cohens’ *d* effect sizes were calculated using means, variance, and covariance estimates derived from the mixed-model analysis (i.e. the estimated mean difference was divided by the square root of the sum of the variance minus two times the covariance estimate at each relevant time point). The two types of effect size are similar (details provided in Paper I) and were interpreted as small (.2), moderate (.5), and large (.8) according to the suggestions made by Cohen (1988). To obtain an indication of the clinical significance of pre-post changes found in mental distress (Paper I), we calculated the ‘number needed to treat’ (NNT), depicting the expected number of people who should participate in the intervention for one person to have a specified effect (Nuovo, Melnikow, & Chang, 2002).

Moderation and predictor analyses. Gender was included as a factor in both the MANCOVA and mixed-model analyses and allowed to interact with the group (Paper I and II) and time (Paper II) factors. Intervention adherence and the duration of home-based practice were examined as predictors of short-term effects using multiple linear regression analyses (Paper I). Further, the frequency and duration of home-based practice were examined as predictors in the mixed-model analysis (Paper II). Non-significant interactions were deleted in a stepwise backward fashion.

Mediation analyses. Mediation analyses were performed to examine increased mindfulness as a causal mechanism of long-term effects. Mediation analyses can be conducted when there is a relationship between the predictor (Group) and mediator (self-reported mindfulness) as well as between a mediator and a dependent variable (outcome; Kazdin, 2007). Mediation occurs when the strength of the direct relationship between predictor and outcome is reduced when the mediator is entered into the analysis (Hayes, 2013). A non-parametric bootstrapping approach was chosen to test the significance of indirect effects. Relative to popular mediation procedures, such as the causal steps approach or Sobel test, the bootstrapping approach has greater statistical power and more accurate Type I error rates and does not rely on the assumption of normality, yielding a

more robust measure of the significance of the mediatory effect (Hayes & Little, 2013; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Preacher & Hayes, 2004). As suggested for longitudinal mediation analysis with an RCT design, the covariance method adjusting for baseline values was used (Roth & MacKinnon, 2013).

For basic mediation models where the indirect and the direct effect have the same direction, the traditional mediation effect size measure is recommended (i.e. the ratio of the indirect effect to the total effect; Wen & Fan, 2015). Thus, the amount of variance explained by the mediator was calculated by using this measure.

Qualitative Study (Paper III)

While the observer perspective in natural sciences seeks empirical explanations of phenomena in which subjective experiences are set aside, the participatory humanistic perspective seeks an understanding of these subjective experiences (i.e. participants' motives, reasons, life worlds, and interpretations). Importantly, neither of these perspectives is self-sufficient or adequate; it is arguably neither possible nor desirable to study the human being as either an object or a subject (Okasha, 2002). However, in mindfulness research, which mirrors psychological science more broadly, quantitative outcomes have been preferred over the phenomenology of experience (Brito, 2014). For example, in 2011, only 2% of mindfulness research publications were qualitative (McCown, 2013). A qualitative study was conducted to deepen understanding of the qualities and processes involved and provide a richer description of experiences in mindfulness training.

Sample and procedure

The qualitative research was conducted in the context of the RCT and involved both individual and group interviews with students allocated to the intervention group. Before the first program session, the Tromsø students were invited to participate in individual trial interviews a week prior to the intervention and subsequent in-depth interviews approximately one month after the intervention. Ten students participated in these interviews (four were men, and three were psychology students). Students were interviewed by IS at the University of Tromsø. After the intervention concluded, students in Oslo were invited to participate in focus group interviews. Twelve students agreed to participate (two were men, and four were medical students). IS and TEE conducted two focus group interviews at the University of Oslo. All interviews were semistructured and

involved probing to create an explorative dialogue regarding how students experienced learning mindfulness and related it to different domains of their lives. Interviews were audio-recorded and transcribed verbatim. Informed written consent was provided separately for the qualitative study. More information about these procedures is provided in Paper III, and interview protocols are included in Appendix V.

Methodological approach and data analysis

The qualitative analyses were performed within a constructivist-interpretivist paradigm (Ponterotto, 2005). This paradigm is concerned with exploring how language constructs reality and truth in different context-specific settings and assumes that meaning and new understanding emerge through reflection stimulated by researcher-participant interaction and dialogue. Interpretative phenomenological analysis (IPA) is located within this constructivist-interpretivist paradigm (Smith, 2003). IPA is a version of the phenomenological method and seeks to explore participants' lived experiences and means of making sense of their worlds. IPA is also connected to hermeneutics and acknowledges that the researchers' world views are implicated in and preconditions for the interpretation of participants' accounts. Therefore, IPA aims to untangle the meaning of participants' accounts through interpretative engagement, while considering how social and cultural context influences the construction of meaning, for both researchers and participants (Smith & Eatough, 2007; Willig, 2001). Interpretative engagement is facilitated by a series of steps in which themes are identified and merge into master themes, first within and then across cases. Data analysis was performed in five steps: (a) the two primary investigators discriminated preliminary units of meaning in five (focus group and in-depth) interviews; (b) meaning units were abstracted into broader themes and overarching concepts; (c) the themes and preliminary conceptual models were validated and adjusted by examining the remaining seven interviews, looking for commonalities as well as idiosyncratic experiences; (d) the fourth author triangulated analyses by reading transcripts and discussing conceptual models; and (e) the whole research team contributed to the final organization of the themes. Further details of the analytic procedure can be found in Paper III.

Research team and reflexivity

To ensure increasing transparency and credibility in the findings, qualitative researchers are advised to describe their identities, assumptions, and personal interest in the research topic (O'Brien, Harris, Beckman, Reed, & Cook, 2014; Tong, Sainsbury, &

Craig, 2007). In the current qualitative work, the research team consisted of seven researchers with professional backgrounds in clinical psychology (IS, HH, JHR, OF), behavioural medicine (MdV, TS), and philosophy (TEE). Some were experts (HH, JHR, TS) and others had intermediate (IS, TEE, OF) or limited (MdV) experience in conducting qualitative research. Two were women (IS and HH), and ages ranged from 30 to 69 years. Two researchers (IS and MdV) engaged in personal meditation and MBIs professionally and one (TEE) had a long-standing meditation practice but was not teaching MBIs.

My personal and theoretical assumptions lean towards the belief that mindfulness training has potentials to foster self-understanding, compassion, and a capacious relation to psychological experience. At the same time I was interested in the complexities involved in introducing mindfulness practice through an MBSR format in educational contexts, and with how the cultural popularization of mindfulness add to this complexity. I was also concerned with the potential of mindfulness in promoting the art of caring for others. This made me more prone to exploring such associations and increased the demand to challenge these assumptions when talking to students and interpreting the data. The collaborative work of the larger group of researchers facilitated such reflection. The combined roles of researcher, instructor, and interviewer are discussed in the Strengths and Limitations section.

Results

Paper I

Mindfulness training for stress management: A randomised controlled study of medical and psychology students.

This study aimed to evaluate the effectiveness of a 7-week MBSR program for medical and clinical psychology students, in the following self-report outcomes: mental distress measured via the GHQ-12, study stress measured via the PMSS Scale, burnout measured via the Maslach Burnout Inventory-Student Version, subjective well-being measured via the Subjective Well-Being (SWB) Scale, and mindfulness measured via the FFMQ.

An RCT, involving 288 students who were allocated to either an intervention or inactive control group, was conducted. Self-report measures were gathered by blinded assessors before and after the intervention. Primary analyses were performed to examine data from the intention-to-treat sample, using MANCOVA.

Results indicated that the intervention exerted a moderate effect on mental distress (Hedges' g : 0.65, CI = .41, .88) and a small effect on subjective well-being (Hedges' g : 0.40, CI = .27, .63) and the mindfulness facet, 'non-reactivity' (Hedges' g : 0.33, CI = .10, .56). Class attendance and the duration of mindfulness exercises predicted changes in mental distress and non-reactivity. The NNT for mental distress was 4, indicating that for one student to move from above to below the cut-off point for mental distress, four individuals would need to receive the intervention. Analyses that included gender revealed that only female students reported significant effects, and women also reported reduced study stress and an increase in the mindfulness facet 'non-judgment.' There were no significant differences in burnout between groups. Intervention effects did not vary according to university location, course instructors, or type of study.

In conclusion, the intervention could be effective in reducing mental distress and enhancing well-being and mindfulness attitudes, particularly for female students. Further studies are needed to examine the role of gender.

Paper II

Long-term mental health effects of mindfulness training: A 4-year follow up.

Longitudinal research examining the distal and enduring impact of MBIs is scarce. This study sought to determine whether the mental health effects of a 7-week MBSR intervention were maintained at 2 and 4-year follow up, meditation practice predicted outcomes, and changes in mindfulness scores mediated potential long-term effects.

Participants from the RCT (Paper 1) provided 2- and 4-year data for this study. During the follow-up period, the MBSR group was offered optional booster sessions semi-annually. Outcomes were those that had shown significant intervention effects at post-intervention assessment (the GHQ-12, SWB, and FFMQ Scale; Paper I), and coping (Halland et al., 2015) assessed using the Ways of Coping Checklist. Predictors included the frequency and duration of meditation practice. Gender interactions were also explored. Primary analyses were performed for the intention-to-treat sample, using linear mixed models, and mediation analyses were performed using the bootstrapping approach.

