UNIVERSITÄRE PSYCHIATRISCHE DIENSTE BERN

UNIVERSITÄT BERN

Improving Validity in the Assessment of Mindfulness: The Comprehensive Inventory of Mindfulness Experiences (CHIME)

Inauguraldissertation der Philosophisch-humanwissenschaftlichen Fakultät

der Universität Bern

zur Erlangung der Doktorwürde

vorgelegt von

Claudia Bergomi

Onsernone (TI)

Eingereicht bei:

Prof. Dr. Hansjörg Znoj (Erstgutachter)

Prof. Dr. Wolfgang Tschacher (Zweitgutachter)

Bern, Februar 2013 (Selbstverlag)

Von der Philosophisch-humanwissenschaftlichen Fakultät der Universität auf Antrag von

Prof. Dr. Hansjörg Znoj (Erstgutachter)

Prof. Dr. Wolfgang Tschacher (Zweitgutachter)

angenommen.

Bern, den ..... Der Dekan: .....

Prof. Dr. Achim Conzelmann

Improving Validity in the Assessment of Mindfulness: The Comprehensive Inventory of Mindfulness Experiences (CHIME)

University of Bern

Faculty of Philosophy and Humanities

Doctoral Thesis in Psychology

Submitted by

Claudia Bergomi

from Onsernone (TI)

for the degree of

Doctor of Philosophy

Thesis advisors

Prof. Dr. Hansjörg Znoj (Advisor)

Prof. Dr. Wolfgang Tschacher (Second advisor)

Bern, February 2013

Content

Abstract

In the last decade, scientific interest in the concept and applications of mindfulness has been growing steadily. Sound empirical investigation relies on the availability of valid operationalizations of the constructs under study. However, a consensus about the operationalization of mindfulness is still missing in the scientific literature. Indeed, currently available mindfulness questionnaires differ from each other in several critical aspects. Moreover, the validity of self-report assessment of mindfulness itself has been called into question.

The present thesis provides an overview of the current state of self-report assessment of mindfulness and describes the construction and validation of a German-language mindfulness questionnaire, the Comprehensive Inventory of Mindfulness Experiences (CHIME). The questionnaire's construction and validation were guided by relevant issues identified through an overview of the scientific literature (*Article 1*). First, the issue of content validity was treated by means of a preliminary questionnaire covering all aspects of mindfulness included in eight available mindfulness scales (*Article 2*). Subsequently, the major focus was placed on the semantic clarity of the items (*Article 3*). The thesis includes data from 974 individuals, 402 of whom were participants in Mindfulness Based Stress Reduction (MBSR) groups in Switzerland and 572 were from the general population.

The CHIME includes eight subscales that proved to be stable over different samples. The findings provided evidence that the CHIME items do not show systematic endorsement bias due to differences in age, gender, and meditation experience thus suggesting that their interpretation did not significantly differ across groups. Taken together, the results support the feasibility and desirability of a valid multi-dimensional assessment of mindfulness.

Introduction

1. Introduction

1.1 Motivation

What is intelligence? Edwin Boring provided the following famous answer to this question in 1923: "Intelligence is what the [intelligence] tests test." (Boring, 1923, p. 35). We could ask a similar question: what is mindfulness? Currently, at least eight mindfulness questionnaires have been validated and used in research. Is mindfulness what such questionnaires measure? If so, then, according to the *Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003), mindfulness refers to low frequency of everyday attention lapses (Carriere, Cheyene, Smilek, 2008). On the other hand, the *Toronto Mindfulness Scale* (TMS; Lau et al., 2006) defines mindfulness as the awareness of the present moment with a quality of curiosity and decentering (i.e., disidentification). According to the Kentucky *Inventory of Mindfulness Skills* (KIMS; Baer, Smith & Allen, 2004), mindfulness consists of four skills: observing, describing (i.e., the capacity to describe and label observed phenomena with words), acting with awareness, and accepting without judgment. Yet another scale, the *Philadelphia Mindfulness Scale* (PHLMS; Cardaciotto et al., 2008), considers two components of mindfulness, namely, awareness and not avoiding inner experiences.

Following this procedure we do not seem to find any standard definition of mindfulness; rather, besides some similarities such as the inclusion of a component relating to attention, the questionnaires mentioned above provide a plurality of aspects different in content. We are thus tempted to discard the notion that mindfulness is what is measured by mindfulness questionnaires. Nevertheless, we know that mindfulness *shall* be closely related to the constructs covered by these scales. If a brief overview of some mindfulness questionnaires elicits more confusion than clarity about what mindfulness is, then a careful examination of these instruments, of what they measure and how they do it, is necessary.

The main objective of this thesis was to examine the current operationalizations of mindfulness and to provide a new self-report measure of mindfulness, the Comprehensive Inventory of Mindfulness Experiences (CHIME), which takes into account previous operationalizations, theoretical considerations, and existing research findings. It was not the aim of the present thesis to provide a definition of mindfulness and certainly not to claim that mindfulness is truly what the questionnaire presented here measures. In fact, although

current mindfulness definitions strongly rely on Buddhist psychology, even among Buddhist scholars a clear consensus on the definition of mindfulness is missing (Grossman, 2008). Therefore, with this thesis, I shall attempt to provide an overview of the current state of self-report assessment of mindfulness as well as to move some steps towards a more comprehensive and valid measurement of mindfulness.

1.2 Overview of the Present Thesis

The present thesis is organized as a cumulative thesis. Chapter 2 provides a theoretical background that introduces the concept of mindfulness (2.1), gives a brief overview of research on the relationships between mindfulness, cognition, and mental health (2.2–2.4), and describes the current debate on the assessment of mindfulness (2.5). Chapter 3 includes the three articles of this thesis. In Chapter 4, findings from the studies are summarized (4.1). The methodology critically discussed (4.2), conclusions drawn, and suggestions for future research given (4.3).

1.3 References

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11,* 191-206.

Boring, E. G. (1923). Intelligence as the tests test it. *New Republic, 35,* 35-37.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological wellbeing. *Journal of Personality and Social Psychology, 84,* 822–848.

Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia Mindfulness Scale. *Assessment, 15,* 204-223.

Carriere, J. S. A., Cheyene, J. A., & Smilek, D. (2008). Everyday attention lapses and memory failures: The affective consequences of mindlessness. *Consciousness and Cognition, 17,* 835-847.

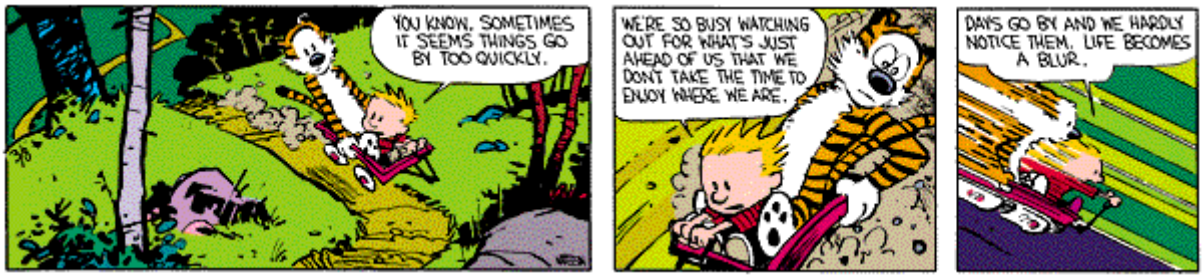
Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research*, *64*, 405.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology, 62,* 1445-1467.

Theoretical Background

2. Theoretical Background

2.1 Defining Mindfulness



Bill Watterson, 1990

Mindfulness is the conscious and purposeful direction of attention in the present moment. It is characterized by a non-evaluative, open, and accepting orientation towards experiences (Kabat-Zinn, 1990; Bishop et al., 2004). Being mindful means being aware of sensory objects and events with "bare attention" rather than through our partial, self-centered perspective (Epstein, 1995; Gunaratana, 2002; Nyanaponika, 1973). It also means being conscious of the concepts, ideas, and judgments that we often automatically impose on our experiences (Brown, Ryan, & Creswell, 2007). Mindfulness and its training through meditation techniques are crucial elements of numerous spiritual, philosophical, and psychological traditions as well as integral parts of more body-oriented disciplines such as Qi-Gong, Kum Nye, and martial arts (La Forge, 2005; Schure, Christopher, & Christopher, 2007). In the recent decades, mindfulness meditation has also developed into wholly secular practices (Kristeller, 2010). Notably, mindfulness can be understood as a "consciousness discipline" (Walsh, 1980) that is not bound to a specific cultural or spiritual context (Kabat-Zinn, 2003).

In the current scientific literature, a consensual definition of mindfulness is missing, which is apparent through the vivid discussion in a number of recent publications (e.g., Brown et al., 2007; Chiesa, 2012; Dreyfus, 2011; Gethin, 2011; Grossman, 2010; Kang & Whittingham, 2010). Relevant differences can already be found between mindfulness in a Western psychological context and its original context in Buddhist psychology (Dreyfus, 2011; Gethin,

2011; Grossman, 2010). In the Buddhist context, mindfulness is a pivotal part of a path of profound transformation aimed at liberation from suffering and its causes through the development of insight and understanding of the workings of the mind (Rahula, 1974). In this view, the cause of suffering is ignorance about the transient nature of entities, which results in craving or attachment (Rahula, 1974). From a Buddhist perspective, the development of mindfulness is associated with the cultivation of ethical behavior and of certain affective states such as empathy, tolerance, patience, and kindness (Chiesa, 2012; Grossman, 2010; Kang & Whittingham, 2010). However, in the Western psychological and medical context, the primary goal of mindfulness practice is largely to overcome a state of suffering that is circumscribed and mainly related to a specific problem or psychological disorder. This aim is mostly pursued by focusing on changing dysfunctional patterns of thought, affect, and behavior. Consequently, through their incorporation into modern psychology, traditional definitions of mindfulness underwent some changes—elements that are particularly relevant in modern Western (clinical) psychology were particularly stressed (e.g., non-judgmental attitude) while others (e.g., ethical behavior) were excluded from most current definitions and operationalizations. As there is no normative definition of mindfulness, there is no definite answer to this issue.

2.2 Mindfulness, Mental Health, and Cognition: Empirical Research

Interest in mindfulness and meditation techniques has been growing steadily in the last four decades in the clinical context as well as in basic cognitive and neuropsychological research. In the late 1970s, Jon Kabat-Zinn developed an eight-week mindfulness-based program (Mindfulness Based Stress Reduction, MBSR; Kabat-Zinn, 1990) for patients with chronic pain. Since then, a number of mindfulness-oriented interventions have been developed, including Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002) for the prevention of depressive relapse, Mindfulness-Based Relapse Prevention (MBRP; Marlatt, Bowen, Chawla, & Witkiewitz, 2004) for substance abusers, and Dialectical Behavioral Therapy (DBT; Linehan, 1993) for the treatment of people with borderline personality disorder. Beyond that, mindfulness and, more generally, contemplative traditions, have steadily gained relevance in the cognitive sciences, which has led to intensive collaborations between eminent cognitive scientists and exponents of the Buddhist tradition (e.g., through the Mind & Life Institute) and to the proliferation of studies

investigating the effects of mindfulness and meditation on cognition and the brain (Chiesa et al., 2011; Hölzel, et al., 2008, 2011a; Xiong & Doraiswamy, 2009).

Ample evidence shows that mindfulness has positive psychological effects such as improved mental and physical health, subjective well-being, emotion regulation capacities, behavior regulation, and interpersonal behavior (Baer, Smith, Hopkins, Krietenmeyer, & Toney, 2006; Brown & Ryan, 2003; Brown et al., 2007; Davidson et al., 2003). A growing body of research supports the efficacy of mindfulness-based interventions in the treatment of numerous psychological disorders (Chiesa & Serretti, 2011; Eberth & Sedlmeier, 2012; Grossman, Niemann, Schmidt, & Walach, 2004; Hofmann, Sawyer, Witt, & Oh, 2010; Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011). Moreover, the development of mindfulness during such interventions has been shown to mediate observed improvements in mental health (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010; Carmody & Baer, 2008). The efficacy of mindfulness in healthy populations has also been established: mindfulness-based interventions have been demonstrated to reduce stress and improve psychological well-being (Chiesa & Serretti, 2009; Eberth & Sedlmeier, 2012) and mindfulness meditation practice to lead to significant changes in self-reported mindfulness, attention, and anxiety (Eberth & Sedlmeier, 2012). Mindfulness-based interventions have moreover been found to be feasible in children and adolescents in both community and clinical settings (Burke, 2009). However, the effect sizes obtained in studies with children and adolescents are slightly smaller than those obtained in studies with adult populations (Black, Milam, & Sussman, 2009).

Mindfulness is closely related to the concept of attention and executive functions (Bishop et al., 2004; Jha, Krompinger, & Baime, 2007; Shapiro, Carlson, Astin, & Freedman, 2006). Traditionally, early phases of mindfulness training involve meditation practices that are more oriented towards the development of the capacity to focus one's attention whereas in latter phases the focus is broadened to include current internal and external stimuli (Chiesa, 2012). In the Buddhist tradition the first kind of meditation is referred to as calm abiding (Pali: *Shamata*) and the second as insight meditation (*Vipassana*). Similarly, in a systematic review, Chiesa, Calati, and Serretti (2011) found evidence for improvements in selective and executive attention during early phases of mindfulness training and improved unfocused sustained attention abilities in the following phases. Mindfulness training also seems to enhance working memory, memory specificity, verbal fluency, inhibition of cognitive

responses, cognitive flexibility, meta-awareness, and to reduce emotional interference from distracting stimuli (Chiesa et al., 2011). Nevertheless, the evidence on the effects of mindfulness on cognitive abilities is still scarce; many studies contain methodological limitations and negative results have been reported (Chiesa et al., 2011).

2.3 Mindfulness and Mental Health: Our Research

Studies conducted by our research group bring further support for the positive effects of mindfulness on mental health. In one study, we showed that the positive relationship between distressing events and psychopathological symptoms and negative affect was weaker in participants who scored higher on self-reported mindfulness (Bergomi, Ströhle, Michalak, Funke, & Berking, 2012). This is in line with empirical findings that have established the usefulness of mindfulness in coping with distressing thoughts and images in psychosis (Abba, Chadwick, & Stevenson, 2008; Chadwick, Taylor, & Abba, 2005) and in dealing with daily hassles (Marks, Sobanski, & Hine, 2010). These findings suggest that mindfulness enhances the ability to cope with distressing events and therefore may mitigate their negative impact on mental health. In a subsequent study, we examined the protective role of mindfulness in the development of addictions (Kupper, Bergomi, Meierhans, Tschacher, & Moggi, 2013a). Results from a sample from the general population showed that elevated levels of mindfulness halved the probability of problematic drinking. Finally, we conducted a study in a population of individuals participating in MBSR groups in a non-clinical (private practice) context in Switzerland (Kupper, Bergomi, & Tschacher, 2013b). The results consistently showed very low levels of dropouts over all studied groups and MBSR teachers as well as significant reductions in psychological symptom load and increases in self-reported mindfulness.

2.4 Investigating the Mechanisms of Mindfulness

Studies on mindfulness are progressing from the mere establishment of effects to a more precise investigation of the mechanisms through which mindfulness exerts its positive influence on mental health (Baer, 2010; Hölzel et al., 2011b; Shapiro et al., 2006). For example, Shapiro and colleagues (2006) proposed that the development of mindfulness leads to changes in the way one relates to experiences, diminishing identification with the

contents of consciousness such as thoughts and emotions (reperceiving or decentering) and thus enabling the individual to view them with more objectivity and clarity. Reperceiving in turn leads to enhanced self-regulation, value clarification, exposure, and emotional, cognitive, and behavioral flexibility (Shapiro et al., 2006). A first attempt to test this model in a sample of MBSR participants could only partially demonstrate that changes in these four variables were mediated by changes in reperceiving (Carmody, Baer, Lykins, & Olendzki, 2009). Interestingly, several authors have proposed that emotion regulation may be a pivotal mechanism of action for mindfulness (Coffey, Hartman, & Fredrickson, 2010; Sauer, 2010). In a recent review of empirical research, which included self-report, experimental and neuroimaging data, Hölzel and colleagues (2011b) proposed four mechanisms that may underlie the beneficial effects of mindfulness meditation, namely, attention regulation, body awareness, emotion regulation, and change in self-perspective. The authors have thus furnished a comprehensive approach encompassing the model proposed by Shapiro and colleagues (i.e., reperceiving as a change in self-perspective) as well as models focusing on the interplay between mindfulness and emotion regulation.

These models will not be discussed further here, as that is beyond the scope of this thesis. It is nevertheless relevant to note how such models point to the close relationships between mindfulness and constructs such as reperceiving, emotion regulation, and attention regulation; no clear boundary between mindfulness and these constructs seems to exist. In fact, while some models refer to these constructs as effects of mindfulness, others include them in the definition of mindfulness. For example, reperceiving (decentering) is included in the definitions underlying the *Toronto Mindfulness Scale* (TMS; Lau et al., 2006), and aspects of emotion regulation (nonavoiding emotions, non-reactivity) in the *Philadelphia Mindfulness Scale* (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) and the *Five Facet Mindfulness Questionnaire* (FFMQ; Baer et al., 2006).

2.5 Mindfulness: Assessment and Operationalization

As research goes deeper into the understanding of the effects of mindfulness and its mechanisms, the need for a valid and reliable assessment of the construct is becoming increasingly crucial. During the last decade, at least eight questionnaires assessing mindfulness have been validated, namely, the *Freiburg Mindfulness Inventory* (FMI; Buchheld, Grossman, & Walach, 2001), *Mindful Attention Awareness Scale* (MAAS; Brown &

Ryan, 2003), *Kentucky Inventory of Mindfulness Scale* (KIMS; Baer, Smith, & Allen, 2004), *Cognitive and Affective Mindfulness Scale-Revised* (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), *Southampton Mindfulness Questionnaire* (SMQ; Chadwick et al., 2008), TMS, FFMQ, and PHLMS.

Some authors have questioned the possibility of a valid assessment of mindfulness through self-report measures and are pledging for the development of alternative or complementary methods (Christopher et al., 2009; Grossman 2008, 2011). Grossman (2008) pointed out several issues related to psychometric testing in general but that may be of particular relevance in the assessment of mindfulness. In particular, reports on mindfulness questionnaires may be biased by (1) differences in the semantic understanding of the items, particularly between individuals with different degrees of experience with meditation and Buddhist psychology; (2) discrepancies between self-ascribed and actual mindfulness, as a certain degree of mindfulness may be needed in order to be aware of one's inner experiences and thus individuals low on mindfulness may tend to overestimate their mindfulness; moreover, (3) long-time meditation practitioners or people undergoing a mindfulness-oriented program may also tend to overestimate their levels of mindfulness. These points will be dealt with in more detail in the articles of this thesis.

Along this line, Burg and Michalak (2010) proposed measuring mindfulness with the Mindful-Breathing Exercise (MBE), a computer task in which people are asked to consciously perceive their breath and report when they notice that their mind wandered away. Likewise, Nyklicek and van Son (2012) developed the 3-Minute Mindfulness Test (3MMT) in which participants verbally express their momentary experiences during three resting minutes. Several dimensions of mindfulness (exteroceptive mindfulness, interoceptive mindfulness, judgmental attitude, and meta-cognition) are evaluated by raters on the basis of the participants' verbalizations.

The issue of the assessment of mindfulness is also crucially related to and dependent on the availability of a consensual definition of mindfulness and of the aspects it includes. As mentioned above, there is no such consensus in the extant literature and each questionnaire assesses different (putative) aspects of the construct. For this reason, some authors suggested relabeling mindfulness questionnaires with a clear description of the psychological characteristics they are measuring, for example the MAAS as assessing "lapses of attention" (Chiesa, 2012; Grossman, 2011). Currently, it is at least advisable to state

"which mindfulness" is concerned when presenting the results of scientific studies on mindfulness, for example, "MAAS-mindfulness" or "KIMS-mindfulness" instead of simply "mindfulness".

In summary, given the current surge of interest towards the empirical investigation of mindfulness, mindfulness meditation, and their relationships with mental health and cognition, it is of primary importance to provide adequate tools for the measurement of mindfulness. During the last decade, numerous mindfulness questionnaires have been constructed and widely used in mindfulness research. However, their validity has been called into question, not only with reference to their psychometric adequacy but also to their content.

2.6 The Present Research: Overview of the Manuscripts

The present thesis focuses on the assessment of mindfulness with self-report measures. The main questions underlying the studies presented here concerns the adequacy of mindfulness assessment: how is mindfulness assessed in current questionnaires and what problems are associated with them? Which aspects of mindfulness should be included in a comprehensive assessment? How can problematic issues concerning response bias be dealt with? Can these issues be resolved?

Article 1 gives an overview of eight validated mindfulness scales, focusing on the strengths and limitations of each questionnaire and providing an overview of the differences in the aspects of mindfulness that they cover. It highlights limitations in the available questionnaires that might have contributed to the issues raised in the literature against the validity of the self-report assessment of mindfulness.

Article 2 mainly deals with the issue of the content of mindfulness questionnaires. It provides a theoretical overview of nine aspects of mindfulness that have been included in current mindfulness questionnaires and describes results from an exploratory investigation of a preliminary questionnaire that covers these nine aspects. The goal of this article was to provide a multi-dimensional and comprehensive conceptualization of mindfulness based on theoretical considerations as well as previous operationalizations.

Finally, *Article 3* describes the construction and validation of the Comprehensive Inventory of Mindfulness Experiences (CHIME), a German-language questionnaire that assesses mindfulness in the general population. The conceptual coverage of the CHIME was

mainly based on the results described in *Article 2*. The construction of the scale was guided by critical psychometric issues identified in existing mindfulness questionnaires. Particular attention was paid to providing items that minimize diverging semantic interpretations in different subgroups, especially between meditators and non-meditators.

2.7 References

Abba, N., Chadwick, P., & Stevenson, C. (2008). Responding mindfully to distressing psychosis: A grounded theory analysis. *Psychotherapy research*, *18*, 77-87.

Baer, R. (Ed.). (2010). *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change.* Oakland: Context Press/New Harbinger.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191-206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27-45.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A Proposed Operational Definition. *Clinical Psychology: Science and Practice, 11*, 230-241.

Black, D. S., Milam, J., & Sussman, S. (2009). Sitting-meditation interventions among youth: A review of treatment efficacy. *Pediatrics, 124,* e532-e541.

Bergomi, C., Ströhle, G., Michalak, J., Funke, F., & Berking, M. (2012). Facing the Dreaded: Does Mindfulness Facilitate Coping with Distressing Experiences? A Moderator Analysis. *Cognitive Behaviour Therapy*. Advance online publication. doi: 10.1080/16506073.2012.713391

Bränström R., Kvillemo P., Brandberg Y., & Moskowitz J. T. (2010). Self-report mindfulness as a mediator of psychological well-being in a stress reduction intervention for cancer patients – a randomized study. *Annals of Behavioral Medicine, 39,* 151-61.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological wellbeing. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18,* 211-237.

Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: The development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1,* 11-34.

Burg, J. M., & Michalak, J. (2011). The Healthy Quality of Mindful Breathing: Associations With Rumination and Depression. *Cognitive Therapy and Research*, *35*, 179-185.

Burke, C. A. (2010). Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Child and Family Studies*, *19*, 133-144.

Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia Mindfulness Scale. *Assessment, 15,* 204-223.

Carmody, J., & Baer, R.A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31,* 23-33.

Carmody, J., Baer, R. A., Lykins, E. L. B., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 65,* 613-626.

Chadwick, P., Taylor, K. N., & Abba, N. (2005). Mindfulness groups for people with psychosis. *Behavioural and Cognitive Psychotherapy*, *33*, 351.

Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton mindfulness questionnaire (SMQ). *British Journal of Clinical Psychology, 47,* 451-455.

Chiesa, A. (2012). The Difficulty of Defining Mindfulness: Current Thought and Critical Issues. *Mindfulness*. Advance online publication. doi: 10.1007/s12671-012-0123-4

Chiesa, A., & Serretti, A. (2010). Mindfulness based cognitive therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Research, 187,* 441-453.

Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review, 31,* 449-464

Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and metaanalysis. *Journal of Alternative and Complementary Medicine, 15,* 593–600.

Christopher, M. S., Charoensuk, S., Gilbert, B. D., Neary, T. J., & Pearce, K. L. (2009). Mindfulness in Thailand and the United States: a case of apples versus oranges? *Journal of Clinical Psychology, 65,* 590–612.

Coffey, K. A., Hartman, M., & Fredrickson, B. L. (2010). Deconstructing mindfulness and constructing mental health: Understanding mindfulness and its mechanisms of action. *Mindfulness, 1*, 235-253.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., Urbanowski, F., Harrington, A., Bonus, Katherine, & Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine, 65,* 564-570.

Dreyfus, G. (2011). Is mindfulness present-centred and non-judgmental? A discussion of the cognitive dimensions of mindfulness. *Contemporary Buddhism*, *12*, 41-54.

Eberth, J., & Sedlmeier, P. (2012). The effects of mindfulness meditation: a meta-analysis. *Mindfulness, 3,* 174-189.

Epstein, M. (1995). *Thoughts without a thinker: Psychotherapy from a Buddhist perspective*. NY: Basic Books.

Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. G., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, *29*, 177-190.

Fjorback L., Arendt M., Ørnbøl E., & Fink P. (2011). Mindfulness-Based Stress Reduction & Mindfulness-Based Cognitive Therapy - a literature review of randomized controlled trials. *Acta Psychiatrica Scandinavica, 124,* 102-19.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57,* 35-43.

Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research, 64,* 405–408.

Grossman, P. (2010). Mindfulness for psychologists: Paying kind attention to the perceptible. *Mindfulness*, *1*, 87-97.

Grossman, P. (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re)invention of mindfulness: Comment on Brown et al. (2011). *Psychological Assessment, 23*, 1034–1040.

Gunaratana, H. (2002). *Mindfulness in plain English.* Boston, MA: Wisdom Publications.

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The Effect of Mindfulness-Based Therapy on Anxiety and Depression: A Meta-Analytic Review. *Journal of Consulting and Clinical Psychology, 78,* 169-183.

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011a). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science, 6,* 537-559.

Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011b). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging, 191*, 36-42.

Hölzel, B. K., Ott, U., Gard, T., Hempel, H., Weygandt, M., Morgen, K., & Vaitl, D. (2008). Investigation of mindfulness meditation practitioners with voxel-based morphometry. *Social Cognitive and Affective Neuroscience, 3*, 55-61.

Hough, L. M., & Schneider, R. J. (1995). Personality traits, taxonomies, and applications in orgainzations. In K. R. Murhpy (Ed.), *Individuals and behavior in organizations* (pp. 31-88). San Francisco: Jossey-Bass.

Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience*, *7*, 109-119.

Kabat-Zinn, J. (2003). Mindfulness-Based Interventions in Context: Past, Present, and Future. *Clinical Psychology: Science and Practice*, *10*, 144-156.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness.* New York, NY: Bantam Dell.

Kang, C., & Whittingham, K. (2010). Mindfulness: A dialogue between Buddhism and clinical psychology. *Mindfulness*, *1*, 161-173.

Kristeller, J. L. (2010). *Spiritual engagement as a mechanism of change in mindfulness-and acceptance-based therapies*. In Baer, R. A., Assessing Mindfulness & Acceptance Processes in Clients: Illuminating the Theory & Practice of Change (pp. 155-184). Oakland, CA: *Context Press*/New Harbinger Publications.

Kupper, Z., Bergomi, C., Meierhans, C., Tschacher, W., & Moggi, F. (2013a). *Mindfulness and Problem Drinking in the General Population.* Manuscript submitted for publication.

Kupper, Z., Bergomi, C., & Tschacher, W. (2013b). *The Effectivity of MBSR Groups in private practice: A Swiss sample.* Manuscript in preparation.

La Forge, R. (2005). Aligning mind and body: Exploring the disciplines of mindful exercise. *ACSM's Health & Fitness Journal*, *9*, 7-14.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N.D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology, 62,* 1445-1467.

Linehan, M. M. (1993). *Cognitive behavioral treatment of borderline personality disorder.* New York: Guilford Press.

Malinowski, P. (2008). Mindfulness as psychological dimension: Concepts and applications. *Irish Journal of Psychology, 29,* 153-164.

Marks, A. D., Sobanski, D. J., & Hine, D. W. (2010). Do dispositional rumination and/or mindfulness moderate the relationship between life hassles and psychological dysfunction in adolescents?. *Australian and New Zealand Journal of Psychiatry*, *44*, 831-838.

Marlatt, G. A., Bowen, S. Chawla, N, & Witkiewitz, K. (2008). Mindfulness-Based Relapse Prevention for Substance Abusers: Therapist Training and Therapeutic Relationships. In S. Hick, & T. Bien (Eds), *Mindfulness and the Therapeutic Relationship* (pp. 107-121). New York: Guilford Press.

Nyanaponika, T. (1973). *The heart of Buddhist meditation.* New York: Weiser Books.

Nyklicek, I., & van Son, J. (2012, August 30th). *Behavioural Measure of Mindfulness: Validity and Reliability of the 3 Minute Mindfulness Test*. Talk given at the XLII European Association for Behavioural and Cognitive Therapies Congress, Geneva, Switzerland.

Rahula, W. (1974) *What the Buddha Taught*. New York: Grove Press.

Sauer, S. (2010*).* Wirkfaktoren von Achtsamkeit. In H. Piron, & R. van Quekelberghe (Eds.), *Meditation und Yoga. Achtsamkeit, Heilung, Selbsterkenntnis* (pp. 167-186). Eschborn: Klotz.

Schure, M. B., Christopher, J., & Christopher, S. (2007). Mind—Body Medicine and the Art of Self-Care: Teaching Mindfulness to Counseling Students Through Yoga, Meditation, and Qigong. *Journal of Counseling & Development*, *86*, 47-56.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York, NY: Guilford Press.

Shapiro, S.L., Carlson, L.E., Astin, J.A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62,* 373–386.

Smith, G. T., Fischer, S., & Fister, S. M. (2003). Incremental validity principles in test construction. *Psychological Assessment, 15*, 467-477.

Smith, G. T., & McCarthy, D. M. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment, 7*, 300-308.

Walsh, R. (1980). The consciousness disciplines and the behavioral sciences: Questions of comparison and assessment. *American Journal of Psychiatry, 137*, 663–673.

Watterson*,* B*.* (1990)*. Weirdos From Another Planet: a Calvin and Hobbes* C*ollection*. New York: Andrews & McMeel Publishing.

Xiong, G. L., & Doraiswamy, P. M. (2009). Does meditation enhance cognition and brain plasticity?. *Annals of the New York Academy of Sciences*, *1172*, 63-69.

Articles

3. Articles

3.1 Article 1: Bergomi, C., Tschacher, W. & Kupper, Z. (2012). The Assessment of Mindfulness with Self-Report Measures: Existing Scales and Open Issues. *Mindfulness*, Advance online publication, doi: 10.1007/s12671-012-0110-9

Contribution: interpretation, manuscript writing.

3.2 Article 2: Bergomi, C., Tschacher, W. & Kupper, Z. (2012). Measuring Mindfulness: First Steps towards a Comprehensive Mindfulness Scale. *Mindfulness, Advance online publication,* doi: 10.1007/s12671-012-0102-9

Contribution: study design, scale construction (with co-authors), data recording, data analysis and interpretation, manuscript writing.

3.3 Article 3: Bergomi, C., Tschacher, W. & Kupper, Z. (2012). *Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit: Das Comprehensive Inventory of Mindfulness Experiences.* Article submitted for publication.

Contribution: study design, scale construction (with co-authors), data recording, data analysis and interpretation, manuscript writing.

3.1 Article 1. The Assessment of Mindfulness with Self-Report Measures: Existing Scales and Open Issues

Authors	Claudia Bergomi, Wolfgang Tschacher, & Zeno Kupper University Hospital of Psychiatry, Department of Psychotherapy, University of Bern, Laupenstrasse 49, 3010 Bern, Switzerland

Title	The Assessment of Mindfulness with Self-Report Measures: Existing Scales and Open Issues
Publication status	in press; advance online publication (2012)

Mindfulness
DOI 10.1007/s12671-012-0110-9

ORIGINAL PAPER

The Assessment of Mindfulness with Self-Report Measures: Existing Scales and Open Issues

Claudia Bergomi · Wolfgang Tschacher · Zeno Kupper

Abstract During recent years, mindfulness-based approaches have been gaining relevance for treatment in clinical populations. Correspondingly, the empirical study of mindfulness has steadily grown; thus, the availability of valid measures of the construct is critically important. This paper gives an overview of the current status in the field of self-report assessment of mindfulness. All eight currently available and validated mindfulness scales (for adults) are evaluated, with a particular focus on their virtues and limitations and on differences among them. It will be argued that none of these scales may be a fully adequate measure of mindfulness, as each of them offers unique advantages but also disadvantages. In particular, none of them seems to provide a comprehensive assessment of all aspects of mindfulness in samples from the general population. Moreover, some scales may be particularly indicated in investigations focusing on specific populations such as clinical samples (Cognitive and Affective Mindfulness Scale, Southampton Mindfulness Questionnaire) or meditators (Freiburg Mindfulness Inventory). Three main open issues are discussed: (1) the coverage of aspects of mindfulness in questionnaires; (2) the nature of the relationships between these aspects; and (3) the validity of self-report measures of mindfulness. These issues should be considered in future developments in the self-report assessment of mindfulness.

Keywords Mindfulness · Assessment · Self-Report · Questionnaire

C. Bergomi (✉) · W. Tschacher · Z. Kupper
Department of Psychotherapy, University Hospital of Psychiatry, University of Bern,
Laupenstrasse 49,
3010 Bern, Switzerland
e-mail: bergomi@spk.unibe.ch

Published online: 19 May 2012

Introduction

During the last decades, the empirical study of mindfulness and the use of mindfulness techniques in clinical practice have been steadily expanding. The efficacy of mindfulness-oriented interventions such as Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn 1990) and Mindfulness-Based Cognitive Therapy (MBCT; Segal et al. 2002; Teasdale et al. 1995) has been established (Grossman et al. 2004; Hofmann et al. 2010; Shigaki et al. 2006). Currently, researchers increasingly concentrate on the mechanisms through which mindfulness exerts positive influences on mental and physical well-being (Coffey and Hartman 2008; Crane et al. 2010; Shapiro et al. 2006; Williams et al. 2011).

A reliable and valid measurement of mindfulness is crucial for empirical investigation, especially as research is moving increasingly toward the study of how mindfulness influences health. The present article provides an overview and discussion of the state of assessment of mindfulness using self-reports. As reliability and validity analyses of current scales were already extensively covered elsewhere (Baer et al. 2009; Johnson 2007), we will focus on conceptual issues related to the content of the available self-report measures (content validity), on the relative strengths and disadvantages of each scale, as well as on the interpretation of unexpected findings and their implications for the validity of the assessment of mindfulness. First, general issues regarding the definition and operationalization of mindfulness will be described. We will then give a critical overview of the currently available validated self-report measures of mindfulness. Finally, we will highlight implications and future challenges for the conceptualization and operationalization of mindfulness.

The Search for a Consensual Definition and Operationalization of Mindfulness

Bishop et al. (2004) offered an influential suggestion for a consensual definition and operationalization of mindfulness. The authors described two components of mindfulness: (1) self-regulation of attention such that it is directed to the present moment and (2) a particular orientation involving curiosity, openness, and acceptance. If one considers other definitions proposed in the scientific literature, further aspects might be added to the second component—mindful orientation. These aspects are: a non-judgmental, compassionate and openhearted attitude, non-identification with the experiences, insightful understanding, non-reactivity to the experiences, a decentered stance (i.e., experiencing one's thoughts and feelings from a decentered perspective, without overidentifying with them), and participation in the experience (Brown and Ryan 2004; Kabat-Zinn 1994, 2003; Lau et al. 2006; Marlatt and Kristeller 1999; Robins 2002; Teasdale et al. 2002; Walach et al. 2006). Hence, mindfulness can be conceptualized as a form of attention characterized by a range of attributes or aspects, which are distinct but overlapping (e.g., acceptance and non-judgment). The breadth and complexity of mindfulness, as well as its origins in Buddhist psychology, have significantly contributed to the current plurality of definitions and operationalizations. As a result, over the last decade, at least eight mindfulness self-report questionnaires have been developed and are now employed in psychological research: The *Freiburg Mindfulness Inventory* (FMI; Buchheld et al. 2001; Walach et al. 2006), the *Mindful Attention Awareness Scale* (MAAS; Brown and Ryan 2003), the *Cognitive and Affective Mindfulness Scale-Revised* (CAMS-R; Feldman et al. 2007; Hayes and Feldman 2004), the *Southampton Mindfulness Questionnaire* (SMQ; Chadwick et al. 2008), the *Kentucky Inventory of Mindfulness Scale* (KIMS; Baer et al. 2004), the *Five Facet Mindfulness Questionnaire* (FFMQ; Baer et al. 2006), the *Philadelphia Mindfulness Scale* (PHLMS; Cardaciotto et al. 2008), and the *Toronto Mindfulness Scale* (TMS; Lau et al. 2006).

The availability of a variety of measures of mindfulness can be beneficial for research. For instance, the TMS specifically assesses the capacity to invoke a mindfulness state during meditation practice, whereas at least seven scales (FMI, MAAS, CAMS-R, SMQ, KIMS, FFMQ, and PHLMS) were designed to measure trait mindfulness. The theoretical and operational distinction between state and trait mindfulness is appropriate, as both are closely related but different constructs (Thompson and Waltz 2007). In fact, studies suggest that there is little or no relationship between the mindfulness state during meditation (TMS) and everyday trait mindfulness (FFMQ, CAMS-R, and MAAS; Carmody, et al. 2008; Thompson and Waltz 2007). It is thus advisable to have at one's disposal distinct questionnaires capturing either trait or state mindfulness.

Current mindfulness scales differ with respect to fundamental aspects of the mindfulness construct. While most scales include a focus on attention or awareness, comparisons also reveal substantial deviations. For instance, the MAAS (Brown and Ryan 2003) measures mindfulness rather narrowly focusing on the attention component. The KIMS and the FMI measure mindfulness as a multifaceted construct. However, the facets are distinct in the KIMS (Baer et al. 2004) but overlap in the FMI and cannot be clearly distinguished through factor analysis (Leigh et al. 2005; Walach et al. 2006). Accordingly, correlations of mindfulness measurements between MAAS, CAMS, FMI, KIMS, and PHLMS were found to range from .21 to .67 (Baer et al. 2006; Cardaciotto et al. 2008). This heterogeneity in the self-report assessments of mindfulness evidently constitutes a problem for comparing and replicating research findings. According to a recent study, current mindfulness scales include nine distinguishable aspects of mindfulness, whereas each scale comprises a different subset of these aspects and none includes all (Table 1) (Bergomi et al. 2012). The nine aspects were theoretically derived based on a review of eight questionnaires, the subscales they include, and the theoretical constructs their conceptualization is based upon. All aspects of mindfulness included in the scales were listed and semantically grouped, taking into consideration the scale descriptions and the content of items. The resulting aspects are (1) *observing, attending to experiences*; (2) *acting with awareness*; (3) *non-judgment, acceptance of experiences*; (4) *self-acceptance*; (5) *willingness and readiness to expose oneself to experiences, non-avoidance*; (6) *non-reactivity to experience*; (7) *non-identification with own experiences*; (8) *insightful understanding*; and (9) *labeling, describing*.

The subsequent section will provide an overview of the existing validated mindfulness scales (for adults), of their strengths and limitations as well as of relevant research findings. Particular attention will be paid to the conceptualization of mindfulness underlying the scales and their suitability for assessing mindfulness in the general population. All scales presented in the following show satisfactory to good internal consistency; several studies have supported their convergent, discriminant, and known-groups validity (Baer et al. 2009; Johnson 2007). Evidence for their predictive validity is nevertheless still scarce and, to our knowledge, limited to the MAAS: in one study, post-treatment MAAS scores predicted the risk of relapse/recurrence to major depressive disorder during 12 months after an MBCT intervention (Michalak et al. 2008). Moreover, scores of mindfulness questionnaires show inconsistent patterns of relationship with practice in meditators. Studies provided evidence for positive associations of meditation practice with MAAS, KIMS, FMI, FFMQ, and TMS (Baer et al.

Table 1 Aspects of mindfulness in eight current mindfulness questionnaires

Aspect of mindfulness (item example)	Questionnaire (subscale or construct)
Observing, attending to experiences (PHLMS 09: "When I walk outside, I am aware of smells or how the air feels against my face.")	CAMS (awareness)
	FMI (mindful presence, Walach et al. 2006; FMI (mind/body awareness, Leigh et al. 2005)
	KIMS (observing)
	FFMQ (observe)
	PHLMS (awareness)
Acting with awareness (MAAS 10: "I do jobs or tasks automatically, without being aware of what I'm doing.")	MAAS (presence)
	KIMS (acting with awareness)
	FFMQ (actaware)
	FMI (concentration, Bergomi 2007)
	CAMS (attention and present-focus)
Non-judgment, acceptance of experiences (KIMS 04: "I criticize myself for having irrational or inappropriate emotions.")	KIMS (accepting without judgment)
	FFMQ (nonjudge)
	SMQ (accepting difficult thoughts/images and oneself versus judging cognitions and self)
	CAMS (acceptance)
Self-acceptance (FMI 19: "I accept myself as I am.")	FMI (non-judgmental acceptance, Walach et al. 2006; acceptance and openness to self and experience in Leigh et al. 2005; self-acceptance, in Bergomi 2007)
	SMQ (accepting difficult thoughts/images and oneself versus judging cognitions and self)
Willingness and readiness to expose oneself to experiences, non-avoidance (PHLMS 06: "I try to stay busy to keep thoughts or feelings from coming to mind.")	PHLMS (acceptance)
	FMI (openness to experience, Walach et al. 2006; non-avoidant awareness, Bergomi 2007)
	SMQ (allowing attention to remain with difficult cognitions versus experiential avoidance)
	TMS (curiosity)
	CAMS (acceptance)
Non-reactivity to experience (SMQ 1: "Usually when I have distressing thoughts or images, I am able just to notice them without reacting.")	FFMQ (nonreact)
	FMI (nonreactivity to inner experience, Bergomi 2007)
	SMQ (letting difficult cognitions pass without reacting versus rumination/worry)
	CAMS (acceptance)
Non-identification with own experiences (SMQ 10: "Usually when I have distressing thoughts or images, I just notice them and let them go.")	TMS (decentering)
	FMI (mindful presence, Walach et al. 2006; non-attachment to thoughts, Leigh et al. 2005)
	SMQ (decentered awareness).
Insightful understanding (FMI 16: "I see how I create my own suffering.")	FMI (insight, Walach et al. 2006),
Labeling, describing (KIMS 2: "I'm good at finding the words to describe my feelings.")	KIMS (describing)
	FFMQ (describe)

The nine aspects proposed here were theoretically derived on the basis of a review of current mindfulness scales. The FMI showed an unstable factor solution over different studies. This overview comprises all subscales of the FMI derived in three different studies in which the scale was subjected to principal component analysis: Walach et al. 2006; Leigh et al. 2005; Bergomi 2007

2004, 2006, 2008; Brown and Ryan 2003; Walach et al. 2006) as well as for the absence of such relationships with MAAS, FFMQ, CAMS, MQ, and TMS (Baer et al. 2006, 2008; Carmody et al. 2008; Lau et al. 2006; MacKillop and Anderson 2007). It is not the primary focus of the present overview to systematically reinvestigate this psychometric evidence. Issues relating to the validity of the scales will be addressed insofar as they may contribute to guide the construction of further mindfulness scales.

This overview will start with two questionnaires, the FMI and the TMQ, which require respondents have some meditation experience. The remaining questionnaires, which

should allow measurement of mindfulness in individuals without meditation experience, will be reviewed in an order convenient for the logic of the argumentation in the overview.

Overview of Available Mindfulness Scales

The Freiburg Mindfulness Inventory

The construction of the FMI (Buchheld et al. 2001; Walach et al. 2006) was particularly inspired by the Buddhist roots of the construct. Items construction and selection were based on an extensive review of mindfulness and insight meditation literature, interviews with experts (i.e., mindfulness meditation teachers and long-time meditators), and finally, on validation analysis in a sample of Buddhist meditators. The final scale contains 30 items. The four-factor structure found in the validation study (*mindful presence*, *non-judgmental acceptance*, *openness to experiences*, and *insight*) was found to be unstable (Walach et al. 2006). Correspondingly, in two studies principal component analyses yielded a three-factor (Leigh et al. 2005) and a four-factor (Bergomi 2007) structure differing from the structure of the FMI validation study, thus reflecting the richness of aspects of mindfulness captured by this scale. In the FMI, mindfulness comprises facets that cannot be clearly disentangled. Further statistical analyses led to a short, putatively one-dimensional 14-item version of the FMI that should be more appropriate for use in the general population (Walach et al. 2006). In two studies, the 14-item version was found to be two-dimensional, comprising a *presence* factor (FMI 7: "I feel connected to my experience in the here-and-now.") and an *acceptance* factor (FMI 9:"I am friendly to myself when things go wrong."), with the number of items of each subscale differing between studies (Kohls et al. 2009; Ströhle 2006). A recent qualitative analysis of the German (i.e., original) 14-item FMI showed that individuals without meditation experience systematically misunderstood items 1 ("I am open to the experience of the present moment"), 2 ("I sense my body, whether eating, cooking, cleaning or talking."), 3 ("When I notice an absence of mind, I gently return to the experience of the here and now."), and 7 (see above) (Belzer et al. 2011). The authors recommended reformulating these items.

In summary, the FMI in its current (short and long) versions seems inappropriate in populations unfamiliar with mindfulness or Buddhist concepts, since at least some items may be systematically misunderstood by individuals without meditation experience. Nevertheless, the FMI may be particularly suited for addressing aspects of mindfulness that are relevant to experienced meditators, and its use is encouraged in populations familiar with meditation. As the scale comprises more "advanced" items, it may better differentiate among meditators. The unstable factor structure of the FMI does not allow the measurement of distinct facets of the mindfulness construct. This is an important limitation for the analysis of the differential contributions of each aspect of mindfulness and of their association with other constructs (Smith et al. 2003; Smith and McCarthy 1995). However, the lack of a clear-cut structure found in the FMI is possibly less an indication of weakness of the scale rather than an inherent aspect of mindfulness itself. This issue will be discussed further.

The Toronto Mindfulness Scale

The TMS was developed by Lau et al. (2006) as a measure of the mindful state. The scale addresses a person's experiences during an immediately preceding meditation session. The TMS comprises two factors, *curiosity* (TMS 17: "I was curious about my reactions to things") and *decentering* (TMS 33: "I was more concerned with being open to my experiences than controlling or changing them"). A trait version of the TMS was developed and preliminarily validated in meditators and nonmeditators (Davis et al. 2009). Both *trait decentering* and *trait curiosity* were positively associated with other trait mindfulness scales, with correlations higher for trait decentering. The trait decentering scores were higher in participants with longer meditation experience. Similarly, in the validation study of the state version of the TMS, *state decentering* was generally higher in meditators with more meditation experience, whereas *state curiosity* was increased only in a subgroup of meditators trained in mindfulness meditation as described in MBSR, yet not in the Shambhala subgroup. These results suggest that the curiosity subscale of the TMS may be specific to particular conceptualizations of mindfulness. The Shambhala Buddhist tradition emphasizes the redirection of attention to the meditation object rather than the observation and investigation of distracting experiences (as is emphasized in the non-secular practice of MBSR), which may explain the reported lack of effect of this practice on curiosity (Lau et al. 2006). Moreover, the Shambhala tradition focuses on existing in the world as a "warrior" who is seeking enlightenment out of compassion for all sentient beings (Rinpoche 2005). In contrast, all curiosity items of the TMS are directed towards oneself (TMS 32: "I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.").

In sum, the TMS measures two aspects of mindfulness: decentering and curiosity. Thus the TMS has the advantage of explicitly assessing the decentered stance to experiences which, as a central aspect of mindful attention (Teasdale et al. 2002), is clearly underrepresented among current mindfulness scales. Moreover, the TMS is the only current

mindfulness scale assessing state mindfulness. The TMS seems to focus on the second component of mindfulness (mindful orientation) proposed by Bishop et al. (2004), whereas self-regulation of attention is not explicitly measured by this scale. Results from meditator subgroups suggest that the curiosity subscale of the TMS may be more related to specific conceptualizations of mindfulness, for example mindfulness as taught in MBSR, rather than to a more general mindfulness construct.

The Philadelphia Mindfulness Scale

The *Philadelphia Mindfulness Scale* (PHLMS; Cardaciotto et al. 2008) is a 20-item questionnaire comprising two subscales: awareness and acceptance. The awareness subscale assesses noticing and being aware of thoughts, feelings, perceptions, and body sensations (PHLMS 3: "When talking with other people, I am aware of their facial and body expressions.") while the acceptance subscale is focused on the assessment of experiential avoidance (PHLMS 12: "There are things I try not to think about."). The scale is theoretically well-founded, predominantly based on definitions of mindfulness proposed by Kabat-Zinn (1994) and Bishop et al. (2004). Unfortunately, the two components of the PHLMS are conceptualized rather narrowly. The awareness subscale comprises open awareness of perceptions, sensations, and feelings and omits the *acting with awareness* aspect that is covered, for example, in the KIMS or FFMQ (Baer et al. 2006). Moreover, the acceptance subscale contains only items that are negatively formulated and capture experiential avoidance while positive acceptance, a compassionate stance towards oneself, non-reactivity and non-judgment are excluded.

The Mindful Attention Awareness Scale

The MAAS (Brown and Ryan 2003) is a 15-item scale measuring mindfulness as a single factor relating to attention. The one-dimensional structure of the MAAS was replicated in several studies (Carlson and Brown 2005; MacKillop and Anderson 2007). Originally, the MAAS comprised a *presence* and an *acceptance* factor. The acceptance factor was excluded in the final version because it did not provide an "explanatory advantage over that shown by the presence factor alone" (Brown and Ryan 2004, p. 244). The authors concluded that the acceptance of the present moment is already embedded within the capacity for sustained attention and thus "as a distinct construct, acceptance is functionally redundant in mindfulness" (Brown and Ryan 2004, p. 245). This conclusion, however, is challenged by results obtained with the PHLMS, which comprises both awareness and acceptance subscales. The associations reported in the validation study of the PHLMS suggest an explanatory advantage of the acceptance factor over the awareness factor, as the former was markedly associated with indicators of well-being that were uncorrelated to awareness. Similarly, using the 14-item FMI, Kohls et al. (2009) claimed that the negative relationship between mindfulness and anxiety and depression may be "completely due to the 'Acceptance' factor of mindfulness" (p. 224).

One important difference between the MAAS and both PHLMS and FMI is that the awareness items in the PHLMS and the 14-item FMI are all in the positive form, whereas in the MAAS items are all negatively formulated (MAAS 7: "It seems I am 'running on automatic' without much awareness of what I'm doing."). Some authors have described the MAAS as a measure of "being seriously, spaced out" (Rosch 2007, p. 262–263), an agitated lack of attentiveness (Grossman 2008), everyday attention lapses (Carriere et al. 2008), or automatic pilot and its effects (Williams 2010). The negative formulation of the MAAS may implicitly measure a judgmental and critical stance towards oneself. This assumption is supported by several findings. First, the MAAS has a higher correlation with the acceptance subscale than with the subscale capturing an open observing stance of the PHLMS (r=.32 vs. .21, p<.001; Cardaciotto et al. 2008) and of the KIMS (r=.41 vs. .18, p<.01; Höfling et al. 2011). Second, in the validation study of the Child and Adolescent Mindfulness Measure (CAMM; Greco et al. 2011), items reflecting (1) noticing or attending to internal phenomena; (2) lack of awareness of ongoing activities (i.e., similar to the presence items of the MAAS); and (3) a judgmental, non-accepting stance towards thoughts and feelings were subjected to exploratory factor analysis. In the resulting two-factor solution of the CAMM, the MAAS-similar items and those capturing a judgmental stance loaded on the same factor, supporting semantic relatedness. In other words, the presence factor of the MAAS may include an acceptance aspect and thus an additional acceptance factor loses explanatory power. This appears to be a result of the specific formulation of the presence items in the MAAS.

In summary, the MAAS allows a concise assessment of mindfulness in populations without previous meditation experience. This scale appears to address both the attention and the acceptance aspects of mindfulness, yet does not differentiate one aspect from the other. Moreover, measuring mindfulness "negatively" may not reflect the complete spectrum of mindfulness experiences.

The Cognitive and Affective Mindfulness Scale-Revised

The CAMS-R (Feldman et al. 2007; Hayes and Feldman 2004) is a 12-item scale of mindfulness in general daily experience. The scale was designed to address *attention*, *present-focus*, *awareness*, and *acceptance/non-judgment of thoughts and feelings*, which all converge in a single total

mindfulness score. The scale differs in an interesting way from most other mindfulness scales: most items capture a capacity and willingness to be mindful (CAMS-R 9: "I try to notice my thoughts without judging them"; CAMS-R 1: "It is easy for me to concentrate on what I am doing") rather than the extent to which an individual is being mindful throughout the day. Moreover, in developing the CAMS, the authors' intention was to measure "a kind of mindfulness that … could be useful in the treatment of depression" (Hayes and Feldman 2004, p. 260). Correspondingly, the present-focus items of the CAMS involve a tendency to preoccupation or worrying (CAMS-R 2: "I am preoccupied by the future"). In two studies, the CAMS-R (resp. the CAMS) was more related to measures of psychological distress (e.g., psychological symptoms, neuroticism, and difficulties in emotion regulation) than the MAAS, FMI, KIMS, and SMQ (Baer et al. 2006; Thompson and Waltz 2007). In sum, the CAMS-R offers a short instrument that still captures different aspects of mindfulness. Mindfulness as measured by the CAMS-R is unique in two ways: (1) it is understood as the willingness and ability to be mindful rather than as a realization of mindfulness experience during the day, and (2) it is particularly related to psychological distress. As a consequence, the CAMS-R may be of particular use in clinical studies.

The Southampton Mindfulness Questionnaire

The Southampton Mindfulness Questionnaire (SMQ; Chadwick et al. 2008; first introduced as *Mindfulness Questionnaire*, MQ, Chadwick et al. 2005, unpublished manuscript, cited in Baer et al. 2006) is a 16-item scale with four related bipolar aspects of a mindful approach to distressing thoughts and images. All items begin with, "Usually, when I have distressing thoughts or images" and continue with a mindfulness-related response (SMQ 1: "I am able to just notice them without reacting."; SMQ 12: "In my mind I try to push them away"). The four bipolar aspects assessed by the SMQ are (1) decentered awareness vs. being lost in reacting to cognitions; (2) allowing attention to stay in contact with difficult cognitions vs. experiential avoidance; (3) acceptance of difficult thoughts and images and of oneself vs. being judgmental; and (4) letting go of and being non-reactive to difficult cognitions vs. rumination or worry. Exploratory factor analyses, however, suggested a one-dimensional factor structure of the scale (Chadwick et al. 2005, 2008). The SMQ specifically assesses how (mindfully) one relates to "distressing thoughts and images, which are important phenomena in all mental health problems and the cornerstone of cognitive theory and therapy" (Chadwick et al. 2008, p. 452). Hence, the SMQ may prove to be very useful for the investigation of relationships between mental health problems and mindful awareness. The scale appears particularly suited for studies focusing on the effects of a mindful attitude towards distressing inner experiences but may be too specific for more general use, as it does not involve items relating to positive or neutral phenomena. Moreover, individuals who are less prone to distressing thoughts and images may have difficulties relating the SMQ items to their daily experience.

The Kentucky Inventory of Mindfulness Scale

The KIMS (Baer et al. 2004) comprises 39 items that largely target the conceptualization of mindfulness skills as described in Dialectical Behavioral Therapy (DBT; Linehan 1993). The KIMS was designed to measure four aspects of mindfulness in daily life (*observing*, *describing*, *acting with awareness*, and *accepting without judgment*). One aspect of mindfulness unique to the KIMS and largely based on elements of DBT is describing, the ability to verbally describe (or label) experiences (KIMS 10: "I'm good at thinking of words to express my perceptions, such as how things taste, smell, or sound."). In the mindfulness tradition, labeling of experiences is often considered a component of mindfulness meditation, signifying a general recognition that thoughts are (just) thoughts, feelings are feelings, etc. rather than an accurate description of feelings or of the contents of thought. In fact, mindfulness has been described as being pre- or para-conceptual, not involving categorization, reflection, introspection, or comparisons of experiences (Brown et al. 2007; Gunaratana 2002). It is thus unclear to what extent the ability to verbally describe experiences as measured by the KIMS constitutes a core component of mindfulness and should accordingly be a central facet in a mindfulness scale. In 2006, Baer et al. developed a further self-report measure of mindfulness, the FFMQ, which includes the four facets of the KIMS and many of its items. As these two scales are similar and interrelated, they will be discussed jointly in the following section.

The Five Facet Mindfulness Questionnaire

The FFMQ (Baer et al. 2006) is a 39-item multifaceted scale covering five aspects of mindfulness: *nonreactivity to inner experience (nonreact)*, *observing/noticing/attending to sensations/perceptions/thoughts/feelings (observe)*, *acting with awareness/automatic pilot/concentration/nondistraction (actaware)*, *describing/labeling with words (describe)*, and *nonjudging of experience (nonjudge)*. We will describe the FFMQ in more detail, as it constitutes an important attempt to integrate the conceptualizations and operationalizations of five validated mindfulness questionnaires. This scale and its facets resulted from an exploratory factor analysis of the combined pool of 112 items collected from the KIMS, the FMI, the MAAS, the CAMS, and the SMQ. The factor analysis produced five factors that could be replicated with confirmatory factor analysis (Baer et al. 2006). In a hierarchical

model, all facets except observe (KIMS 21: "I pay attention to sensations, such as the wind in my hair or sun on my face.") were shown to be aspects of an overall mindfulness construct (in a subgroup of meditators, observe significantly loaded on the overall mindfulness construct as well). This finding was unexpected, since observing, i.e., directing attention at perceptions and experiences, is generally recognized as the core aspect of mindfulness. Moreover, the observe facet was unexpectedly positively correlated with measures of dissociation, absentmindedness, psychological symptoms, and thought suppression, and not associated with nonjudging of experience (Baer et al. 2006). Furthermore, the nearly identical observe scale of the KIMS (which comprises some additional items) was negatively associated with the accepting without judgment KIMS scale in a college student sample (Baer et al. 2004). Similar associations with thought suppression (Greco et al. 2011; Thompson and Waltz 2010), somatic complaints (Greco et al. 2011), and accepting without judgment (Vujanovic et al. 2009) were also established in further studies using the original English versions of the FFMQ and KIMS and in the validation study of the CAMM (an adaptation of the KIMS for children and adolescents, from which the observing scale was finally excluded). The authors proposed that attention to experiences might be related to a tendency towards judging them in individuals without meditation experience, which is not (or less so) the case for people with meditation experience. In accordance with this, the correlation between the FFMQ observe and the FFMQ nonjudging of experience was positive in a subgroup with meditation experience (Baer et al. 2006). However, other mindfulness scales do not show similar association patterns (Bergomi 2007; Cardaciotto et al. 2008). These unexpected patterns may be more related to the observe items of the FFMQ than to attending to experience that is characteristic of mindfulness. Baer et al. (2006) proposed that the unexpected results may be due to FFMQ observe items addressing external stimuli and bodily sensations, whereas items pertaining to other facets are rather related to internal factors such as emotions, cognitions, and functioning on "automatic pilot" (Baer et al. 2006). However, this explanation leaves the unexpected positive associations between observe items and measures of mental disorders unresolved. One possible alternative explanation is that many items of the observe facet involve aspects such as strain and effort to pay attention (KIMS 9: "When I'm walking, I deliberately notice the sensations of my body moving."; KIMS 13: "When I take a shower or a bath, I stay alert to the sensations of water on my body."). What these items aim at may be well understood by individuals with some degree of meditation experience, but in the general population, endorsement of such items may reflect an exaggerated tendency to self-attention. Moreover, individuals lacking experience with meditation may easily misinterpret and misunderstand FFMQ items such as "I notice how foods and drinks affect my thoughts, bodily sensations, and emotions." (KIMS 17) (cf. Grossman 2008).

In sum, the FFMQ is a comprehensive scale that integrates the conceptualizations of mindfulness underlying five validated mindfulness scales and measures clearly distinct facets of mindfulness. It is thus a suitable instrument for the assessment of differential contributions of mindfulness aspects. Unfortunately, it also has several limitations. The approach leading to the scale was mainly empirically (rather than theoretically) founded. Merging all items of different mindfulness scales produced a rather arbitrary item pool, in which some theoretically meaningful aspects of mindfulness are absent (e.g., willingness and readiness to expose oneself to experiences), whereas others are over- or underrepresented. Additionally, it must be expected that those questionnaires which contributed more items to the item pool and which had a clearer factor structure may have had a larger impact on the results of the exploratory factor analysis. In particular, four out of the five facets resulting from the analysis yielded the same factor structure as the KIMS, which was the longest scale included in the analysis and the only one showing a clear multifaceted factor structure. It may be a consequence of this procedure that some of the aspects present in the five contributing questionnaires did not appear in the final factor structure of the FFMQ. For example, non-identification with own experiences, which is included in the FMI and the SMQ, failed to emerge from the factor analysis. The observe facet was positively associated with psychopathological categories and with mental disorders and, in a hierarchical model, it failed to load on an overall (second-order) mindfulness factor (Baer et al. 2006). It is thus unclear whether the observe items adequately pertain to the quality of noticing, an essential characteristic of mindfulness.

Implications for the Assessment of Mindfulness

The available questionnaires provide an interesting range of instruments, some of which may be particularly helpful in the investigation of specific research questions. For example, the CAMS and the SMQ may be preferable for assessments in clinical practice and research, as they focus on clinically relevant aspects such as reactions on distressing inner experiences. All other scales may also be applied in clinical contexts but may be more generally useful for research, including fields such as meditation research, cognitive science, and social psychology. For example, the use of the FMI may be encouraged in populations that are familiar with meditation. For assessments in the general population, the FFMQ provides the most comprehensive coverage of aspects of mindfulness, whereas the PHLMS offers the advantages of a short but multidimensional scale.

Yet, the current situation in the self-report assessment of mindfulness suffers from several limitations. First, each of the validated mindfulness scales is associated with particular advantages but also disadvantages for a comprehensive assessment of mindfulness in the general population. Second, substantial differences in the covered aspects of mindfulness hinder the comparison of results from studies using different scales, thus impeding communication about the construct (Brown et al. 2007; Malinowski 2008). Finally, results from current scales point at a possible further problem: the inclusion of items that can be easily misinterpreted, in particular, by respondents who are not familiar with the mindfulness concept (cf. Grossman 2008).

The availability of a suitable scale, however, is essential for research in the rapidly evolving field of mindfulness research. New self-report instruments may therefore be needed that are theoretically based and take into account previous operationalizations as well as results from the empirical research based on the available measures. The development of new scales may profit from cross-validation with constructs that are closely related to mindfulness such as non-attachment (Sahdra et al. 2010), self-compassion (Neff 2003) and awareness (Shields et al. 1989), as well as with mindfulness measures that do not rely on self-report but, for example, on experimental tasks or interview data (Grossman 2008; Frewen et al. 2011). The development of such measures is attracting increasing interest (see Bishop et al. 2004; Brown and Ryan 2003; Burg and Michalak 2010; Collins et al. 2009; Davidson 2010; Dobkin 2008; Frewen et al. 2008; Williams 2010).

Open Issues for Self-Report Measures

Researchers working on the further development of self-report measures of mindfulness will have to deal with at least three major open issues: (1) the aspects of mindfulness to be assessed; (2) the nature of the relationships between these aspects; and (3) the validity of mindfulness assessment using self-report. In the following, these issues and possible research strategies for resolving them will be described.

The issue of the coverage of the aspects of mindfulness is related to the comprehensiveness or, conversely, the parsimony (Carmody 2009) of assessments. As mentioned above, each of the current mindfulness scales provides a different description of the construct (Christopher et al. 2009). Conceiving of mindfulness too narrowly would entail the danger of denaturizing the construct, e.g., by focusing primarily on the attention component while leaving out the attributes that distinguish mindfulness from a more general attention construct. For operationalizations of mindfulness, this would correspond to a lack of content validity. On the other hand, Rosch (2007) suggested that some of the factors included in current mindfulness questionnaires assess traits indicating reasonableness such as not being "spaced out", overly emotional, or self-critical. This may imply that a more general inclusion of such aspects may lead to "measuring a construct of more versus less pathology…or Relative Sanity or Reasonableness" (Rosch 2007, p. 262–263). There is no definite answer to the issue of conceptual coverage of mindfulness because no normative mindfulness definition exists. Despite disparities, the conceptualizations of mindfulness behind current questionnaires also show important similarities and overlaps pointing to an implicit consensus among experts regarding an applicable definition of mindfulness for scientific research. It seems reasonable for research to pursue a flexible (but still consensual) conceptualization of the construct. In our view, the use of a more comprehensive conceptualization and operationalization of mindfulness is preferable. Our exploratory study based on the nine aspects of mindfulness reported in Table 1 pointed, on one side, to the relevance of non-avoidance as an aspect of the mindfulness construct and, on the other side, to a possibly marginal role of the capacity to put thoughts and feelings into words (Bergomi et al. 2012). In future studies, researchers may investigate and compare the development of putative facets of mindfulness with mindfulness meditation practice in different traditions, including secular practices such as taught in MBSR. This may contribute to determining the aspects of the mindfulness construct that are commonly enhanced among different mindfulness meditation practices. Moreover, empirical research may generally profit from a phenomenological approach, which allows a more detailed account of individual experiences related to mindfulness and meditation.

The second issue concerns the extent to which mindfulness can be subdivided into meaningful, distinct facets. Results based on the FMI, CAMS-R, and SMQ suggest that mindfulness is intrinsically holistic with tightly interconnected aspects (Leary and Tate 2007; Walach et al. 2006). Alternatively, validation studies of the KIMS, FFMQ, TMS, and PHLMS support that mindfulness may be conceptualized and assessed by distinct (and stable) facets (Baer et al. 2004, 2006; Cardaciotto et al. 2008; Lau et al. 2006). An important point needs to be resolved in this respect: do such results depend on the nature of mindfulness, or rather on theoretical assumptions and methodological artifacts specific to each questionnaire? The KIMS items, for instance, were formulated based on a clear four-factor conceptualization of mindfulness (Baer et al. 2004), which may have had a decisive influence on the factor-analytical confirmation of the expected structure. Interestingly, in a cross-cultural study, the clear-cut KIMS factor structure reported by Baer et al. (2004) could not be replicated in both an American and a Thai sample (Christopher et al. 2009). Further studies comparing the structure of

mindfulness scales between samples varying in degree of meditation experience, cultural background, gender, and age are needed. Such studies could shed light on the (in)stability of putative factor structures of scales and thus provide evidence for or against the conceptualization and measurement of mindfulness as comprising clearly distinct facets.

The third major challenge concerns whether self-report measures are a valid assessment of mindfulness (Brown et al. 2007; Christopher et al. 2009; Grossman 2008, 2011; Van Dam et al. 2009), i.e., if they provide an accurate and consistent measurement. As mentioned previously, several studies have supported the validity of current mindfulness scales, including expected associations with other constructs (convergent and discriminant validity) as well as with meditation experience (known-groups validity) (Baer et al. 2009). The MAAS was also found to predict outcomes that are consistent with mindfulness theory (predictive validity) (Michalak et al. 2008). However, several authors point to a range of problems specific to the assessment of mindfulness (Christopher et al. 2009; Grossman 2008, 2011; Grossman and van Dam 2011; Van Dam et al. 2009). Grossman (2011) mentions ten putatively intractable problems. Some of these (e.g., substantial divergence in the operationalizations of mindfulness, content validity, the complexity and richness of mindfulness, and the possibility to measure the construct relying exclusively on negatively formulated items as in the MAAS) were already discussed above. A number of the issues raised by Grossman challenge the validity of current mindfulness scales and should carefully be dealt with: Are people's ratings of their own mindfulness biased by desires or valuations due to the personal meaningfulness of items? Does the understanding of mindfulness items vary across different populations? The first question deals with an issue affecting self-report assessment in general such as bias due to social desirability and personal values. Evidence dealing with this issue in mindfulness assessment is still scarce and inconsistent. For example, social desirability was found to be positively correlated with the MAAS (Brown and Ryan 2003) but negatively correlated with the PHLMS (Cardaciotto et al. 2008). Moreover, the results were not consistent over different social desirability scales as well as over different populations (Brown and Ryan 2003; Cardaciotto et al. 2008). This question, although pointing to an important issue, generally applies to self-report assessment, and it may not be specifically relevant for mindfulness. Some unexpected results, however, suggest that a valid self-report assessment of mindfulness may be hampered by significant differences in how scale items are understood semantically (Grossman 2008, 2011). Several findings pointed to such differences: in a student sample, binge drinking and smoking students scored higher on the FMI than matched control students (Leigh et al. 2005); positive associations of the FFMQ observe scale with measures of psychological disorders in people without meditation experience, but not in experienced meditators, likewise suggested an idiosyncratic understanding of certain items (Baer et al. 2006). A qualitative study by Belzer et al. (2011) involving the FMI could confirm the unstable interpretation of some items. The ambiguity of words that are typically used in mindfulness items such as "awareness", "to notice", "to judge" or "experience" may be the reason for the differences in the understanding of items (Belzer et al. 2011; Grossman 2008). Moreover, Grossman (2011) suggested that a certain degree of mindfulness may be a prerequisite for identifying own states of mindfulness (resp. mindlessness), and thus for meaningfully responding to mindfulness items. Nevertheless, mindfulness has also been described as an inherent human capacity that occurs naturally and is not culturally bound (Brown and Ryan 2004; Goldstein 2002; Kabat-Zinn 2003). As such, it is experienced by all individuals and hence should be measurable in individuals unacquainted with Buddhist psychology. In our view, a general rejection of the validity of self-report scales in the measurement of mindfulness (as advocated by Grossman 2008) seems a rather extreme response to this challenge. In fact, current criticisms of self-report measures are based up on data derived from the currently available measures and are thus influenced by the limitations of these scales.

The weaknesses of current mindfulness scales can serve to improve the operationalization of the concept in the future. Therefore, it may be misleading to generalize from the current state of research and conclude that mindfulness in principle cannot be assessed using self-report scales. The challenge for the construction of self-report measures of mindfulness may thus lie with constructing semantically clear and unambiguous items, e.g., by formulating less abstract items. This fundamental issue should be addressed in future studies. Further qualitative examinations, evaluating item understanding in participants with different meditation experience, age, culture, or gender may considerably contribute to the compilation of items that are uniformly interpreted across different groups. Such studies may also point to aspects of mindfulness that cannot be meaningfully self-evaluated by individuals who lack a certain degree of mindfulness. Uniform understanding of items across groups should also be addressed in quantitative studies by means of differential item functioning analyses (Walker 2011).

Finally, it should be noted that the act of responding to a mindfulness questionnaire itself may exert a positive influence on the development of mindfulness. In fact, the process of self-monitoring and self-reporting alone can produce desirable behavior change (Korotitsch and Nelson-Gray 1999), and this effect may be deliberately employed in mindfulness-based interventions. To our knowledge, no study has yet dealt with this putative effect but several

observations speak for its plausibility. Favorable effects may for example result from the fact that the act of responding to questionnaire items may remind participants of their intention to develop mindfulness. Moreover, the items may provide a trigger for reflecting on which kind of experiences or emotional states facilitate or hinder keeping a mindful attitude through the day. Feedback from participants involved in studies we are currently conducting appear to confirm that such favorable effects occur when mindfulness is assessed through self-report.