Intervention effects were observed for mental distress, mindfulness, avoidance, problem-focused coping, and trait mindfulness up to 4 years after the intervention. Between-group effect sizes were small (Cohen's $d = 0.23-0.42$). The frequency, $F(5, 621) = 6.12, p < .001$, and duration, $F(5, 599) = 2.35, p < .05$, of meditation practice positively predicted mindfulness scores but not coping or mental distress scores. Increases in mindfulness scores from pre- to post-intervention significantly mediated long-term intervention effects on mental distress, avoidance, and problem-focused coping. Small effects on subjective well-being and seeking social support were not maintained at follow up. Intervention effects did not vary according to gender. During the follow-up period, the control group reported increased use of meditation practice, increases in mindfulness scores and adaptive coping, and stable mental distress.

This was the first RCT study to document the 4-year program benefits of a 7-week MBSR intervention for mental distress and coping, mediated by enhanced mindfulness. MBSR could foster longer-term resilience, in terms of reduced reactivity, mental distress, avoidance, and increased problem solving, in high-performing students.

Paper III

Medical and psychology students' experiences in learning mindfulness: Benefits, pitfalls, and paradoxes.

The study explored participants' experiences with and conceptualizations of mindfulness after participation in a 7-week MBSR program. Two focus-group and ten in-depth interviews were conducted with 22 students after the intervention. Interpretive phenomenological analysis (IPA) was performed to examine the interviews.

Two overarching, interrelated themes were identified: (a) 'Understanding mindfulness', which included the ways in which students conceptualized mindfulness and their intentions in learning mindfulness, which ranged from 'instrumental' and 'ambiguous' to 'comprehensive' conceptions; and (b) 'engaging with mindfulness', which involved experiences related to the journey of learning mindfulness according to four subcategories: 'relaxation and concentration', 'containing difficult thoughts and emotions', 'self-acceptance', and 'broadening perspectives in interpersonal relationships'.

The themes suggested that the experience of mindfulness was partially mediated by intention and interpretation in mindfulness training. While all students reported increased awareness of psychological and bodily phenomena, many also reported a shift in orientation towards experience associated with reduced reactivity, increased affect-tolerance and self-acceptance, and improved relational qualities. A broader range of benefits appeared dependent upon grasping the paradoxes inherent in mindfulness practice, particularly with regard to attitudinal qualities such as radical acceptance and non-striving. A cultural framework that valued symptomatic relief, performance, and self-optimization could have added to the challenges faced in inhabiting such attitudes.

The findings emphasized the importance of intention and attitude in the process of learning mindfulness. In so far as challenges and paradoxes in learning mindfulness are acknowledged and addressed, mindfulness training could provide a promising avenue for fostering personal qualities that healthcare professionals' need.

Discussion

The findings of this thesis suggest that MBSR could be an efficient and acceptable intervention for medical and psychology students. Data from the RCT (Paper I) showed that mental distress, subjective well-being, and the mindfulness facet non-reactivity in participants who received the MBSR intervention showed greater improvement relative to that observed in those in the control group. Only female participants benefitted significantly, and they also showed effects on study stress and the mindfulness facet non-judgement. These improvements are supported further by the longitudinal data (Paper II) indicating enduring intervention effects for up to 4 years for mental distress, trait mindfulness scores, and the use of adaptive coping skills, regardless of gender. Effect sizes were small to moderate (Papers I & II). Mediation analyses indicated that pre-post changes in mindfulness scores mediated the long-term effects on mental distress and problem-focused and avoidance coping. The frequency and duration of meditation exercises predicted mindfulness scores (Paper II). The qualitative exploration of the subjective experience of a subset of participants (Paper III) highlighted the benefits and complexity of learning mindfulness, particularly in developing attitudinal qualities of mindfulness such as acceptance, affect-tolerance, non-striving, and non-judgement. The extent of the integration of these qualities appeared to be associated with the breadth and depth of program benefits, which should be considered when delivering MBIs in the context of healthcare education programs.

Taken as a whole, these results add to the growing body of research in support of MBIs, indicating that taking a non-reactive, present-moment-oriented stance towards psychological content may reduce mental distress and foster adaptive coping and accepting self-relation. The enduring impact of the intervention on mental distress, mindfulness scores, and coping skills indicate that mindfulness training could prevent high levels of distress and burnout observed in the helping professions.

Main Findings

The results of the RCT (Paper I) were consistent with previous research examining MBSR in students and healthcare professionals, as they demonstrated moderate between-group effect sizes for mental distress and subjective well-being (Jain et al., 2007; Khoury et al., 2015; Rosenzweig et al., 2003; Shapiro et al., 2007; Shapiro et al., 1998). For one student's mental distress to decrease to a subclinical level, four individuals would need to receive the intervention (NNT), which indicates that the intervention was clinically significant in our sample. The proportions of students whose scores exceeded the cut-off

score for mental distress at baseline were 36.5% for women and 25.6% for men, which were higher relative to those of 22.9% and 16.2%, respectively, in a large Norwegian survey involving first-year undergraduate students from different faculties (Nerdrum et al., 2006). Our findings converge with those of research documenting higher levels of distress in medical students relative to those observed in age-matched peers (Dahlin, Joneborg, & Runeson, 2005; Dyrbye et al., 2010; Maher et al., 2013). The enduring intervention effect on mental distress was therefore encouraging (Paper II). Effect sizes decreased from medium to small in size for mental distress (Paper II), which was expected based on modest findings in previous studies involving 1- to 2-year follow up (Fjorback et al., 2013; Henderson et al., 2012; Shapiro et al., 2011).

The terms ‘generation perfect’ and ‘generation performance’ are used frequently in Norwegian media to characterize the generation of young people who participated in the study (Rødevand, 2015; Sørensen, 2014). This alludes to the dominance of sociocultural norms of mastery and performance and the imperative to succeed across multiple life domains, which are fuelled by social and mainstream media (Chen & Lee, 2013). Some students in the qualitative study (Paper III) highlighted such norms and the pressure to live up to them. Mindfulness training was experienced as an arena for connecting with body sensations and needs and taking a more accepting stance towards oneself and ones’ mental processes. This theme has also been observed in other studies involving healthcare professionals (Beckman et al., 2012; Irving et al., 2014). Mindfulness practice involves recognizing and observing one’s self-stories and evaluations without buying in to, holding on to, or arguing with them. Such detached observation could, for brief moments, reduce identification with such stories and identities and lessen the need to criticize, optimize, or defend the self. As young, high-achieving medical and psychology students, learning to relate to high external and internalized demands in a balanced way could serve as an important buffer against elevated levels of stress and mental distress.

The ability to experience even very discomforting states as shifting patterns of thoughts and sensations counteracts both experiential avoidance and overengagement and is proposed to be a core component underlying the effects of MBIs (Brown et al., 2007; Shapiro et al., 2006). The results of the mediation analyses (Study III) and enduring intervention effects on the non-reactivity mindfulness facet provide further support for these processes. The small and enduring intervention effect on avoidance coping supports this notion and indicates a reduction in maladaptive coping strategies such as self-blame; denying stressful situations; or avoiding strain through the use of food, alcohol, drugs,

and sleep. Qualitative accounts from Paper II also support these findings, as some participants reported that attending to experiences more consciously and with acceptance made it possible for them to contain strong emotions and negative thought processes and respond more flexibly and adaptively in adverse situations. The reduced levels of experiential avoidance and reactivity could encourage people to seek out meaningful, value-consistent activities, despite the discomfort they might induce, and help to expand the range of coping skills used in the face of stressors. The intervention effect on problem-focused coping aligns with such notions, as the scale includes items related to both active problem solving (i.e. active attempts to resolve the stressor through planning and implementing solutions) and cognitive coping (i.e. cognitive reappraisal of stressful events, identifying growth through adversity, and new ways of looking at the situation). Similarly, qualitative accounts (Paper III) indicated that mindfulness practices facilitated a reappraisal of stressful situations for some students. Although cognitive restructuring is not a target in MBIs, positive reappraisal and a sense of coherence have been shown to increase following MBIs (Dobkin & Zhao, 2011; Garland, Gaylord, & Fredrickson, 2011; Henderson et al., 2012; Matousek & Dobkin, 2010; Weissbecker, Salmon, Studts, Floyd, Dedert & Septhon, 2002), and these increases have been shown to mediate the effects of MBIs on psychological health (Carmody, Baer, Lykins, & Olendzki, 2009; Garland et al., 2011).