Conclusion

During past decades, several self-report measures of mindfulness have been validated and are currently used in research. Each of the scales offers unique advantages and disadvantages. Together they provide an interesting palette of instruments allowing the assessment of trait and state mindfulness in populations with differing degrees of familiarity with mindfulness meditation, covering a broad spectrum of aspects of mindfulness. Yet, several findings have pointed to weaknesses of current scales, particularly with regard to the ambiguous interpretations of some items of these scales. Moreover, there is still a lack of consensus with regard to which aspects of mindfulness should be included in a scale and to the kind of relationships existing between them. Further studies, as well as new assessment instruments addressing these issues, are thus encouraged. The present overview suggested how problematic issues may be addressed. Moreover, future studies may profit from the growing literature based on previous operationalization attempts. In general, given the increased importance of the mindfulness concept and its widespread application in various clinical and health-related fields, the assessment of mindfulness should be put on a more solid theoretical and methodological basis.

References

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: the Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191–206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27–45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329–342.

Baer, R. A., Walsh, E., & Lykins, E. L. B. (2009). Assessment of mindfulness. In F. Didonna (Ed.), *Clinical handbook of mindfulness* (pp. 153–168). New York: Springer.

Belzer, F., Schmidt, S., & Lucius-Höhne, G. (2011, June). *Freiburger Fragebogen zur Achtsamkeit im Kognitiven Interview. Analyse der Beantwortungsprozesse in Abhängigkeit von Achtsamkeitserfahrung.* Speech presented at the 3. Tagung des Forschungsnetzwerks Achtsamkeit (3rd Conference of the Mindfulness Research Network). Bern, Switzerland.

Bergomi, C. (2007). Achtsamkeit, buddhistische Meditation und psychische Gesundheit (Unpublished master's thesis). Psychology Department, University of Bern, Switzerland / Retrieved from http://www.upd.unibe.ch/research/papers/Liz_Bergomi.pdf.

Bergomi, C., Tschacher, W., & Kupper, Z. (2012). Measuring mindfulness: first steps towards the development of a comprehensive mindfulness scale. *Mindfulness*. Advance online publication. doi:10.1007/s12671-012-0102-9.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: a proposed operational definition. *Clinical Psychology: Science and Practice, 11*, 230–241.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological wellbeing. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., & Ryan, R. M. (2004). Perils and promises in defining and measuring mindfulness: observations from experience. *Clinical Psychology: Science and Practice, 11*, 242–248.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211–237.

Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: the development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1*, 11–34.

Burg, J. & Michalak, J. (2010, October). Assessing mindfulness: is there an alternative to questionnaires? Talk given at the XL European Association for Behavioural and Cognitive Therapies Congress, Milan, Italy.

Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: the Philadelphia Mindfulness Scale. *Assessment, 15*, 204–223.

Carlson, L. E., & Brown, K. W. (2005). Validation of the Mindful Attention Awareness scale in a cancer population. *Journal of Psychosomatic Research, 58*, 29–33.

Carmody, J. (2009). Evolving conceptions of mindfulness in clinical settings. *Journal of Cognitive Psychotherapy, 23*, 270–280.

Carmody, J., Reed, G., Kristeller, J., Merriam, P. (2008). Mindfulness, spirituality, and health-related symptoms. *Journal of Psychosomatic Research, 64,* 393–403.

Carriere, J. S. A., Cheyene, J. A., & Smilek, D. (2008). Everyday attention lapses and memory failures: the affective consequences of mindlessness. *Consciousness and Cognition, 17*, 835–847.

Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: reliability and validity of the Southampton Mindfulness Questionnaire (SMQ). *British Journal of Clinical Psychology, 47*, 451–455.

Christopher, M. S., Charoensuk, S., Gilbert, B. D., Neary, T. J., & Pearce, K. L. (2009). Mindfulness in Thailand and the United States: a case of apples versus oranges? *Journal of Clinical Psychology, 65*, 590–612.

Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review, 13*, 79–91.

Collins, S. E., Chwala, N., Hsu, S. H., Grow, J., Otto, J. M., & Marlatt, G. A. (2009). Language-based measures of mindfulness: initial validity and clinical utility. *Psychology of Addictive Behaviors, 23*, 743–749.

Crane, C., Barnhofer, T., Hargus, E., Winder, R., & Amarasinghe, M. (2010). The relationship between mindfulness and conditional goal setting in depressed patients. *British Journal of Clinical Psychology, 42*, 281–290.

Davidson, R. J. (2010). Empirical explorations of mindfulness: conceptual and methodological conundrums. *Emotion, 10*, 8–11.

Davis, K. M., Lau, M. A., & Cairns, D. R. (2009). Development and preliminary validation of a trait version of the Toronto Mindfulness Scale. *Journal of Cognitive Psychotherapy, 23*, 185–197.

Dobkin, P. L. (2008). Mindfulness-based stress reduction: what processes are at work? *Complementary Therapies in Clinical Practice, 14*, 8–16.

Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. G., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: the development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*, 177–190.

Frewen, P. A., Evans, E. M., Maraj, N., Dozois, D. J. A., & Partridge, K. (2008). Letting go: mindfulness and negative automatic thinking. *Cognitive Therapy and Research, 32*, 758–774.

Frewen, P. A., Lundberg, E., MacKinley, J., & Wrath, A. (2011). Assessment of response to mindfulness meditation: mediation breath attention scores in association with subjective measures of state and trait mindfulness and difficulty letting-go of depressive cognition. *Mindfulness, 2*, 254–269.

Goldstein, J. (2002). *One dharma: the emerging western Buddhism*. New York: Harper San Francisco.

Greco, L. A., Baer, R. A., & Smith, G. T. (2011). Assessing mindfulness in children and adolescents: development and validation of the child and adolescent mindfulness measure (camm). *Psychological Assessment, 23*, 606–614.

Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research, 64*, 405–408.

Grossman, P. (2011). Defining mindfulness by "how poorly I think I pay attention during everyday awareness" and other intractable problems for psychology's (re)invention of mindfulness. *Psychological Assessment, 23*, 1034–1040.

Grossman, P., & van Dam, N. T. (2011). Mindfulness, by any other name…: trials and tribulations of *sati* in western psychology and science. *Contemporary Buddhism, 12*, 219–239.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: a meta-analysis. *Journal of Psychosomatic Research, 57*, 35–43.

Gunaratana, B. H. (2002). *Mindfulness in plain English*. Somerville: Wisdom.

Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice, 11*, 255–262.

Höfling, V., Moosbrugger, H., Schermelleh-Engel, K., & Heidenreich, T. (2011). Mindfulness or mindlessness? A modified version of the Mindful Attention and Awareness Scale (MAAS). *European Journal of Psychological Assessment, 27*(1), 59–64.

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: a meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*, 169–183.

Johnson, N. (2007). *Self report measures of mindfulness: a review of the literature*. Thesis: Pacific University. Common Knowledge; Retrieved from http://commons.pacificu.edu/cgi/viewcontent.cgi?article=1145&context=spp.

Kabat-Zinn, J. (1990). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness*. New York: Dell.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: mindfulness meditation in everyday life*. New York: Hyperion.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice, 10*, 144–156.

Kohls, N., Sauer, S., & Walach, H. (2009). Facets of mindfulness—results of an online study investigating the Freiburg mindfulness inventory. *Personality and Individual Differences, 46*, 224–230.

Korotitsch, W. J., & Nelson-Gray, R. O. (1999). An overview of self-monitoring research in assessment and treatment. *Psychological Assessment, 11*, 415–425.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto Mindfulness Scale: development and validation. *Journal of Clinical Psychology, 62*, 1445–1467.

Leary, M. R., & Tate, E. B. (2007). The multi-faceted nature of mindfulness. *Psychological Inquiry, 18*, 251–255.

Leigh, J., Bowen, S., & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse. *Addictive Behaviors, 30*, 1335–1341.

Linehan, M. M. (1993). *Cognitive behavioral therapy of borderline personality disorder*. New York: Guilford Press.

MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the Mindful Attention Awareness Scale (MAAS). *Journal of Psychopathology and Behavioral Assessment, 29*, 289–293.

Malinowski, P. (2008). Mindfulness as psychological dimension: concepts and applications. *Irish Journal of Psychology, 29*, 153–164.

Marlatt, G. A., & Kristeller, J. L. (1999). Mindfulness and meditation. In W. R. Miller (Ed.), *Integrating spirituality into treatment* (pp. 67–84). Washington: APA.

Michalak, J., Heidenreich, T., Meibert, P., & Schulte, D. (2008). Mindfulness predicts relapse/recurrence in major depressive disorder following MBCT. *The Journal of Nervous and Mental Disease, 196*, 630–633.

Neff, K. D. (2003). Development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223–250.

Rinpoche, S. M. (2005). *Ruling your world: ancient strategies for modern life*. New York: Morgan Road Books.

Robins, C. J. (2002). Zen principles and mindfulness practice in dialectical behavior therapy. *Cognitive and Behavioral Practice, 9*, 50–57.

Rosch, E. (2007). More than mindfulness: when you have a tiger by the tail, let it eat you. *Psychological Inquiry, 18*, 258–264.

Sahdra, B. K., Shaver, P. R., & Brown, K. W. (2010). A scale to measure nonattachment: a Buddhist complement to Western research on attachment and adaptive functioning. *Journal of Personality Assessment, 92*, 116–127.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression. A new approach to preventing relapse*. New York: Guilford.

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*, 373–386.

Shields, S. A., Mallory, M. E., & Simon, A. (1989). The body awareness questionnaire: reliability and validity. *Journal of Personality Assessment, 53*, 802–815.

Shigaki, C. L., Glass, B., & Schopp, L. H. (2006). Mindfulness-based stress reduction in medical settings. *Journal of Clinical Psychology in Medical Settings, 13*, 209–216.

Smith, G. T., & McCarthy, D. M. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment, 7*, 300–308.

Smith, G. T., Fischer, S., & Fister, S. M. (2003). Incremental validity principles in test construction. *Psychological Assessment, 15*, 467–477.

Ströhle, G. (2006). *Empirische Erfassung der Achtsamkeit*. (Unpublished master's thesis).Jena: Universität Jena.

Teasdale, J. D., Segal, Z. V., & Williams, J. M. G. (1995). How does cognitive therapy prevent relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy, 33*, 25–39.

Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: empirical evidence. *Journal of Consulting and Clinical Psychology, 70*, 275–287.

Thompson, B. L., & Waltz, J. (2007). Everyday mindfulness and mindfulness meditation: overlapping constructs or not? *Personality and Individual Differences, 43*, 1875–1885.

Thompson, B. L., & Waltz, J. (2010). Mindfulness and experiential avoidance as predictors of posttraumatic stress disorder avoidance symptom severity. *Journal of Anxiety Disorders, 24*, 409–415.

Van Dam, N., Earleywine, M., & Danoff-Burg, S. (2009). Differential item function across meditators and non-meditators on the Five Facet Mindfulness Questionnaire. *Personality and Individual Differences, 47*, 516–521.

Vujanovic, A. A., Youngwirth, N. E., Johnson, K. A., & Zvolensky, M. J. (2009). Mindfulness-based acceptance and posttraumatic stress symptoms among trauma-exposed adults without axis I psychopathology. *Journal of Anxiety Disorders, 23*, 297–303.

Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—The Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40*, 1543–1555.

Walker, C. M. (2011). What's the DIF? Why differential item functioning analyses are an important part of instrument development and validation. *Journal of Psychoeducational Assessment, 29*, 364–376.

Williams, J. M. G. (2010). Mindfulness and psychological process. *Emotion, 10*, 1–7.

Williams, M. J., McManus, F., Muse, K., & Williams, J. M. (2011). Mindfulness-based cognitive therapy for severe health anxiety (hypochondriasis): an interpretative phenomenological analysis of patients' experiences. *British Journal of Clinical Psychology, 50*, 379–397.

3.2 Article 2. Measuring Mindfulness: First Steps towards a Comprehensive Mindfulness Scale

Authors	Claudia Bergomi, Wolfgang Tschacher, & Zeno Kupper University Hospital of Psychiatry, Department of Psychotherapy, University of Bern, Laupenstrasse 49, 3010 Bern, Switzerland

Title	Measuring Mindfulness: First Steps towards a Comprehensive Mindfulness Scale
Publication status	in press; advance online publication (2012)

Mindfulness
DOI 10.1007/s12671-012-0102-9

ORIGINAL PAPER

Measuring Mindfulness: First Steps Towards the Development of a Comprehensive Mindfulness Scale

Claudia Bergomi · Wolfgang Tschacher · Zeno Kupper

Abstract The present study describes the development of and results obtained from the first version of a new mindfulness scale: the Comprehensive Inventory of Mindfulness Experiences beta (CHIME-β). The aim of the present analysis was to investigate two relevant open questions in mindfulness assessment: (1) the coverage of aspects of mindfulness and (2) the type of interrelationships among these aspects. A review of the aspects of mindfulness assessed by eight currently available mindfulness questionnaires led to the identification of nine aspects of mindfulness. The CHIME-β was constructed in order to cover each of these aspects in a balanced way. Initially, principal component and confirmatory factor analyses, as well as reliability and validity analyses, were performed in the entire sample (n=313) of individuals from the general population and mindfulness-based stress reduction (MBSR) groups. The factor structure that emerged from this analysis was further investigated in meditation-trained individuals (n=144) who had just completed an MBSR intervention. Results suggested a four-factor structure underlying the nine aspects proposed. The relationship between these mindfulness factors appears to be influenced by the degree of meditation experience. In fact, the mindfulness factors showed a greater interconnectedness among mediation-trained participants. Finally, data suggest that a non-avoidant stance plays a central role in mindfulness, while the capacity to put inner experiences into words may be related to mindfulness rather than a component of the construct.

C. Bergomi (✉) · W. Tschacher · Z. Kupper
University Hospital of Psychiatry, Department of Psychotherapy,
University of Bern,
Laupenstrasse 49,
CH-3010 Bern, Switzerland
e-mail: bergomi@spk.unibe.ch

Published online: 15 April 2012

Keywords Mindfulness · Questionnaire · Self-report · Assessment

Introduction

Mindfulness has been described as a particular way of paying attention: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn 1994). During the last three decades, several mindfulness-oriented interventions, such as mindfulness-based stress reduction (MBSR; Kabat-Zinn 1990) and mindfulness-based cognitive therapy (MBCT; Segal et al. 2002; Teasdale et al. 1995), have been developed and their efficacy has been established in a number of studies (Grossman et al. 2004; Hofmann et al. 2010; Shigaki et al. 2006). There has been an increasing focus in current research on the ways in which mindfulness affects mental and physical health (Baer 2010; Coffey and Hartman 2008; Dimidjian and Linehan 2003; Shapiro et al. 2006). Thus, the availability of valid measures of the construct is crucial (Baer 2010; Shapiro et al. 2006). Correspondingly, in recent years, the assessment of mindfulness has received increasing attention. During the last decade, at least eight mindfulness questionnaires have been developed and validated: the *Freiburg Mindfulness Inventory* (FMI; Buchheld et al. 2001; Walach et al. 2006), the *Mindful Attention Awareness Scale* (MAAS; Brown and Ryan 2003), the *Cognitive and Affective Mindfulness Scale-Revised* (CAMS-R; Feldman et al. 2007; Hayes and Feldman 2004), the *Southampton Mindfulness Questionnaire* (SMQ; Chadwick et al. 2008, 2005, in Baer et al. 2006), the *Kentucky Inventory of Mindfulness Scale* (KIMS; Baer et al. 2004), the *Five Facet Mindfulness Questionnaire* (FFMQ; Baer et al. 2006), the *Philadelphia Mindfulness Scale* (PHLMS; Cardaciotto et al. 2008), and the *Toronto Mindfulness Scale* (TMS; Lau et al. 2006).

Recently, self-report measures of mindfulness were developed for adolescents and children: the *Child and Adolescent Mindfulness Measure* (Greco et al. 2011) and an adaptation of the MAAS (Brown et al. 2011). Moreover, some interesting propositions and developments have been made with regard to methods of assessing mindfulness that do not rely on self-reports (for example Bishop et al. 2004; Burg and Michalak 2010; Collins et al. 2009; Dobkin 2008; Frewen et al. 2008).

The present paper will first describe relevant open questions relating to the conceptualization and operationalization of mindfulness. An overview of all aspects of mindfulness that have been proposed in previous operationalizations will be used as the basis for the construction of a preliminary version of a new mindfulness scale. Finally, results concerning the factor structure and validity of the preliminary scale will be presented.

Are Current Mindfulness Scales Measuring the "Same Mindfulness"?

An overview of the currently available mindfulness scales shows that the conceptualizations of mindfulness upon which they are based differ in several respects. The more evident point of divergence concerns which aspects of mindfulness are covered by the scales (Christopher et al. 2009). Semantic coverage ranges from the one-dimensional assessment of mindfulness as the direction of attention in the present moment (as in the MAAS), through two-dimensional conceptualizations (e.g., PHLMS and TMS), to a multifaceted understanding of the construct encompassing aspects such as non-reactivity to experiences and the capacity to describe inner experiences (e.g., KIMS and FFMQ). In other words, while some questionnaires are based on a narrow conceptualization of mindfulness, others provide a broader semantic coverage of the construct.

Current scales not only vary widely in terms of the choice of aspects of mindfulness, but also in terms of the conceptualization of the relationship between these aspects. Results from scales such as the KIMS, FFMQ, and PHLMS support a conceptualization of mindfulness as being separable in aspects or components that are stable over different populations (Baer et al. 2004, 2006; Cardaciotto et al. 2008). Contrary to this, studies involving the CAMS-R, FMI, and SMQ favor a more holistic conceptualization of mindfulness as entailing interconnected aspects that cannot be meaningfully disentangled in order to create stable questionnaire subscales (Buchheld et al. 2001; Chadwick et al. 2008; Feldman et al. 2007).

Current mindfulness scales also vary with respect to the trait-to-state continuum. The TMS assesses the capacity to invoke a mindfulness state during a very short period of time, for instance, during a meditation session. The FMI, MAAS, and PHLMS measure mindfulness as a quasi-trait, as respondents are required to refer to the items over a period of time, for instance, the last two weeks. In the KIMS, CAMS-R, and FFMQ, respondents are asked to rate whether items are generally true for them, thus treating mindfulness as a trait (Cardaciotto 2005).

In sum, current mindfulness scales base on conceptualizations of mindfulness that differ over relevant issues. Some differences may be desirable. For example, as trait mindfulness and state mindfulness are two related but different constructs (e.g. Thompson and Waltz 2007), it is suitable to possess scales allowing for the measurement of each of them. Nevertheless, the open questions related to (1) the coverage of aspects of mindfulness and (2) the kind of relationships between these aspects pose relevant problems. They hamper a meaningful comparison of the results from different studies and point to a lack of consensus regarding the conceptualization of mindfulness (Brown et al. 2007; Dimidjian and Linehan 2003; Hayes and Wilson 2003; Malinowski 2008).

Present Research

The present study is of exploratory nature. Its aim was to contribute to the development of a new measure of mindfulness, the Comprehensive Inventory of Mindfulness Experiences (CHIME). First, a theoretical integration of previous operationalizations will be proposed and used to construct a preliminary version of the scale, the CHIME-β. On the basis of the CHIME-β the two open questions described above will be explored: (1) appropriate coverage of the components of mindfulness and (2) the nature of the relationship between the components covered by the scale. Pertaining to the first issue, the factorization of the CHIME-β and the correlations among the components may shed light on the centrality of the aspects of mindfulness included in the analysis and designate the aspects that are more (or less) central to the construct. The second issue (i.e., the interrelationship between the aspects of mindfulness) may be addressed through model comparison, as well as by the stability of factor solutions in populations with different meditation experiences. A stable solution would speak for the possibility to separate mindfulness in stable components while an instability in the factorization would support a holistic understanding of mindfulness.

Method

Scale Construction

A Review of Previously Proposed Aspects of Mindfulness

In 2004, Bishop and colleagues made an important contribution to the field by proposing a consensual operational

definition of mindfulness that distinguishes between two main components: (1) self-regulation of attention so that it is directed in the present moment and (2) a particular orientation involving curiosity, openness, and acceptance. In this section, all aspects of mindfulness included in the eight validated mindfulness questionnaires available as of 2009 were reviewed and grouped according to their content. For this purpose, the two-component conceptualization proposed by Bishop and colleagues was used as a guideline, beginning with aspects pertaining to self-regulation of attention, followed by aspects describing a mindful orientation. For all scales, the aspects of mindfulness included in the following review correspond to the aspects indicated by the scale's authors in the validation studies. As the FMI is shown to have a different component structure across different populations, the aspects of mindfulness measured by this scale will be drawn not only from the results of the validation study (Walach et al. 2006) but also from two studies in which the FMI was subjected to principal component analysis (PCA). In one study, PCA used in an undergraduate college population (N=196) yielded three components: *acceptance and openness to self and experience*, *mind/body awareness*, and *non-attachment to thoughts* (Leigh et al. 2005). In the other study, PCA in 409 subjects from the general population provided four interpretable components: *non-avoidant awareness*, *non-reactivity to negative experiences*, *self-acceptance*, and *concentration* (Bergomi 2007).

Self-regulation of attention is generally regarded as the central element of mindfulness (Bishop et al. 2004; Kabat-Zinn 1994). Within self-regulation of attention, two distinct aspects have been described and assessed: the first may be labeled *observing, attending experiences* and the second, *acting with awareness. Observing, attending experiences* refers to the directing of one's attention to present experiences, including one's current thoughts, feelings, sensations, and perceptions. This aspect is included in the CAMS (factor: *awareness*), FMI (*mindful presence* in Walach et al. 2006; *mind/body awareness* in Leigh et al. 2005), KIMS (*observing*), FFMQ (*observe*), and the PHLMS (*awareness*). The second aspect of attentional self-regulation, *acting with awareness*, addresses focusing on one thing at a time or concentrating (i.e., not running on automatic pilot) while doing things. This aspect is assessed in the MAAS (*presence), KIMS (acting with awareness), FFMQ (actaware), FMI (concentration in Bergomi 2007), and CAMS (attention and present-focus).*

With regard to the second component of mindfulness, the literature is less clear as to exactly which aspects it should comprise. According to the popular definition by Kabat-Zinn (1994), nonjudgment of experiences and self is a central aspect of a mindful orientation. It means accepting or welcoming one's own feelings, thoughts, sensations, and perceptions without being adversely judgmental or critical. Nonjudgmental acceptance is well represented among the mindfulness scales: it is measured by the KIMS (*accepting without judgment*), FMI (*nonjudgmental acceptance* in Walach et al. 2006; *acceptance and openness to self and experience* in Leigh et al. 2005; *self-acceptance* in Bergomi 2007), FFMQ (*nonjudge*), and *SMQ* (*accepting difficult thoughts/images and oneself versus judging cognitions and self*). Most of the acceptance items focus on acceptance of one's own experiences, such as thoughts and feelings (KIMS16: *I believe some of my thoughts are abnormal or bad and I shouldn't think that way*). However, many of the acceptance-related items, particularly those from the FMI, tap a semantically different aspect: an accepting, compassionate stance that is more directly related to oneself (FMI19: *I accept myself as I am*). These two aspects, *nonjudgment of experiences* and *self-acceptance*, are clearly overlapping but semantically distinguishable. This distinction is supported by empirical evidence: Baer et al. (2006) subjected all the items of five mindfulness scales (the MAAS, FMI, SMQ, KIMS, CAMS) to exploratory factor analysis (EFA), which led to the construction of the FFMQ (Baer et al. 2006). In their analysis, none of the FMI acceptance items loaded on the *nonjudgment of experience* factor. Therefore, in the present study, *nonjudgment of experiences* and *self-acceptance* were treated as two distinct aspects of mindfulness.

The *acceptance* scale of the PHLMS does not directly capture self-acceptance or nonjudgment but rather addresses experiential avoidance (PHLMS16: *If there is something I don't want to think about, I'll try many things to get it out of my mind*). The term "experiential avoidance" refers to behaviors aimed at altering the form and frequency of particular private experiences (e.g., memories, thoughts, bodily sensations, emotions) in order to avoid them (Hayes et al. 1996). As pointed out by Bishop et al. (2004), a mindful orientation to experiences is characterized by openness and curiosity—in other words, by a *willingness and readiness to expose oneself to (pleasant and unpleasant) experiences* (i.e., the opposite of experiential avoidance). Among the current scales, this aspect is not only addressed by the PHLMS, but is also found in the FMI *(openness to experience* in Walach et al. 2006; *non-avoidant awareness* in Bergomi 2007) and the *SMQ* (*allowing attention to remain with difficult cognitions versus experiential avoidance*). Moreover, the *curiosity* scale in the TMS captures a construct closely related to the willingness to expose oneself to experiences.

A further proposed aspect of mindfulness is *non-reactivity to experience*, which means refraining from impulsive reactions to experiences. Non-reactivity to experience contributes to a disruption of automatic reaction patterns. Baer et al. (2006) suggested that this capacity "*may be seen as [a]*

way(s) of operationalizing acceptance" (p. 42). This aspect of mindfulness is captured by the FFMQ (*nonreact*), FMI (*non-reactivity to inner experience*, Bergomi 2007), and SMQ (*letting difficult cognitions pass without reacting versus rumination/worry*).

The *acceptance* scale of the CAMS could not be clearly assigned to one of the proposed aspects. This scale involves three items: CAMS3: *I can tolerate emotional pain*; CAMS4: *I can accept things I cannot change*; and CAMS10: *I am able to accept the thoughts and feelings I have*. Semantically, these items can be subsumed into the following components: *nonjudgment/acceptance of experiences*, *non-reactivity to inner experiences*, and *willingness and readiness to expose oneself to (pleasant and unpleasant) experiences*.

The TMS, FMI, and SMQ address aspects of mindfulness that are related to insight rather than to an accepting attitude: *decentering* (TMS), *mindful presence* (FMI, Walach et al. 2006), *non-attachment to thoughts (*FMI, Leigh et al. 2005), *insight (*FMI, Walach et al. 2006), and *decentered awareness* (SMQ). When analyzed at the item level, these subscales seem to comprise two distinct aspects: on one side, *non-identification with own experiences* (TMS40: *I was aware of my thoughts and feelings without over-identifying them*) and on the other side, *insightful understanding* (FMI16: *I see how I create my own suffering*). Of the two, *non-identification with own experiences* is more process-related and refers to the act of experiencing one's thoughts and feelings from a decentered perspective, without over-identifying with them or elaborating them further. This aspect of mindfulness has also been described as metacognitive insight or "*experiencing thoughts as thoughts (that is, as events in the mind, rather than as direct readouts on reality)*" (Teasdale 1999, p. 147). *Insightful understanding* means understanding thoughts and feelings from a broader perspective, being aware of their relativity and caducity, and gaining insight into the inner workings of the mind.

Finally, *describing/describe* (KIMS, FFMQ) has also been suggested as a component of mindfulness. Describing or labeling refers to the ability to put feelings, mood, perceptions, and thoughts into words. The inclusion of this capacity as a component of mindfulness in self-report measures was first proposed by Baer et al. (2004, 2006) and was based largely on the conceptualization of mindfulness proposed by dialectical behavioral therapy (DBT; Linehan 1993).

In sum, a review of the mindfulness literature suggests a working hypothesis list of nine aspects of mindfulness (Table 1): (1) *observing, attending to experiences (OBSERVE)*, (2) *acting with awareness (ACTAWARE)*, (3) *nonjudgment/acceptance of experiences (NONJUDGE)*, (4) *self-acceptance (SELFACCEPT)*, (5) *willingness and readiness to expose oneself to experiences/non-avoidance (NONAVOID)*, (6) *non-reactivity to experience (NONREACT)*, (7) *non-identification with own experiences (NONIDENTIFY)*, (8) *insightful understanding (INSIGHT)*, *and* (9) *labeling/describing (DESCRIBE)*. Given the complexity and richness of the mindfulness construct, the aspects of mindfulness found in the literature could have been classified in a different manner. The scope of the arrangement presented here is not intended to suggest a list of non-overlapping or independent (orthogonal) aspects of mindfulness, but rather to provide one possible meaningful description of all components of the construct. This list will allow a testing of hypotheses concerning the structure of mindfulness.

The Construction of the CHIME-β

The CHIME-β construction was based on the list of mindfulness aspects derived from the above review of all published scales. New items were formulated instead of relying on already existing ones in order to avoid a biased selection of items. Nevertheless, previous formulations were largely taken into account in the development of the items of the CHIME-β. For each aspect, seven to nine items were created by the authors, two of whom have personal, long-term experience with mindfulness meditation and Buddhist psychology. From this initial item pool, four items per aspect were selected through consultation with meditation-naïve individuals. Thus, each aspect was represented in a balanced way in the final item pool to avoid certain aspects from being represented more than others and thus more strongly influencing the results of dimension reduction analysis. Moreover, the procedure aimed at selecting items that a general population sample would easily understand. The resulting scale, the CHIME-β, comprised 36 items covering the previously proposed nine aspects of mindfulness with four items each. The current project regards mindfulness as a general human capacity occurring in daily life that is susceptible to change, for example, through specific training (Brown and Ryan 2004; Buchheld et al. 2001). Hence, mindfulness was conceptualized as a quasi-trait (Cardaciotto 2005). Thus, the CHIME-β instructs respondents to relate items to the past seven days of their life. Participants respond using a six-point Likert scale (1=*applies fully* to 6=*does not apply at all*).

Participants

The study sample comprised 313 participants, 128 from the general population, and 185 from MBSR groups. Participants from the general population completed a questionnaire once while participants from the MBSR groups were asked to complete a questionnaire at the beginning of the eight-week intervention (between group sessions one and two) and at the end of the intervention (during the week before the final session). Demographic data are shown in Table 2. A subsample of 68 participants from the general population also completed an additional mindfulness measure, the FFMQ. The

Table 1 Overview of eight mindfulness questionnaires and the mindfulness aspects they include

	Aspects of mindfulness								
	OBSERVE	ACTAWARE	NONJUDGE	SELFACCEPT	NONAVOID	NONREACT	NONIDENTIFY	INSIGHT	DESCRIBE
MAAS		x							
FMI	x	x		x	x	x	x	x	
KIMS	x	x	x						x
FFMQ	x	x	x			x			x
CAMS	x	x	x		x	x			
SMQ			x		x	x	x		
PHLMS	x				x				
TMS					x		x		

For each row crosses indicate the aspects of mindfulness that are included in the respective questionnaires

participants' education levels ranged from *10 school years or less* (2.9 %) to *university or advanced technical college degree* (37.0 %). The majority of the participants (39.0 %) reported *diploma or apprenticeship* as their highest educational qualification. Seventy-nine participants reported practicing meditation on a regular basis (at least one session per week); this included meditation techniques in a broad sense, such as Yoga, autogenic training, progressive muscle relaxation, Zen meditation, Vipassana meditation, Qigong, and Tai Chi. Ethnic information was not collected, but the sample was predominantly Caucasian. The sample was nonclinical as it included individuals from the general population participating in MBSR groups that focused on teaching a more mindful and conscious way of coping with everyday stress. The mean psychopathological symptom load of all groups was in the nonclinical range (i.e., within one standard deviation of the mean scale *t* score). This was also true for the mean psychopathological symptom load among participants from MBSR groups at the beginning of the intervention (GSI: mean=58.2, SD=12.5, n=185). The MBSR interventions took place in several cities in German-speaking Switzerland and were conducted by teachers from the MBSR Union Switzerland.

Table 2 Demographic data

	N	% female	Mean age, SD	% Meditation practice	GSI, SD
Entire sample	313	63.6 (0)	41.6, 11.5 (4)	25.2	55.7, 12.3
Subsample with FFMQ	68	43.1 (0)	37.4, 11.2 (0)	25.0	50.1, 10.1
Meditation-trained	144	68.8 (0)	45.0, 9.7 (1)	25.7	52.1, 11.8

The numbers of missing cases are in parentheses

Meditation practice current meditation practice, including meditation techniques in a broad sense, at least one session per week; *GSI* Global Symptom Index *t* value (psychopathological symptom load)

Two analyses were performed using this sample of participants. The first analysis used the data of the entire sample. For this analysis, the initial measurement in the MBSR groups was used. Thus, data in the first analysis involved largely meditation-untrained individuals. The second analysis considered 144 participants who had completed the questionnaire at the end of the MBSR interventions. Participants in this sample had thus just undergone an intensive 8-week mindfulness-based intervention comprising a theoretical introduction to mindfulness and daily practice of approximately 1 h and were thus all trained in meditation.

Instruments

Participants completed the CHIME-β, the German version of the Brief Symptom Inventory (BSI, Franke 2000), and two scales of the Emotion-Regulation Skills Questionnaire (ERSQ; Berking and Znoj 2008). A subgroup of the general population (N=68) also completed the German version of the Five Facets of Mindfulness Questionnaire (FFMQ; Heidenreich et al. 2011). Mindfulness was assessed using the CHIME-β, which was described above.

Psychological distress was measured using the BSI, which includes 53 items and measures subjective impairment due to somatic and psychological symptoms. The scale covers nine symptom dimensions (*somatization*, *obsession–compulsion*, *interpersonal sensitivity*, *depression*, *anxiety*, *hostility*, *phobic anxiety*, *paranoid ideation*, *psychoticism*) and includes a general severity index (GSI). Participants rated the items on a scale from 0 (*not at all*) to 4 (*extremely often*). In support of the validity of the scale, the GSI has been shown to be negatively associated with quality of life and with social support and it showed discriminant validity from personality measures (Franke 2000)

The ERSQ is a self-report instrument that utilizes a five-point Likert-type scale (0=*not at all* to 4=*almost always*) to

assess adaptive emotion-regulation skills. In this study, two of the nine skills covered by the scale (each consisting of three items) were assessed: *readiness to confront distressing situations* (e.g., *I did what I had planned, even if it made me feel uncomfortable or anxious*) and *modification* (e.g., *I was able to influence my negative feelings*). The validity of these ERSQ subscales is supported by several results: in both community (Berking and Znoj 2008) and clinical (Berking et al. 2008) samples the two subscales used in this study were positively associated with measures of mental health and well-being and negatively with measures of psychopathology.

The FFMQ is a 39-item scale that measures five facets of mindfulness: *non-reactivity to inner experience*, *observing/noticing/attending to sensations/perceptions/thoughts/feelings*, *acting with awareness/automatic pilot/concentration/nondistraction*, *describing/labeling with words*, and *nonjudgment of experience*. Participants responded on a five-point Likert-type scale (1=*never or very rarely true* to 5=*very often or always true*). The FFMQ was chosen because of its wide assessment of the mindfulness construct and the availability of subscales. The questionnaire was shown to have satisfying convergent and discriminant validity (Heidenreichet al. 2011).

All scales showed good reliabilities in this study's sample. In the entire sample the Cronbach's alpha were α=0.96 for the BSI, α=0.83 for the ERSQ subscale *readiness to confront distressing situations* and α=0.76 for the ERSQ subscale *modification*. In the subsample to which the FFMQ was administered Cronbach's alpha for this scale was, with α=0.91, highly satisfactory.

Procedure

MBSR teachers from the MBSR Union Switzerland distributed the questionnaires to their group participants, who participated voluntarily in the study. The study targeted 29 MBSR groups and mean participation was 74 % (range= 25–100 %). Participants from the general population were solicited by the authors from among their friends and acquaintances. Participation in this case was also voluntary and the study followed guidelines of research ethics. Participants completed the questionnaires either on an online platform (51.4 %) or using paper and pencil. Several studies have shown that results obtained using online data collection techniques are typically consistent with those obtained through traditional methods (Gosling et al. 2004). The questionnaires were presented in the same order for each participant, with the exception of 68 participants, to whom the FFMQ was also administered and where the sequence of the FFMQ and CHIME-β was counterbalanced. No compensation was paid for participation.