Some issues serve to temper these encouraging results. The effects on students' stress (Paper I) were weaker relative to those reported in meta-analyses documenting large (Khoury et al., 2015) and moderate (Regher et al., 2014; Burton et al., 2016) reductions in stress in non-clinical populations following MBIs. The low baseline levels of study stress relative to those observed in another study involving Norwegian medical students using the same measure (Holm, Tyssen, Stordal, & Haver, 2010) could indicate a 'floor' effect, which would account for the lack of overall intervention effects on study stress. A floor effect could also have accounted for the lack of longitudinal intervention effects on study stress (unpublished) and subjective well-being (Paper II). While previous studies have shown increasing levels of stress and mental distress (Ludwig et al., 2015; Moffat, McConnachie, Ross, & Morrison, 2004; Niemi & Vainiomaki, 2006), and reduced well-being (Kjeldstadli et al., 2006) and use of engagement coping (Tyssen et al., 2001a) during medical school, in the current research, the levels of stress and distress remained stable over time in the control group, adaptive coping increased, and women showed increased levels of well-being.

Similarly, no pre-post effects were observed on student burnout (Paper I), contrary to findings from non-controlled mindfulness studies documenting small effects in physicians (Regehr et al., 2014) and non-clinical populations (Khoury et al., 2015). Unpublished longitudinal data indicated a continuous lack of intervention effects on burnout, because levels were stable over the 4-year period in both groups, while previous studies indicated increasing levels of burnout during medical school (Dyrbye, Thomas, Huntington, et al., 2006; Galán, Sanmartín, Polo, & Giner, 2011), which provides further support for the possibility of a floor effect in our longitudinal findings.

No longitudinal effects were observed on seeking social support, as both the intervention and control group showed an increase in this coping variable at follow up. Therefore, the intervention did not exert a wide-ranging impact on all coping variables, which is consistent with the results of previous research (Henderson et al., 2012; Sear & Kraus, 2008; Tacon et al., 2003; Witek-Janusek et al., 2008). Questions remain about the specificity of mindfulness training on different coping strategies.

The presence of a contamination effect could not be ruled out, as the control group also showed increasing levels of mindfulness practice over time and increases in self-reported mindfulness scores, which were positively predicted by levels of practice (see details in Paper II). The exclusion of 37 students from the control group, who reported having undertaken mindfulness training during the follow-up period, did not significantly affect the results. Nevertheless, the indication of treatment contamination suggests that the present study sample could have been selective; many students could have volunteered for mindfulness, and those allocated to the control group might have attempted to pursue mindfulness on their own. This could also have contributed to the ‘floor effect’ and increased the difficulty in detecting longitudinal intervention effects.

Interpersonal Mindfulness

Some students reported that mindfulness practice promoted emotional exploration and containment and increased self-acceptance (Paper III). The increases in non-reactivity and non-judgement also indicated an attitudinal shift (Papers I & II). These mindfulness facets have been defined as indirect measures of emotional competency central to empathy (Lamothe et al., 2016), associated with greater therapist empathy (Keane, 2014), and positively correlated with self-compassion (Kingsbury, 2009). In turn, self-compassion has been associated with empathic concern (Neff & Pommier, 2013), converging with research documenting that therapists’ self-affiliation positively predicted patient outcomes (Nissen-Lie et al., 2015). Some students in the qualitative study explained how

tuning in to their sensations and feelings in a mindful way increased their ability to attune to others with presence, curiosity, and patience and reduced the tendency to strive for a particular goal with the social interaction. Together, these findings provide some support for the hypothesis that mindfulness training can be experienced as a means of internalizing attitudes and qualities associated with empathic interaction with others. However, it should be noted that many of the students in the qualitative study did not elaborate on the relevance of mindfulness to their personal or professional relationships. This finding differs from the body of qualitative research documenting substantial interpersonal benefits for therapeutic capabilities in healthcare professionals/trainees (Morgan et al., 2015) but is consistent with the relatively uncertain evidence regarding mindfulness and patient outcomes reported in two reviews (Davis & Hayes, 2011; Escuriex & Labbe, 2011). Future analyses of self-report empathy assessed in the current sample should elucidate this issue, but this was beyond the scope of the current research. However, preliminary analyses of pre-post data indicated a lack of effect on this outcome (de Vibe, 2014), mirroring the findings of a recent RCT with general practitioners using the same outcome measure (Verweij et al., 2016). Of note, only one of seven MBSR sessions directly thematized interpersonal mindfulness and mindful communication exercises. Thus, health care trainees could benefit from interventions emphasizing the interpersonal dimensions of mindfulness training to a greater extent.

Gender and Sub-Group Variation?

Contrary to the findings of a meta-analysis (Sedlmeier et al., 2012), RCT results (Paper I) indicated that women received greater benefit from the intervention relative to that observed in men. Another RCT reported a similar pattern (Kuyken et al., 2010). However, as in our study, few men participated in the treatment condition, and these findings should be interpreted with caution. Gender effects did not prevail in the long-term follow-up data (Paper II). Baseline analyses indicated that men's scores for mental distress and study stress were lower relative to those observed in women (Paper I), echoing patterns in previous research involving Nordic medical students (Dahlin et al., 2005; Nerdrum et al., 2006; Nes, Roysamb, Tambs, Harris, & Reichborn-Kjennerud, 2006; Tyssen, 2001, 2007). The gender difference in mental distress continued in the control group at 2-year follow up. We also found that students with a higher level of self-reported mental health vulnerability in terms of neuroticism received greater benefit from the intervention relative to those with lower levels, and the prevalence of this trait in women was greater relative to that observed in men (de Vibe et al., 2015; Halland et al.,

2015). Our qualitative data corresponded with these findings, as they indicated that being in contact with emotional challenges and stressors in life motivated participants to engage in mindfulness practice and appeared to be associated with richer program benefits. Psychology students showed higher levels of self-report mindfulness relative to those observed in medical students across groups (Paper II). The interview data (unpublished) also indicated that the three male *psychology* students joined the female majority in valuing the MBSR-related notions of acceptance, self-care, and self-insight. Conversely, the three male *medical* students tended to consider mindfulness a tool to improve performance or achieve relaxation. One of these students also cited masculinity norms of emotional toughness as a reason for feeling uncomfortable about disclosing personal issues in mindfulness classes. These cases anecdotally illustrate how the combination of gender and subcultural position could offer somewhat different possibilities for experiencing and viewing the world, including the experience of ‘learning mindfulness.’ They also emphasize the role of language in teaching mindfulness. For instance, action-oriented language framing mindfulness training as a tool to improve performance or a means of ‘training the muscle of attention’ was intentionally used in a mindfulness trial involving fighter pilots (Meland, 2014) and could appeal to masculinity norms, and contrast the emotion-oriented, self-exploring language used in the current intervention. The negotiation and construction of ‘mindfulness’ in the unique settings of intervention delivery and its impact on engagement across subgroups is an interesting and underinvestigated line of empirical inquiry.

Mediation and Mechanisms

The small between-group effect sizes in non-reacting (and non-judgement for women) were consistent with previous research examining MBSR in healthy individuals (Khoury et al., 2015). However, to our knowledge, our study is the first to document longitudinal MBSR intervention effects on self-reported mindfulness (Paper II). Moreover, no previous studies involving the helping professions have employed mediation analysis to assess the hypothesized relationship between increased mindfulness and psychological outcomes (Lamothe et al., 2016). Short-term studies involving undergraduate students or the general population documented that mindfulness mediated intervention effects on cognitive reactivity, emotion regulation, and negative and positive affect (Bergen-Cico, Possemato, & Cheon, 2013; Keng, Smoski, Robins, Ekblad, & Brantley, 2012; Raes, Dewulf, Van Heeringen, & Williams, 2009; Snippe, Nyklicek, Schroevers, & Bos, 2015). Our findings are consistent with those of these studies and indicate that increased post-

intervention mindfulness partly mediated long-term intervention effects on mental distress (at 2-year follow up) and coping (at 4-year follow up). The temporality of the data (i.e. change in mediator precedes change in outcome) allows for stronger conclusions regarding causality and suggests that the effects of MBSR cannot be reduced to ‘non-specific’ effects, such as support from group leaders, strengthening relationships with peers, or expectancy, but could be partly explained by increases in the target intervention component, mindful disposition. Future research could disentangle the roles of unique mindfulness facets in mediation analysis, which could serve to increase understanding of the most important processes of change. To make our analytic procedures as parsimonious as possible, however, we chose to use only the total score of the FFMQ as mediator in Paper II. Still, the fact that only non-reactivity showed an enduring effect indicates a particular role for this mindfulness attitude in the effects observed in our sample. This converges with evidence documenting this specific mindfulness facet’s role in predicting and mediating psychological health in both novices and experienced meditators (Curtiss & Klemanski, 2014; Desrosiers, Klemanski, & Nolen-Hoeksema, 2013; Desrosiers, Vine, Curtiss, & Klemanski, 2014; Josefsson et al., 2011). While requiring replication, our findings suggest that the influence of automatic processes could be reduced in a modest but enduring fashion following mindfulness training, facilitating enhancement of the ability to cope with stressors and reduce levels of mental distress.

A related assumption is that regular mindfulness practice is a key factor driving the clinical changes observed in MBIs. To date, empirical findings regarding this relationship have been contradictory (Gotnik et al., 2015; Eberth and Sedlmeier, 2012; de Vibe et al, 2012; Vettese et al., 2009), perhaps because of heterogenic methods used to measure practice. Our studies (I–III) converge in suggesting that actual engagement in formal mindfulness practice influences the experience of program benefits. In the qualitative study (Paper III), students with high levels of engagement in mindfulness practice typically reported more comprehensive conceptions of mindfulness and experiences of enrichment of several areas of their lives through mindfulness qualities relative to those with low engagement levels. Minutes spent practicing mindfulness moderated the pre-post intervention effects on mental distress and non-reactivity but not those on subjective well-being (Paper I). Further, the duration and frequency of mindfulness home practice predicted mindfulness scores over 4 years across groups (Paper II) but did not predict mental distress or coping scores, which is consistent with a previous report documenting a decline in the predictive role of meditation practice over time (Carlson, Speca, Faris & Patel, 2007). These modest findings could be explained by

low levels of adherence to formal meditation practice, which decreased additionally during follow up. Further, while class attendance during the intervention was high (average attendance: 5.3/7 sessions) and moderated intervention effects on mental distress, almost half of the students declined to participate in the subsequent booster sessions, and booster session attendance did not predict long-term outcomes. Unsystematic feedback from students indicated attendance difficulties, as the sessions were arranged irregularly and students were off campus periodically. However, this low rate of booster session attendance could also indicate waning motivation to practice mindfulness. Greater engagement in practice in both the short and long term could have provided more robust results.

However, the provision of concrete exercises could induce an increased sense of manageability and perceived control of stress symptoms, even if the exercises are used infrequently. One participant in the qualitative study testified to this, stating, 'I haven't practiced exercises much since I am not currently stressed...but I like to think of mindfulness as a tool that I can use when (stressful) times come'. In addition, the intervention included teaching and experiential exercises that explored the psychophysiology of stress, the value of self-acceptance, tolerance of thoughts and feelings, and notions such as 'being on autopilot' and 'I am not my thoughts'. These notions do not rely on repeated formal mindfulness practice to remain valuable. Two recent meta-analyses observed no difference in post-intervention trait mindfulness between active control conditions and mindfulness interventions in six and four RCTs, respectively (Goyal et al., 2014; Visted et al., 2015) raising questions as to the optimal promotion of processes such as mindfulness. Some authors discuss whether MBIs offer something qualitatively new or can be viewed as an extension of other therapeutic approaches such as the CBT framework (Arch & Craske, 2008), humanistic and existential psychology (Dryden & Still, 2006; Harris, 2013), mentalization-based and psychodynamic therapy (DelMonte, 2012; Masterpasqua, 2016), and narrative therapy (Percy, 2008). A salient clinical research question is that of whether MBSR would be as effective with less emphasis on personal mindfulness practice, and conversely, whether the inclusion of mindfulness practice would improve other therapy or interventions.

The Paradoxes of Mindfulness

The interview study (Study III) revealed diversity in intentions in and conceptions of learning mindfulness, influencing the extent of engagement with practice and the range of program benefits. Positions of understanding ranged from approaching mindfulness

primarily as a set of tools to help with concentration enhancement or relaxation, to considering mindfulness training comprehensively, as a way to engage in intra- and interpersonal exploration. The latter tended to be associated with greater engagement in practice and a broader range of experienced program benefits relative to those observed for the former. In a meta-ethnography synthesizing qualitative research regarding patients' experiences with mindfulness (Malpass et al., 2012), the ability to let go of expectations and set goals in the initial phases of meditation was a prerequisite for progression to phases identified as the therapeutic processes of mindfulness. Our data complement these findings and suggest that integrating mindfulness attitudes (i.e. a non-striving, accepting stance) during practice is an ongoing challenge and complex process.

The non-instrumental, non-striving nature of mindfulness practice induces confusion easily, as both clinicians and participants typically act to reduce symptoms or achieve a defined goal. Further, by cultivating radical acceptance of psychological phenomena, the impact of symptoms may change passively, inducing salutogenic effects. This paradox could contribute to misconceptions regarding what mindfulness 'is about' or how it works (Sauer et al., 2011). For instance, most students noted that mindfulness practice promoted relaxation at times, which was attributed to a shift from immersion in thoughts to greater connection with the body, senses, and present-moment experience. However, in taking a more instrumental approach and aiming to achieve this relaxed state, rather than remaining receptive towards moment-to-moment experience, the process of meditation could become tense or confusing. Some regarded the practice a failure, while others realized that having an agenda was the origin of their struggle. Carl Rogers recognized this complexity by stating, 'The curious paradox is that when I accept myself just as I am, then I can change' (Rogers, 1961, p.17). Even in intellectual appreciation of the notions of mindfulness attitudes, such as acceptance and non-reactivity, embodying these qualities and grasping the dialectics involved in mindfulness training remained challenging. As one participant stated, 'acceptance is a good idea, but you need to take it all the way inside you'. A central didactic task involves continuous stimulation of awareness of and curiosity about the intentions and attitudes in practice and how they colour moment-to-moment awareness.

Defining Mindfulness Revisited

These common challenges may not be of only didactic concern but also reflect a tension between the pedagogy and science of MBIs. Science aims to reduce vastly complex phenomena to more simple norms, rules, formulas, or models. However, this

reductionism becomes problematic if it neglects important elements of the phenomenon it seeks to explain. By using cause-effect, action-oriented, mechanistically connoted language⁴ (i.e. outcome/effect, symptom reduction, and emotion regulation), most existing research literature downplays or blurs the inherently dialectical, paradoxical, non-instrumental processes and qualities involved in mindfulness training. This could contribute to confusion regarding the nature of mindfulness in the rapidly growing number of professionals and laypersons interested in MBIs and consuming such research literature, or translations thereof, delivered via the media. Fundamentally, even the drive for outcomes in mindfulness research establishes tension regarding the abandonment of desired outcomes key to the pedagogy of MBIs (McCown, 2013). Therefore, learning mindfulness in the context of an RCT could have reinforced participants' instrumental intentions and efforts to achieve particular outcomes.

Further, as discussed in Paper III, the current cultural context centres on individuals and their responsibility for attaining a 'perfect life' by consuming products and 'quick-fix' services. This is in contrast to the intention to use MBSR as an invitation to come to terms with the shared human pain and suffering in life, increasing compassion for oneself and others. Moreover, the healthcare systems in this cultural context tend to value performance and symptom reduction at the expense of more humanistic or existential values (Binder, Holgersen, & Nielsen, 2010). However, the influence of broader contextual values on the process of learning mindfulness are discussed infrequently in the current literature.

Some recent attempts to re-define mindfulness could assist both clinical and scientific enterprises by broadening the understanding of mindfulness. As a counterpoint to viewing mindfulness as measurable mind states (or brain states) that participants achieve individually, 'delivered' through the teacher, McCown (2013) defines mindfulness as a relational achievement of the gathering of teachers and participants, as follows: 'What is said and done in the classroom is actually the definition of mindfulness that the participants co-create and work with from moment to moment and session to session' (p. 196). A relational, dynamic view of mindfulness underlines how definitions

⁴ For instance, the concept of emotion regulation is frequently defined as a core process or 'mechanism' involved in mindfulness training, as in the current work. The word, regulate, originated from the Latin word *regula*, which means 'rule', and synonyms include control, adjust, manage, modulate, tune, supervise, oversee, police, superintend, monitor, direct, guide, govern, rule, and order (Waite, 2005). However, as already alluded to, mindfulness practice can be understood as the opposite of controlling, modulating, and ruling emotion and as a second-order change in relationships with emotions regarding an openhearted receptivity, which can passively promote the experience of emotions as 'tolerable', which scientific, psychological language translates as 'adaptively regulated'.

of mindfulness are always historically and contextually situated and negotiated in the group process, through images, metaphors, meditation guidance, textbooks, the use of words, and vocal expression. This definition of mindfulness encourages the use of qualitative research enterprises (McCown, 2013) to study group processes, the teacher-participant relationship, and individuals' construction of mindfulness in a given sociocultural context.

Grossman (2015) advocates for a reversal of emphasis from cognitive (i.e. attention, concentration, and consciousness) to attitudinal (i.e. openness, acceptance, kindness, curiosity, generosity, compassion, patience, and courage) elements of mindfulness and defined mindfulness as 'an act of unbiased, openhearted, equanimous experience of perceptible events and processes as they unfold moment to moment' (p. 18). Consistent with our findings (Papers I–III), this definition of mindfulness could help to communicate the centrality of the attitudinal component of mindfulness, which is a pedagogical concern. Grossman argues that these virtuous attitudes play a central role as ethical qualities in the world's major religions; this could also be true for many philosophical ethical systems, such as virtue ethics and stoic philosophy. However, rather than remaining an abstract idea or moral imperative, mindfulness practice serves as a concrete invitation to evoke virtuous attitudinal qualities towards immediate experience and explore the influence of their absence or presence on experience at any given moment. Grossman therefore conceptualizes mindfulness as awareness informed by embodied ethics. Ultimately, this method of formal practice aims to strengthen the habits of eliciting these attitudinal qualities in everyday life and interactions with others and nature (Grossman, 2015).