Statistical Procedures

As the CHIME-β was developed for use in the general population, PCA was first conducted on the data of the entire sample, which included individuals largely untrained in meditation (N=313). Before conducting PCA, the item distributions were screened. The overall reliability was calculated using Cronbach's alpha and the corrected item-total correlations were analyzed. Items with low (r<0.20) corrected item-total correlation (Everitt 2002) were screened in order to establish if low item-to-scale correlation was due to a poor formulation of the items. The items retained after this preliminary analysis were subjected to PCA with oblique rotation (oblimin), which allows for correlations between the components. In contrast to EFA methods (e.g., principal axis factoring, maximum likelihood), PCA allows keeping as much variance as possible from the measured variables, since principal components are calculated using the total variance of the measured variables (Jolliffe 2002; Park et al. 2002). Although models resulting from PCA and EFAs can differ, when they do for a given set of data, then the number of principal components required for an adequate dimension reduction is equal or larger than the number of factors proposed by EFA (Jolliffe 2002). This is usually due to larger item loadings in the PCA solution (Jolliffe 2002) and thus to the formation of additional components (rather than to the further partitioning of factors into smaller components). This property of PCA is desirable for the present analysis. In fact, the aim was to reduce the nine aspects proposed above maintaining as much as possible of their dimensionality (i.e. not excluding too many) in order to study their interrelationships. Moreover, given the exploratory nature of the study, no a priori structure was expected to emerge from the analysis, which is also in line with use of PCA (Costello and Osborne 2005). In fact, the eight aspects of mindfulness covered in the CHIME-β were not expected to emerge from the analysis as distinct factors but rather to merge into a smaller set of variables. The number of factors to be retained was determined using parallel analysis and Velicer's minimum average partial (MAP) test (O'Connor 2000). Parallel analysis gives the number of components accounting for more variance than the components derived from random data. The MAP test is based on the relative amount of systematic and unsystematic variance remaining in the correlation matrix after successive extractions of components (O'Connor 2000). Only items with a minimum loading of 0.40 on at least one factor (pattern matrix) were retained. Moreover, items that could not be clearly assigned to one factor (difference between absolute values of the highest and next highest loading below 0.20) were excluded from the final solution. Cross-comparison with loadings from the structure matrix was performed.

The model derived from PCA was subjected to CFA. The aim of the CFA in the entire sample was not to confirm the generalizability of the model derived from the PCA, as this could only be done performing CFA in new samples (Cudeck and Browne 1983). Rather, the aim was to focus on analyzing the interrelationships of the components, i.e. comparing correlation and hierarchical models, performing correlation analysis at the level of latent variables (which limits the impact of measurement error; Tomarken and Waller 2005) or calculating regression coefficients to a putative higher-order mindfulness factor. In the CFA, accuracy of the model fit was tested with four fit indices: the Chi-square, the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Estimates were calculated using the maximum likelihood (ML) method. All items included in the analysis had skewness and kurtosis below 1, which is well below the cutoff values of 2 for skewness and 7 for kurtosis, suggested by West et al. (1995) for the use of the ML method. The fit of the models was evaluated using the following fit index cutoffs indicating a good fit: RMSEA≤ 0.08, SRMR≤0.10, and CFI≥0.90 (Brown 2006; Browne and Cudeck 1993; Marsh et al. 2004; Schermelleh-Engel et al. 2003). More restrictive goodness of fit indices can be more easily achieved when latent variables are derived from item parcels (i.e., means of aggregated items pertaining to the same factor) but are too restrictive if latent variables are derived directly from the scale items (Marsh et al. 2004). Several authors have criticized the use of parcels in the scale development process, as parcels may hide possible model misspecifications and existing relationships among items and factors, thus hampering analysis of construct validity (Bandalos and Finney 2001; Cattell 1974; Christopher et al. 2009; Marsh et al. 2005). We therefore opted for analysis at the item level with less restrictive cutoffs.

Several models were tested with CFA: (1) a single-factor model in which one overall mindfulness factor directly accounts for the variance of all the indicators (i.e., items); (2) a correlational multiple-factor model representing the factor structure found in the PCA and in which the factors are allowed to freely correlate with one another; and (3) a hierarchical multiple-factor model in which an overall mindfulness construct explains the variance in the factors emerging from the PCA. Models were compared by means of Chi-square difference tests. If lack of fit was present in the best fitting model, modification indices were examined. Modification indices give an estimate of the expected Chi-square decrease (i.e., gain of model fit) if a particular parameter is left unconstrained. CFA was repeated in meditation-trained individuals. The 5:1 criterion for the proportion of sample size to number of items (5×28=140) suggested for CFA (Kline 2005) was, with n=144, fulfilled. Reliabilities were calculated with Cronbach's alpha. For correlational analysis, the Pearson product–moment correlation and partial correlations were used. Group differences were tested by means of t-tests. Reliability analysis, correlational analysis, and PCA were performed using the software package PASW Statistics 18. CFA was performed using Mplus 6.

Missing values in the questionnaire data from CHIME-β, FFMQ, BSI and ERSQ were screened. Missing values amounted to less than 0.5 % of all cases. Possible biases due to missing values were evaluated by comparing results obtained with an iterative Markov Chain Monte Carlo (MCMC) multiple imputations procedure, mean substitution and pairwise deletion. As SPSS 18.0 cannot compute the statistical analysis required in this study (e.g., reliabilities and data reduction analysis) by pooling multiple data sets with imputed values (Acock 2005; Graham 2009), this strategy was not used. Instead, results based on the dataset computed by mean substitution were compared to both results based on five datasets computed with multiple imputation and results based on pairwise deletion. Results with mean substitution were highly congruent with results derived with the other strategies, e.g. in PCA 89 % of the loadings on the pattern matrix deviated maximally by 0.01 (and no loading deviated by more than 0.03). This suggests that data derived through mean substitution are unbiased in the current dataset. Thus, data imputed by mean substitution were utilized for the analysis in both SPSS and MPLUS.

Results

Exploring the Structure of Mindfulness

The following analyses were performed in the entire sample (N=313). Cronbach's alpha over all 36 items was very high (α=0.94), but four items showed corrected item-total correlations below 0.20. One item (*I am the greatest critic of myself*) pertained to the NONJUDGE aspect; the second item (*I am right in the middle of my thoughts*), to the NONIDENTIFY aspect; the third (*In distressing situations, I feel myself inwardly distressed*), to the NONREACT aspect; and the fourth (*I know that my experiences are transient*), to the INSIGHT aspect of mindfulness. A closer analysis of these items suggested that they may have been ambiguous and may thus have been interpreted differently by participants, leading to the observed lack of association. The four items were excluded from consequent analysis, and the remaining 32 items were again subjected to reliability analysis. The ensuing Cronbach's alpha was 0.95, and all corrected item-total correlations were above 0.20.

The 32 mindfulness items were subjected to PCA. The Bartlett Test of Sphericity was significant (CHI=5,974.0,

$p<0.001$), and the KMO coefficient was very good (>0.90). The number of participants ($N=313$) was large enough to produce a stable solution even in the case of low item communalities or low determination of the components (MacCallum et al. 1999). In the present data, the MAP test indicated a four-component solution. Parallel analysis showed that three components had eigenvalues greater than those of the components derived from random data. The four-component solution was retained because specifying too few components is potentially more harmful than specifying too many as it might lead to a loss of important information (Zwick and Velicer 1986). Moreover, the scree plot also indicated a four-component solution. The chosen four-component solution accounted for 57.2 % of the total variance. As shown in Table 3, 28 of the original 32 items met the inclusion criteria. Of the four items excluded, one showed the highest loading below 0.40, while three did not show the required minimal loading difference of 0.20 between the two highest loadings. Cross-comparison of the pattern and the structure matrices support this structure. As expected due to the associations between the components, loadings in the structure matrix were larger, leading to numerous cross-loadings. Nevertheless, for each variable the highest pattern coefficient coincided with the highest structure coefficient. Moreover, for each component, the items showing the highest pattern coefficients were the same as those having the highest structure coefficients.

The component accounting for most variance comprised items from SELFACCEPT (3 items of the 3 retained in the final solution), NONJUDGE (4/4), NONREACT (2/3), INSIGHT (2/3), NONIDENTIFY (1/3), and NONAVOID (1/4). This component describes an *accepting, nonreactive*, *and insightful orientation*. As was expected, one component addressed self-regulation of attention and included items from OBSERVE (3/4) and ACTAWARE (3/4). It was termed *present awareness*. The third component included all four DESCRIBE items and was thus named *describing of experiences*. The fourth component included mostly NONAVOID items (3/4) but also an OBSERVE and a NONIDENTIFY item, thus capturing an *open, non-avoidant orientation*.

The component structure from the PCA was further examined in a CFA (Table 4). As expected, the single-factor model showed a poor fit, which indicates that the structure of the CHIME-β is not unidimensional. The correlational four-factor model representing the factor structure found in the PCA yielded good results except for the CFI, which was slightly below the cutoff value of 0.90. Finally, the hierarchical four-factor model was tested. It was compared with the correlational four-factor model by means of Chi-square difference. The hierarchical model yielded a significantly higher Chi-square value, which supports the correlational model. Nevertheless, CFI, SRMR, and RMSEA showed only slight differences, which speaks against rejection of the more parsimonious hierarchical model.

According to the modification indices for the correlational four-factor model (i.e., the best fitting model), the lack of fit was primarily due to existing correlations between items from the *accepting, nonreactive, and insightful orientation* factor, not accounted for in the model. As this suggested that this factor may be meaningfully subdivided into further subscales, PCA was run on its 13 items. Parallel analysis pointed to a one-component solution, while MAP indicated the presence of two components. PCA enforcing a two-component solution accounted for 61.7 % of total variance. The first component comprised five items from the mindfulness aspects: SELFACCEPT (item 42), NONREACT (item 34), NONIDENTIFY (item 7), INSIGHT (item 29), and NONAVOID (item 30). The second component comprised the four NONJUDGE items. The four remaining items did not show differences above 0.20 between their loadings on the two components. This suggests that within the *accepting, nonreactive, and insightful orientation* items, those relating to a nonjudgmental stance tend to emerge as a meaningful distinct component, even if this tendency was not strong enough to show in the analysis at the level of the entire item pool. Interestingly, SELFACCEPT, NONREACT, INSIGHT, NONIDENTIFY, and NONAVOID showed a high degree of interconnectedness, as items referring to these aspects tended to load on the same component.

Reliability, Validity, and Correlational Analyses

In order to test the reliability of the proposed mindfulness factors and of the overall scale, Cronbach's alphas were calculated for each. All alpha coefficients were very satisfactory ($\alpha \geq 0.85$), with the exception of the factor *open, non-avoidant orientation* ($\alpha=0.65$). This suggests a larger heterogeneity of the items in this factor and is acceptable for a factor including only five items (John and Benet-Martinez 2000; Ryff and Keyes 1995). Discriminant and convergent correlations between each of the four factors, the assessed emotion-regulation skills, and psychopathological symptom load were also calculated (Table 5, top). All correlations showed the expected pattern of mindfulness to be positively associated with emotion-regulation skills and negatively associated with psychopathological symptom loads. Among the mindfulness factors, *accepting, nonreactive, and insightful orientation* showed the strongest associations with lack of symptoms and regulatory skills. Finally, correlations between the FFMQ and CHIME-β (criterion validity) were calculated (Table 5, bottom). The correlations indicate the validity of the CHIME-β. In fact, correlations between the overall scores were high and each FFMQ subscale had the strongest correlation with its semantically closest CHIME-β factor. In order to examine whether the CHIME-β provides incremental validity over an existing mindfulness scale, the FFMQ, partial correlations were computed. First, correlations between CHIME-β, BSI

Table 3 Component structure of CHIME-β in the entire sample

Item	Component loading			
	1	2	3	4
Factor 1: accepting, nonreactive and insightful orientation				
20. (SELFACCEPT) I can accept myself as I am.	**0.809**	−0.011	0.093	−0.056
38. (NONJUDGE) I believe my thoughts are abnormal and tell myself that I should not be thinking like that.	**0.777**	−0.211	0.160	0.175
27. (NONJUDGE) I am ashamed because of my thoughts.	**0.761**	−0.216	0.117	0.171
42. (SELFACCEPT) Even when I see my flaws, I can still be friendly towards myself.	**0.760**	0.148	−0.080	−0.067
05. (NONJUDGE) I think that my feelings are bad or inappropriate and that I should not have them.	**0.717**	−0.192	0.173	0.201
09. (SELFACCEPT) I have an appreciative attitude towards myself.	**0.660**	0.071	0.117	−0.026
34. (NONREACT) Even in painful and problematical situations, I can inwardly stay calm and serene.	**0.649**	0.350	−0.067	−0.304
16. (NONJUDGE) I judge my thoughts and feelings as being good or bad.	**0.606**	−0.043	0.072	−0.020
07. (NONIDENTIFY) I can distance myself from my thoughts and observe them from another angle.	**0.587**	0.218	−0.053	0.158
29 (INSIGHT) When I see how I create big problems from small difficulties, I can smile about it.	**0.575**	0.106	0.023	0.103
40. (INSIGHT) I can consider things from different perspectives.	**0.540**	−0.100	0.157	0.300
30. (NONAVOID) I can confront unpleasant situations as well.	**0.485**	0.101	0.235	0.102
01. (NONREACT) I notice my feelings, without having to immediately put them into action.	**0.433**	0.172	0.151	0.144
Factor 2: Present awareness				
02. (OBSERVE) When I wash my hands or brush my teeth I notice my movements and the sensations occurring in my body.	−0.088	**0.795**	0.023	0.109
13. (OBSERVE) During daily activities as well, I pay attention to the sensations in my body.	−0.063	**0.744**	0.017	0.166
03. (ACTAWARE) While I am doing something I pay attention to how I do it.	0.052	**0.632**	0.147	0.140
35. (OBSERVE) When I eat, I consciously pay attention to the taste of the food.	0.034	**0.610**	0.199	0.117
36 (ACTAWARE) I find it difficult to pay attention to the "here and now" and to concentrate on that which currently happens.	0.238	**0.565**	0.111	−0.205
14. (ACTAWARE) I rush through my activities without paying much attention to them.	0.152	**0.536**	0.072	0.262
Factor 3: Describing of Experiences				
04. (DESCRIBE) I have trouble finding the right words to express my feelings.	0.063	0.004	**0.890**	−0.043
15. (DESCRIBE) I find it hard to put my thoughts into words.	−0.059	0.039	**0.882**	−0.043
26. (DESCRIBE) I can find the right words that describe my feelings.	0.003	0.138	**0.796**	0.034
37. (DESCRIBE) I am good at verbally conveying my ideas, expectancies and concerns.	0.217	0.014	**0.709**	−0.022
Factor 4: Open, non-avoidant orientation				
19. (NONAVOID) When I am in pain, I try to avoid the sensation as much as possible.	0.107	0.056	−0.101	**0.576**
8. (NONAVOID) I tend to suppress unpleasant feelings and thoughts. Ich neige dazu, unangenehme Gefühle und Gedanken zu verdrängen.	0.093	0.030	0.061	**0.531**
41. (NONAVOID) I can dwell on unpleasant feelings and sensations. Ich kann bei unangenehmen Gefühlen und Empfindungen verweilen.	−0.016	−0.004	0.141	**0.521**
17. (NONIDENTIFY) I observe how my thoughts and feelings come and go.	0.212	0.269	−0.026	**0.486**
24. (OBSERVE) I consciously notice everyday sounds, for example, the mowing of the lawn, the ticking of clocks or the sound of a keyboard.	−0.075	0.171	0.145	**0.474**

N=313; loadings are from pattern matrix; the questionnaire items are in German, which the authors translated into English; these translations are preliminary

and emotion-regulatory skills were controlled by the FFMQ overall score (Table 6, top). Additionally, partial correlations were calculated controlling each CHIME-β subscale for its semantically most associated subscale(s) from the FFMQ (Table 6, bottom). Results support the incremental value of the CHIME-β over the FFMQ scores. Particularly the CHIME-β overall score and the subscale *accepting, nonreactive, insightful orientation* showed substantial partial correlations with emotion regulation and, to a lesser extent, with symptom load after controlling for the FFMQ scores.

Table 4 Fit indices of the models in confirmatory factor analysis

Model	*df*	X^2	X^2 difference	CFI	SRMR	RMSEA (90 %CI)
Entire sample (n=313)						
One-factor model	350	1,783.88***		0.69	0.09	0.11 (0.11–0.12)
Four-factor model	344	974.30***		0.87	0.06	0.08 (0.07–0.08)
Hierarchical four-factor model	346	985.90***	11.60** (*df*=2)	0.86	0.07	0.08 (0.07–0.08)
Meditation-trained individuals (n=144)						
One-factor model	350	1,075.23***		0.67	0.10	0.12 (0.11–0.13)
Four-factor model	344	648.91***		0.86	0.08	0.08 (0.07–0.09)
Hierarchical four-factor mode	346	650.50***	1.59 (*df*=2)	0.86	0.08	0.08 (0.07–0.09)

*p<0.05; **p<0.01; ***p<0.001

Group comparisons showed that, as would be expected, in participants who completed the MBSR training the CHIME-β overall was significantly higher at the end (mean=4.41, SD=0.60) compared to the beginning of the training (mean=3.96, SD=0.65, t(143)=11.32, p<0.001). In the entire sample, male participants reported significantly higher CHIME-β overall scores (mean=4.13, SD=0.79, n=114) than women (mean=3.94, SD=0.72, n=199, t(311)=2.11, p=0.04) although the difference was not conspicuous. The CHIME-β overall score was not significantly correlated with the age of participants (p>0.69).

Tables 7 and 8 (above) display the intercorrelations between the four latent factors of mindfulness and the loadings of each latent factor to an overreaching mindfulness variable respectively. All correlations and loadings showed the expected directions and were moderate to strong. Moreover, even if the hierarchical model failed to outperform the correlational four-factor model, all standardized regression weights on the higher-order mindfulness factor were above 0.7, which suggests that the four factors share a relevant proportion of variance.

Factor Analysis in Meditation-Trained Individuals

The one- and four-factor models from the previous analysis were tested with CFA in meditation-trained individuals (n=144). As in the entire sample, the one-factor model fitted poorly (Table 4). The four-factor models again showed good fit, except for the CFI. Nevertheless, modification indices gave a pattern different than that in the entire sample, as they did not indicate the presence of residual correlations between items in the *accepting, nonreactive, and insightful orientation* factor. Rather, they pointed out residual shared variance between a few items from the *present awareness*, *accepting*, *nonreactive*, *and insightful orientation*, and *open, non-avoidant orientation* factors. As these residual correlations did not suggest any clear pattern beyond an interconnectedness between items from different factors, no additional PCA was performed.

Other than in the entire sample, the Chi-square difference between the hierarchical and the non-hierarchical four-factor model was nonsignificant. Thus, the more parsimonious hierarchical model was preferred in the case of data from

Table 5 Criterion, discriminant, and convergent intercorrelations

	Overall CHIME-β score	Accepting, nonreactive, insightful orientation	Present awareness	Describing of experiences	Open, non-avoidant orientation
GSI	−0.46***	−0.52***	−0.31***	−0.28***	−0.20**
ER confront	0.52***	0.52***	0.29***	0.45***	0.35***
ER modification	0.74***	0.76***	0.53***	0.46***	0.49***
FFMQ overall	0.88***	0.80***	0.65***	0.68***	0.60***
FFMQ observe	0.67***	0.46***	0.73***	0.35**	0.64***
FFMQ describe	0.65***	0.43***	0.52***	0.85***	0.44***
FFMQ actaware	0.66***	0.57***	0.65***	0.46***	0.35**
FFMQ nonjudge	0.46***	0.60***	0.12	0.33**	0.25*
FFMQ nonreact	0.65***	0.76***	0.26*	0.42***	0.42***

N=313; *GSI* General Severity Index (BSI), *ER confront* readiness to confront distressing situations, *ER modif* modification
*p<0.05; **p<0.01; ***p<0.001; two-tailed

Table 6 Incremental validity: partial correlations controlling for FFMQ scores

	Overall CHIME-β score	Accepting, nonreactive, insightful orientation	Present awareness	Describing of experiences	Open, non-avoidant orientation
Control variable: FFMQ overall					
GSI	−0.19	−0.27*	0.01	0.09	−0.14
ER confront	0.43***	0.42***	0.12	0.26*	0.04
ER modification	0.39**	0.54***	0.07	−0.15	0.16
Control variable(s): semantically related FFMQ subscales					
GSI		−0.23†	−0.03	−0.19	−0.24†
ER confront		0.38**	0.25*	0.37**	0.12
ER modification		0.60***	0.00	0.19	0.13

N=68; in the bottom part of the table *accepting, nonreactive, insightful orientation* was controlled for FFMQ nonjudge and FFMQ nonreact, *present awareness* for FFMQ actaware and FFMQ observe, *describing of experiences* for FFMQ describe, and *open, non-avoidant orientation* for FFMQ observe and FFMQ nonreact

† $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

meditation-trained individuals. Correlations between the latent factors and standardized regression coefficients on the higher-level mindfulness factor are displayed in Tables 5 and 6 (bottom) respectively. The Fisher test for differences between correlations showed that two inter-factor correlations (*open, non-avoidant orientation* with both *accepting, nonreactive, and insightful orientation*, and *present awareness)* were significantly higher ($p<0.05$) in meditation-trained individuals. The correlation between *describing of experiences* and *accepting, nonreactive, and insightful orientation* showed a decreasing tendency in meditation-trained individuals ($p<0.10$). After Bonferroni correction for six tests, only the correlation between *present awareness* and *open, non-avoidant orientation* remained significantly higher ($p<0.008$). As in the complete sample, but more markedly, *describing of experiences* showed the lowest regression coefficient to the higher-level mindfulness factor, while *open, non-avoidant orientation* had the highest regression coefficient (n.b., standardized coefficients above one can occur when factors are not orthogonal; see Jöreskog 1999).

Discussion

The aim of this study was to contribute to the development of a self-report scale that is suitable for the assessment of mindfulness as a quasi-trait in a general population, taking into account the scientific literature on mindfulness, current mindfulness scales, and empirical results. For this purpose, a review of the aspects of mindfulness assessed by the available validated mindfulness scales was performed. Nine mindfulness aspects were identified. This was helpful because it provided a common language across the current questionnaires and conceptualizations. A first version of a mindfulness scale that covers the nine identified aspects in a balanced way was constructed.

In a sample largely untrained in meditation, PCA suggested that four mindfulness factors underlie the nine aspects assessed. One factor, *present awareness*, clearly taps into the first component of mindfulness—self-regulation of attention—of Bishop and colleagues (2004); this factor involves both the awareness of perceptual and bodily experiences and the non-distracted, attentive way of carrying out

Table 7 Correlations between the four latent mindfulness factors

	Present awareness	Describing of experiences	Open, non-avoidant orientation
Entire sample (n=313)			
Accepting, nonreactive, insightful orientation	0.60***	0.63***	0.72***
Present awareness		0.47***	0.75***
Describing of experiences			0.60***
Mediation-trained individuals (n=144)			
Accepting, nonreactive, insightful orientation	0.62***	0.52***	0.81***
Present awareness		0.45***	0.85***
Describing of experiences			0.61***

* $p<0.05$; ** $p<0.01$; *** $p<0.001$; two-tailed

Table 8 Standardized regression weights on the overall mindfulness construct

	Accepting, nonreactive, insightful orientation	Present awareness	Describing of experiences	Open, non-avoidant orientation
Entire sample (n=313)	0.83***	0.74***	0.71***	0.89***
Meditation-trained individuals (n=144)	0.79***	0.80***	0.60***	1.04***

*p<0.05; **p<0.01; ***p<0.001; two-tailed

everyday activities. Two factors captured a mindful orientation towards experiences: *accepting, nonreactive, and insightful orientation* and *open, non-avoidant orientation*. Finally, the fourth factor that emerged from the analysis was *describing of experiences*. The CHIME-β and its factors showed acceptable internal consistencies and generated the expected patterns in criterion, discriminant and convergent validity analyses. Moreover, results suggest that the CHIME-β provides incremental value over another mindfulness measure, the FFMQ. In fact, the CHIME-β includes aspects of mindfulness such as self-acceptance, an insightful orientation, non-identification with inner experiences and non-avoidance, which are not included in the FFMQ. Pre-post comparisons in participants who completed the MBSR intervention showed the expected pattern of heightened reported mindfulness at the end of the intervention. Unexpectedly, male participants showed significantly higher mindfulness scores than women, although the difference was not conspicuous. A similar result was reported in the validation study of the CAM-R (Feldman et al. 2007). In CFA, the four-factor structure yielded comparable results in individuals who were more experienced in meditation, yielding additional supportive evidence for this structure.

Interestingly, a factor addressing a lack of experiential avoidance (vs. a heightened willingness to be exposed to negative situations) and another factor that addresses an accepting stance towards one's own thoughts, feelings, and oneself emerged from the analyses. This points to a meaningful distinction between "acceptance" as conceptualized in the PHLMS (i.e., as lack of experiential avoidance) and acceptance as conceptualized in most other mindfulness questionnaires (i.e., as self-acceptance and nonjudgment). *Open, non-avoidant orientation* showed the highest correlations with the other factors as well as the highest loading to a putative higher-order mindfulness construct. This supports the particular relevance of this aspect. In fact, a certain degree of openness and willingness to stay in contact with experiences may be viewed as an essential attitude in the development of mindfulness (cf., Hayes and Feldman 2004). The fourth factor of the analysis, *describing of experiences*, was the only factor exclusively containing items from one of the nine suggested mindfulness aspects. Thus, while eight of the nine suggested mindfulness aspects showed a high degree of interconnectedness, items related to the capacity to put experiences into words appear to denote a capacity that is semantically distinct. From a theoretical point of view, *describing own experiences* neither belongs to self-regulation of attention nor describes an orientation towards experiences. Most definitions of mindfulness do not include this aspect (Bishop et al. 2004; Kabat-Zinn 1994). In the mindfulness tradition, labeling of experiences is often considered a component of mindfulness meditation. However, traditionally, such labeling is typically not an accurate description of emotions or of the contents of thought; more commonly, it is a general recognition that thoughts are thoughts, feelings are feelings, etc. This does not involve categorization, reflection, or introspection (Brown et al. 2007; Gunaratana 2002). In accordance with this, among the four factors, *describing of experiences* showed the weakest regression coefficient to a putative higher-order mindfulness construct and the weakest correlations to the other three factors. Moreover, *describing of experiences* showed a tendency for decreasing associations with other mindfulness factors in meditation-trained individuals. It is thus unclear to what extent the ability to verbally describe experiences as measured by the KIMS or FFMQ constitutes a component of mindfulness and should thus be included in a parsimonious assessment of mindfulness.

In sum, with reference to the first open question described above concerning an appropriate conceptual coverage of mindfulness scales, the present results suggest a conceptualization of mindfulness as comprising one factor covering the self-regulation of attention component as described by Bishop and colleagues (2004) and at least two factors covering a mindful orientation: one describing a self-accepting, nonjudgmental, insightful, and non-reactive stance towards experiences and the other describing an open, non-avoidant presence. Results suggest that an open, non-avoidant presence may be viewed as a fundamental attitude in mindfulness, while *describing of experiences* may be a capacity that is *related to* mindfulness rather than constituting an aspect *of* mindfulness.

In the CFA, the four-factor model showed a slight lack of fit in both the entire sample and in meditation-trained individuals. Nevertheless, the reason for this slight lack of fit was different in the two analyses: in the entire sample, the model failed to account for a tendency of the items capturing a nonjudgmental stance to form a factor of their own within the *accepting, nonreactive, and insightful orientation* factor.

In fact, the *accepting, nonreactive, and insightful orientation* factor tended to split into two distinct aspects, one uniformly addressing nonjudgment towards experiences and the other comprising self-acceptance, an open and insightful orientation, and non-reactivity. This tendency may be due to the different meaning of the items. Alternatively, it may be a consequence of the negative formulation of the nonjudgment items, which contrasts with the positive formulation of all other items within the *accepting, nonreactive, and insightful orientation* factor. On the other hand, in meditation-trained individuals, the slight lack of fit of the model was due to associations between factors (vs. within-factor) that were not accounted for in the model. In other words, in this sample the model failed to account for associations between items from different factors. This result suggests that with increasing experience in mindfulness meditation, the different aspects of the construct become more interconnected. This is also supported by the fact that only in meditation-trained individuals, the model assuming a higher-level mindfulness factor was clearly superior to a model in which the four factors were merely correlated. Moreover, inter-factor correlations, excluding those involving *describing of experiences*, tended to be higher in meditation-trained individuals than in the entire sample. This is a relevant finding with reference to the second issue concerning the kind of relationship among mindfulness aspects and, in particular, the issue about the possibility to discern distinct aspects of mindfulness. An important research issue is the need to measure complex constructs at the component level, which allows testing hypotheses about their relationships with other variables (Hough and Schneider 1995; Smith et al. 2003; Smith and McCarthy 1995). The current results suggest the possibility of a stable solution over different populations. Nevertheless, the results also suggest that the relationship between the aspects of mindfulness may tend towards one involving heightened interconnectedness through experience with mindfulness meditation and a growing understanding of the construct. This may help explain the current inconsistency in findings in the scientific literature, i.e., the fact that some findings support a multifaceted conception of mindfulness (Baer et al. 2006; Cardaciotto et al. 2008; Lau et al. 2006, Leary and Tate 2007) while others indicate a more holistic conceptualization of mindfulness (Buchheld et al. 2001; Chadwick et al. 2008; Feldman et al. 2007). The current results differ in several ways from the findings of a similar study that led to the construction of the FFMQ (Baer et al. 2006). In the study by Baer et al., all items of five mindfulness questionnaires were subjected to EFA, yielding five interpretable factors: *nonreact*, *observe*, *actaware*, *describe*, and *nonjudge*. The main reason for the different factorizations may be that some aspects of mindfulness were represented to a greater extent than others in terms of quantity of items and that the structure of the FFMQ was strongly influenced by the structure of the KIMS, which was the longest scale included in the EFA. This was not the case with the present study, as particular attention was paid to address every aspect of mindfulness with an equal number of items.

It should be noted that the current study has a number of limitations. About a quarter of the participants reported practicing meditation regularly. Meditation practice, however, was defined in a broad sense, and included Tai Chi, Yoga, Qui Gong, and relaxation techniques. Moreover, the difference in meditation experience between the two groups consisted of an 8-week mindfulness-based intervention and was thus limited. Nevertheless, as MBSR constituted a rather intensive intervention, involving daily formal and informal mindfulness practice, as well as weekly meetings and theoretical information, important changes related to mindfulness practice may well be expected. Third, the present handling of missing data may be suboptimal as it was influenced by the capabilities of the software used. Nevertheless, given the small percentage of missing values in the current data the chosen procedure should not have sensibly influenced the results. Fourth, the arrangement of aspects of mindfulness proposed in the present study is possibly only one of several different meaningful classifications and it may be expected that results from a questionnaire based on another arrangement may have yielded different results. Finally, the quality of the questionnaire may have been improved by experts' ratings of the items as well as by the inclusion of more items per mindfulness aspect. Nevertheless, according to Fabrigar et al. (1999), three to five items per expected factor should provide an adequate item pool.

The current study also has substantial merits. The item pool included all aspects of mindfulness that have been proposed in previous operationalizations. Moreover, biases that may have arisen from an unequal inclusion of these aspects were avoided. The study involved a comparatively large sample and implemented sophisticated statistical methods. Finally, the results help to explain some of the inconsistencies of previous findings and provide clear developments for the conceptualization and operationalization of mindfulness.

Future research should further analyze the influence of meditation practice on the structure of mindfulness in order to better characterize this construct and provide measures of mindfulness that are adequate for different populations. Particular attention should be paid to finding a middle ground between measuring mindfulness at the aspect level and avoiding giving the construct a factitious structure. Furthermore, the measurement of mindfulness using methods other than self-report deserves greater attention. In summary, the findings reported here have helped to shed light on the mindfulness construct. The results offer important directions for the construction of the final version of the CHIME.

References

Acock, A. C. (2005). Working with missing values. *Journal of Marriage and Family, 67*, 1012–1028.

Baer, R. (Ed.). (2010). *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change*. Oakland: Context Press/New Harbinger.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: the Kentucky inventory of mindfulness skills. *Assessment, 11*, 191–206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27–45.

Bandalos, D. L., & Finney, S. J. (2001). *Item parceling issues in structural equation modeling* (pp. 269–296). In G. A. Marcoulides, & R. E. Schumacker (Eds.), *New developments and techniques in structural equation modeling* (pp. 269–296). Hillsdale, NJ: Erlbaum.

Bergomi, C. (2007). *Achtsamkeit, buddhistische Meditation und psychische Gesundheit* (Unpublished master's thesis). Psychology Department, University of Bern, Switzerland. Retrieved from http://www.upd.unibe.ch/research/papers/Liz_Bergomi.pdf.

Berking, M., & Znoj, H. (2008). Entwicklung und Validierung eines Fragebogens zur standardisierten Selbsteinschätzung emotionaler Kompetenzen (SEK-27). *Zeitschrift für Psychiatrie, Psychologie und Psychotherapie, 56*, 141–152.

Berking, M., Wupperman, P., Reichardt, A., Pejic, T., Dippel, A., & Znoj, H. (2008). General emotion-regulation skills as a treatment target in psychotherapy. *Behavior Research and Therapy, 46*, 1230–1237.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., et al. (2004). Mindfulness: a proposed operational definition. *Clinical Psychology: Science and Practice, 11*, 230–241.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., & Ryan, R. M. (2004). Perils and promises in defining and measuring mindfulness: observations from experience. *Journal of Clinical Psychology, Science & Practice, 11*, 242–248.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211–237.

Brown, K. W., West, A. M., Loverich, T. M., & Biegel, G. M. (2011). Assessing adolescent mindfulness: Validation of an adapted mindful attention awareness scale in adolescent normative and psychiatric populations. *Psychological Assessment*, in press: Epub ahead of print retrieved May 10, 2011, doi: 10.1037/a0021338.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park: Sage.

Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: the development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1*, 11–34.

Burg, J., & Michalak, J. (2010). *Assessing mindfulness: Is there an alternative to questionnaires?* Talk given at the XL European Association for Behavioural and Cognitive Therapies Congress, Milan, Italy.

Cardaciotto, L. (2005). *Assessing mindfulness: The development of a bi-dimensional measure of awareness and acceptance*. Unpublished doctoral dissertation, Drexel University, Philadelphia.

Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: the Philadelphia mindfulness scale. *Assessment, 15*, 204–223.

Cattell, R. B. (1974). Radial item parcel factoring vs. item factoring in defining personality structure in questionnaires: theory and experimental checks. *Australian Journal of Psychology, 26*, 103–119.

Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: reliability and validity of the Southampton Mindfulness Questionnaire (SMQ). *British Journal of Clinical Psychology, 47*, 451–455.

Christopher, M. S., Charoensuk, S., Gilbert, B. D., Neary, T. J., & Pearce, K. L. (2009). Mindfulness in Thailand and the United States: a case of apples versus oranges? *Journal of Clinical Psychology, 65*, 590–612.

Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review, 13*, 79–91.

Collins, S. E., Chwala, N., Hsu, S. H., Grow, J., Otto, J. M., & Marlatt, G. A. (2009). Language-based measures of mindfulness: initial validity and clinical utility. *Psychology of Addictive Behaviors, 23*, 743–749.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis, *Practical Assessment, Research & Evaluation: A Pear-reviewed Electronic Journal, 10*, 1–9. Retrieved from http://pareonline.net/pdf/v10n7.pdf.

Cudeck, R., & Browne, M. W. (1983). Cross-validation of covariance structures. *Multivariate Behavioral Research, 18*, 147–167.

Dimidjian, S., & Linehan, M. M. (2003). Defining an agenda for future research on the clinical application of mindfulness practice. *Clinical Psychology: Science and Practice, 10*, 166–171.

Dobkin, P. L. (2008). Mindfulness-based stress reduction: what processes are at work? *Complementary Therapies in Clinical Practice, 14*, 8–16.

Everitt, B. S. (2002). *The Cambridge Dictionary of Statistics*, 2nd Edition, CUP.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272–299.

Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. G., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: the development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*, 177–190.

Franke, G. H. (2000). *Brief symptom inventory (BSI)*. Göttingen: Beltz.

Frewen, P. A., Evans, El M., Maraj, N., Dozois, D. J. A., & Partridge, K. (2008). Letting go: mindfulness and negative automatic thinking. *Cognitive Therapy and Research, 32*, 758–774.

Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about Internet questionnaires. *American Psychologist, 59*, 93–104.

Graham, J. W. (2009). Missing data analysis: making it work in the real world. *Annual Review of Psychology, 60*, 549–576.

Greco, L. A., Baer, R. A., & Smith, G. T. (2011). Assessing mindfulness in children and adolescents: Development and validation of the child and adolescent mindfulness measure (CAMM). *Psychological Assessment*, in press: Epub ahead of print retrieved May 10, 2011, doi: 10.1037/a0022819.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: a meta-analysis. *Journal of Psychosomatic Research, 57*, 35–43.