We regard this argument as a pragmatic position in the debate regarding the role of ethics in contemporary MBIs. Some authors defend the potential importance of explicit incorporation of ethical considerations into MBIs inspired by Buddhist ethics (Monteiro, Musten, & Compson, 2015), while others warn against imposing Buddhist ethics onto people who do not necessarily accept them, in secularized mindfulness interventions (Davis, 2015; Lindahl, 2015). Recognizing these tensions, Davis (2015) argues that there is a need for dialogical practices exploring those values and convictions, which participants and instructors bring to MBI courses. Grossman's' definition of mindfulness in terms of basic ethical virtues, which are neither determined by metaphysical beliefs nor premised on a Buddhist vocabulary, could serve as a fruitful starting point for such dialogue.

Limitations and Strengths

Several limitations should be noted. Self-selection of 40% of the eligible students could have decreased the external validity of the findings, as these students are likely to have been particularly interested in mindfulness and/or more stressed relative to the remaining student population. Therefore the results might not be generalizable to students who are less motivated to learn mindfulness. The findings indicating that the control group showed increasing levels of mindfulness practice over time and 37 students' participated in various mindfulness courses during the follow-up period suggest a selective sample, in that many students might have registered in the hope of receiving mindfulness training and attempted to seek mindfulness alone when randomized to the control group. It is also possible that the students in the intervention group inspired classmates in the control group to initiate practice, and randomizing students within each class, rather than choosing separate classes for the intervention and control groups, could have increased the risk of contamination over time. In addition, the findings might not be generalizable to older or younger populations from other cultural contexts. Further, we did not perform stratification according to gender, which was unfortunate, as a gender imbalance occurred by chance between the intervention and control groups. Therefore, conclusions regarding the gender effect favouring women in the short-term data should be interpreted with caution. The absence of treatment adherence assessment is also a study limitation. Including independent expert ratings of treatment fidelity (e.g. through the use of video recordings) would have strengthened the validity of the findings but was deemed too resource demanding when the study was designed.

The use of psychometric measures could have been affected by several biases such as demand characteristics, cognitive dissonance, and placebo and other expectancy effects. The lack of an active control condition in this research precluded controlling for such biases and other effects that can be explained by known processes (e.g. support from group or instructors; psychoeducation). However, the findings that mindfulness mediated the enduring intervention effects and self-report mindfulness exercise predicted short-term mental distress and long-term mindfulness scores provide some evidence for intervention-specific effects.

Specific challenges related to the measurement of mindfulness should be considered. The fact that introspective ability and familiarity with concepts vary as a function of experience with mindfulness training make it difficult to compare control and intervention participants. Further, we do not know whether the intervention effect on self-reported mindfulness reflected a true change in the disposition to relate mindfully to

psychological experience in daily life, or the familiarity or desirability of mindfulness concepts. Using qualitative methods in addition to self-report measures added to understanding and suggested that many students found mindfulness concepts and attitudes meaningful, but embodying mindfulness in everyday life was an ongoing and complex learning process.

The fact that most of the researchers were not personally or professionally involved in mindfulness or intervention delivery could have countered the commonly observed effect of researcher allegiance in favour of experimental treatment (Hollon & Wampold, 2009). However, the double roles played by the intervention instructor and interviewer in the individual interviews and researchers and interviewers in the group interviews could have resulted in undercommunication of negative experiences or critical views of the program. To counter this possibility, we made it clear at the start of each interview that we wanted to understand the students' experiences rather than their evaluation of the program, and we actively explored negative or mixed responses during interviews. Further, the role of instructor was associated with greater knowledge of students' experiences, which facilitated the exploration of more challenging issues. In addition, the students provided consent to participate in the in-depth interviews before they had received the intervention, countering the possibility that only students who benefitted most volunteered to participate. The data revealed a range of responses, and many participants also expressed difficulties with practice.

One of the major strengths of the study was that it used multiple methodologies to address several gaps in the research literature, assessing coping strategies and psychological health at 4-year follow up, examining the mechanisms of effects through mediation analyses, and exploring the complex processes involved in learning mindfulness. The methodological strengths of the quantitative studies (Papers I and II) include the recruitment of a relatively large sample and the use of an RCT design with allocation concealment and electronic assessment, reducing the potential influence of assessors. External validity was increased by high response rates, and the effects of the intervention were independent of university site, instructors, and study topic, which increased the generalizability of the results. The studies were adequately powered for the detection of differences between the intervention and control groups in both the short and long term. Increased mindfulness disposition was shown to drive the intervention effects of MBSR, which were predicted by engagement in formal mindfulness practice, substantiating a fundamental theoretical proposition of change mechanisms in MBSR. The use of multiple data collection procedures (i.e. focus-group and individual

interviews) and triangulation of the analysis within a team of researchers with a range of expertise also represents a strength of the qualitative study. The findings of paper III provide support, from a first-person perspective, that mindfulness training was perceived acceptable, and that the ways of engaging with the program impacted the range of perceived benefits, strengthening the validity of the conclusions from papers I and II.

Implications for Higher Education

Stress and mental distress exert a negative impact on performance, quality of life, and the quality of patient care in healthcare professionals. Offering helpers strategies to manage stressors inherent to their careers is an important dimension of professional development and could contribute to helpers' care quality, resilience, and persistence in the field. Our results supplement the existing body of research indicating that mindfulness training could have a valuable place in the education of medical and psychology students, who constitute a population of high-achieving young people prone to high levels of performance-based stress. The findings demonstrate the viability of mindfulness training in the prevention of increasing levels of mental distress in healthcare professionals, with the potential to benefit future employers, patients, and users of the healthcare system (Burton et al. 2016).

Our findings indicate that long-term effects can be observed even if the intensity of the program is lower relative to that of the standard MBSR program, echoing previous short-term findings in educational contexts (Cohen & Miller, 2009; Fortney, Luchterhand, Zakletskaia, Zgierska, & Rakel, 2013; Jain et al., 2007; Phang et al., 2015; Warnecke, Quinn, Ogden, Towle, & Nelson, 2011). Further, positive effects relied only modestly on formal mindfulness practice. Increasing motivation for continuous engagement with formal mindfulness practice, as one means of cultivating a mindful disposition, is a didactic challenge. However, intention and attitude in practicing mindfulness could be as important as the amount of practice completed. Our data complement the growing body of evidence highlighting the importance of the attitudinal components of mindfulness, but they also underline the complexity faced in integrating such attitudinal qualities. Continually inviting examination of attitudes and intentions in practicing mindfulness throughout the MBSR process could support students in fostering sometimes counterintuitive attitudes involving patience in the face of distress and relinquishing the desire for quick, predefined outcomes. This could strengthen the individual's willingness to observe and 'befriend' thoughts, feelings, and afflictive states openheartedly, as passing phenomena that are common to all of us.

Offering mindfulness programs that emphasize relational awareness to a larger degree, relative to MBSR, could increase motivation and strengthen the interrelational dimensions of mindfulness. Some previous research along these lines show promising outcomes (Cohen & Miller, 2009; Krasner et al., 2009; Surrey & Kramer, 2013). For instance, Krasner et al. (2009) developed an intervention for general practitioners combining mindfulness, appreciative inquiry and interpersonal dialogue exercises, with the aim of increasing self-awareness and awareness of interpersonal relationships and communication. Themes included ‘witnessing suffering’, ‘self-care vs. caring for others’, and ‘meaningful encounters’. The program has been associated with a range of positive benefits including reduced burnout and increased self-reported empathy. A version of this program, the ‘Mindful Practice Curriculum’, has been integrated into the curriculum for third-year medical students at the University of Rochester, USA, and future clinical/educational work along these lines appears promising.

The most efficient means of delivering mindfulness training in educational contexts has not been determined thus far. Mindfulness training is integrated into the core curricula in some medical schools (i.e. Monash University, Australia; Rochester University, USA), offered as an elective subject in the curricula for medicine and psychology training programs at universities and medical schools worldwide, or provided as an extra-curricular activity (Britton, 2013; Bush, 2011; Dobkin & Hutchinson, 2013). Formats include brief 10-min group-led practice (P. Moore, 2008), take-home practice using audio CDs (Warnecke et al., 2011), Internet-based mindfulness-interventions (Cavanagh, Strauss, Cicconi, Griffiths, Wyper, & Jones, 2013; Chan, Cheung, Lin, & Ngai, 2015), and extensive semester-long training programmes (Hassed, de Lisle, Sullivan, & Pier, 2009; Schure et al., 2008). While one qualitative review (Morgan et al., 2015) noted that students undertaking in-depth programs appeared to report a broader range of benefits, a narrative review and review indicated that differences in program intensity did not appear to impact outcomes in any obvious way, as results were mainly positive regardless of format or frequency (Carmody & Baer, 2009; Dobkin & Hutchinson, 2013), and a meta-analysis found that shorter interventions were as valuable as more intensive programmes in working adults (Virgil, 2013).