Gunaratana, B. H. (2002). *Mindfulness in plain English*. Somerville: Wisdom.

Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice, 11*, 255–262.

Hayes, S. C., & Wilson, K. G. (2003). Mindfulness: method and process. *Clinical Psychology: Science and Practice, 10*, 161–165.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. D. (1996). Experiential avoidance and behavioral disorders: a functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*, 1152–1168.

Heidenreich, T., Zarbock, G., Ströhle, G., & Michalak, J. (September, 2011). *The German version of the five-facet mindfulness questionnnaire (FFMQ): Psychometric properties and relationship with the Schema Mode Inventory*. Talk given at the 41st European Association for Behavioural and Cognitive Therapies Congress, Reykjavík, Iceland.

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: a meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*, 169–183.

Hough, L. M., & Schneider, R. J. (1995). Personality traits, taxonomies, and applications in organizations. In K. R. Murphy (Ed.), *Individuals and behavior in organizations* (pp. 31–88). San Francisco: Jossey-Bass.

John, O. P., & Benet-Martinez, V. (2000). Measurement: reliability, construct validation, and scale construction. In H. T. Reis &C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 339–369). New York: Cambridge.

Jolliffe, I. T. (2002). *Principal component analysis, Springer series in statistics* (2nd ed.). New York: Springer.

Jöreskog, K. G. (1999). *How large can a standardized coefficient be*? Lincolnwood, IL: Scientific Software International. Available at www.ssicentral.com.

Kabat-Zinn, J. (1990). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness*. New York: Dell.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: mindfulness meditation in everyday life*. New York: Hyperion.

Kline, R. B. (2005). *Principles and practice of structural equation modeling*. New York: Guilford.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., et al. (2006). The Toronto mindfulness scale: development and validation. *Journal of Clinical Psychology, 62*, 1445–1467.

Leary, M. R., & Tate, E. B. (2007). The multi-faceted nature of mindfulness. *Psychological Inquiry, 18*(4), 251–255. doi:10.1080/10478400701598355.

Leigh, J., Bowen, S., & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse. *Addict Behavior, 30*, 1335–1341.

Linehan, M. M. (1993). *Cognitive behavioral therapy of borderline personality disorder*. New York: Guilford.

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4*, 84–99.

Malinowski, P. (2008). Mindfulness as psychological dimension: concepts and applications. *Irish Journal of Psychology, 29*, 153–164.

Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: comment on hypothesis-testing approaches to setting cutoff values for fit indexes and danger in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*, 320–341.

Marsh, H. W., Hau, K. T., & Grayson, D. (2005). Goodness of fit evaluation in structural equation modeling. In Maydeu-Olivares, A. & McArdle, J. (Eds.), *Contemporary Psychometrics: A festschrift to Roderick P. McDonald* (pp. 275–340). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers, 32*, 396–402.

Park, H. S., Dailey, R., & Lemus, D. (2002). The use of exploratory factor analysis and principal components analysis in communication research. *Human Communication Research, 28*, 562–577.

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*, 719–727.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8*, 23–76.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: a new approach to preventing relapse*. New York: Guilford.

Shapiro, S. L., Carlson, L., Astin, J., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 72*, 373–36.

Shigaki, C. L., Glass, B., & Schopp, L. H. (2006). Mindfulness-based stress reduction in medical settings. *Journal of Clinical Psychology in Medical Settings, 13*, 209–216.

Smith, G. T., & McCarthy, D. M. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment, 7*, 300–308.

Smith, G. T., Fischer, S., & Fister, S. M. (2003). Incremental validity principles in test construction. *Psychological Assessment, 15*, 467–477.

Teasdale, J. D. (1999). Metacognition, mindfulness and modification of mood disorders. *Clinical Psychology & Psychotherapy, 5*, 146–155.

Teasdale, J. D., Segal, Z. V., & Williams, J. M. G. (1995). How does cognitive therapy prevent relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy, 33*, 25–39.

Thompson, B. L., & Waltz, J. (2007). Everyday mindfulness and mindfulness meditation: overlapping constructs or not? *Personality and Individual Differences, 43*, 1875–1885.

Tomarken, A. J., & Waller, N. G. (2005). Structural equation modeling: strengths, limitations, and misconceptions. *Annual Review of Clinical Psychology, 1*, 31–65.

Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—the Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40*, 1543–1555.

West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables. In R. H. Hoyle (Ed.), *Structural equation modeling: concepts, issues, and applications* (pp. 57–75). Thousand Oaks: Sage.

Zwick, W. R., & Velicer, W. F. (1986). Factors influencing five rules for determining the number of components to retain. *Psychological Bulletin, 99*, 432–442.

3.3 Article 3. Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit: Das Comprehensive Inventory of Mindfulness Experiences

Authors	Claudia Bergomi, Wolfgang Tschacher, & Zeno Kupper University Hospital of Psychiatry, Department of Psychotherapy, University of Bern, Laupenstrasse 49, 3010 Bern, Switzerland

Title	Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit: Das Comprehensive Inventory of Mindfulness Experiences
Publication status	submitted first revision (2012); under review

Kurzüberschrift: ACHTSAMKEITSFRAGEBOGEN

Titel: Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit: Das Comprehensive Inventory of Mindfulness Experiences

Title: Construction and first validation of the Comprehensive Inventory of Mindfulness Experiences

Claudia Bergomi
Universitäre Psychiatrische Dienste, Universität Bern, Schweiz

Wolfgang Tschacher
Universitäre Psychiatrische Dienste, Universität Bern, Schweiz

Zeno Kupper
Universitäre Psychiatrische Dienste, Universität Bern, Schweiz

Zusammenfassung: In der vorliegenden Arbeit werden Entwicklung und Validierung eines Fragebogens zur umfassenden Erfassung der Achtsamkeit, des Comprehensive Inventory of Mindfulness Experiences (CHIME), beschrieben. An einer Allgemeinbevölkerungs-Stichprobe (N=298) und einer Stichprobe von TeilnehmerInnen an MBSR-Kursen (N=161) wurde die Faktorenstruktur des CHIME ermittelt und seine Reliabilität und Validität geprüft. Faktorenanalytische Verfahren ergaben eine achtfaktorielle Struktur. Die Struktur wurde in einer zusätzlichen konfirmatorischen Stichprobe (N=202) überprüft. Der Fragebogen sowie seine Unterskalen weisen gute Reliabilitätswerte auf (interne Konsistenz und Retest-Reliabilität). Analysen zur Messinvarianz der einzelnen Items über Gruppen, die sich bezüglich Meditationserfahrung, Alter, Geschlecht und Symptombelastung unterschieden, zeigten keine systematischen Unterschiede im Verständnis der Items. Die Kennwerte zur Konstrukt-, Kriterium-, und inkrementellen Validität sowie zur Veränderungssensitivität waren alle mindestens zufriedenstellend. Mit dem CHIME steht somit ein Fragebogen mit guten psychometrischen Eigenschaften zur Selbsteinschätzung der Achtsamkeit zur Verfügung. Der CHIME umfasst alle in den aktuellen Instrumenten enthaltenen Aspekte des Achtsamkeitskonstrukts.

Schlüsselwörter: Achtsamkeit, Achtsamkeitserfahrungen, Selbsteinschätzung, Fragebogen

Abstract: The present article describes the development and validation of a questionnaire for the comprehensive assessment of mindfulness: the Comprehensive Inventory of Mindfulness Experiences (CHIME). The factor structure, reliability and validity of the CHIME were established in a community sample (N=298) and a sample of MBSR group participants (N=161). Factor-analytical procedures supported an eight-factor structure. The structure was tested in a further confirmatory sample (N=202). The questionnaire and its subscales exhibited good reliability (internal consistency and retest-reliability). Analysis of the measurement invariance of the single items over groups differing in age, gender, meditation experience, and symptom load pointed to the absence of systematic differences in the items' semantic understanding. Parameters reflecting construct validity, criterion validity and incremental validity as well as change sensitivity were all at least satisfactory. The CHIME is a self-report measure with favorable psychometric properties comprising all aspects of mindfulness that are included in current mindfulness scales.

Keywords: Mindfulness, Mindfulness Experiences, Self-Report, Questionnaire

Achtsamkeit ist eine spezifische Form der Aufmerksamkeitslenkung auf den gegenwärtigen Moment hin (Kabat-Zinn, 1994). Sie ist durch eine besondere Haltung charakterisiert (Bishop et al., 2004), die absichtsvoll, nicht-wertend, offen, neugierig, nicht-anhaftend und nicht-identifiziert mit eigenen Gedanken, Emotionen oder anderen inneren Erfahrungen ist (Kabat-Zinn, 1994; Bishop et al., 2004; Lau et al., 2006; Walach et al., 2004; Brown & Ryan, 2004; 2003). In den letzten Jahrzehnten wurden zahlreiche achtsamkeitsbasierte Interventionsmethoden wie Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1990) und Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams & Teasdale, 2002) entwickelt. Für die Wirksamkeit dieser Verfahren liegen konsistent Nachweise vor (Bohlmeijer, Prenger, Taal & Cuijpers, 2010; Chiesa & Serretti, 2011; Hofmann, Sawyer, Witt & Oh, 2010). In den letzten Jahren hat sich die Achtsamkeitsforschung zunehmend den Mechanismen zugewandt, durch die sich Achtsamkeit positiv auf Wohlbefinden und psychische Gesundheit auswirkt (Shapiro, Carlson, Astin & Freedman, 2006). Hierfür sind gut fundierte Erfassungsinstrumente notwendig. Dabei wurden mindestens acht Fragebögen zur Erfassung der Achtsamkeit bei Erwachsenen entwickelt und validiert (Baer, 2011; Bergomi, Tschacher & Kupper, 2012a). Dies sind der *Freiburger Fragebogen zur Achtsamkeit* (FFA, Walach et al. 2004), der *Kentucky Inventory of Mindfulness Skills* (KIMS; Baer, Smith & Allen, 2004), *Five Facets of Mindfulness Questionnaire* (FFMQ, Baer, Smith, Hopkins, Krietemeyer & Toney, 2006), die *Cognitive and Affective Mindfulness Scale-Revised* (CAMS-R, Feldman, Hayes, Kumar, Greeson & Laurenceau, 2007), die *Philadelphia Mindulness Scale* (PHLMS, Cardaciotto, Herbert, Forman, Moitra & Farrow, 2008), die *Mindful Awareness Attention Scale* (MAAS, Brown & Ryan, 2003), der *Southampton Mindfulness Questionnaire* (SMQ, Chadwick et al., 2008) und die *Toronto Mindfulness Scale* (TMS, Lau et al., 2006). Zusätzlich wurden Fragebögen zur Erfassung der Effekte der Meditation und des Erlebens während der Achtsamkeitspraxis entwickelt (Solloway & Fisher, 2007; Reavley & Pallant, 2009), die deutliche Überlappungen zum Achtsamkeitskonstrukt aufweisen. Die Konzeptualisierungen, die den Instrumenten zur Erfassung von Achtsamkeit zugrunde liegen, unterscheiden sich z. T. erheblich (Bergomi et al., 2012a; Christopher, Charoensuk, Gilbert, Neary & Pearce, 2009). Ein auffallender Unterschied betrifft die berücksichtigten Aspekte oder Komponenten der Achtsamkeit und somit die Inhaltsvalidität, d. h. die Frage ob das verwendete Messinstrument den Inhalt des Achtsamkeitskonstrukts in seinen zentralen Aspekten vollständig erfasst. In der Vorstudie zur vorliegenden Skala konnten neun semantisch unterscheidbare Aspekte der Achtsamkeit identifiziert werden, die in acht validierten

Fragebögen zur Achtsamkeit enthalten sind (Bergomi et al., 2012a). Dabei wurden die in den acht Fragebögen enthaltenen Unterskalen sowie die theoretischen Konstrukte, die der Skalenkonstruktion zugrundelagen (sofern im Validierungsartikel erwähnt), berücksichtigt und semantisch zusammengefasst (Bergomi et al., 2012a). Derzeit liegt kein Achtsamkeitsfragebogen vor, der alle neun Aspekte umfasst (Bergomi, Tschacher & Kupper, 2012b).

Zahlreiche Studien weisen auf eine potentiell grundlegende Problematik für die Validität von Achtsamkeitsfragebögen hin, die durch divergente Interpretationen von Items in Gruppen mit unterschiedlicher Meditationserfahrung (Belzer et al., 2012; Grossman, 2008; 2011; van Dam, Earleywine & Danoff-Burg, 2009), unterschiedlichem Alter (Baer et al., 2007), aus verschiedenen Kulturkreisen (Christopher et al., 2009) oder mit unterschiedlichen Ausprägungen psychopathologischer Merkmale (Leigh, Bowen & Marlatt, 2005) entsteht. Solche Befunde werden hauptsächlich auf Unterschiede im Verständnis der Items und nicht auf tatsächliche Unterschiede der Achtsamkeit dieser Gruppen zurückgeführt (Christopher et al., 2009; Grossman, 2008). Unterschiede in der Interpretation der Items könnten auf die Ambiguität von Wörtern zurückgehen, die in Achtsamkeitsitems typischerweise verwendet werden (Grossman, 2008). In der Tat fanden Belzer und Kollegen (2012) in einer qualitativen Studie, dass Personen ohne Meditationserfahrung fünf Items der Kurzversion (14 Items) des FFA systematisch missverstanden. Insbesondere wurde das Wort „Erfahrung“ abweichend interpretiert, nicht (wie erwünscht) als Synonym für „Erleben“, sondern als „Lebenserfahrung“.

Das Ziel der vorliegenden Arbeit war es, einen Fragebogen zur Selbsteinschätzung der Achtsamkeit zu entwickeln, der alle bisherigen Operationalisierungen berücksichtigt und theoretische Überlegungen sowie Implikationen bisheriger empirischer Resultate einbezieht. Dieser Fragebogen sollte geeignet sein für die Erfassung von Achtsamkeit in der Allgemeinbevölkerung, unabhängig von der individuellen Meditationserfahrung und der Vertrautheit mit dem Achtsamkeitskonzept. Der neue Fragebogen strebt eine umfassende Erfassung der Achtsamkeit an und wurde entsprechend „Comprehensive Inventory of Mindulness Experiences“ (CHIME) benannt. Mit dieser Bezeichnung wird zudem betont, dass die Erfassung der Achtsamkeit durch die Selbsteinschätzung anhand konkreter Achtsamkeitserfahrungen erfolgen soll.

Methodik

Fragebogenkonstruktion

Basierend auf Resultaten der Vorstudie und theoretischen Überlegungen (cf. Bergomi et al., 2012a) wurde bei der Konstruktion des CHIME auf Items zur Fähigkeit, Emotionen und Gedanken in Worte zu fassen, verzichtet. Dies ist im Einklang mit Befunden einer Studie, in welcher sich vierzehn Zen-Praktizierende über FFMQ-Items im Interview äußerten (Christopher, Woodrich & Tiernan, 2012). Insgesamt wurden die Items auf unterschiedlichem Hintergrund basierend formuliert: Bereits existierende Skalen, publizierte Literatur über Achtsamkeit, deren Erfassung und die damit verbundenen Probleme, sowie die persönliche Erfahrung zweier Autoren (CB und ZK) mit Meditation und buddhistischer Psychologie. Aufgrund der erwähnten Befunde zu einer heterogenen Iteminterpretation in verschiedenen Gruppen wurde bei der Konstruktion des CHIME durchgängig auf die eindeutige Formulierung der Items geachtet. Items sind konkret auf alltägliche Situationen bezogen formuliert und Ausdrücke, die ohne Meditationserfahrung oder buddhistischen Hintergrund missverständlich wären, werden vermieden. Einige Items, die den gesetzten Kriterien schon entsprachen, wurden wörtlich aus anderen Instrumenten übernommen (Tabelle 1). Es wurde darauf geachtet, sowohl positiv als auch negativ formulierte Items einzubeziehen, auch bei Aspekten der Achtsamkeit, die in den bisherigen Fragebögen ausschließlich durch negativ formulierte Items erfasst werden (z. B. „Handeln mit Bewusstheit“ in MAAS, KIMS und FFMQ). Bei den Items zur Erfassung eines offenen Gewahrseins wurden Formulierungen vermieden, die Anstrengung betonen. In der Tat haben die Unterskalen zu *Gewahrsein* aus den zwei Fragebogen KIMS und FFMQ, die diese Aspekte betonen (z. B. KIMS 13: “When I take a shower or a bath, I *stay alert* to the sensations of water on my body.”), in mehreren Studien unerwünschte Resultate gezeigt (Bergomi et al., 2012b). In Tabelle 1 werden Items des CHIME semantisch ähnlichen Items aus anderen Achtsamkeitsfragebögen gegenübergestellt, dabei in der 3. Spalte angegeben, welche Ziele mit der Modifikation des Items erreicht werden soll. Alle Items werden auf einer 6-Punkte Likert-Skala von 1 = *fast nie* bis 6 = *fast immer* eingeschätzt und beziehen sich auf die vergangenen zwei Wochen. Dies ist konsistent mit der Konzeptualisierung der Achtsamkeit als (quasi-)Disposition, die sich über die Zeit verändern kann (Brown & Ryan, 2004; Walach et al., 2004).

Aufgrund theoretischer Überlegungen wurden drei inhaltliche Hauptbereiche für die Items festgesetzt: 1. Selbstregulation der Aufmerksamkeit, 2. eine Orientierung, die durch Akzeptanz und Mitgefühl charakterisiert ist und 3. eine Orientierung, die durch Einsicht und metakognitive Bewusstheit charakterisiert ist. Diese drei Bereiche können den drei Gruppen

zugeordnet werden, in die der achtfache Pfad, ein zentraler Teil der buddhistischen Psychologie, eingeteilt ist: die Vertiefungs-, die Sittlichkeits- und die Weisheits-Gruppe. In der buddhistischen Psychologie werden diese drei Gruppen nicht als Stufen angesehen: Sie haben gleiche Relevanz und unterstützen und befruchten sich gegenseitig (Gunaratana, 2001). Zu jedem der drei inhaltlichen Hauptbereiche wurden drei bis fünf Aspekte aufgelistet (z. B. Gewahrsein für Sinneseindrücke; Gewahrsein für mentale Abläufe; Annehmen, nicht-urteilende Haltung; Dezentrierte, nicht-identifizierte Haltung; Einsichtsvolles Verstehen). Zu jedem Aspekt wurden mindestens sechs Items formuliert. Deren Verständlichkeit wurde durch wiederholte Rückmeldungen von Personen ohne Meditationserfahrung geprüft. Basierend auf den Rückmeldungen wurden für jeden Aspekt der Achtsamkeit fünf bis neun Items ausgewählt. Damit ergab sich eine Testversion des Fragebogens mit 85 Items[1].

Stichproben und Prozedur

Die Studie umfasste drei Stichproben. Die 85-Item-Testversion des CHIME wurde in zwei Stichproben verteilt, eine Allgemeinbevölkerungs-Stichprobe ($N = 298$) und eine Stichprobe von TeilnehmerInnen an MBSR-Kursen ($N = 161$). In beiden Stichproben wurden Daten zu zwei Zeitpunkten erhoben, wobei die zweite Erhebung sieben bis neun Wochen nach der ersten stattfand. In der MBSR-Stichprobe stimmten die Erhebungszeitpunkte mit der ersten und letzten Kurswoche überein. Zum Zweck der konfirmatorischen Analyse wurde die aus den beiden Stichproben ermittelte Endversion des CHIME zusätzlich in einer Stichprobe (N = 202) aus der Allgemeinbevölkerung ($n = 146$) und aus MBSR-Kursen ($n = 56$) eingesetzt.

Die Allgemeinbevölkerungs-Stichprobe ($N = 298$) wurde von den Autoren und im Rahmen von Masterarbeiten durch Studenten im Freundes-, Bekannten-, Familien- und Kollegenkreis zusammengestellt. TeilnehmerInnen wurden persönlich kontaktiert und füllten die Fragebögen online auf einer Internetplattform aus. Vor der Datenerhebung wurde eine Stichprobengröße von 300 Personen abgezielt. Das Alter lag im Schnitt bei 35 Jahren (SD = 12, 18–75), 61 % waren weiblich. 47 % gaben einen Universitätsabschluss, 16 % einen Fachhochschulabschluss, 17 % Lehrabschluss oder Diplom, 17 % Hochschulreife und 3 % 10. Schuljahr oder weniger als höchsten Bildungsabschluss an. Die Stichprobe wies somit einen hohen Ausbildungsgrad auf, was ihre Repräsentativität tangiert. Für manche Analysen wurde

[1] Aufgrund eines Gutachter-Hinweises wurde CHIME-Item 4 leicht umformuliert. Der Fragebogen mit dem veränderten Item wurde in einer Untergruppe der konfirmatorischen Stichprobe (Allgemeinbevölkerung, $n = 146$) verwendet. Das Item zeigte eine zufriedenstellende korrigierte Item-Skala-Korrelation ($r = .31$) und beeinflusste das gesamte Cronbach α nicht (α = .90 mit und ohne Item 4).

die Allgemeinbevölkerungs-Stichprobe in drei Gruppen geteilt: Individuen 1. ohne Meditationserfahrung (n = 177), 2. mit Meditationspraxis in der Vergangenheit aber nicht aktuell (n = 39) und 3. mit aktueller Meditationspraxis (n = 82). Individuen mit Praxis in der Vergangenheit berichteten über eine signifikant kürzere Praxis in Monaten als Individuen mit aktueller Meditationspraxis (M_{Verg} = 36, SD_{Verg} = 46 vs. M_{Akt} = 130, SD_{Akt} = 131, $t_{(114)}$ = 5.72, p < .001). Durchschnittlich meditierten Personen in Gruppe 2 seit 7 Jahren (SD = 8) nicht mehr. Gruppe 1 ohne Meditationserfahrung war im Durchschnitt signifikant jünger als beide andere Gruppen (M_{Ohne} = 32, SD_{Ohne} = 11; M_{Verg} = 37, SD_{Verg} = 12, $t_{(214)}$ = 2.53, p < .05; M_{Akt} = 40, SD_{Akt} = 13, $t_{(257)}$ = 4.64, p < .001).

Die Daten der MBSR-Stichprobe (N = 161) wurden durch LehrerInnen des MBSR-Verbands Schweiz erhoben, die die Fragebögen an Kursteilnehmer verteilten. Für diese Stichprobe wurde keine bestimmte Stichprobengröße abgestrebt, weil diese wesentlich durch die angebotenen Kurse und die Bereitschaft von TeilnehmerInnen, bei der Befragung mitzuwirken, bestimmt wurde. Die Daten umfassen 22 MBSR-Kurse. Die durchschnittliche Teilnahme an der Studie betrug 73 % (17–100 %). 62 % der GruppenteilnehmerInnen füllten die Fragebogen Internet-basiert aus. Das Alter lag hier im Schnitt bei 46 Jahren (SD = 11). 73 % der TeilnehmerInnen waren Frauen. 32 % gaben einen Universitätsabschluss, 56 % Lehrabschluss oder Diplom, 8 % Hochschulreife und 4 % 10. Schuljahr oder weniger als höchsten Bildungsabschluss an. 128 Teilnehmende füllten die Fragebögen auch bei der zweiten Erhebung aus. Die MBSR-Kurse fanden in mehreren deutschsprachigen Schweizer Städten außerhalb klinischer Einrichtungen statt und waren auf den achtsamen Umgang mit alltäglichem Stress fokussiert. Der durchschnittliche, in T-Werte transformierte globale Symptom Index (GSI) des Brief Symptom Inventory (BSI) zum ersten Erfassungszeitpunkt lag bei 60 (SD = 13).

Die konfirmatorische Stichprobe (N = 202) wurde durch Listen von TeilnehmerInnen an drei Psychologieseminaren der Universität Bern, durch die Adressenliste einer beruflichen Vereinigung (Schweizer Kochverein), im Bekanntenkreis der Autoren sowie durch Erhebungen in MBSR-Kursen zusammengestellt. Die TeilnehmerInnen wurden persönlich per Email kontaktiert und füllten die Fragebögen online auf einer Internetplattform aus. Es wurde vor der Datenerhebung eine Stichprobengröße von 200 Personen angestrebt. Das Alter lag im Schnitt bei 42 Jahren (SD = 15, 19–82), 58 % waren weiblich. 53 % gaben einen Universitätsabschluss, 37 % Lehrabschluss oder Diplom, 8 % Hochschulreife („Matura“) und 3 % 10. Schuljahr oder weniger als höchsten Bildungsabschluss an. Diese Stichprobe wies ebenfalls einen durchschnittlich hohen Ausbildungsgrad auf.

Erhebungsinstrumente

Zusätzlich zum CHIME wurden folgende Fragebögen zur Erfassung relevanter Aspekte psychischer Gesundheit verteilt: 1. die deutsche Version des FFMQ (Fünf Facetten der Achtsamkeit Fragebogen FFAF; Heidenreich, Zarbock, Ströhle & Michalak, 2011), 2. das Brief Symptom Inventory (BSI; dt. Version von Franke, 2000), 3. der Berner Fragebogen zur Erfassung des Wohlbefindens (BFW; Grob et al., 1991) und 4. der *Alcohol Use Disorder Identification Test* der WHO (AUDIT; Babor, Higgins-Biddle, Saunder & Monteiro, 2001). Dazu wurden Quantität und Häufigkeit des Konsums von Zigaretten und Cannabis in den letzten 30 Tagen erfasst.

Datenanalysen

Item- und Dimensionsanalysen: Die Itemschwierigkeiten sollten im Bereich von .20 bis .80 liegen. Um die inhaltliche Passung der Items zu sichern und die Anzahl Items pro erfassten Aspekt auszugleichen, wurden vor dem faktoranalytischen Verfahren Items aufgrund von Redundanz (i.e. starke Inter-Item-Korrelationen) oder mangelnder Homogenität ausgeschlossen. Die exploratorische Faktorenanalyse wurde mit Hauptachsenanalysen (PAF) mit obliquer Faktorenrotation (oblimin) in der Allgemeinbevölkerungs-Stichprobe durchgeführt. Die Anzahl der Skalenfaktoren wurde anhand des Velicer‘s Minimum Average Partial (MAP) Test bestimmt (O’Connor, 2000; Velicer, 1976). Es wurden nur Items mit einer Mindestfaktorenladung von .40 (Mustermatrix) auf einem Faktor beibehalten. Items, die > .30 auf einen weiteren Faktor luden oder bei denen sich die Absolutwerte der zwei höchsten Ladungen um < .20 unterschieden, wurden ausgeschlossen. Die erhaltene Faktorenstruktur wurde anhand konfirmatorischer Faktorenanalyse (KFA) geprüft. Die Modelle wurden mit den folgenden Cutoffs für Fit-Indizes als Indikatoren für guten Fit beurteilt: RMSEA ≤ .08, SRMR ≤ .10, und CFI ≥ .90 (Brown, 2006; Marsh, Hau & Wen, 2004; Schermelleh-Engel, Moosbrugger & Müller, 2003). Die Passung der Modelle wurde anhand der Modifikationsindizes untersucht. Es wurden hochredundante Items sowie Items mit substantiellen Cross-Ladungen ausgeschlossen. Die Messinvarianz der Items wurde mittels Differential Item Functioning (DIF)-Analysen bzgl. Alter, Geschlecht und Meditationserfahrung geprüft. Die DIF-Analysen wurden mittels des Multiple Indicator Multiple Causes (MIMIC) Modell nach der von Muthen und Muthen (2008) beschriebenen Prozedur durchgeführt. Dabei werden direkte Effekte der Kovariaten auf die Items auf Null gesetzt und schrittweise direkte Pfade zu den Items mit dem größten Modifikationsindex (*MI* > 15) hinzugefügt, bis die MI auf keine weiteren substantiellen direkten Effekte hinweisen. Das damit erschlossene Modell wurde durch KFA in der MBSR-Stichprobe weiter getestet.

Aufgrund der Resultate der KFA wurde eine weitere PAF durchgeführt und das Modell entsprechend angepasst. Die Skalenumfänge wurden durch Itemausschluss harmonisiert und das definitive Modell in beiden Stichproben getestet. In einem nächsten Schritt wurde die angenommene hierarchische Faktorenstruktur des CHIME mittels konfirmatorischer Modelltestung überprüft. Schwerpunkt dieser Analyse war nicht mehr die Beurteilung der einzelnen Items. Aus diesem Grunde wurden für die Modellvergleiche die latenten Faktoren aus je zwei Parcels berechnet. Die Zuordnung der Items zu Parcels erfolgte randomisiert (Little, Cunningham & Shahar, 2002). Die Modelle mit Parcels wurden mit restriktiveren Cutoffs für Fit-Indizes beurteilt: RMSEA ≤ .05 bzw. .08, SRMR ≤ .05 bzw. .10 und CFI ≥ .97 bzw. .95 für einen guten bzw. akzeptablen Fit (Schermelleh-Engel et al. 2003).

Bei der Einschätzung der Angemessenheit der Stichprobengröße wurde auf die Verwendung vorgegebener Faustregeln verzichtet. Derartige Faustregeln gelten als unangemessen, da das minimale N für eine stabile Faktorlösung nicht invariant ist über verschiedene Studien (Fabrigar, Wegener, McCallum & Strahan, 1999; McCallum, Widaman, Zhang & Hong, 1999). Insbesondere sollten bei der Einschätzung der Angemessenheit der Stichprobengrößen die Kommunalitäten der Items sowie die Determination der Faktoren berücksichtigt werden (Fabrigar et al., 1999; McCallum et al., 1999).

Reliabilitäts- und Validitätsanalyse: Die Skalenkonsistenz (Cronbachs α) und die Test-Retest-Reliabilität (Pearson-Korrelationen) wurden ermittelt. Zur Überprüfung der semantischen Eigenständigkeit der Unterskalen wurde für jede Unterskala eine Regressionsanalyse berechnet mit den restlichen Unterskalen als Prädiktoren. Durch Substraktion der jeweiligen korrigierten R^2 vom Cronbachs α wurde die systematische Varianz jeder Unterskala bestimmt, die von den anderen Unterskalen unabhängig ist.

Zur Überprüfung der Konstruktvalidität wurden die Korrelationen zwischen CHIME und dem Achtsamkeitsfragebogen FFAF, Wohlbefinden, Symptombelastung, problematischem Alkoholkonsum, und aktuellem Cannabis- und Tabakkonsum untersucht. Pearson-Korrelationen und partielle Korrelationen wurden für Variablen berechnet, deren Verteilung die Anwendung parametrischer Verfahren zuließ. Die Korrelationen mit AUDIT, Cannabis- und Tabak-Konsum wurden unter Ausschluss von TeilnehmerInnen, die keinen Konsum angaben, berechnet (n = 278, n = 76 resp. n = 101). Kriteriumsvalidität wurde anhand von Vergleichen der drei Gruppen aus der Allgemeinbevölkerungs-Stichprobe mit unterschiedlicher Meditationserfahrung ermittelt. Die Vergleiche wurden mit ANOVA untersucht. Für die post-hoc paarweisen Vergleiche wurden Mittelwertdifferenzen mit Bonferroni-Korrektur ($p < .05$) berechnet. Für die Bestimmung der Veränderungssensitivität

wurden anhand von t-Tests für gepaarte Stichproben prä-post-Vergleiche in der MBSR-Stichprobe durchgeführt sowie Effektstärken (Cohens d) berechnet. Die Analysen zum Einfluss der Itempolung wurden mit ANOVA und t-Test durchgeführt.

Ergebnisse

Itemanalyse und Faktorenstruktur

Siebzehn Items wurden aufgrund zu tiefer Itemschwierigkeit, hoher Redundanz oder fehlender Homogenität ausgeschlossen. In der PAF wies der MAP-Test auf eine sechs-Faktoren-Struktur hin. Es wurde eine PAF berechnet, der eine sechs-Faktoren-Struktur aufgezwungen wurde. Die extrahierten sechs Faktoren erklärten 48 % der Gesamtvarianz. 45 Items erfüllten die gestellten Kriterien bezüglich der Faktorenladungen (Tabelle 2). Die sechs Faktoren wurden mit *annehmende, nicht-urteilende, mitfühlende Haltung* (*Annehmen*, Eigenwert $\lambda_1 = 18.2$); *Gewahrsein* (*Gewahrsein*, $\lambda_2 = 5.1$); *bewusstes Handeln, Gegenwärtigkeit* (*BewusstHandeln*, $\lambda_3 = 3.2$); *nicht-reaktive, dezentrierte Orientierung* (*Dezentrierung*, $\lambda_4 = 2.6$); *offene, nicht-vermeidende Haltung* (*Offenheit*, $\lambda_5 = 2.1$); und *Bewusstheit über die Relativität von Gedanken und Überzeugungen* (*Relativität*, $\lambda_6 = 1.7$) bezeichnet. Der Mittelwert der Kommunalitäten über die 68 Items lag bei .44 (*SD* = .11). Das Verhältnis der Anzahl Items zu Faktoren lag bei 11.3 und war somit sehr hoch. Die hohe Faktorendetermination zeigte sich darüber hinaus in dem hohen Anteil an Items mit substantieller Ladung auf einem einzelnen Faktor (66 %) sowie darin, dass kein Faktor weniger als vier Items enthielt. Aufgrund der guten Faktorendetermination und der zufriedenstellenden Kommunalitäten kann bei der vorliegenden Stichprobengröße eine stabile Faktorenstruktur erwartet werden (McCallum et al., 1999). Die sechs-Faktoren-Struktur wurde anhand einer KFA geprüft. Das Modell ergab knapp unzureichende Fit-Indizes ($\chi^2_{(930)} = 1\,824.68$, $p < .001$, CFI = .84, RMSEA = .06, SRMR = .06). Unter Berücksichtigung der Erhaltung einer minimalen Anzahl von vier Items pro Faktor wurden schrittweise, der Stärke der Modifikationsindizes entsprechend, acht Items aufgrund von Redundanz oder Crossloadings ausgeschlossen. Am Ende dieser Prozedur blieben 36 Items und die Fit-Indizes waren zufriedenstellend ($\chi^2_{(579)} = 1\,000.10$, $p < .001$, CFI = .90, RMSEA = .05, SRMR = .06). In DIF-Analysen zeigte ein Item mangelnde Messinvarianz in Bezug auf Geschlecht und wurde ausgeschlossen. Die Modifikationsindizes zeigten keine weiteren bedeutenden direkten Effekte der Prädiktoren Geschlecht, Alter und Meditationserfahrung.

Das sechs-Faktoren-Modell mit 35 Items wurde durch KFA in der MBSR-Stichprobe geprüft. Der Modellfit war knapp unzureichend ($\chi^2_{(545)} = 939.77$, $p < .001$, CFI = .85, RMSEA

= .07, SRMR = .07). Der Mittelwert der Kommunalitäten für die 35 Items lag bei .48 (*SD* = .16) und die Determination der Faktoren (5.8 Items pro Faktor) war hoch. Die Modifikationsindizes zeigten, dass der Mangel an Fit hauptsächlich durch starke Korrelationen zwischen Items, die den Aspekt Gewahrsein erfassen, bedingt waren. Aufgrund dieses Resultats wurde eine oblique PAF mit den 11 *Gewahrsein*-Items in der MBSR-Stichprobe durchgeführt. Der MAP-Test wies auf eine zweifaktorielle Struktur hin. Es wurde eine zwei-faktorielle PAF berechnet. Alle Items erfüllten die Kriterien bezüglich der Faktorladungen. Die zwei Faktoren wurden als *Gewahrsein gegenüber äußeren Erfahrungen* (*GewahrAussen*) und *Gewahrsein gegenüber inneren Erfahrungen* (*GewahrInnen*) bezeichnet. Die neue sieben-Faktoren-Struktur wurde wieder anhand einer KFA in der MBSR-Stichprobe geprüft. Diesmal erwiesen sich die Fit-Indizes als zufriedenstellend ($\chi^2_{(539)}$ = 794.50, $p < .001$, CFI = .91, RMSEA = .06, SRMR = .06). Der zusätzliche Faktor führte zu einer Reduktion der Determination der Faktoren (5 Items pro Faktor) und zu einer Erhöhung der Kommunalitäten (*M* = .51, *SD* = .15). Um die Skalenumfänge zu harmonisieren wurden drei Items ausgeschlossen. Die resultierende sieben-Faktoren-Struktur mit 32 Items zeigte im Korrelationsmodell gute Fit-Indizes in der Allgemeinbevölkerungs-Stichprobe ($\chi^2_{(443)}$ = 694.39, $p < .001$, CFI = .93, RMSEA = .04, SRMR = .05) und der MBSR-Stichprobe ($\chi^2_{(443)}$ = 634.39, $p < .001$, CFI = .92, RMSEA = .05, SRMR = .06).

Mit einer Ausnahme deckt die erhaltene Faktorenstruktur alle bei der Itemformulierung vorgeschlagenen Aspekte der Achtsamkeit ab. Die Items zur Erfassung eines einsichtsvollen Verstehens zeigten in der EFA auf 68 Items je zwei bis drei Ladungen mit Absolutwert > .20 auf die erhaltenen Faktoren und konnten somit mit einer Ausnahme nicht einem Achtsamkeitsfaktor zugeordnet werden. Der Ausschluss dieses Aspektes, der für eine achtsame Haltung von Bedeutung ist (Walach et al., 2004) würde jedoch die Inhaltsvalidität des Fragebogens beeinträchtigen. Darüber hinaus sprechen die Resultate für die hohe Vernetzung dieses Aspektes mit den erfassten Faktoren, d. h. für seine Relevanz innerhalb des Konstrukts Achtsamkeit. Aus diesen Gründen wurden fünf Items aus diesem Aspekt als zusätzlicher Faktor, *Einsichtsvolles Verstehen* (*Einsicht*), angenommen. Die sich somit ergebende acht-Faktoren-Struktur mit 37 Items (Tabellen 1 und 2) wurde mit KFA überprüft. Die Resultate in der Allgemeinbevölkerungs-Stichprobe ($\chi^2_{(601)}$ = 978.14, $p < .001$, CFI = .91, RMSEA = .05, SRMR = .06) und der MBSR-Stichprobe ($\chi^2_{(601)}$ = 903.54, $p < .001$, CFI = .89, RMSEA = .06, SRMR = .07) waren befriedigend. Differential item functioning-Analysen in der Allgemeinbevölkerungs-Stichprobe auf 37 Items ergaben keine Hinweise auf

Messinvarianz. Die Interkorrelationen zwischen den acht Skalen waren moderat bis stark (Tabelle 4).

Es wurden Modellvergleiche zwischen zwei hierarchischen Modellen berechnet. In einem Modell luden die zwei Faktoren *GewahrInnen* und *GewahrAussen* auf den übergeordneten Faktor *Gewahrsein*, welcher wiederum mit den restlichen sechs Faktoren auf den übergeordneten Faktor Achtsamkeit lud (7+2-Faktoren-Modell). Im zweiten Modell luden alle acht Faktoren auf einem übergeordneten Faktor (8-Faktoren-Modell). Sowohl in der Normal- als auch in der MBSR-Stichprobe zeigte das 7+2-Faktoren-Modell zufriedenstellende Fit Indizes und war dem 8-Faktoren-Modell signifikant überlegen (Tabelle 5). Dasselbe Muster ergab sich, wenn die Modelle mit den einzelnen Items als Indikatoren berechnet wurden.

Die Modelle wurden in der konfirmatorischen Stichprobe untersucht. Dabei zeigten beide hierarchische Modelle keine zufriedenstellende Passung (Tabelle 5, unten), wobei sich das 7+2-Faktoren-Modell dem 8-Faktoren-Modell signifikant überlegen erwies. Die Modifikationsindizes wiesen auf signifikante Korrelationen zwischen den Unterskalen hin. Dementsprechend wurde ein 7+2-Korrelationsmodell, in dem die sieben Hauptunterskalen miteinander korrelieren, berechnet. Dieses zeigte einen zufriedenstellenden Fit. Trotz der Überlegenheit des Korrelationsmodells wiesen alle Unterskalen einen signifikanten Regressionspfad auf den übergeordneten Achtsamkeitsfaktor auf. Die Skalenwerte in dieser Stichprobe waren zufriedenstellend bis gut (Tabelle 3, unten).

Reliabilität und Validität

Die Test-Retest-Korrelationen für die Gesamtskala und die einzelnen Unterskalen waren durchgängig ≥ .70, was für eine akzeptable Reliabilität des CHIME spricht (Tabelle 3). Cronbachs α war lediglich für die Unterskala *BewusstHandeln* in der konfirmatorischen Stichprobe < .70, was auf eine größere Heterogeneität der Items aus dieser Skala hinweist. Bei der Regressionsanalyse zur Vorhersage jeder einzelnen Unterskala durch die restlichen Unterskalen waren die korrigierten R^2-Werte im Bereich von .21 bis .51 (Tabelle 3). Die eigene Varianz der einzelnen Subskalen (α minus $_{korr}R^2$) betrug .30 bis .51. Trotz der hohen Zahl der Prädiktoren (sechs bis sieben) und der teilweise großen semantischen Überlappung (z. B. bei *GewahrInnen* und *GewahrAussen*) zeigte somit jede Unterskala einen wesentlichen eigenen Anteil an Varianz.

Bezüglich der Konstruktvalidität zeigten alle Korrelationen die erwünschte Richtung (Tabelle 6). Zwischen CHIME und FFAF zeigten sich die stärksten Zusammenhänge zwischen den Unterskalen, die denselben Aspekt der Achtsamkeit erfassen. Die inkrementelle

Validität des CHIME wurde mittels partieller Korrelationen unter Kontrolle der Variable FFAF-Gesamtwert untersucht (Tabelle 7). Auch unter Kontrolle des Einflusses der Scores des FFAF zeigten sich zahlreiche, wenn auch reduzierte, signifikante Korrelationen, insbesondere für die Variable *Annehmen*. Es ergaben sich einige Vorzeichenwechsel in den Korrelationen mit den CHIME-Unterskalen *GewahrInnen* und *GewahrAussen*. Die Vergleiche zwischen Gruppen mit unterschiedlicher Meditationserfahrung zeigten das erwartete Muster: Personen mit aktueller Meditationspraxis erhielten auf jeder Unterskala sowie der Gesamtskala höhere Werte als Personen ohne Meditationserfahrung (Tabelle 8). Darüber hinaus zeigten sie in vier Unterskalen und in der Gesamtskala signifikant höhere Werte als Personen mit einer abgebrochenen Meditationspraxis. Zwischen Letzteren und Personen ohne Meditationserfahrung gab es hingegen keine signifikanten Unterschiede. Dieses Ergebnis könnte allerdings durch das signifikant unterschiedliche Durchschnittsalter in den Stichproben konfundiert sein. Zur Beurteilung der Veränderungssensitivität wurden die Werte der einzelnen CHIME-Skalen sowie der Gesamtskala am Anfang und am Ende der MBSR-Intervention verglichen. Wie erwartet zeigten sich bei allen Achtsamkeitsskalen signifikant höhere Werte am Ende der Intervention (Tabelle 9). Die Effektstärken waren mittel bis stark. Die größten Veränderungen zeigten sich in der Gesamtskala und den Skalen *Annehmen* und *Dezentrieren*.

Neun der 37 CHIME-Items sind negativ formuliert. In der Allgemeinbevölkerung-Stichprobe war der Mittelwert der positiv formulierten Items ($M = 4.33$, $SD = 0.57$) signifikant höher als der der negativ formulierten Items ($M = 3.86$, $SD = 0.74$, $t_{(297)} = 12.63$, $p < .001$). Diese Mittelwertdifferenz unterschied sich nur tendenziell in den Untergruppen mit unterschiedlicher Meditationserfahrung ($\triangle M_{Ohne} = 0.54$, $SD_{Ohne} = 0.71$, $\triangle M_{Verg} = 0.52$, $SD_{Verg} = 0.62$, $\triangle M_{Akt} = 0.33$, $SD_{Akt} = 0.48$; $F = 2.90$, $p = 0.06$). Bei Personen mit aktueller Meditationserfahrung war die Korrelation zwischen positiv und negativ formulierten Items ($r = .72$, $p < .001$) signifikant größer als bei Personen ohne Meditationserfahrung ($r = .34$, $p < .001$, $Z_{\triangle r}=4.08$, $p < .01$).

Diskussion

Ziel dieser Studie war die Entwicklung eines umfassenden Fragebogens zur Selbsteinschätzung der Achtsamkeit. Dabei wurden alle Aspekte der Achtsamkeit berücksichtigt, die in acht bisher validierten Achtsamkeitsskalen enthalten sind. Die Analysen ergaben acht Unterskalen: *GewahrInnen, GewahrAussen, BewusstHandeln, Annehmen, Dezentrierung, Offenheit, Relativität* und *Einsicht*. Die zwei ersten Unterskalen können zu

einem übergeordneten Faktor *Gewahrsein* zusammengefasst werden. Mit insgesamt 37 Items erlaubt der CHIME eine ökonomische Erfassung dieser Aspekte, die sich mit bisherigen Messinstrumenten nur durch Addition mehrerer, zum Teil redundanter, Skalen erreichen ließ. Die Ergebnisse belegen, dass die Unterskalen des CHIME trotz ihrer Kürze befriedigende interne Konsistenz aufweisen. Darüber hinaus zeigten sich gute Retest-Reliabilitäten über einen Zeitraum von sieben bis neuen Wochen. Für die Gesamtskala sind die Reliabilitäten sehr gut. Die Eigenständigkeit jeder Unterskala wurde durch die Resultate unterstützt: Jede Unterskala zeigte einen wesentlichen Varianzanteil, der durch die anderen Unterskalen nicht erklärt wurde.

Die Ergebnisse zur Messinvarianz der einzelnen Items sprechen dafür, dass CHIME-Items von Personen aus verschiedenen soziodemographischen Gruppen sowie mit und ohne Meditationserfahrung relativ einheitlich aufgefasst wurden. Dies unterstützt die Annahme, dass eine valide Erfassung der Achtsamkeit aufgrund sorgfältig formulierter Items möglich ist. Die Konstruktvalidität des CHIME wird durch die substantiellen Korrelationen mit dem FFAF unterstützt. Dabei zeigten sich die stärksten Korrelationen zwischen den semantisch verwandten Unterskalen. Drei CHIME-Unterskalen, *Offenheit, Relativität* und *Einsicht*, sind im FFAF nicht enthalten. Erstere korrelierte am stärksten mit der FFAF-Unterskala *Nicht-wertende Haltung,* die beiden anderen mit *Nicht-Reaktivität*. Alle Korrelationen mit Maßen psychischer Gesundheit zeigten die erwartete Richtung. Von den CHIME-Unterskalen zeigte *Annehmen* die stärksten Zusammenhänge mit erhöhtem Wohlbefinden und verminderter Symptombelastung. Die Unterschiede in den Korrelationsmustern der Unterskalen *GewahrInnen* und *GewahrAussen* weisen darauf hin, dass die hier erstmalig in einem Achtsamkeitsfragebogen vorgenommene Unterscheidung in der Ausrichtung der Aufmerksamkeit durchaus sinnvoll ist und eine differenziertere Erforschung des Konstrukts erlaubt. Die Zusammenhänge waren zumeist schwach bis moderat, wodurch die konzeptuelle Abgrenzung des CHIME von Maßen zur Erfassung der psychischen Gesundheit unterstützt wird. Im Unterschied zu früheren Ergebnissen, die einen positiven Zusammenhang zwischen dem FFA einerseits und Alkohol- und Tabakkonsum andererseits feststellten (Leigh et al., 2005), fanden sich beim CHIME mit diesen Variablen keine oder negative Zusammenhänge. Insgesamt unterstützen die Resultate zur Messinvarianz und Konstruktvalidität die semantische Klarheit der CHIME-Items in der Allgemeinbevölkerung. Im Unterschied zu FFMQ und KIMS, bei denen in verschiedenen Studien die Unterskalen zu Gewahrsein unerwartet positiv mit Maßen psychischer Belastung (u. a. Dissoziation, psychologischen

Symptomen und Gedankenunterdrückung) assoziiert waren (Baer et al., 2006; Thompson & Waltz, 2010) zeigten sich bei keiner CHIME-Unterskala unerwartete Zusammenhänge.

Die Zusammenhänge zwischen den CHIME-Unterskalen waren positiv und zum größten Teil moderat. Die Resultate zur inkrementellen Validität unterstützen die Annahme, dass der CHIME einen inkrementellen Wert über den FFAF hinaus aufweist. Interessanterweise zeigten sich bei Konstanthaltung des Einflusses des FFAF einige Vorzeichenwechsel in den Korrelationen zwischen *GewahrInnen* und *GewahrAussen* mit Wohlbefinden und Symptombelastung. Dieses Resultat unterstreicht die Bedeutung einer umfassenden Erfassung der Achtsamkeit: Die Vorzeichenumkehrung bei den Unterskalen zum Gewahrsein deuten auf eine möglicherweise dysfunktionale Rolle der Aufmerksamkeit hin, wenn diese nicht durch die Fähigkeiten zur Nicht-Wertung und Nicht-Reaktivität begleitet wird. Bezüglich der Kriteriumsvalidität zeigten sich wie erwartet höhere Werte auf jeder Unterskala sowie auf der Gesamtskala bei Personen mit aktueller Meditationspraxis. Personen, die ihre Meditationspraxis abbrachen, hatten hingegen keine höheren CHIME-Scores als Nicht-Meditierende. Alle Unterskalen zeigten gute Veränderungssensitivität beim prä-post-Vergleich in der MBSR-Stichprobe. Diese Resultate weisen darauf hin, dass die Unterskalen Aspekte erfassen, die eng mit der Übung der Meditation und somit mit Achtsamkeit verbunden sind.

Ähnlich wie in den Studien von Van Dam und Kollegen (2009) und Höfling, Moosbrugger, Schermelleh-Engel und Heidenreich (2011) zeigten sich in der vorliegenden Stichprobe signifikante Effekte der Itempolung. Die Befunde weisen darüber hinaus darauf hin, dass solche Unterschiede insbesondere bei Personen ohne Meditationserfahrung eine Rolle spielen. Trotz dieser Effekte ist die Verwendung beider Itempolungen wesentlich für die Erfassung der Achtsamkeit und stellt ein Vorteil des vorliegenden Fragebogens dar. Mehrere Autoren haben in Frage gestellt, dass sich Achtsamkeit zufriedenstellend durch die Umkehrung von Items zu mangelnder Gegenwärtigkeit erfassen ließe (Grossman, 2011).

Die vorliegenden Resultate sprechen für die Stabilität der ermittelten Faktorenlösung. Obwohl sich in der konfirmatorischen Stichprobe das hierarchische Modell dem Korrelationsmodell unterlegen zeigte, konnten die einzelnen CHIME Unterskalen bestätigt werden. Darüber hinaus war jede Unterskala signifikant und stark mit dem übergeordneten Achtsamkeitsfaktor assoziiert.

Der bisher umfassendste Fragebogen der Achtsamkeit, der Unterskalen enthält, ist der FFAF. Allerdings fehlen im FFAF zentrale Aspekte der Achtsamkeit wie die Fähigkeit zur Dezentrierung (in der TMS; Lau et al., 2006), einsichtsvolles Verstehen (im FFA; Walach et

al., 2004) und eine nicht-vermeidende Haltung (in der PHLMS; Cardaciotto et al., 2008; Hayes & Feldman, 2004). In der vorliegenden Untersuchung erwiesen sich diese Aspekte als Teile eines übergeordneten Achtsamkeitskonstrukts. Dementsprechend weisen Sauer und Baer (2010) darauf hin, dass die Definitionen von Achtsamkeit und Dezentrierung sehr ähnlich sind. Carmody, Baer, Lykins und Olendzki (2009) fanden sehr hohe Korrelationen zwischen Achtsamkeit und Dezentrierung (r = .74–.81) und konnten keine Evidenz für eine zeitliche Sequenzierung in der Besserung in Achtsamkeit und Dezentrierung während einer MBSR-Intervention finden. Eine nicht-vermeidende (d. h. zur Konfrontation mit angenehmen und unangenehmen Erfahrungen bereiten) Haltung kann als eine Voraussetzung für die Entwicklung von Achtsamkeit angesehen werden: Die individuelle Bereitschaft, mit den eigenen Erfahrungen in Kontakt zu treten und zu bleiben, ist erforderlich für die Ausrichtung der Aufmerksamkeit im gegenwärtigen Moment (Hayes & Feldman, 2004). Die Zentralität dieses Aspektes innerhalb der Achtsamkeit wurde durch die Befunde in der Vorstudie zum CHIME unterstützt (Bergomi et al., 2012 a). Die Relevanz von einsichtsvollem Verstehen für die Entwicklung von Aufmerksamkeit und Akzeptanz wurde bereits oben verdeutlicht.

Die vorliegende Studie unterliegt einigen Einschränkungen. Sie stellt eine erste Validierung des CHIME dar. Weitere Analysen der Items, insbesondere qualitative Analysen, sind sinnvoll, um die bessere Verständlichkeit der Items nachzuweisen. Darüber hinaus sollte die Validität jeder Unterskala einzeln weiter geprüft werden. Es könnte sein, dass weitere wichtige Aspekte der Achtsamkeit vom CHIME ausgeschlossen sind (z. B. Aspekte der interpersonalen Interaktion wie empathisches Verstehen; Reavley & Pallant, 2009). Schließlich kann nicht ausgeschlossen werden, dass die Altersunterschiede in den Untergruppen mit unterschiedlicher Meditationserfahrung die Resultate zur Kriteriumsvalidität konfundiert haben.

Insgesamt sprechen die Ergebnisse dafür, dass mit dem CHIME ein psychometrisch valides Instrument zur Selbsteinschätzung der Achtsamkeit vorliegt. Aufgrund seiner umfassenden Abdeckung der Teilaspekte der Achtsamkeit und seiner faktoriellen Struktur bietet sich der CHIME für die Erforschung der Wirkmechanismen der Achtsamkeit an.

Literaturliste

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B. & Monteiro, M. G. (2001). *AUDIT. The Alcohol Use Disorders Identification Test. Guidelines for Use in Primary Care.* Geneva: WHO.

Baer, R. A. (2011). Measuring mindfulness. *Contemporary Buddhism, 12*, 241–261.

Baer, R. A., Smith, G. & Allen, K .B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191–206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J. & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27–45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S. et al. (2007). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15,* 329–342.

Belzer, F., Schmidt, S., Lucius-Höhne, G., Schneider, J. F., Orellana Rios, C. L. & Sauer, S. (2012). Challenging the construct validity of mindfulness assessment. A cognitive interviewing study of the Freiburg Mindfulness Inventory. *Mindfulness*. Advance online publication. Doi: 0.1007/s12671-012-0165-7

Bergomi, C., Tschacher, W. & Kupper, Z. (2012a). Measuring mindfulness: First steps towards the development of a comprehensive mindfulness scale. *Mindfulness,* Advance online publication. DOI: 10.1007/s12671-012-0102-9

Bergomi, C. Tschacher, W. & Kupper, Z. (2012b). The assessment of mindfulness with self-report measures: Existing scales and open issues. *Mindfulness,* Advance online publication. DOI: 10.1007/s12671-012-0110-9

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J. et al. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*, 230–241.

Bohlmeijer, E., Prenger, R., Taal, E. & Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: A meta-analysis. *Journal of Psychosomatic Research, 68,* 539–544.

Brown, K. W. & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W. & Ryan, R. M. (2004). Perils and promises in defining and measuring mindfulness: Observations from experience. *Journal of Clinical Psychology, Science & Practice, 11*, 242–248.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research.* New York, NY: Guilford.

Cardaciotto L., Herbert J. D., Forman E. M., Moitra E. & Farrow V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia Mindfulness Scale. *Assessment, 15*, 204–223.

Carmody, J., Baer, R. A., Lykins, E. L. B. & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 65*, 613–626.

Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E. & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton Mindfulness Questionnaire (SMQ). *British Journal of Clinical Psychology, 47*, 451–455.

Chiesa, A. & Serretti, A. (2011). Mindfulness based cognitive therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Research, 187,* 441–453.

Christopher, M. S.*,* Charoensuk, S.*,* Gilbert, B. D.*,* Neary, T. J. *&* Pearce, K. L. (2009). Mindfulness in Thailand and the United States: A case of apples versus oranges*?* *Journal of Clinical Psychology*, *65*, 590–612.

Christopher, M. S., Woodrich, L. E. & Tiernan, K. A. (2012). Using cognitive interviews to assess the cultural validity of state and trait measures of mindfulness among Zen buddhists. *Mindfulness*, Advance online publication. DOI 10.1007/s12671-012-0160-z

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C. & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4,* 272–299.

Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. G. & Laurenceau, J .P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29,* 177–190.

Franke, G. H. (2000). *Brief Symptom Inventory (BSI).* Göttingen: Beltz.

Grob, A., Lüthi, R., Kaiser, F. G., Flammer, A., Mackinnon, A. & Wearing A. J. (1991). Berner Fragebogen zum Wohlbefinden Jugendlicher (BFW). *Diagnostica*, *37*, 66–75.

Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research, 64,* 405–408.

Grossman, P. (2011). Defining mindfulness by "how poorly I think I pay attention during everyday awareness" and other intractable problems for psychology's (re)invention of mindfulness. *Psychological Assessment, 23,* 1 034–1 040.

Gunaratana. B. H. (2001). *Eight Mindful Steps to Happiness - Walking the Path of the Buddha.* Boston, MA: Wisdom Publications.

Hayes, A. M. & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice, 11,* 255–262.

Heidenreich, T., Zarbock, G., Ströhle, G. & Michalak, J. (2011, September). *The German version of the five-facet mindfulness questionnnaire (FFMQ): Psychometric properties and relationship with the Schema Mode Inventory.* Paper presented at the 41st European Association for Behavioural and Cognitive Therapies Congress, Reykjavík, Iceland.

Höfling, V., Moosbrugger, H., Schermelleh-Engel, K. & Heidenreich, T. (2011). Mindfulness or mindlessness? A modified version of the Mindful Attention and Awareness Scale (MAAS). *European Journal of Psychological Assessment*, *27*, 59–64.

Hofmann, S. G., Sawyer, A. T., Witt, A. A. & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*. *78,* 169–183.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life.* New York, NY: Hyperion.

Kabat-Zinn, J. (1990). *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness*. New York, NY: Dell Publishing.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L. et al. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology, 62,* 1 445–1 467.

Leigh, J., Bowen, S. & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse. *Addict Behavior, 30*, 1 335–1 341.

Little, T. D., Cunningham, W. A. & Shahar, G. (2002). To parcel or not to parcel: Exploring the questions, weighing the merits. *Structural Equation Modeling, 9,* 151–173.

McCallum, R. C., Widaman, K. F., Zhang, S. & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4,* 84–99.

Marsh, H. W., Hau, K.-T. & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and danger in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11,* 320–341.

Muthen, L. & Muthen, B. (2008). Exploratory Factor Analysis, Confirmatory Factor Analysis, And Structural Equation Modeling For Continuous Outcomes. UCLA: Academic Technology Services, Statistical Consulting Group. from http://www.ats.ucla.edu/stat/seminars/muthen_08/ (accessed May 14, 2012).

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments & Computers, 32,* 396–402.

Reavley, N. & Pallant, J. F. (2009). Development of a scale to assess the meditation experience. *Personality and Individual Differences, 47,* 547–552.

Sauer, S. & Baer, R. A. (2010). Mindfulness and decentering as mechanisms of change in mindfulness- and acceptance-based interventions. In R. A. Baer (ed.), *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change* (pp. 25–50). Oakland, CA: New Harbinger Publications.

Schermelleh-Engel, K., Moosbrugger, H. & Müller, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8***,** 23–76.

Segal, Z. V., Williams, J. M. G. & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for Depression. A New Approach to Preventing Relapse*. New York, NY: Guilford Press.

Shapiro, S. L., Carlson, L., Astin, J. & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 72,* 373–36.

Solloway, S. G & Fisher, W. P. (2007). Mindfulness practice: a Rasch variable construct innovation. *Journal of Applied Measurement, 8*, 359–372.

Thompson, B. L. & Waltz, J. (2010). Mindfulness and experiential avoidance as predictors of posttraumatic stress disorder avoidance symptom severity. *Journal of Anxiety Disorders, 24,* 409–415.

Van Dam, N., Earleywine, M. & Danoff-Burg, S. (2009). Differential item function across meditators and non-meditators on the Five Facet Mindfulness Questionnaire. *Personality and Individual Differences, 47*, 516–521.

Velicer, W. F. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika, 41,* 321–327.

Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., Grossmann, P. & Schmidt, S. (2004). Empirische Erfassung der Achtsamkeit – Die Konstruktion des Freiburger Fragebogen zur Achtsamkeit (FFA) und weitere Validierungsstudien. T. Heidenreich und J. Michalak (Hrsg.), *Achtsamkeit und Akzeptanz in der Psychotherapie* (S. 729–772). Tübingen: dgvt-Verlag.

Tabelle 1. CHIME-Items und semantisch ähnliche Items aus bestehenden Achtsamkeitsskalen.

CHIME-Item	Ähnliche Items bestehender Skalen	Grund der Veränderung
1. Wenn sich meine Stimmung verändert, nehme ich das sofort wahr.	KIMS 30: I intentionally stay aware of my feelings. PHLMS 17: Whenever my emotions change, I am conscious of them immediately.	KON KIMS 30: ANS
2. Im Auf und Ab des Lebens bin ich mir gegenüber warmherzig.	FFA 5: Ich kann mich selbst wertschätzen. KIMS 24: I tend to make judgments about how worthwhile or worthless my experiences are.	FFA5: ALL, KON KIMS (allg.): POS
4. Es ist mir klar, dass sich meine Bewertungen von Situationen oder Personen leicht verändern können.	FFA 14: Ich bin mir der der Flüchtigkeit und Vergänglichkeit meiner Erfahrungen bewusst.	MIS, KON
5. Beim Sitzen oder Liegen nehme ich meine Körperempfindungen wahr.	KIMS 9 / FFMQ 1: When I'm walking, I deliberately notice the sensations of my body moving.	ANS
6. Ich muss darüber schmunzeln, wenn ich sehe, wie ich mir manchmal die Dinge als viel komplizierter vorstelle, als sie eigentlich sind.	FFA 30: Ich kann darüber lächeln, wenn ich sehe, wie ich mir manchmal das Leben schwer mache.	KON
8. Wenn ich belastende Gedanken oder Vorstellungen habe, fühle ich mich relativ schnell danach wieder ruhig.	FFA 28: Ich erlebe Momente innerer Ruhe und Gelassenheit, selbst wenn äusserlich Schmerzen und Unruhe da sind. SMQ 4/FFMQ 24: (Usually) when I have distressing thoughts or images, I feel calm soon after.	FFA 28: KON, MIS SMQ 4: ID
10. Ich zerbreche oder verschütte Dinge aus Unachtsamkeit oder weil ich an anderes denke.	MAAS 2: I break or spill things because of carelessness, not paying attention, or thinking of something else.	ID

11. Ich sehe meine Fehler und Schwierigkeiten, ohne mich zu verurteilen.	FFA 17: Ich sehe meine Fehler und Schwierigkeiten ohne mich zu verurteilen.	ID
12. Es fällt mir leicht, mich darauf zu konzentrieren, was ich tue.	FFA 21: In bin in Kontakt mit meinen Erfahrungen, hier und jetzt MAAS3/FFMQ 18: I find it difficult to stay focused on what's happening in the present.	FFA 21: MIS, KON MAAS/ FFMQ (allg.): POS
14. Wenn ich mit anderen Personen spreche, nehme ich wahr, welche Gefühle ich dabei erlebe.	KIMS 30: I intentionally stay aware of my feelings.	ANS, KON, ALL
16. In schwierigen Situationen kann ich einen Moment innehalten, ohne sofort zu reagieren.	FFA 26: In schwierigen Situationen kann ich innehalten. FFA 18: Ich nehme meine Gefühle wahr, ohne auf sie reagieren zu müssen.	AUS
17. Im Alltag werde ich durch viele Erinnerungen, Bilder oder Träumereinen abgelenkt.	FFA 13: Ich verliere mich im Inhalt meiner Gedanken.	MIS, ALL, KON
19. Ich versuche beschäftigt zu bleiben, damit mir bestimmte Gedanken und Gefühle nicht bewusst werden.	PHLMS 6: I try to stay busy to keep thoughts or feelings from coming to mind.	ID
21. Ich achte auf Empfindungen wie zum Beispiel Wind in meinem Haar oder Sonnenschein auf meinem Gesicht.	KIMS 21/FFMQ 15: I pay attention to sensations, such as the wind in my hair or sun on my face.	ID
23. Im Alltag ist mir bewusst, dass viele Gedanken Interpretationen sind, die nicht unbedingt der Realität entsprechen.	FFA 2: Ich erkenne, dass ich nicht mit meinen Gedanken identisch bin	MIS, ALL, KON
31. Mir ist im Alltag bewusst, dass meine Sicht der Dinge subjektiv ist und den Tatsachen nicht entsprechen muss.	FFA 14: Ich bin mir der der Flüchtigkeit und Vergänglichkeit meiner Erfahrungen bewusst.	MIS, ALL, KON

33. Wenn ich Schmerzen habe, versuche ich diese Wahrnehmung möglichst zu vermeiden.	FFA 27: Ich wehre mich innerlich gegen unangenehme Gefühle	KON
34. Es ist mir im Alltag bewusst, wie ich mich gerade fühle.	FFA 1: Ich bin offen für die Erfahrung des Augenblicks. KIMS 30: I intentionally stay aware of my feelings.	FFA 1: MIS, ALL, KON KIMS 30: ANS
35. Es ist mir im Alltag bewusst, dass sich eigene Meinungen, die ich zur Zeit sehr ernst nehme, deutlich verändern können.	FFA 14: Ich bin mir der der Flüchtigkeit und Vergänglichkeit meiner Erfahrungen bewusst.	MIS, ALL, KON
37. Wenn ich mir unnötig das Leben schwer mache, wird mir das bald danach klar.	16. Ich sehe, wie ich mir Leiden schaffe.	MIS, KON

Anmerkungen: Die Items sind in der Originalsprache des jeweiligen Fragebogens aufgeführt; Grund der Veränderung: KON = Konkretisierung (z. B. Beispiele hinzugefügt), ALL = Alltagsbezug, AUS = Ausführlichere Formulierung, POS = Positiv -Formulierung, ANS = Elimination der Anstrengungskomponente, MIS = Verzicht auf für Nicht-Meditierende potentiell missverständliche Begriffe, ID = (weitgehend) identisch. Die vollständige Version der vorliegenden Tabelle sowie der gesamte Fragebogen können bei der Erstautorin eingefordert werden.

Tabelle 2. Itemkennwerte des CHIME

Item-Nr.	*M* ± *SD*	IS	TS	ANN	GEW	BHA	DEZ	OFF	REL	GEI$^{\varphi}$	GEA$^{\varphi}$	EIN
36	4.03 ± 1.29	0.67	.56	**.77**	-.06	.03	.06	.08	-.04			
2	4.30 ± 1.10	0.72	.62	**.76**	.14	-.09	-.03	.02	.06			
32	3.85 ± 1.20	0.64	.60	**.74**	.09	-.13	-.01	.00	.11			
11	4.13 ± 1.09	0.69	.52	**.64**	-.06	.06	.14	-.04	-.01			
7	3.20 ± 1.27	0.53	.44	**.54**	-.02	-.04	.06	.18	-.07			
27	4.73 ± 1.12	0.79	.43	.01	**.73**	.13	-.02	-.20	.04	-.06	**-.79**	
9	4.77 ± 1.15	0.79	.45	.11	**.69**	.16	-.10	-.18	.03	-.09	**-.96**	
21	4.57 ± 1.13	0.76	.40	.12	**.64**	.03	-.12	-.11	.06	.19	**-.63**	
34	4.70 ± 0.91	0.78	.54	.04	**.63**	.05	.14	.12	-.03	**.70**	-.22	
5	4.45 ± 1.17	0.74	.44	.04	**.56**	-.05	.05	.06	.05	**.60**	-.08	
18	4.37 ± 1.22	0.73	.37	.02	**.55**	.24	-.13	-.12	.10	.12	**-.56**	
1	4.77 ± 0.94	0.80	.31	-.06	**.53**	-.11	.10	.07	.00	**.83**	.08	
29	4.32 ± 1.24	0.72	.35	.01	**.50**	-.04	.05	.20	-.08	**.51**	.06	
14	4.66 ± 0.95	0.78	.37	-.06	**.48**	-.06	.16	.12	.01	**.65**	-.14	
17	3.86 ± 1.26	0.64	.38	.01	-.10	**.58**	.24	.14	-.02			
26	3.88 ± 1.22	0.65	.39	.06	-.03	**.53**	.00	.07	.17			
10	4.40 ± 1.26	0.73	.16	-.11	.00	**.50**	.04	.14	-.04			
12	4.48 ± 0.98	0.75	.43	.11	.10	**.43**	.19	-.02	-.02			
13	3.81 ± 1.06	0.63	.55	.01	.09	-.07	**.64**	.03	.14			
20	3.97 ± 1.03	0.66	.57	.11	.11	.06	**.56**	-.11	.11			
25	4.06 ± 0.99	0.68	.60	.17	.02	.14	**.55**	.03	.07			
16	4.11 ± 1.06	0.69	.52	.12	.10	.07	**.51**	-.07	.08			
8	3.71 ± 1.06	0.62	.59	.23	-.02	.07	**.50**	-.04	.11			
28	4.12 ± 0.97	0.69	.58	.10	.18	-.02	**.46**	.09	.12			
19	4.28 ± 1.27	0.71	.49	.20	.11	.13	.03	**.57**	.00			
33	3.89 ± 1.24	0.65	.32	.07	.13	.02	-.11	**.49**	.11			
30	3.55 ± 1.33	0.59	.37	.04	.09	.01	.04	**.44**	.12			
22	3.60 ± 1.21	0.60	.38	.07	.02	.19	-.05	**.44**	.16			
35	4.59 ± 1.02	0.76	.43	-.05	-.07	-.03	-.01	.10	**.80**			
31	4.68 ± 1.00	0.78	.41	-.02	-.08	.03	-.01	.04	**.72**			
4	4.72 ± 0.97	0.79	.39	.01	-.02	.01	.02	.03	**.62**			
23	4.45 ± 1.07	0.74	.45	-.02	.05	-.07	.21	.01	**.51**			
24	4.16 ± 1.11	0.69	.52	.36	.03	.07	.08	-.00	.18			*
37	4.33 ± 0.95	0.72	.61	.16	.32	-.01	.30	-.04	.18			*
3	4.11 ± 1.08	0.68	.32	.00	.24	-.18	.19	.04	.14			*

6	4.16 ± 1.16	0.69	.43	.42	.12	-.11	.00	-.17	.21	*
15	4.26 ± 1.07	0.71	.51	.36	.08	.02	.28	-.21	.12	*

Anmerkungen: Alle Kennwerte aus der Allgemeinbevölkerungs-Stichprobe $N = 298$ mit der Ausnahme von ^{c}=Kennwerte aus der MBSR-Stichprobe $N = 161$; IS = Itemschwierigkeit; TS = Trennschärfe; ANN = *Annehmen*, GEW = *Gewahrsein*, BHA = *BewusstHandeln,* DEZ = *Dezentrierung*, OFF = *Offenheit* , REL = *Relativität*; GEI = *GewahrInnen*, GEA = *GewahrAussen*, EIN = *Einsicht*; * = Unterskala hinzugefügt aufgrund von theoretischen Überlegungen.