Our data permits some further speculations regarding implementation. Organizational support through frequent follow-up sessions and ongoing supervision, perhaps in smaller groups, could help trainees to deepen their mindfulness experience, maintain practice, and transfer learning to their roles as helping professionals, as frequently suggested by others (Morgan et al., 2015). Further, mindfulness training could

be offered at a later point in the curriculum, when students have received sufficient exposure to the challenges of patient care and student life, as students who had experienced emotional challenges, either personally or professionally, appeared to be more motivated to explore these practices and benefitted most from the intervention (Paper III; de Vibe et al., 2015). A recent study similarly found that medical students who were interested in and participated in MBSR training reported more psychological distress and higher levels of neuroticism than students not interested (van Dijk, Lucassen, & Speckens, 2015). Thus, it could also be important to offer mindfulness interventions to those who experience higher levels of distress, as part of student health services on campus. Offering optional interventions for students, with a particular emphasis on the self-compassion component of mindfulness, could also be a promising venture, as indicated in previous research involving university students (Iskender, 2009; Neely et al., 2009; Neff et al., 2005; Terry et al., 2013). In addition, it is unclear whether use of an elective or mandatory format is optimal. However, as indicated in our study, motivation to participate is essential if students are to benefit, and motivational factors should be considered in future implementation.

Lastly, as many stressors facing healthcare professionals are system-generated, person-centred approaches to reducing stress and burnout should be complemented by institutional approaches. System-level changes could include greater autonomy and control over the work, better resource allocation, and institutional leadership support for the healthcare professional (Dunn, Arnetz, Christensen, & Homer, 2007).

Conclusions and Future Directions

We recommend the use of flexible research designs that offer multiple means of examining the complex processes involved in learning mindfulness and tailoring MBIs to the helping professions in particular. Future research that includes both moderator variables and qualitative enterprises could enrich our understanding of how different sub-cultural positions and identities could provide different possibilities for exploring mindfulness and therefore impact outcomes differently (i.e. gender roles, profession or study identities, cultural or religious identities, and personality). For instance, a recent review (Lamothe et al., 2016) of MBSR-based interventions in nascent and seasoned healthcare professionals indicated that only 19% of the 2,379 participants were men. Our findings remain uncertain with respect to the effect of gender. Exploring intervention frameworks that appeal to (young) men is an area for further investigation. Further, individual motivation should be considered in qualitative research enterprises; for instance by exploring how intention and engagement could be affected by the ways in

which definitions of mindfulness are negotiated in the group process and informed by broader sociocultural discourse, the role of the teacher-participant relationship, and the nature of challenges in practicing mindfulness. Such research could provide professionals with a richer understanding of the processes involved in MBIs relative to that provided by most of the existing literature. Examination of the role of personality traits as moderators of intervention effects could also illuminate individual variability in intervention receptivity, and this is a topic for future analysis using our longitudinal data.

In this thesis, it has been argued that mindfulness training could promote qualities central to therapeutic relationships. However, the qualitative data revealed relatively ‘thin’ descriptions of transferring mindfulness qualities to interpersonal domains. Future research should consider whether and how changes generalize to students’ work with peers, colleagues, supervisors, and patients, by including their perspectives. We recommend testing and comparing MBSR with interventions with a greater emphasis on relational mindfulness and communication in educational contexts. Studies designed to determine whether mindfulness training affects real-world helping behaviour, compassionate responses, or emotionally driven behaviour towards others, as seen in some recent innovative studies (Cameron & Fredrickson, 2015; Condon, Desbordes, Miller, & DeSteno, 2013; Grecucci et al., 2015; Weng et al., 2013), could also contribute to our understanding of the potential interplay between mindfulness and interrelational qualities and behaviours. Further, academic performance, passing or failing exams, and sick leave are relevant intervention outcome measures that should be evaluated in student samples.

Our findings provided a modest indication that the extent of engagement in formal practice influenced program benefits. However, increases in self-report mindfulness have been observed following interventions that did not target mindfulness precepts (Goldberg, 2015; Goyal et al., 2014; Hedman et al., 2013; Kocovski, Fleming, Hawley, Ho, & Antony, 2015; Visted et al., 2015), supporting the notion of mindfulness as a transtheoretical construct that could be enhanced in numerous ways and account for beneficial effects across interventions (Baer, 2007). Direct comparison of commonalities and differences in outcomes between various MBIs and MBIs and other interventions/therapies in RCTs is required. Even in cases involving no differences in treatment outcomes, as indicated in a meta-analysis (Goyal et al., 2014), outlining distinctive pathways to the enhancement of psychological well-being and resilience across different interventions would constitute a conceptual improvement (Arch & Craske, 2008). Longitudinal studies using multicomponent mediator models could help us

to gain further insight into the mechanisms underlying change (i.e. testing different mindfulness facets and self-compassion). To assess the specific effect of mindfulness meditation practice, the 'dose' of meditation practice within the framework of MBSR could be manipulated (i.e. randomizing participants to no practice, low practice, and standard practice). Further, studies could compare outcome paths for MBSR and MBIs, with less emphasis on formal practices such as Acceptance and Commitment Therapy (Hayes et al., 1999). Such research avenues would increase our understanding of the components that are most central to beneficial outcomes, and the intentions in and ways of learning mindfulness that could engage students in the helping profession the most.

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Appendix I - Invitation letter to participate in the study

Invitation to participate in the study: Mindfulness training and stress management for 2nd term medical and 3rd term psychology students

We are pleased to invite you to participate in a research study in which we will examine if a method for stress management can reduce stress and promote the personal development of medicine and psychology students.

Good patient care depends on healthcare professionals who have developed strong abilities to see, understand and communicate with patients, in addition to coping with the stress that the study and the job entails. Several studies show that students and health professionals struggle with significant stress, psychological distress and low quality of life, and the problems remain for at least ten years after qualifying.

The method we will use has been tested in experiments with students in the USA and has been shown to reduce stress and psychological distress, and increase well-being and the ability to empathise and be present.

The participants who sign up will randomly be invited to attend the course in stress management or join the control group who continue the study as usual. The course starts in the 2nd week in September and has six weekly evening sessions of 1.5 hours each, in addition to a one-day session of six hours in week seven. Participants will receive teachings on basic physical and mental exercises that promote personal development and stress management. Between sessions, the participants practice home exercises 30 minutes daily. Course materials are free. Throughout the remainder of the study, those who have attended the course will be offered a 1.5-hour follow-up session each term. Those who participate in the control group will be offered a similar course free of charge after the study is completed. Participants will get paid for filling out questionnaires in the form of a book voucher from the university bookstore.

We hope that you would like to participate. Visit the website www.kunnskapssenteret.no/OT. There you will find information about the study, and you can register and fill out the consent form and questionnaire. The deadline for registration and completion of the questionnaire is If you have any questions, feel free to call or send us an email.

Very best regards

Michael de Vibe and Ida Solhaug
Project Manager for the study in Oslo and Tromsø
The university of Tromsø, Department of Psychology ida.solhaug@uit.no Tel: 94481525
Norwegian Knowledge Centre for the Health Services mfd@kunnskapssenteret.no
Tel: 91610957

Appendix II – Approval from the Regional Committee for Medical and Health Research Ethics



UNIVERSITETET I OSLO

DET MEDISINSKE FAKULTET

Seniorrådgiver Michael de Vibe
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E-post: t.e.svanes@medisin.uio.no

Nettadresse: <http://helseforskning.etikkom.no>

Dato: 29.06.09

Deres ref.:

Vår ref.: S-09268c 2009/5781 (oppgis ved henvendelse)

Vedr. oppmerksomhetstrening for å mestre stress: En randomisert to-senter studie for medisin- og psykologistudenter

Vi viser til brev med svar på komiteens merknader til ovennevnte prosjekt av 05.06.09. Justert versjon av protokoll var vedlagt brevet.

Prosjektet ble godkjent i møte 22.04.09. Komiteen tar brevet med innhold til orientering.

Det gjøres oppmerksom på at REK har lagt om til elektronisk saksbehandling fra 04.05.09. All korrespondanse skal fra denne datoen gå via saksportalen:
<http://helseforskning.etikkom.no>

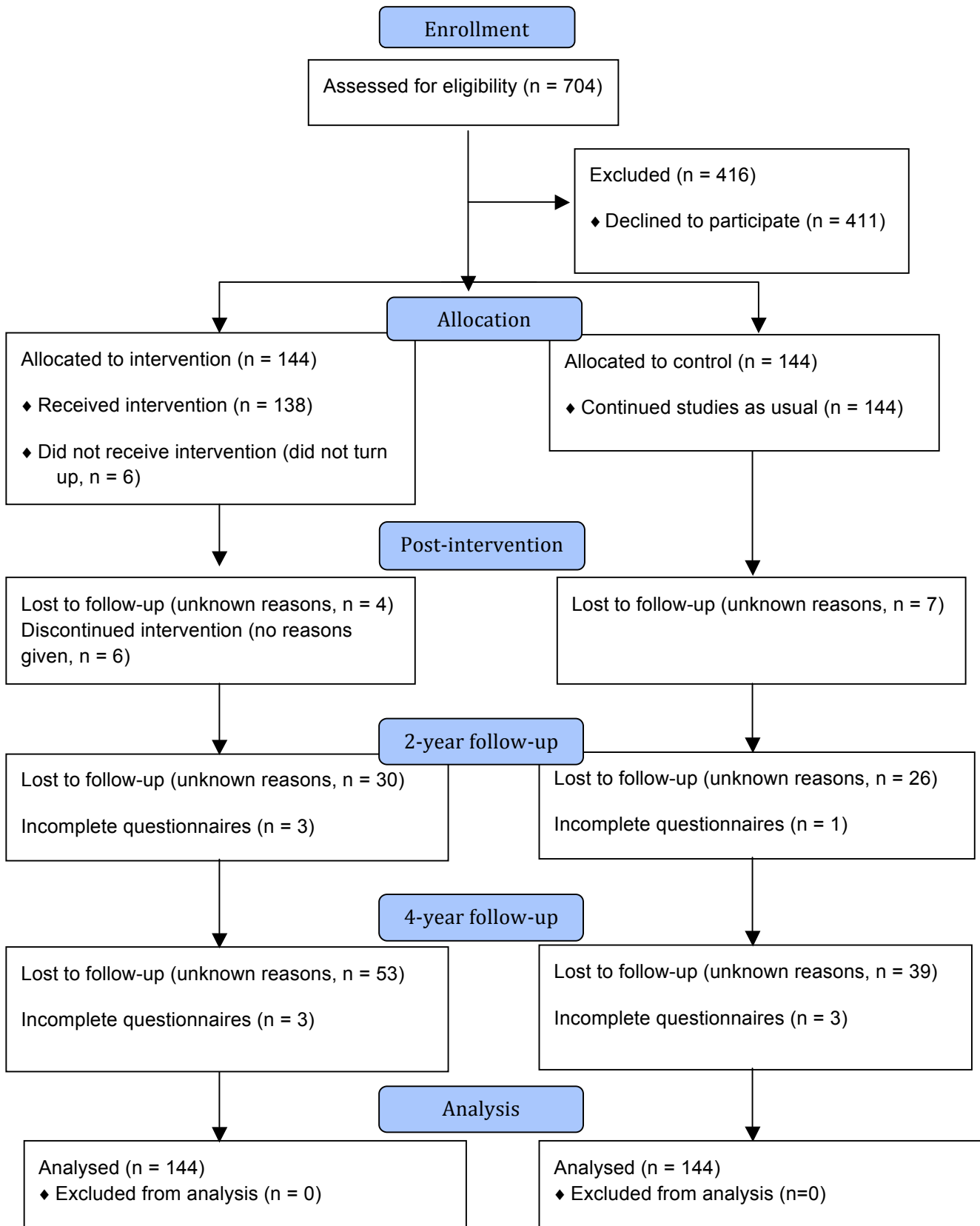
Med vennlig hilsen

Arvid Heiberg (sign.)
professor dr. med.
leder


Tor Even Svanes
komitésekretær

Kopi: Den norsk legeforenings kvalitetsfond, v/ Anne Sofie Torp, Postboks 1152
Sentrum, 0107 Oslo

Appendix III - Flow Chart



Appendix IV - Description of the 7-week MBSR program

This is based on Kabat-Zinn's' 8-week MBSR program: Kabat-Zinn, J. (2005). *Full Catastrophe Living: Using the wisdom of your body and mind to face stress, pain and illness*. New York: Bantam Dell.

Class one: Mindfulness and the power of being present

Introduction to what it means to be mindful both on a theoretical level through didactic teaching and experientially through the “raisin exercise,” eating a raisin slowly while trying to stay present to each facet of the sensory experience. Furthermore, physical anchoring exercises and the body-scan exercise was introduced. During body-scan attention is given to each part of the body, just noticing what arises of sensations while doing this. The focus of the class was on causes and consequences of having an absent mind, and some of the benefits of being fully present to what is happening just now. An important distinction was made between seeing thoughts as facts and being aware of thoughts as objects of observation. The home practice was 15 or 20 minutes body-scan from the CD with mindfulness exercises, developed by the Ph.D. candidates, once a day for six days, and to choose one daily activity to be done with full awareness every day for the coming week. Suggestions for daily activities to do mindfully were given in the workbook and included washing hands, stopping in the traffic at a red light, taking a shower, eating dinner, answering the telephone and getting dressed.

Class two: Perception – how we perceive reality

In the second class, participants were guided in sitting meditation with a focus on breathing. The theme of the class was how perceptual processes shape experience. Information about how earlier experience and expectation shape perception were introduced. Mindfulness was highlighted as a mode of perception that is both curious and open, welcoming reality just as it is, without analyzing or judging what arises, thereby making new interpretations and actions possible. The home practice assigned for the next week was practicing the 15-20 minute body-scan once a day for six days, practicing sitting meditation 5 – 15 minutes every day, bringing the attention gently back to the breath each time one discovers that the attention has left the breath, and to choose a new activity to do mindfully every day. Also, participants were asked to notice one pleasant event each day the coming week, and to note any sensations, thoughts, and feelings associated with the event.

Class three: Stress, and how it affects us

Two new formal mindfulness exercises were practiced in class three. Slow stretching exercises from the hatha yoga tradition, done with full attention on sensing the body rather than doing the exercises correctly; and walking meditation, the students walking slowing in a circle resting the attention on the contact between the feet and the ground, and bringing the attention gently back to the feet each time it wanders off. The class was centered on the concept of stress, and how stress is manifested in the mind and body. The home practices for week three were: To alternate between the 30-minute yoga stretching exercises lying down, and the body-scan for six days. Also, they should practice sitting meditation for 5-15 minutes every day and notice unpleasant events and take notice of sensations, thoughts, and feelings associated with these events.

Class four: Coping with stress

Standing yoga stretching exercises, sitting meditation and walking meditation were practiced during class four. The theme of the class was how the capacity to be aware of the mind and body in stressful situations, without immediately reacting to it, makes it

possible to adapt more effectively to challenges and stressors. The breath was highlighted as an important place to anchor one's awareness when feeling stressed out. The following week the participants were invited to alternate between 20 minutes sitting meditation and 15-20 minutes body-scan or exercises in hatha yoga, every day, for six days. As part of their home practice participants were also asked to pay attention to their breathing both in everyday situations and especially in stressful situations and to open up to new ways of responding to stressful situations.

Class five: Communication

Class five consisted of sitting and walking meditation and exercises in hatha yoga. The emphasis of the class was on interpersonal mindfulness. Interpersonal reaction patterns and habits of emotional expression/suppression were discussed. Mindfulness was in this context highlighted as the capacity to stay aware of one's experience, including thoughts and interpretations, emotions, and behavioral impulses during communication. The home practice between class five and six was to do one formal mindfulness practice every day, choosing between the body scan, sitting meditation and hatha yoga, and experimenting with doing the exercises without listening to the instructions on the CD. The participants were also invited to pay close attention to how they communicated with others the following week, accepting their reactions without necessarily trying to change anything. Finally, they were asked to pick one activity to do with full awareness every day.

Class six: Self-reliance

Class six consisted of guided practices in sitting and walking meditation. The focus of this class was on acceptance and trust in oneself and life. Difficulties in accepting oneself and forgiving oneself and others were discussed. Participants were asked to do the same formal exercises' as in week five. Also, they were invited to experiment with trust, openness and acceptance towards oneself, others and life in general.

Class seven: six-hour mindfulness session

The participants were invited to practice mindfulness a whole day in silence in week 7. Instructions in different formal practices were given including anchoring, meditation focusing on sensory impulses like sounds, the breath, on thoughts and emotions arising, and finally on practicing being aware to whatever arises in one's consciousness. Also standing and lying yoga exercises. The day also contained a quiet meal followed by a 30-minute walk outside in silence. The last 45 minutes consisted of a group reflection on how the silent day was experienced and informal feedback on the programme as a whole.

Appendix V - Interview Guide

ENKELTINTERVJUER; semistrukturert intervjuguide

Intervju før deltagelse på mindfulness-kurs (data herfra ikke brukt i artikkel III)

Intro og rammer. Skriv under samtykkeerklæring.

Hensikt med intervju å høre litt om forskjellige sider ved ditt hverdagsliv. Dine erfaringer det sentrale, ikke noe rett eller galt svar. Fortrolig. Ingenting av det du sier her vil tas opp i kursgruppen. Båndopptager. Tekstmaterialet anonymiseres. Spør underveis om du lurer på noe. Hvis det er noe du synes er vanskelig å svare på eller ikke vil svare på – helt i orden å ikke svare. Har du noen spørsmål?

Bakgrunn: Alder? Bor alene eller sammen med noen? Barn? Tidligere studier? Tidligere yrkeserfaring?

Introduksjon: Hva gjorde at du valgte å studere medisin/psykologi? Hvordan synes du studielivet er så langt? Hva forbinder du med det å være “en god hjelper”? Selv erfaringer med god eller “dårlig” hjelper?

Interesse for mindfulness: Hva gjorde at du meldte deg på studien? Hva forstår du ved fenomenet mindfulness/oppmerksomt nærvær? Har du erfaringer med mindfulness-trening? Hvilke forventninger har du til det å delta på kurset?