Tabelle 3. Skalenkennwerte des CHIME

	ANN	GEW	BHA	DEZ	OFF	REL	GEI$^{\varsigma}$	GEA$^{\varsigma}$	EIN	GES
Allgemeinbevölkerungs-Stichprobe, N = 298										
M	3.90	4.59	4.16	3.96	3.83	4.61	4.50	4.58	4.61	4.25
SD	0.95	0.73	0.86	0.77	0.94	0.78	0.75	0.73	0.93	0.55
Cronbachs α	.86	.84	.70	.85	.73	.78	.73	.73	.82	.90
Test-Retest-Reliabilität (n = 222)	.86*	.86*	.77*	.81*	.75*	.75*	.70*	.77*	.84*	.89*
r_A	.76*	.56*	.52*	.88*	.60*	.63*	.83*	.97*	.77*	
$_{korr}R^2$	.41	.21	.19	.51	.23	.28	.38	.32	.44	
$\alpha-\ _{korr}R^2$	.45	.63	.51	.30	.50	.50	.32	.45	.38	
konfirmatorische Stichprobe, N = 202										
M	3.53	4.58	4.01	3.67	3.76	4.28	4.07	4.57	4.61	4.04
SD	1.04	0.74	0.85	0.98	1.01	0.92	0.78	0.77	0.94	0.64
Cronbachs α	.87	.84	.65	.89	.78	.78	.73	.73	.84	.93
r_A	.74*	.75*	.59*	.95*	.54*	.65*	.85*	.83*	.85*	

Anmerkungen: Abkürzungen wie Tabelle 3 plus GES = CHIME Gesamtwert; r_A = Regressions-koeffizient auf übergeordneten Faktor im 7+2-Faktoren Modell; $_{korr}R^2$ = erklärte Varianz durch alle anderen Unterskalen (sechs Prädiktoren außer GEI und GEA mit sieben Prädiktoren); $\alpha-\ _{korr}R^2$ = Eigene Varianz; zweiseitige Signifikanzniveau: * $p < .001$

Tabelle 4. Interkorrelationen zwischen latenten Variablen (Allgemeinbevölkerungs-Stichprobe)

	GEA	BHA	ANN	DEZ	OFF	REL	EIN
GEI	.72***	.26**	.36***	.52***	.41***	.33***	.46***
GEA		.18*	.29***	.35***	.24***	.23***	.42***
BHA			.45***	.55***	.50***	.27***	.40***
ANN				.67***	.53***	.46***	.66***
DEZ					.47***	.59***	.72***
OFF						.33***	.37***
REL							.53***

Anmerkungen: $N = 298$; Abkürzungen wie in Tabelle 3*;* zweiseitige Signifikanzniveaus: *$p < .05$, ** $p < .01$ *** $p < .001$

Tabelle 5. Fit-Indizes der Modelle in der KFA

	χ^2 (*df*)	CFI	SRMR	RMSEA (90 % CI)	χ^2_{diff} (*df*)
Allgemeinbevölkerungs-Stichprobe (*N* = 298)					
1. 8-Faktoren HM	201.50** (96)	.95	.06	.05–.07	72.45** (1)
2. 7-2-Faktoren HM	129.05* (95)	.98	.04	.02–.05	
MBSR-Stichprobe (*N* = 161)					
1. 8-Faktoren HM	178.79** (96)	.94	.06	.06–.09	17.78** (1)
2. 7-2-Faktoren HM	161.01** (95)	.96	.06	.05–.08	
Konfirmatorische Stichprobe (*N* = 202)					
1. 8-Faktoren HM	260.14** (96)	.91	.08	.08–.11	22.79** (1)
2. 7-2-Faktoren HM	237.35** (95)	.92	.08	.07–.10	104.08** (19)
3. 7-2-Faktoren KM 8	133.27** (76)	.97	.04	.04–.08	

Anmerkungen: HM = hierarchisches Modell; KM = Korrelationsmodell;

Signifikanzniveaus: * $p < .05$, ** $p < .001$

Tabelle 6. Korrelationen mit anderen Maßen (Allgemeinbevölkerungs-Stichprobe, $N = 298$)

	GEI	GEA	BHA	ANN	DEZ	OFF	REL	EIN	GES
FFAF BEO	.63***	.80***	.12*	.22***	.32***	.24***	.30***	.42***	.58***
FFAF BHA	.30***	.35***	.74***	.39***	.40***	.37***	.19**	.33***	.58***
FFAF NWE	.16**	.16**	.46***	.65***	.48***	.43***	.37***	.39***	.60***
FFAF NRE	.39***	.32***	.37***	.56***	.84***	.37***	.50***	.57***	.76***
FFAF BES	.39***	.19**	.28***	.34***	.32***	.39***	.17**	.31***	.46***
FFAF GES	.52***	.51***	.57***	.63***	.66***	.52***	.43***	.57***	.85***
BFW ZF	.20***	.13*	.46***	.51***	.43***	.34***	.19**	.33***	.51***
BFW NB	-.11†	-.00	-.15**	-.14*	-.17**	-.24***	-.10	-.14*	-.20**
BFW GES	.17**	.05	.32***	.38***	.36***	.30***	.21***	.27***	.40***
BSI DEPR	-.08	-.10†	-.40***	-.46***	-.41***	-.29***	-.25***	-.34***	-.46***
BSI ANGST	-.09	-.12*	-.38***	-.38***	-.32***	-.27***	-.17**	-.28***	-.39***
BSI AGGR	-.09	-.04	-.35***	-.44***	-.40	-.26***	-.23***	-.37***	-.43***
BSI GSI	-.05	-.07	-.45***	-.50***	-.43***	-.35***	-.24***	-.36***	-.48***
AUDIT (n = 278)	-.17**	-.18**	-.13*	-.08	-.14*	-.16**	-.08	-.08	-.19**
Cannabis (n = 76)	-.09	.08	-.09	.27*	.08	.11	-.02	.10	.12
Tabak (n = 101)	-.14	-.01	.16	.10	-.04	.03	.11	.05	.04

Anmerkungen: $N = 298$; Abkürzungen: CHIME wie in Tabelle 3*;* GES = Gesamtscore; BEO = beobachten; NWE = nicht-wertende Haltung; NRE = Nicht-Reaktivität; BES = Beschreiben; ZF = Zufriedenheit; NB = negative Befindlichkeit; DEPR = Depressivität; ANGST = Ängstlichkeit; AGGR = Aggressivität; GSI = Global Severity Index; Cannabis = Cannabiskonsum; Tabak = Tabakkonsum; Pearson-Korrelationen mit Ausnahme der Variablen AUDIT und Cannabiskonsum (Spearman-Rangkoeffizientkorrelation); zweiseitige Signifikanzniveaus: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Tabelle 7. partielle Korrelationen kontrolliert für FFAF-Gesamtscore (Allgemeinbevölkerungs-Stichprobe)

	GEI	GEA	BHA	ANN	DEZ	OFF	REL	EIN	GES
BFW ZF	-.09	-.19**	.23***	.28***	.13*	.09	-.04	.05	.16**
BFW NB	-.11†	.00	-.15**	-.05	-.17**	-.24***	-.10	-.14*	-.20**
BFW GES	-.03	-.18**	.14*	.19**	.16**	.14*	.05	08	.17**
BSI DEPR	.23***	.21***	-.16**	-.22***	-.13*	-.05	-.05	-.08	-.08
BSI ANGST	.17**	.13*	-.18**	-.16**	-.05	-.06	.02	-.05	-.06
BFW AGGR	.19**	.24***	-.13*	-.23***	-.15**	-.04	-.05	-.15**	-.11†
BSI GSI	.32***	.29***	-.21***	-.26***	-.11*	-.09	-.00	-.07	-.05
Tabak (n = 101)	-.25*	-.17	.09	-.01	-.19†	-.04	.03	-.09	-.21*

Anmerkungen: $N = 298$; Abkürzungen wie in Tabelle 3; partielle Korrelationskoeffizienten; zweiseitige Signifikanzniveaus: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Tabelle 8. Gruppenvergleiche nach Meditationserfahrung (Allgemeinbevölkerungs-Stichprobe, $N = 298$)

	Mittelwerte (*SD*)			ANOVA	Post-Hoc-Tests: Signifikanz der mittleren Differenz		
	1) keine MP (n = 177)	2) MP in der Vergangenheit (n = 39)	3) aktuelle MP (n = 82)	F-Test	2) minus 1)	3) minus 1)	3) minus 2)
GEI	4.43 (0.70)	4.56 (0.71)	4.91 (0.71)	12.90***		***	*
GEA	4.49 (1.00)	4.67 (0.84)	4.83 (0.78)	3.86*		*	
BHA	4.06 (0.84)	4.01 (0.92)	4.43 (0.81)	6.10**		**	*
ANN	3.73 (0.95)	3.93 (0.89)	4.27 (0.86)	9.95***		***	
DEZ	3.80 (0.74)	3.86 (0.71)	4.35 (0.75)	15.88***		***	**
OFF	3.59 (0.88)	3.79 (0.73)	4.36 (0.92)	21.44***		***	**
REL	4.49 (0.78)	4.59 (0.79)	4.88 (0.73)	7.41**		***	
EIN	4.04 (0.70)	4.27 (0.60)	4.53 (0.80)	13.13***		***	
GES	4.10 (0.48)	4.22 (0.48)	4.58 (0.58)	24.76***		***	**

Anmerkungen: MP = Meditationspraxis; Abkürzungen wie in Tabelle 3; MP = Meditationspraxis; Post-Hoc-Tests mit Bonferroni-Korrektur; Signifikanzniveaus: * $p < .05$, ** $p < .01$, *** $p < .001$

Tabelle 9. Veränderungssensitivität (MBSR-Stichprobe, *N* = 128)

				95 % Konfidenz-Intervall der Differenz			
t	Mittel-wert	*SD*	*SF*	Untere	Obere	*T*	*ES*
DEZ	.68	.77	.07	.82	.55	9.96*	0.87
GEA	.52	.72	.06	.64	.39	8.06*	0.60
OFF	.41	.75	.07	.54	.28	6.12*	0.51
REL	.43	.73	.06	.56	.30	6.64*	0.53
BHA	.45	.68	.06	.57	.33	7.43*	0.54
ANN	.81	.77	.07	.94	.67	11.88*	0.89
GEI	.42	.70	.06	.54	.30	6.74*	0.53
EIN	.65	.72	.06	.77	.52	10.17*	0.87
GES	.53	.51	.05	.62	.44	11.81*	0.97

Anmerkungen: Df = 127; Abkürzungen wie in Tabelle 3; SF = Standardfehler des Mittelwertes; ES = Effektstärke (Cohens d).
Signifikanzniveau: * $p < .001$

Discussion

4. Discussion

4.1 Summary of Findings

The main goal of this thesis was to contribute to the validity of the assessment of mindfulness through self-report measures. In order to achieve this, currently available scales that assess mindfulness in adults were reviewed and key problematic issues identified. Finally, a new German-language mindfulness questionnaire was developed and validated.

Article 1 provides an overview of eight validated mindfulness questionnaires. Relevant open issues concerning self-report assessment of mindfulness were identified and discussed. The following three main conclusions were drawn with regard to these issues. First, each of the eight scales is based on a different conceptualization of mindfulness in terms of the content of the construct. As a result, each scale covers a different set of aspects. Moreover, none of the scales seems to offer a comprehensive assessment of mindfulness. Differences in the definition and operationalization of mindfulness may be traced back to the context of mindfulness research in psychology, which is closely related to clinical practice and research (Brown, Ryan, & Creswell, 2007). For example, the definition of mindfulness underlying the Kentucky *Inventory of Mindfulness Skills* (KIMS; Baer, Smith & Allen, 2004) is largely based on skills trained within DBT (Baer et al., 2004) whereas the construction of the *Cognitive and Affective Mindfulness Scale-Revised* (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007) was more focused on aspects of mindfulness that are relevant in the treatment of depression (Hayes & Feldman, 2004). In summary, it is unclear to which extent the available assessment instruments actually measure mindfulness in all of its aspects and thus provide adequate content validity. Second, the scales differ in their conceptualization of the relationships between the aspects of mindfulness assessed. Some scales (e.g., KIMS, *Five Facet Mindfulness Questionnaire* [FFMQ; Baer, Smith, Hopkins, Krietenmeyer, & Toney, 2006], and *Toronto Mindfulness Scale* [TMS; Lau et al., 2006]) stress a multi-factorial structure in which mindfulness can be subdivided in clearly distinct aspects. Other scales (e.g., CAMS-R, *Southampton Mindfulness Questionnaire* [SMQ; Chadwick et al., 2008], and *Freiburg Mindfulness Inventory* [FMI; Buchheld, Grossman, & Walach, 2001]) rely on a holistic conceptualization in which mindfulness encompasses aspects that cannot be meaningfully disentangled and thus no stable subscales can be provided. Third, several

studies point to relevant problems regarding the validity of current mindfulness scales; in particular, they stress the necessity of a more careful consideration of possible differences in the semantic understanding of the questionnaire items among groups differing in meditation experience, age, and culture (Christopher et al., 2009a; Grossman, 2008). The existence of such differences was confirmed in a qualitative study comparing, through cognitive interviewing, the understanding of FMI items between meditators and non-meditators (Belzer et al., 2012). In summary, in *Article 1*, we argued that none of the eight scales provides a comprehensive and valid assessment of mindfulness in the general population. Yet, conclusions and implications drawn from scientific studies are influenced by the construct validity of the assessment instruments employed (Haynes, Richard & Kubany, 1995). Thus, the main implication was that a new mindfulness scale is needed that takes into account the three issues highlighted.

Article 2 focused on the issue of conceptual coverage and, more marginally, on the relationships between different aspects of mindfulness (i.e., the first two issues mentioned above). Stated more concretely with reference to the construction of the questionnaires, the foci were construct validity and clarifying the possibility to provide stable factor solutions and thus stable subscales. All aspects of mindfulness included in eight scales were reviewed. They were the same scales mentioned in two recent reviews (Baer, 2011; Didonna, 2008). Nine aspects of mindfulness could be identified. The classification of the aspects of mindfulness was theoretically guided by the operational definition of mindfulness proposed by Bishop and colleagues (2004). The definition distinguishes two main components of mindfulness, which are self-regulation of attention and an orientation that is accepting, open, and curious. Within the attention component, two aspects of mindfulness could be identified, i.e., attending to experiences and acting with awareness. The first denotes an open awareness for the current experiences while the second is characterized by maintaining focus during activities. Within the orientation component, six aspects could be identified, namely, non-judgment/acceptance of experiences, self-acceptance, non-avoidance, non-reactivity, non-identification with experiences, and insightful understanding. The ninth aspect, the capacity to put experiences into words (labeling/describing), could not be ascribed to either of the two components proposed by Bishop and colleagues. This aspect is included in the KIMS and FFMQ. A questionnaire including these nine aspects was constructed (Appendix 1). Results from a principal component analysis in 313 individuals

from the general population and MBSR groups produced a four-factor solution. As expected, one factor, *present awareness*, covered the two aspects of mindfulness related to the attention component. Two factors captured a mindful orientation: *accepting, nonreactive, insightful orientation,* and *open, non-avoidant orientation*. Of these, *open, non-avoidant orientation* was strongly associated with all other factors and showed the strongest association to a high-order mindfulness factor. These findings emphasize the relevance of this aspect, which was until now absent in the currently most widely used mindfulness questionnaires (i.e., KIMS, FFMQ, and *Mindful Attention Awareness Scale* [MAAS; Brown & Ryan, 2003]). Finally, all items capturing the capacity to put experiences into words formed a fourth factor, *describing own experiences*. Although significantly associated with the other factors, *describing own experiences* was less interconnected with the other assessed aspects of mindfulness. On the basis of this evidence and theoretical considerations, it was inferred that the inclusion of this aspect in a parsimonious assessment of mindfulness may be questionable. This conclusion is supported by recent evidence. In a recent study by Christopher, Woodrich, and Tiernan (2012) on the FFMQ and TMS, 14 Zen practitioners were interviewed. The most salient concern with the FFMQ was the *describing* facet, which was considered by several participants as not being an essential facet of mindfulness and as penalizing individuals who are not good with words. Moreover, in a recent article, Baer (2011), the first author of both FFMQ and KIMS, characterized the *describing* facet as relevant only for some mindfulness training approaches and thus relativized the centrality of this aspect for a general definition of mindfulness. Finally, the study's results suggested a stable factorization over different populations. Interestingly, the four mindfulness factors showed stronger relationships among individuals with meditation experience.

In *Article 3*, the construction and validation of a new mindfulness questionnaire, the Comprehensive Inventory of Mindfulness Experiences (CHIME), was described. This study focused on the issue of the understanding of the scale's items across different groups from the general population. The range of the aspects assessed was based on the results of *Article 2*. Items were partly drawn from existing scales and partly formulated anew. Attention was put on providing a broad coverage of each aspect. For example, items assessing present awareness were chosen and formulated in order to include the perception of outer experiences (e.g., vision and smell), body sensations, and mental experiences such as thoughts and feelings. Aspects were assessed with both positively and negatively formulated

items whenever possible. Particular care was put in choosing and formulating semantically unambiguous items. This was, for example, performed by avoiding formulations that require experience with mindfulness practice and by providing concrete situations and examples closely related to daily life. The complete test version of the CHIME comprised 85 items (Appendix 2) and was tested in 459 individuals. The final version was also tested on an additional sample of 202 individuals. The final factor solution was not derived from only factor analysis; theoretical considerations were also taken into account. In fact, items addressing insightful understanding were first excluded from the results of the exploratory factor analysis because they loaded on several factors and therefore could not be assigned to any factor. Nevertheless, these results indicate the pivotal role of this aspect in mindfulness. Consequently, *insightful understanding* was added as a factor and the resulting factor structure was tested with confirmatory factor analysis.

In measurement invariance analyses, one item ("I notice even small changes in the clothing or in the expression of other persons."; free translation from German: "Ich bemerke auch kleinere Veränderungen an der Kleidung oder im Ausdruck anderer Menschen.") was found to be, on average, differentially endorsed by women and men and was hence excluded from the final solution. No items showed systematic biases in endorsement that were due to meditation experience or age. Moreover, the CHIME did not show the unexpected positive associations with alcohol or tobacco consumption that were found with the FMI in a study by Leigh and colleagues (2005). The final scale includes 37 items (Appendix 3) and comprises the following eight factors: *awareness towards inner experiences*, *awareness towards outer experiences*, *acting with awareness*, *acceptance*, *decentering*, *openness to experiences*, *relativity of thoughts and beliefs*, and *insightful understanding*. It is currently the most comprehensive mindfulness scale that provides a stable multi-factorial structure. Moreover, the CHIME items did not show systematic biases in the endorsement of response options in subgroups of the general population, which suggests that they may be interpreted homogeneously regardless of age, gender, and meditation experience.

4.2 Methodological Considerations and Limitations

Bill Watterson, 1996

This section provides an overall discussion of the methods utilized in the Articles 1 to 3. It is structured according to the three issues highlighted in *Article 1*: (1) conceptual coverage of mindfulness scales and hence their content validity; (2) the relationships between the aspects of mindfulness and thus the possibility to provide stable factor solutions; and (3) the possibility of providing valid items that are largely immune to significant bias, especially in their semantic understanding. The main question is: to which extent could the methodology used provide relevant advancements with reference to these issues? It should be noted that it was not the goal of this thesis to provide a throughout investigation of the relationships between the aspects of mindfulness (issue 2). In fact, *Article 2* explicitly focused on content validity (issue 1) and *Article 3* on items validity (issue 3). Nevertheless, as the findings also provide interesting insights to issue 2, these will be briefly discussed.

I shall first discuss in detail the procedure leading to the identification of the three issues indicated in *Article 1*. *Article 1* provides a narrative literature overview that is not the result of quantitative or systematic analyses such as interviews or surveys involving researchers dealing with the assessment of mindfulness. The ideas proposed in *Article 1* are hence not empirically confirmed. However, the relevance of the three issues that I assumed as focal for the current development of mindfulness assessment seems to be confirmed by the scientific literature. The diverging conceptual coverage of mindfulness scales was addressed by several authors who pointed to a number of resulting drawbacks. In particular, the current plurality of operationalizations may hamper the comparability of studies as well as

communication about the construct (Brown et al., 2007; Malinowski, 2008) and it may result in growing confusion and arbitrariness with regard to the definition of mindfulness (Chiesa, 2012; Christopher, Charoensuk, Gilbert, Neary, & Pearce, 2009b; Rosch, 2007). The question of whether one could include aspects that are meaningfully and statistically distinguished when describing and measuring mindfulness is of relevance because of previous inconsistent results on one hand, and the desireability of this possibility for an exhaustive investigation of the relationships between mindfulness and other constructs on the other hand (Hough & Schneider, 1995; Smith, Fischer, & Fister, 2003; Smith & McCarthy, 1995). Finally, as the validity of the self-report assessment of mindfulness has been called into question by several authors (Belzer et al., 2012; Grossman, 2008; 2011a; van Dam, Earleywine, & Danoff-Burg, 2009; Christopher et al., 2009b), it should be clear that this issue deserves careful consideration. The issues described in *Article 1* are thus consistent with the scientific literature. In the article, they were, for the first time, brought together in order to provide a general framework guiding the systematic investigation and improvement of mindfulness assessment.

4.2.1 Conceptual Coverage of the Mindfulness Construct

In this section, I shall discuss to what extent the methods employed have contributed to clarifying the conceptual coverage of mindfulness. It should first be noted that the present thesis aimed at providing a comprehensive assessment of mindfulness. In other words, the approach was more inclusive than exclusive with reference to the aspects of mindfulness. Comprehensiveness was chosen for several reasons. First, in order to address all potential aspects of mindfulness and thus avoid premature exclusions. In fact, including a broad range of aspects allows the investigation of their interrelationships, the test of hypotheses concerning their relevance within the construct, and hence their relevance within a questionnaire. Second, a more comprehensive assessment is suitable for an accurate investigation of the mechanisms behind the beneficial effects of mindfulness.

With this goal in mind, we can now tackle the question of whether the procedure underlying this thesis succeeded in attaining a meaningful comprehensive assessment. The conceptual coverage of the CHIME is strongly based on an overview of the aspects of mindfulness covered in eight currently available mindfulness scales, an empirical evaluation of a preliminary mindfulness questionnaire, and on theoretical considerations. The nine aspects of mindfulness described in *Article 2* were derived by me and checked by the two co-

authors, one of whom is a longtime mindfulness meditation practitioner. No external validation by other researchers or meditation experts was conducted. For the construction of the CHIME (*Article 3*), particular attention was paid to providing a rich and comprehensive coverage (positive and negative formulations, reference to inner and outer experiences for the awareness items, and broad coverage of insight-related aspects such as relativity of thoughts) of each aspect.

It is nevertheless possible that relevant aspects of the construct are still absent in the CHIME. The tenability of the decision to exclude labeling/describing from the questionnaire has been discussed in detail (Section 4.1). Two recent overviews (Offenbächer et al., 2011; Sauer et al., 2012) point to three questionnaires that were not included in the conceptual overview in *Article 2* but may include further aspects relevant to mindfulness: Langer's Mindfulness/Mindlessness Scale (MMS; Haigh, More, Kashdan, & Fresco, 2011), the Effects of Meditation Scale (EOM; Reavley & Pallant, 2009) and the Developmental Mindfulness Survey (DMS; Solloway & Fisher, 2007). Moreover, Burg, Heidenreich, and Michalak (2012) developed a German-language questionnaire of body-mindfulness that includes two factors, *experiencing body awareness* and *appreciating body awareness*.

The conceptualization of mindfulness underlying the MMS is based on information processing theory and includes aspects such as novelty seeking, engagement, novelty producing, and flexibility. It was developed independently of Buddhist ideas and is based on Ellen Langer's (1989) mindfulness construct. Her conceptualization and the one on which this thesis is based developed concurrently and independently and, although they sharesome similarities, it is beyond the scope of the present work to include it in the mindfulness construct addressed here.

According to the overview by Offenbächer and colleagues (2011), the EOM and DMS assess aspects that are not contemplated in current mindfulness measures. The DMS is a one-dimensional measure rich in conceptual coverage that assesses mindfulness practice. It includes items addressing an aspect of awareness that was named by Shunryu Suzuki (1970) as beginner's mind (e.g., "I feel like I'm seeing for the first time.") as well as equanimity and peacefulness (e.g., "Meditation makes me feel peaceful."). Items addressing a beginner's mind were not included in the CHIME because of their potential ambiguity for individuals without meditation experience or unfamiliar with Buddhist psychology. With reference to items in the DMS that assess peacefulness, Sauer and colleagues (2012) pointed to the

danger of mindfulness questionnaires being "contaminated with variables relevant for health and well-being while solely asserting to capture mindfulness." (p. 7). They thus seem to discourage including this aspect in mindfulness questionnaires. The EOM includes aspects of interpersonal interaction, such as empathetic understanding, as effects of meditation practice. Owing to the conceptual coverage of the EOM, Offenbächer and colleagues (2011) drew "the tentative conclusion that mindfulness is predominantly operationalized as an intrapersonal rather than an interpersonal variable, and this seems to be an unwarranted restriction of the concept…" (p. 2442). This restriction is also true for the CHIME. Interestingly, during the construction of the CHIME, the option of including items assessing a compassionate and empathetic stance towards others was discussed but discarded. In fact, we wished to avoid a far-reaching overlap with the concepts of compassion and emotional intelligence. Nevertheless, it is true that these concepts, as well as emotion regulation, are tightly related and overlap with mindfulness (Allen & Knight, 2005; Ciarrochi, Forgas, & Mayer, 2001; Chambers, Gullone, & Allen, 2009; Hayes & Feldman, 2004; Schutte & Malouff, 2011). It remains unclear whether these dimensions should also be included in the assessment of mindfulness. Finally, the questionnaire of body-mindfulness by Burg and colleagues (2012) points to a further, potentially relevant approach in the self-report assessment of mindfulness. In their questionnaire, individuals were asked not only to rate their awareness, but also the extent to which they appreciate their state of awareness (e.g., item 3: "I value experiencing a strong body-connectedness."; free translation from German: "Ich schätze es, wenn ich eine starke Körperverbundenheit erfahre."). This approach is in line with recent recommendations by Paul Grossman (2011a, 2011b). On the other hand, it seems premature to argue for or against the inclusion of this aspect in the assessment of mindfulness because empirical results are still scarce (at the time of writing, the questionnaire by Burg and colleagues was unpublished) and the semantic clarity of items addressing the appreciation of behaviors related to mindfulness requires further study.

One may also argue that the conceptualization of mindfulness underlying the CHIME is too broad and thus comprises aspects that are not relevant to the construct. In fact, the integration of aspects such as decentering, insightful understanding, and a non-avoiding attitude (openness to experiences) is controversial, as these aspects are sometimes considered effects rather than components of mindfulness. This issue was broadly discussed

in *Article 3* and it was argued that these aspects might be better viewed as being part of the mindfulness construct.

In summary, regarding conceptual coverage, the CHIME is the most comprehensive mindfulness questionnaire that provides subscales currently available and is solidly based on current scientific literature. The CHIME focuses on the intrapersonal dimension of mindfulness and does not systematically address the interpersonal dimension of the construct.

4.2.2 Relationships within the Aspects of Mindfulness

The results of the present thesis support a multi-factorial conceptualization of mindfulness and thus the possibility of providing stable subscales in mindfulness questionnaires. In fact, both the factor structure of the preliminary scale presented in *Article 2* and of the CHIME could be replicated in different samples. However, the findings also point to holistic properties of the mindfulness construct. In particular, items addressing insightful understanding tended to distribute over multiple subscales of the CHIME in exploratory factor analysis (*Article 3*). Following standard procedures (exclusion of items significantly loading on different factors), this aspect would have been dropped from the factor solution. Instead, it was included as a factor in the final solution, which could be confirmed through confirmatory factor analysis. It should be noted that this procedure, while providing the advantage of valuing theoretical considerations in the face of methodological artifacts, is also susceptible to methodological limitations. In fact, even if the inclusion of insightful understanding could be assured, this could be done only through the introduction of a separate factor, by which the holistic nature of the construct may have been masked.

Results from *Article 2* pointed to stronger relationships among the questionnaires' subscales with increasing meditation experience. Thus, it seems that the aspects of mindfulness become more interconnected through practice and deeper understanding. However, the difference in experience with meditation between the two samples described in *Article 2* was limited and it is possible that analyses of data from more experienced samples would have highlighted more significant changes in factor structure.

The influence of other variables on the factor structure was not investigated in the present thesis. Indeed, Christopher and colleagues (2009b) showed that cultural differences have a strong influence on the factor structure of the KIMS. As previously stated, it was not the aim of this thesis to provide a systematic investigation of the relationships within the

aspects of mindfulness over different populations. Rather, the present results provide sufficient evidence for a stable factor solution in samples from the general population, which consists mostly of Swiss participants.

4.2.3 Validity of the Items

A major concern underlying the construction and validation of the CHIME was the validity of its items. We took great care in including semantically unambiguous items that should be similarly understood by individuals with and without meditation experience. Accordingly, potential problems related to items in eight validated mindfulness measures were considered. These were identified through several works addressing the validity of the self-report assessment of mindfulness (*Article 1*; Christopher et al., 2009b; Grossman, 2008; Rosch, 2007; Van Dam et al., 2009). For example, it was argued in *Article 1* that unexpected results relating to the *observe* scale of the KIMS and FFMQ may be due to particular characteristics of the questionnaire items. It was also suggested that the MAAS items, although developed to measure *present awareness*, may also cover, through their negative phrasing, a judgmental attitude. Belzer and colleagues (2012) showed conclusively that the word "experience" is ambiguous and should thus be avoided in mindfulness questionnaires. Therefore, in the construction of the CHIME, items including formulations that may be easily misunderstood by meditation-naïve individuals were avoided. We obtained feedback related to the items from seven meditation-naïve individuals. The items were not externally validated by expert meditators and their comprehension was not systematically tested through cognitive interviews. In the validation study, the possible existence of systematic bias was evaluated through analyses of measurement invariance based on Differential Item Functioning (DIF) analyses. No item in the final version of the CHIME showed significant endorsement biases related to gender, age, or meditation experience, which supports the semantic clarity of the items. Nevertheless, only qualitative analyses could bring definite evidence for the clarity of the items. Moreover, although two studies by Christopher and colleagues (2009a; 2009b) showed cultural background to critically influence the understanding of mindfulness items, DIF was applied in this thesis to control for bias due to meditation experience, gender, age, but not culture. Control for culture was not applicable to the present samples, as they were mostly culturally homogeneous.

In summary, preliminary empirical results from the CHIME suggest that the approach utilized was successful in providing robust items without systematic endorsement bias.

Previous studies applying DIF to FFMQ items revealed differences in the endorsement of the items that were attributed to either meditation practice or age (Baer, Samuel, & Lykins, 2011; Van Dam et al., 2009). The CHIME items did not show such differences. It is nevertheless necessary to further investigate the validity of the CHIME items through qualitative analyses and to consider different cultural groups.

4.3 Conclusion and Outlook

When measuring psychological constructs, it is essential to clarify the conceptualization one's measurement is based upon as well as to provide a solid assessment method. In the case of mindfulness, the most widely used assessment method is self-report questionnaires. Self-report assessment is associated with drawbacks, such as biases due to desirability or to relying on self-perceptions and memories. On the other hand, questionnaires allow assessment of subjective experiences from the first-person perspective, which is desirable in the case of a construct such as mindfulness. Keeping in mind the limitations intrinsic to self-report assessment, this thesis aimed at improving current assessments of mindfulness. Results suggest that a comprehensive and multi-dimensional assessment of mindfulness is possible and desirable and that problems due to semantic ambiguity of items may be reduced. Altogether, this thesis supports the assessment of mindfulness through self-report as a valid method.

The validity of the self-report assessment of mindfulness and of the measure proposed here, the CHIME, should nevertheless be further investigated. In particular, qualitative methods may be utilized in order to ascertain the homogeneity in the semantic understanding of items across different demographic groups. Moreover, further contributions to the assessment of mindfulness may be achieved through person-oriented approaches, such as cluster analysis. Person-oriented approaches allow one to focus on patterns of response on mindfulness factors instead of relying entirely on their linear associations (Lilja, Lundh, Josefsson, & Falkenström, 2012). Such methods allow the consideration of the contextual meaning of the individual values on specific variables (Bergman & Magnusson, 1997) such as the different meanings of heightened awareness in the presence or absence of an accepting attitude. Finally, although the CHIME allows an assessment of mindfulness based on numerous previous operationalization attempts and theoretical considerations, other relevant aspects may be absent from the scale. Therefore,

aspects pertaining to interpersonal dimensions such as empathy and compassion should be considered for inclusion in mindfulness questionnaires. Finally, the assessment of mindfulness through methods other than questionnaires should be further addressed.

4.4 References

Acock, A. C. (2005). Working With Missing Values. *Journal of Marriage and Family, 67*, 1012-1028.

Allen, N. B., & Knight, W. E. (2005). Mindfulness, compassion for self, and compassion for others. In P. Gilbert (Ed.), *Compassion: Conceptualizations, research, and use in psychotherapy* (pp. 239-262). New York, NY: Routledge.

Baer, R. A. (2011). Measuring mindfulness. *Contemporary Buddhism, 12,* 241-261.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11,* 191-206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27-45.

Baer, R. A., Walsh, E., & Lykins, E. L. B. (2009). Assessment of mindfulness. In F. Didonna (Ed.), *Clinical Handbook of Mindfulness* (pp. 153-168). NY: Springer.

Baer, R. A., Samuel, D. B., & Lykins, E. L. (2011). Differential item functioning on the Five Facet Mindfulness Questionnaire is minimal in demographically matched meditators and nonmeditators. *Assessment, 18,* 3-10.

Belzer, F., Schmidt, S., Lucius-Höhne, G., Schneider, J. F., Orellana Rios, C. L., & Sauer, S. (2012). Challenging the construct validity of mindfulness assessment. A cognitive interviewing study of the Freiburg Mindfulness Inventory. *Mindfulness*. Advance online publication. doi: 0.1007/s12671-012-0165-7

Bergman, L. R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology, 9,* 291-319.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical psychology: Science and practice*, *11*, 230-241.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological wellbeing. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18,* 211-237.

Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: The development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1,* 11-34.

Burg, J. M., Heidenreich, T., & Michalak, J. (2012). *Being Aware of the Body: The Development of the Body Mindfulness Questionnaire.* Unpublished manuscript.

Christopher, M. S., Christopher, V., & Charoensuk, S. (2009a). Assessing "Western" Mindfulness Among Thai Theravāda Buddhist Monks. *Mental Health, Religion and Culture*, *12*, 303-314.

Christopher, M. S., Charoensuk, S., Gilbert, B. D., Neary, T. J., & Pearce, K. L. (2009b). Mindfulness in Thailand and the United States: A case of apples versus oranges? *Journal of Clinical Psychology*, *65*, 590–612.

Ciarrochi, J., Forgas, J. P., & Mayer, J. D. (Eds.). (2001). *Emotional intelligence in everyday life: A scientific inquiry*. Philadelphia: Psychology Press.

Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton mindfulness questionnaire (SMQ). *British Journal of Clinical Psychology, 47,* 451-455.

Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review*, *29*, 560.

Didonna, F. (2009). *Clinical Handbook of Mindfulness.* Berlin: Springer.

Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. G., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, *29*, 177-190.

Graham, J. W. (2009). Missing data analysis: Making it work in the real world. *Annual Review of Psychology, 60,* 549-576.

Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research, 64,* 405–408.

Grossman, P. (2011a). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re)invention of mindfulness: Comment on Brown et al. (2011). *Psychological Assessment, 23*, 1034–1040.

Grossman, P. (2011b). Mindfulness, by another name…: Trials and tribulations of Sati in Western psychology and Science. *Contemporary Buddhism, 12,* 219–239.

Haigh, E. A. P., Moore, M. T., Kashdan, T. B., & Fresco, D. M. (2011). Examination of the factor structure and concurrent validity of the Langer mindfulness/mindlessness scale. *Assessment, 18,* 11–26.

Hayes, A. M., & Feldman, G. (2004). Clarifying the Construct of Mindfulness in the Context of Emotion Regulation and the Process of Change in Therapy. *Clinical Psychology: Science and Practice, 11*, 255-262.

Haynes, S. N., Richard, D. C. S., & Kubany, E. S. (1995). Content Validity in Psychological Assessment: A Functional Apporach to Concepts and Methods. *Psychological Assessment, 7,* 238-247.

Hawthorne, G., & Elliott, P. (2005). Imputing cross-sectional missing data: comparison of common techniques. *Australian and New Zealand Journal of Psychiatry*, *39*, 583-590.

Johnson, N. (2007). *Self Report Measures of Mindfulness: A Review of the Literature.* Thesis: Pacific University. Common Knowledge; Retrieved from http://commons.pacificu.edu/cgi/viewcontent.cgi?article=1145&context=spp

Langer, E. J. (1989). *Mindfulness*. Cambridge, MA: De Capo Press.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology, 62,* 1445-1467.