Stress: Hva gjør deg stressa? Kan du tenke på en situasjon for nylig, som du opplevde som vanskelig eller stressende? Hva skjedde? Hva gjorde du? Hva følte du? Hvordan tenkte du? Hvordan tenkte du om deg selv? Hvilke egenskaper har du som hindrer deg/hjelper deg i å møte utfordringer?

Selvivaretagelse: Hvordan tar du vare på deg selv? Har du et eksempel på en opplevelse du har hatt for nylig, hvor du opplevde at du var god til å passe på deg selv/ta vare på deg selv? Hva gjorde du? Tenkte? Følte? Har du et eksempel på en situasjon eller opplevelse for nylig, hvor du ikke tok så bra vare på deg selv? Utdyp erfaring.

Aksept/romslighet: Sjølaksept – hva forbinder du med det? Hva hjelper deg til selvaksept? Hva hindrer deg i selvaksept? Hvor mye tenker du over det å akseptere eller romme andre – hvor viktig er det for deg? Hva hindrer deg i å akseptere/romme andre? Utdyp.

Avrundning: Nå har jeg ikke flere spørsmål. Er det noe du gjerne vil tilføye? Hvordan har det vært å bli intervjuet? Hvor mye synes du at du ble styrt av det du trodde at jeg som intervjuer ville høre?

Oppfølgingsamtale, ca. 1 mnd etter endt mindfulness-kurs (datagrunnlag for artikkel III)

Intro: Vi har jo snakket sammen før kurset startet. Hensikten da var å få en føling med hvordan dere studenter forholder dere til forskjellige aspekter av deres hverdagsliv. Vi snakket om flere tema, blant annet om aksept, om hvordan du møter utfordrende situasjoner, om hva du gjør for å ta vare på deg selv. Vi vil undersøke stabilitet- og endringsprosesser i forhold til disse temaer. Så når vi snakker sammen i dag igjen, vil vi

komme inn på noen av de samme temaene som sist, og høre hva du opplever, tenker, føler i forhold til disse temaene i dag.

Siden vi prata sammen sist, har du deltatt i et 7-ukers mindfulness-basert stresshåndterings-program. Vi vet veldig lite om hvordan et slikt program mottas av medisin og psykologistudenter, en gruppe relativt unge og ”friske” individer, i Norge, i dag. Vi er like nysgjerrige som mange av dere var da dere startet på kurset- på å finne ut hvordan det oppleves å delta på kurset og hvordan det oppleves å praktisere oppmerksomt nærvær- for akkurat dere. Så derfor vil vi også gjerne høre hvordan du har opplevd å delta på kurset, og hvordan du opplever mindfulness og oppmerksomt nærvær. *Både* høre om det var noe du syntes fungerte godt for deg, i så fall på hvilken måte, og hva som kanskje opplevdes som mer nøytralt eller ikke var noe du syntes har betydning for deg. Jeg inviterer deg til å utforske dette åpent og nysgjerrig sammen med meg. Bare slik kan vi lære mer om hvordan oppmerksomhetstrening og det å delta på dette kurset oppleves av akkurat dere.

(Rekkefølgen av temaer under varierer utfra samtalens naturlige forløp. Relasjonen mellom mindfulness/kursdeltagelse og hovedtemaene blir utforsket løpende dersom studentene selv spontant kommer inn på betydningen av mindfulness, indikert med stjerner. Ellers blir temaer knyttet til mindfulness og kursopplevelse utforsket mer direkte senere i intervjuet.)

Stress/utfordring: Er det noe som stresser deg for tiden? Hvordan møter du dette? Kan du tenke på en situasjon den siste måneden, som du opplevde som vanskelig eller stressende? Utdyp.

*** Har oppmerksomt nærvær eller oppmerksomhetstrening betydning i forhold til måten du møter det du opplever som krevende situasjoner i livet? I så fall, hvilke lærdommer eller redskaper fra kurset bruker du for å håndtere vanskelige situasjoner? Kan du gi noen eksempler?

Selvivaretagelse Har du et eksempel på en opplevelse du har hatt for nylig, hvor du opplevde at du var god til å passe på deg selv/ta vare på deg selv? Utdyp. Har du et eksempel på en situasjon eller opplevelse for nylig, hvor du ikke tok så bra vare på deg selv? Utdyp.

*** Synes du mindfulness eller oppmerksomt nærvær spiller noen rolle inn i det å ta vare på seg selv? På hvilken måte? Har du eksempler på dette?

Aksept (romslighet) Synes du dette med selvaksept er noe som forandrer seg i ditt liv, blir lettere eller vanskeligere? Kan du komme i tanke om en episode for ikke så lenge siden, der du ikke var så vennlig eller aksepterende overfor deg selv? Eller omvendt, der du følte du var ekstra romslig og aksepterende overfor deg selv? Utdyp. Har du lagt merke til om graden av hvor romslig eller vennlig du er overfor andre varierer? På hvilken måte?

*** **Selvforhold/ forholdet til andre og mindfulness:** Har det å trene oppmerksomt nærvær betydning for hvordan du forholder deg til deg selv eller møter deg selv? Kan du gi eksempler? Har det skjedd forandringer i måten du opplever deg selv? Har oppmerksomt nærvær betydning for hvordan du opplever, forholder deg til eller møter andre? Kan du gi konkrete eksempler på dette?

Hva er mindfulness? Basert på erfaringa di med å delta på dette kurset: hva er oppmerksomt nærvær? Hva opplever du er målet med å praktisere oppmerksomt nærvær?

Opplevelsen av å gjøre oppmerksomhetstrening. Hvordan opplever du å gjøre øvelsene? Hvordan virker øvelser fra kurset på dine tanker, følelser og kroppsfunnmermelser? Eksempler.

Hvilken betydning har kurset/mindfulness-trening? Har du lært noe nytt ved å delta i kurset? Utdyp? Hva er det viktigste du har lært gjennom deltagelse i kurset? Er det noe ved det å ha deltatt på kurset eller det å øve oppmerksomt nærvær som påvirker måten du opplever hverdagslivet på? I så fall, på hvilken måte?

Oppmerksomt nærvær – nåtid og fremover: Det har jo gått ca en måned siden kurset. I hvilken grad opplever du at det du lærte på mindfulness-kurset preger livet ditt nå? På hvilken måte? Hvordan ønsker du å bruk redskaper, øvelser, forståelser fra kurset i oppmerksomhetstrening i ditt liv fremover?

Kurset-feedback: Er det noe som du mener kunne vært gjort bedre i fht kursopplegget – øvelser, instruksjoner, informasjon, undervisning, kurshefte etc? Problematiske aspekter ved mindfulness-basert stressreduksjon? Hvordan fungerte det å ha hjemmeøvelser?

Avrundning: Nå har jeg ikke flere spørsmål. Er det noe du gjerne vil tilføye? Hvordan har det vært å bli intervjuet? Hvordan klarte du å hente frem det du egentlig mener om det vi snakket om? Hvor mye synes du at du ble styrt av det du trodde at jeg som intervjuer ville høre?

FOKUSGRUPPEINTERVJUER; semistrukturert intervjuguide

1. Basert på erfaringa di med å delta på dette kurset: hva er oppmerksomt nærvær? Hvilke forventinger hadde dere til hva oppmerksomhetstrening eller oppmerksomt nærvær var, før kurset begynte? Har dere blitt overrasket over noe? Skuffet?

2. Hva lærer du når du praktiserer oppmerksomt nærvær? Blir dere oppmerksomme på ting dere før ikke har vært oppmerksomme på, eller ikke så ofte er oppmerksom på? Kom med eksempler. Hvordan påvirker oppmerksomhetstrening dine tanker, følelser og kroppsfunnmermelser?

3. Opplever dere sammenheng/forbindelse mellom oppmerksomhetstrening og måten dere møter utfordringer i livet– situasjoner som dere opplever som stressende? Har det skjedd forandringer i måten du opplever og reagerer på stress – i så fall hvordan da? Hvilke lærdommer fra kurset bruker du for å håndtere vanskelige situasjoner?

4. Det å ha deltatt på kurset eller det å øve oppmerksomt nærvær: påvirker det måten dere opplever hverdagslivet /livet generelt på? I så fall, på hvilken måte?

5. Har det å trene oppmerksomt nærvær betydning for hvordan du forholder deg til deg selv / møter deg selv? Kan du gi eksempler? Har det skjedd forandringer i måten du opplever deg selv? Hvordan da? Har det skjedd forandringer i måten dere tenker om det å ta vare på dere selv? I så fall, på hvilken måte?

6. Har oppmerksomt nærvær betydning for hvordan du opplever andre? Forholder deg til eller møter andre? Kan du gi eksempler på dette?

7. I hvilken grad opplever du at det du lærte på ot-kurset preger livet ditt nå? På hvilken måte? Hvordan vil du bruke redskaper, øvelser, forståelser fra kurset i oppmerksomhetstrening i ditt liv nå etter at kurset er over?

8. Synes dere at kurs i oppmerksomhetstrening bør tilbys medisin og psykologistudenter? Hva er grunner for eller i mot? Hva er begrensninger i denne måten å forholde seg til stress og mestring på? Hva er styrker i denne tilgang til helse/mestring?