Leigh, J., Bowen, S., & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse. *Addict Behavior, 30*, 1335–1341.

Lilja, J. L., Lundh, L. G., Josefsson, T., & Falkenström, F. (2012). Observing as an Essential Facet of Mindfulness: A Comparison of FFMQ Patterns in Meditating and Non-Meditating Individuals. *Mindfulness*. Advance online publication. doi: 10.1007/s12671-012-0111-8.

Miller, G. A., & Chapman, J. P. (2001). Misunderstanding analysis of covariance. *Journal of Abnormal Psychology, 110*, 40–48

Offenbächer, M., Sauer, S., Hieblinger, R., Hufford, D. J., Walach, H., & Kohls, N. (2011). Spirituality and the International Classification of Functioning, Disability and Health: content comparison of questionnaires measuring mindfulness based on the International Classification of Functioning. *Disability & Rehabilitation, 0,* 1-12.

Reavley, N., &Pallant, J. F. (2009). Development of a scale to assess the meditation experience. *Personality and Individual Differences, 47,* 547–552.

Sauer, S., Walach, H., Schmidt, S., Hinterberger, T., Lynch, S., Büssing, A., & Kohls, N. (2012). Assessment of mindfulness: review on state of the art. *Mindfulness*. Advance online publication. doi: 10.1007/s12671-012-0122-5.

Schutte, N. S., & Malouff, J. M. (2011). Emotional intelligence mediates the relationship between mindfulness and subjective well-being. *Personality and Individual Differences*, *50*, 1116-1119.

Solloway, S. G., & Fisher W.P. (2007). Mindfulness practice: a Rasch variable construct innovation. *Journal of Applied Measurement, 8*, 359–372.

Suzuki, S. (1970). *Zen mind, beginner's mind.* New York, NY: Weatherhill, Inc.

Van Dam, N. T., Earleywine, M., & Danoff-Burg, S. (2009). Differential item function across meditators and non-meditators on the Five Facet Mindfulness Questionnaire. *Personality and Individual Differences*, *47*, 516-521.

Watterson, B. (1996). *It's a Magical World: a Calvin and Hobbes collection*. New York: Andrews & McMeel Publishing.

Zinbarg, R. E., Suzuki, S., Uliaszek, A. A., & Lewis, A. R. (2010). Biased parameter estimates and inflated type I error rates in analysis of covariance (and analysis of partial variance) arising from unreliability: alternatives and remedial strategies. *Journal of Abnormal Psychology, 119*, 307–319.

Appendix

5. Appendix

5.1 Appendix 1: CHIME-β

Schätzen Sie bitte mit Hilfe der bereitgestellten Skala ein, inwieweit jede der folgenden Aussagen für Sie zutrifft. Bitte beziehen Sie dabei die Aussagen auf die letzten 7 Tage. Bitte antworten Sie spontan, ohne lange darüber nachzudenken, und so, wie Sie die Dinge tatsächlich erleben und nicht, wie Sie sie gerne erleben würden. Es gibt keine „richtigen" oder „falschen" und keine „guten" oder „schlechten" Antworten. Ihre persönliche Erfahrung ist uns wichtig. Bitte beantworten Sie jede Frage.

		trifft völlig zu	trifft überwiegend zu	trifft eher zu	trifft eher nicht zu	trifft überwiegend nicht zu	trifft gar nicht zu
1	Ich nehme meine Gefühle wahr, ohne sie gleich in Verhalten umsetzen zu müssen.	○	○	○	○	○	○
2	Wenn ich die Hände wasche oder die Zähne putze, bin ich mir meiner Bewegungen und der dabei entstehenden Empfindungen bewusst.	○	○	○	○	○	○
3	Während ich etwas tue, achte ich darauf, wie ich das mache.	○	○	○	○	○	○
4	Ich habe Mühe, die richtigen Worte zu finden, um meine Gefühle auszudrücken.	○	○	○	○	○	○
5	Meine Gefühle erscheinen mir schlecht oder unangebracht und ich finde, dass ich sie nicht haben sollte.	○	○	○	○	○	○
6	Ich weiss, dass meine Erfahrungen vergänglich sind.	○	○	○	○	○	○
7	Ich kann von meinen Gedanken Abstand nehmen und sie von einer anderen Warte aus beobachten.	○	○	○	○	○	○
8	Ich neige dazu, unangenehme Gefühle und Gedanken zu verdrängen.	○	○	○	○	○	○
9	Ich habe eine wertschätzende Haltung mir selbst gegenüber.	○	○	○	○	○	○
10	Ich mache, was ich mir vorgenommen habe, auch wenn ich mich dabei unwohl oder ängstlich fühle.	○	○	○	○	○	○
11	Ich kann positivere Gefühle gezielt herbeiführen.	○	○	○	○	○	○
12	In Stresssituationen kann ich innehalten.	○	○	○	○	○	○

		trifft völlig zu	trifft überwiegend zu	trifft eher zu	trifft eher nicht zu	trifft überwiegend nicht zu	trifft gar nicht zu
13	Auch bei alltäglichen Verrichtungen achte ich auf Empfindungen, die in meinem Körper entstehen.	○	○	○	○	○	○
14	Ich spule meine Aktivitäten ab, ohne ihnen viel Aufmerksamkeit zu schenken.	○	○	○	○	○	○
15	Ich finde es schwierig, meine Gedanken in Worte zu fassen.	○	○	○	○	○	○
16	Ich beurteile meine Gedanken und Gefühle nach gut oder schlecht.	○	○	○	○	○	○
17	Ich nehme wahr, wie meine Erfahrungen kommen und gehen.	○	○	○	○	○	○
18	Ich kann erkennen, wenn ich mir unnötig das Leben schwer mache.	○	○	○	○	○	○
19	Wenn ich Schmerzen habe, versuche ich diese Wahrnehmung möglichst zu vermeiden.	○	○	○	○	○	○
20	Ich kann mich selbst akzeptieren, so wie ich bin.	○	○	○	○	○	○
21	Ich kann trotz negativer Gefühle das machen, was ich mir vorgenommen habe.	○	○	○	○	○	○
22	Ich kann meine negativen Gefühle beeinflussen.	○	○	○	○	○	○
23	In Stresssituationen fühle ich mich auch innerlich gestresst.	○	○	○	○	○	○
24	Ich nehme Alltagsgeräusche wie zum Beispiel Rasenmähen, das Ticken von Uhren oder die Geräusche einer Tastatur bewusst wahr.	○	○	○	○	○	○
25	Ich funktioniere wie automatisch und bin mir dessen, was ich gerade tue, nicht besonders bewusst.	○	○	○	○	○	○
26	Ich kann die passenden Worte finden, die meine Gefühle beschreiben.	○	○	○	○	○	○
27	ich schäme mich wegen meiner Gedanken.	○	○	○	○	○	○
28	Ich beobachte, wie meine Gedanken und Gefühle kommen und gehen.	○	○	○	○	○	○
29	Ich kann darüber lächeln, wenn ich sehe, wie ich aus kleinen Schwierigkeiten riesige Probleme mache.	○	○	○	○	○	○
30	Ich kann auch unangenehmen Situationen gegenübertreten.	○	○	○	○	○	○
31	Ich bin der grösste Kritiker meiner selbst.	○	○	○	○	○	○

		trifft völlig zu	trifft überwiegend zu	trifft eher zu	trifft eher nicht zu	trifft überwiegend nicht zu	trifft gar nicht zu
32	Ich kann wichtige Ziele verfolgen, auch wenn ich mich dabei manchmal unwohl oder unsicher fühle.	○	○	○	○	○	○
33	Mir ist klar, dass ich meine Gefühle beeinflussen kann.	○	○	○	○	○	○
34	Auch in schmerzhaften und problematischen Situationen kann ich innerlich ruhig und gelassen bleiben.	○	○	○	○	○	○
35	Wenn ich esse, achte ich bewusst auf den Geschmack der Speisen.	○	○	○	○	○	○
36	Es fällt mir schwer, mit meiner Aufmerksamkeit im „Hier und Jetzt“ zu sein und mich auf das zu konzentrieren, was gegenwärtig passiert.	○	○	○	○	○	○
37	Ich kann meine Ideen, Erwartungen und Anliegen gut sprachlich mitteilen.	○	○	○	○	○	○
38	Ich finde meine Gedanken nicht normal und sage mir, ich sollte nicht so denken.	○	○	○	○	○	○
39	Ich bin mittendrin in meinen Gedanken.	○	○	○	○	○	○
40	Ich kann Dinge aus verschiedenen Perspektiven betrachten.	○	○	○	○	○	○
41	Ich kann bei unangenehmen Gefühlen und Empfindungen verweilen.	○	○	○	○	○	○
42	Auch wenn ich meine Fehler sehe, kann ich mir selbst gegenüber freundlich sein.	○	○	○	○	○	○

5.2 Appendix 2: CHIME - Preliminary Version

Schätzen Sie bitte mit Hilfe der bereitgestellten Skala die folgenden Aussagen ein. Bitte beziehen Sie dabei die Aussagen auf die letzten zwei Wochen.

		Fast nie	Selten	Eher selten	Eher häufig	Häufig	Fast immer
1	Ich nehme Veränderungen in meinem Körper deutlich wahr, z.B. schnelleres oder langsameres Atmen.	○	○	○	○	○	○
2	Ich kann erkennen, wenn eine kleine oder alltägliche Schwierigkeit in meinem Kopf zu einem grossen Problem wird.	○	○	○	○	○	○
3	Es ist mir bewusst, dass meine Ansichten über Situationen oder Personen nicht dauerhaft sein müssen, sondern sich wieder verändern können.	○	○	○	○	○	○
4	Es kommt vor, dass ich so sehr mit der Zukunft beschäftigt bin, dass ich kaum bemerke, was gerade um mich herum passiert.	○	○	○	○	○	○
5	Ich kann mich so akzeptieren, wie ich bin.	○	○	○	○	○	○
6	Ich gehe hart mit mir selber um, wenn ich Fehler mache.	○	○	○	○	○	○
7	Ich kann darüber schmunzeln, wenn ich sehe, wie ich aus einer kleinen Schwierigkeit ein Problem gemacht habe.	○	○	○	○	○	○
8	Beim Sitzen oder Liegen nehme ich meine Körperempfindungen wahr.	○	○	○	○	○	○
9	Wenn sich meine Stimmung verändert, nehme ich das sofort wahr.	○	○	○	○	○	○
10	Wenn ich es mir selber unnötig schwer gemacht habe, kann ich das mit einer Spur Humor wahrnehmen.	○	○	○	○	○	○
11	Ich sehe meine Fehler und Schwierigkeiten, ohne mich zu verurteilen.	○	○	○	○	○	○
12	Ich kann auch meine Schwächen und Unzulänglichkeiten annehmen.	○	○	○	○	○	○
13	Es kommt vor, dass ich mich wegen meiner Gedanken schäme.	○	○	○	○	○	○
14	Ich sage mir, dass ich nicht so denken sollte, wie ich denke.	○	○	○	○	○	○

		Fast nie	Selten	Eher selten	Eher häufig	Häufig	Fast immer
15	Fehler zu machen erlebe ich als einen wesentlichen Bestandteil des Menschseins.	○	○	○	○	○	○
16	Ich bemerke im Alltag, wenn eine bestimmte Situation erst durch meine negative Einstellung ihr gegenüber mühsam wird.	○	○	○	○	○	○
17	Auch bei alltäglichen Verrichtungen achte ich auf Empfindungen, die in meinem Körper entstehen.	○	○	○	○	○	○
18	Ich zerbreche oder verschütte Dinge aus Unachtsamkeit oder weil ich an anderes denke.	○	○	○	○	○	○
19	Wenn ich Auto oder Zug fahre, bin ich mir meiner Umgebung, z.B. der Landschaft, bewusst.	○	○	○	○	○	○
20	Ich höre jemandem mit einem Ohr zu während ich mich gleichzeitig mit etwas anderem beschäftige.	○	○	○	○	○	○
21	Erinnerungen nehmen mich so ein, dass ich mich darin verliere.	○	○	○	○	○	○
22	Wenn ich meine Auffassungen und Interpretationen zu ernst nehme, bemerke ich es schnell.	○	○	○	○	○	○
23	Ich versuche mich abzulenken, wenn ich unangenehme Gefühle erlebe.	○	○	○	○	○	○
24	Wenn ich mich in negativen Gedanken verstricke, kann ich mich nur schwer wieder davon lösen.	○	○	○	○	○	○
25	Auch in schwierigen Situationen kann ich meine Gedanken und Gefühle mit etwas Abstand betrachten.	○	○	○	○	○	○
26	Im Alltag ist mir bewusst, dass viele Gedanken Interpretationen sind, die nicht unbedingt der Realität entsprechen.	○	○	○	○	○	○
27	Wenn ich mit anderen Personen spreche, nehme ich wahr, welche Gefühle ich dabei erlebe.	○	○	○	○	○	○
28	Wenn ich in einer belastenden Situation bin, werde ich von meinen Gefühlen überwältigt.	○	○	○	○	○	○
29	Bei Diskussionen mit anderen Personen wird mir bewusst, dass meine Sicht der Dinge nur eine von vielen möglichen ist.	○	○	○	○	○	○
30	Ich bin freundlich zu mir selbst, wenn ich innerlich leide.	○	○	○	○	○	○

		Fast nie	Selten	Eher selten	Eher häufig	Häufig	Fast immer
31	Ich funktioniere wie automatisch und bin mir nicht besonders bewusst, was ich gerade tue.	○	○	○	○	○	○
32	Beim Lesen muss ich Abschnitte wiederholt lesen, weil ich an etwas anderes gedacht habe.	○	○	○	○	○	○
33	Ich bemerke es sofort, wenn ich mich unter Stress fühle.	○	○	○	○	○	○
34	Ich nehme meine Gefühle und Gedanken wahr und kann sie gleichzeitig mit etwas Distanz betrachten.	○	○	○	○	○	○
35	Ich bin mir selbst gegenüber freundlich, wenn Dinge schief laufen.	○	○	○	○	○	○
36	Es ist mir bewusst, welche Gedanken mir gerade durch den Kopf gehen.	○	○	○	○	○	○
37	Ich mag es nicht, wenn ich ärgerlich oder ängstlich bin und versuche, solche Gefühle beiseite zu schieben.	○	○	○	○	○	○
38	Ich nehme meine Gefühle wahr, ohne auf sie reagieren zu müssen.	○	○	○	○	○	○
39	Es fällt mir leicht, mich darauf zu konzentrieren, was ich tue.	○	○	○	○	○	○
40	Ich kann meine Gedanken und Gefühle beobachten, ohne mich in ihnen zu verstricken.	○	○	○	○	○	○
41	In schwierigen Momenten kann ich einen Schritt zurücktreten und meine Gefühle und Gedanken betrachten.	○	○	○	○	○	○
42	Ich versuche beschäftigt zu bleiben, damit mir bestimmte Gedanken und Gefühle nicht bewusst werden.	○	○	○	○	○	○
43	Ich hänge gedankenverloren der Zukunft oder der Vergangenheit nach.	○	○	○	○	○	○
44	Während ich etwas tue, achte ich darauf, wie ich das mache.	○	○	○	○	○	○
45	Ich achte auf Empfindungen wie zum Beispiel Wind in meinem Haar oder Sonnenschein auf meinem Gesicht.	○	○	○	○	○	○
46	Wenn ich auf eine belastende Alltagssituation emotional reagiere, dauert es bei mir lange, bis sich dieser Gefühlszustand wieder auflöst.	○	○	○	○	○	○

		Fast nie	Selten	Eher selten	Eher häufig	Häufig	Fast immer
47	Wenn ich mir unnötig das Leben schwer mache, wird mir das bald danach klar.	○	○	○	○	○	○
48	Ich nehme Farben und Formen in der Natur deutlich und bewusst wahr.	○	○	○	○	○	○
49	Auch wenn ich einen grossen Fehler gemacht habe, gehe ich mit mir auf eine verständnisvolle Art um.	○	○	○	○	○	○
50	Wenn es mir schlecht geht, stehe ich mir selbst zur Seite.	○	○	○	○	○	○
51	Ich muss darüber schmunzeln, wenn ich sehe, wie ich mir manchmal die Dinge als viel komplizierter vorstelle, als sie eigentlich sind.	○	○	○	○	○	○
52	Es ist mir im Alltag bewusst, dass sich eigene Meinungen, die ich zur Zeit sehr ernst nehme, deutlich verändern können.	○	○	○	○	○	○
53	Wenn ich merke, dass ich unangemessen reagiert habe, ist mir gleichzeitig klar, dass es menschlich ist, Fehler zu machen.	○	○	○	○	○	○
54	Wenn ich belastende Gedanken oder Vorstellungen habe, fühle ich mich relativ schnell danach wieder ruhig.	○	○	○	○	○	○
55	Wenn es mir schlecht geht, finde ich kaum unterstützende Worte für mich.	○	○	○	○	○	○
56	Wenn bei mir belastende Erinnerungen oder Gedanken auftauchen, dann versuche ich sie loszuwerden, indem ich mich ablenke.	○	○	○	○	○	○
57	Mir ist im Alltag bewusst, dass meine Sicht der Dinge subjektiv ist und den Tatsachen nicht entsprechen muss.	○	○	○	○	○	○
58	Wenn ich in einer Schlange stehe oder auf jemanden warten muss, achte ich darauf, was bei mir innerlich an Gedanken, Gefühlen, Bildern, usw. abläuft.	○	○	○	○	○	○
59	Es gibt Dinge, an die ich möglichst nicht denken will.	○	○	○	○	○	○
60	Wenn ich leide, reagiere ich mir gegenüber verständnislos oder kalt.	○	○	○	○	○	○
61	Ich bemerke auch kleinere Veränderungen an der Kleidung oder im Ausdruck anderer Menschen.	○	○	○	○	○	○

		Fast nie	Selten	Eher selten	Eher häufig	Häufig	Fast immer
62	Mir fallen Veränderungen in meiner Umgebung auf, auch wenn sie Details betreffen, wie z.B. blühende Blumen oder Wolken am Himmel.	○	○	○	○	○	○
63	Ich urteile darüber, ob meine Gedanken gut oder schlecht sind.	○	○	○	○	○	○
64	Ich kann die Gedanken und Gefühle, die ich habe, annehmen.	○	○	○	○	○	○
65	Wenn ich Schwierigkeiten habe, so neige ich dazu, hart zu mir selbst zu sein.	○	○	○	○	○	○
66	Im Alltag werde ich durch viele Erinnerungen, Bilder oder Träumereinen abgelenkt.	○	○	○	○	○	○
67	Ich nehme mir meine Fehler und Schwächen übel.	○	○	○	○	○	○
68	Ich habe Schwierigkeiten, mich so anzunehmen, wie ich bin.	○	○	○	○	○	○
69	Ich denke, dass manche meiner Gefühle schlecht oder unangebracht sind und dass ich sie nicht haben sollte.	○	○	○	○	○	○
70	Ich spule meine Aktivitäten ab, ohne ihnen viel Aufmerksamkeit zu schenken.	○	○	○	○	○	○
71	Wenn ich belastende Gedanken oder Vorstellungen habe, kann ich sie einfach bemerken, ohne gleich auf sie zu reagieren.	○	○	○	○	○	○
72	Wenn ich innerlich leide, kann ich meine Gefühle und Gedanken wahrnehmen, ohne ihnen auszuweichen.	○	○	○	○	○	○
73	Wenn ich Schmerzen habe, versuche ich diese Wahrnehmung möglichst zu vermeiden.	○	○	○	○	○	○
74	Während Tätigkeiten bin ich darauf konzentriert, was ich gerade mache und wie ich es mache.	○	○	○	○	○	○
75	Mir begegnen Seiten an mir, über die ich nicht nachdenken will.	○	○	○	○	○	○
76	Wenn ich esse, achte ich bewusst auf den Geschmack der Speisen.	○	○	○	○	○	○
77	Es ist mir im Alltag bewusst, wie ich mich gerade fühle.	○	○	○	○	○	○
78	Im Auf und Ab des Lebens bin ich mir gegenüber warmherzig.	○	○	○	○	○	○

		Fast nie	Selten	Eher selten	Eher häufig	Häufig	Fast immer
79	Wenn ich belastende Gedanken oder Vorstellungen habe, werde ich von meinen Gefühlen ganz eingenommen.	○	○	○	○	○	○
80	Ich kann auch eigene Gefühle oder Gedanken, die mir übertrieben oder unangebracht scheinen, annehmen.	○	○	○	○	○	○
81	In schwierigen Situationen kann ich einen Moment innehalten, ohne sofort zu reagieren.	○	○	○	○	○	○
82	Es ist mir klar, dass sich meine Bewertungen von Situationen oder Personen leicht verändern können.	○	○	○	○	○	○
83	Wenn ich in Gedanken und Gefühlen gefangen bin, dauert es nicht lange, bis ich das merke und mich wieder davon distanzieren kann.	○	○	○	○	○	○
84	Ich nehme Geräusche in meiner Umgebung, wie z.B. zwitschernde Vögel oder vorbeifahrende Autos, bewusst wahr.	○	○	○	○	○	○
85	Auch wenn ich Fehler mache, kann ich mir selbst gegenüber freundlich sein.	○	○	○	○	○	○

5.2 Appendix 3: CHIME - Final Version

Dieser Fragebogen umfasst Aussagen, die sich auf verschiedene Aspekte der Achtsamkeit im Alltag beziehen. Bitte antworten Sie spontan, ohne lange darüber nachzudenken. Es gibt keine „richtigen“ oder „falschen“ und keine „guten“ oder „schlechten“ Antworten. Ihre persönliche Erfahrung ist uns wichtig. Bitte beantworten Sie jede Frage.

Bitte beziehen Sie die Aussagen auf die letzten zwei Wochen.

		fast nie	selten	eher selten	eher häufig	häufig	fast immer
1	Wenn sich meine Stimmung verändert, nehme ich das sofort wahr.	○	○	○	○	○	○
2	Im Auf und Ab des Lebens bin ich mir gegenüber warmherzig.	○	○	○	○	○	○
3	Ich bemerke im Alltag, wenn eine bestimmte Situation erst durch meine negative Einstellung ihr gegenüber schwieriger wird.	○	○	○	○	○	○
4	Es ist mir klar, dass sich meine Bewertungen von Situationen oder Personen leicht verändern können.	○	○	○	○	○	○
5	Beim Sitzen oder Liegen nehme ich meine Körperempfindungen wahr.	○	○	○	○	○	○
6	Ich muss darüber schmunzeln, wenn ich sehe, wie ich mir manchmal die Dinge als viel komplizierter vorstelle, als sie eigentlich sind.	○	○	○	○	○	○
7	Ich gehe hart mit mir selber um, wenn ich Fehler mache.	○	○	○	○	○	○
8	Wenn ich belastende Gedanken oder Vorstellungen habe, fühle ich mich relativ schnell danach wieder ruhig.	○	○	○	○	○	○
9	Ich nehme Farben und Formen in der Natur deutlich und bewusst wahr.	○	○	○	○	○	○
10	Ich zerbreche oder verschütte Dinge aus Unachtsamkeit oder weil ich an anderes denke.	○	○	○	○	○	○
11	Ich sehe meine Fehler und Schwierigkeiten, ohne mich zu verurteilen.	○	○	○	○	○	○
12	Es fällt mir leicht, mich darauf zu konzentrieren, was ich tue.	○	○	○	○	○	○
13	Wenn ich belastende Gedanken oder Vorstellungen habe, kann ich sie einfach bemerken, ohne gleich auf sie zu reagieren.	○	○	○	○	○	○
14	Wenn ich mit anderen Personen spreche, nehme ich wahr, welche Gefühle ich dabei erlebe.	○	○	○	○	○	○

		fast nie	selten	eher selten	eher häufig	häufig	fast immer
15	Wenn ich es mir selber unnötig schwer gemacht habe, kann ich das mit einer Spur Humor wahrnehmen.	○	○	○	○	○	○
16	In schwierigen Situationen kann ich einen Moment innehalten, ohne sofort zu reagieren.	○	○	○	○	○	○
17	Im Alltag werde ich durch viele Erinnerungen, Bilder oder Träumereinen abgelenkt.	○	○	○	○	○	○
18	Wenn ich Auto oder Zug fahre, bin ich mir meiner Umgebung, z.B. der Landschaft, bewusst.	○	○	○	○	○	○
19	Ich versuche beschäftigt zu bleiben, damit mir bestimmte Gedanken und Gefühle nicht bewusst werden.	○	○	○	○	○	○
20	Wenn ich in Gedanken und Gefühlen gefangen bin, dauert es nicht lange, bis ich das merke und mich wieder davon distanzieren kann.	○	○	○	○	○	○
21	Ich achte auf Empfindungen wie zum Beispiel Wind in meinem Haar oder Sonnenschein auf meinem Gesicht	○	○	○	○	○	○
22	Ich versuche mich abzulenken, wenn ich unangenehme Gefühle erlebe.	○	○	○	○	○	○
23	Im Alltag ist mir bewusst, dass viele Gedanken Interpretationen sind, die nicht unbedingt der Realität entsprechen.	○	○	○	○	○	○
24	Ich kann darüber schmunzeln, wenn ich sehe, wie ich aus einer kleinen Schwierigkeit ein Problem gemacht habe.	○	○	○	○	○	○
25	Ich kann meine Gedanken und Gefühle beobachten, ohne mich in ihnen zu verstricken.	○	○	○	○	○	○
26	Beim Lesen muss ich Abschnitte wiederholt lesen, weil ich an etwas anderes gedacht habe.	○	○	○	○	○	○
27	Ich nehme Geräusche in meiner Umgebung, wie z.B. zwitschernde Vögel oder vorbeifahrende Autos, bewusst wahr.	○	○	○	○	○	○
28	Ich nehme meine Gefühle und Gedanken wahr und kann sie gleichzeitig mit etwas Distanz betrachten.	○	○	○	○	○	○
29	Ich nehme Veränderungen in meinem Körper deutlich wahr, z.B. schnelleres oder langsameres Atmen.	○	○	○	○	○	○

		fast nie	selten	eher selten	eher häufig	häufig	fast immer
30	Ich mag es nicht, wenn ich ärgerlich oder ängstlich bin und versuche, solche Gefühle beiseite zu schieben.	○	○	○	○	○	○
31	Mir ist im Alltag bewusst, dass meine Sicht der Dinge subjektiv ist und den Tatsachen nicht entsprechen muss.	○	○	○	○	○	○
32	Auch wenn ich einen grossen Fehler gemacht habe, gehe ich mit mir auf eine verständnisvolle Art um.	○	○	○	○	○	○
33	Wenn ich Schmerzen habe, versuche ich diese Wahrnehmung möglichst zu vermeiden.	○	○	○	○	○	○
34	Es ist mir im Alltag bewusst, wie ich mich gerade fühle.	○	○	○	○	○	○
35	Es ist mir im Alltag bewusst, dass sich eigene Meinungen, die ich zur Zeit sehr ernst nehme, deutlich verändern können.	○	○	○	○	○	○
36	Ich nehme mir meine Fehler und Schwächen übel.	○	○	○	○	○	○
37	Wenn ich mir unnötig das Leben schwer mache, wird mir das bald danach klar.	○	○	○	○	○	○

6. Declaration of Originality

Last name, first name: Bergomi, Claudia

Matriculation number: 02-217-065

I hereby declare that this thesis represents my orginal work and that I have used no other sources except as noted by citations.

All data, tables, figures and text citations which have been reproduced from any other source, including the internet, have been explicitly aknowledged as such.

I am aware that in case of non-compliance, the Senate is entitled to divest me of the doctorate degree awarded to me on the basis of the present thesis, in accordance with the "Statut der Universität Bern (Universitätsstatut; UniST)", Art. 20, of 17 December 1997.

Place, date	Signature
……	……

7. Curriculum Vitae

Claudia Bergomi (Lic. phil.)

born in Lugano, Switzerland, November 24th, 1981

Address

Department of Psychotherapy
University Hospital of Psychiatry
Laupenstrasse 49
3010 Bern

e-mail: bergomi@spk.unibe.ch

Education

- from 2008 Doctoral student and research assistant by Prof. W. Tschacher, Department of Psychotherapy, University Hospital of Psychiatry, Bern
  and Bachelor student of mathematics and philosophy, University of Bern
- 2004-08 University of Bern, License in Psychology,
  (Clinical Psychology, Psychotherapy, Neuropsychology and Psychopathology)
- 2002-04 University of Fribourg (Switzerland), Psychology
- 2000-02 High school of Lugano (3rd and 4th year), Savosa
- 1996-99 School of commerce and languages, Villa Erica, Locarno
- 1987-96 Primary and secondary school, Lugano-Besso

Employment History

Psychology

- from 2006 assistant scientist in the Department of Psychotherapy, University Hospital of Psychiatry, Bern
- 2007 Research internship (two months) at the Behavioral Research & Therapy Clinics (BRTC), Department of Psychology, University of Washington, Seattle, USA
- 2006 Clinical internship at the crisis intervention clinic of the University Hospital of Psychiatry, Bern
- 2005 Clinical internship at the Humaine Clinic for neuropsychological rehabilitation, Zihlschlacht, Switzerland

Other fields

- 2007 Secretary (substitution) in the Buddhist Theravada Dhammapala Monastery, Kandersteg, Switzerland
- 1999-2000 Secretary in the trust/fiduciary company Prismafin SA, Chiasso, Switzerland

Awards

1. Price: Scientific research price of the Society for Meditation and Meditation Research (SMMR), Germany (September 2009).
For the master thesis (Lizenziatsarbeit) “Achtsamkeit, buddhistische Meditation und psychische Gesundheit“

Member of

Society for Mind-Matter Research

Society for Meditation and Meditation Research

8. List of Publications

8.1 Journal Articles

Bergomi, C., Ströhle, G., Michalak, J., Funke, F., & Berking, M. (2012). Facing the Dreaded: Does Mindfulness Facilitate Coping with Distressing Experiences? A Moderator Analysis. *Cognitive Behaviour Therapy.* Advance online publication, doi: 10.1080/16506073.2012.713391

Bergomi, C., Tschacher, W., & Kupper, Z. (2012). The Assessment of Mindfulness with Self-Report Measures: Existing Scales and Open Issues. *Mindfulness.* Advance online publication. doi: 10.1007/s12671-012-0110-9

Bergomi, C., Tschacher, W., & Kupper, Z. (2012). Measuring Mindfulness: First Steps towards a Comprehensive Mindfulness Scale. *Mindfulness.* Advance online publication. doi: 10.1007/s12671-012-0102-9

Tschacher, W., & **Bergomi, C.** (2011). Cognitive Binding in Schizophrenia: Weakened Integration of Temporal Intersensory Information. *Schizophrenia Bulletin, 37(suppl 2),* S13-S22.

Röthlin, P., Grosse Holtforth, M., **Bergomi, C.**, Berking, M., Ottenbreit, N. D., & Caspar, F. (2010). Vermeidung und Depression: Die psychometrische Evaluation der deutschen Version der "Cognitive-Behavioral Avoidance Scale" (CBAS). *Diagnostica, 56,* 46-55.

8.2 Journal Articles in Preparation or Submitted

Bergomi, C., Tschacher, W., & Kupper, Z. (2012). *Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit: Das Comprehensive Inventory of Mindfulness Experiences.* Manuscript submitted for publication.

Tschacher, W., **Bergomi, C.**, & Tröndle, M. (2012). *Art Affinity Index: An Instrument to Assess Expertise in Art Reception.* Manuscript submitted for publication.

Kupper, Z., **Bergomi, C.**, Meierhans, C., Tschacher, W., & Moggi, F. (2013). *Mindfulness and Problem Drinking in the General Population.* Manuscript submitted for publication.

Tschacher, W., & **Bergomi, C.** (2013). *Visual Organization in Schizophrenia and its development through different stages of the disorder.* Manuscript in preparation.

Kupper, Z., **Bergomi, C.**, & Tschacher, W. (2013). *The Effectivity of MBSR Groups in private practice: A Swiss sample.* Manuscript in preparation.

8.3 Edited Books

Tschacher, W., & **Bergomi, C.** (Eds.) (2011). *The Implications of Embodiment: Cognition and Communication.* Exeter: Imprint Academic.

8.4 Book Chapters

Bergomi, C. (2010). *Achtsamkeit, buddhistische Meditation und psychische Gesundheit* (S. 153-165). In Piron, H., van Quekelberghe R. (Hg.). Meditation und Yoga. Eschborn bei FfM: Klotz.

Tschacher, W., Ramseyer, F., & **Bergomi C.** (under review). The subjective present and its modulation by psychological interventions. Leiden, The Netherlands: Brill Academic Publishers.

8.5 Other

Bergomi, C. (2012, January 16). Review of the book *Selbstorganisation der Wissenschaft [Self-organisation of Science]*, by E. J. Brunner, W. Tschacher, & K. Kenklies (Eds.). *Systemagazin – online Journal für systemische Entwicklungen*. Available online at http://www.systemagazin.de

Bergomi, C. (2011). *Intentionalität: Vorschlag für eine Naturalisierung auf der Basis der Theorie der Selbstorganisation. [Intentionality: A Suggestion for a Naturalisation on the Basis of Self-Organisation Theory]*. Research Reports of the University Hospital of Psychiatry, University of Bern, nr. 11-2. Available online at http://www.upd.unibe.ch/research/papers/FB11_2.pdf

9. Conference Presentations

Bergomi, C., Tschacher, W., & Kupper, Z. (2012, August 30th). *The Comprehensive Inventory of Mindfulness Experiences (CHIME): Construction and validation*. Talk given at the XLII European Association for Behavioural and Cognitive Therapies Congress, Geneva, Switzerland.

Bergomi, C., & Tschacher, W. (2012, March 28th). *Investigating Phenomenal Present over Different Modalities and the Effect of Mindfulness and Meditation.* Poster presented at the TIMELY Training School "Temporal processing in clinical populations", Thessaloniki, Greece.

Bergomi, C., Kupper, Z., & Tschacher, W. (2011, June 9th). *Die Erfassung von Achtsamkeit mittels Fragebogen: Comprehensive Inventory of Mindfulness Experiences (CHIME).* Talk given at the 3rd Congress of the German-speaking Mindfulness research network [3. Tagung des Forschungsnetzwerks Achtsamkeit - Achtsamkeit: Grundlagen und klinische Anwendungen], Bern, Switzerland.

Bergomi, C., Kupper, Z., & Tschacher, W. (2011, April 6th). *Contextual Binding in Schizophrenia: Weakened Integration of Temporal Intersensory Information*. Poster presented at the TIMELY Training School "Psychophysical, Computational and Neuroscience Models of Time Perception", Groningen, Netherlands.

Bergomi, C., Kupper, Z., & Tschacher, W. (2010, October 8th). *Advancements in the Assessment of Mindfulness.* Talk given at the XL European Association for Behavioural and Cognitive Therapies Congress, Milan, Italy.

Bergomi, C. (2009, November 14th). *Achtsamkeit, buddhistische Meditation und Psychische Gesundheit*. Talk given at the Yoga-Vidya – Yoga Congress 2009 [Yoga Vidya - Yoga Kongress 2009 (Veranstalter: Yoga Vidya und Society for Meditation and Meditation Research)], Bad Meinberg, Germany.

Bergomi, C., Pfammatter, M., Rees, G., von Schlippe, J., Junghan, U. M., & Tschacher, W. (2009, June 16th). *Auditory hallucinations in schizophrenia could be related to disturbances in auditory gestalt perception*. Talk given at the 16th International Symposium of the Psychological Treatments of the Schizophrenias and other Psychosis (ISPS), Copenhagen, Danemark.

Bergomi, C., Michalak, J., Wupperman, P., & Berking, M. (2008, June 22nd). *Mindfulness could mitigate the Negative Effects of the Non-Attainment of relevant Goals on Mental Health*. Talk given at the 6th International Congress of Cognitive Psycotherapy (ICCP), Rome, Italy.

Bergomi, C. (2008, March, 8th). *Achtsamkeit, buddhistische Meditation und psychische Gesundheit: Zusammenhänge und mögliche Wirkmechanismen*. Talk given at the first Meeting of the German-speaking Mindfulness research network [Netzwerktreffen vom Forschungsnetzwerk Achtsamkeit], Freiburg am Breisgau, Germany.