Chapter 13
Mindfulness: Challenges to the cognitive-behavioral approach

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Abstract

This chapter consists of two parts. The first provides some general considerations and introduces the second, a comparison study on mindfulness training as an effective component in treating emotional disorders.

Part I. Mindfulness approaches challenge some basic tenets of clinical cognitivism. Firstly, the pivotal aspect in the therapeutic process seems to be 'deautomatizing-disidentifying' rather than changing attitudes, schemas, etc. To escape automaticity, patients learn to relate to experiences as mental events within a field of awareness. Secondly, a question is posed by mindfulness approaches: is there a non-conceptual way of conscious knowing? Mindfulness is spoken of as 'insight meditation' (i.e. 'a non-conceptual and penetrating seeing into the nature of mind'; Kabat-Zinn (2003)**.** Such non-conceptual 'seeing' is a form of knowing not yet recognized in any cognitive model of mind, and results as the key factor in reducing dysfunctional automaticity.

Part II. F. Giommi, H. Barendregt, L. Oliemeulen, J. van Hoof, J. Tinge, A. Coenen, and P. van Dongen conducted a randomized controlled trial. Mindfulness-Based Stress Reduction (MBSR) was compared to Psychoeducation (PE, a standard psychiatric intervention) in a sample of patients with emotional disorders. Assessments were made on symptoms reduction (5 scales of depression, anxiety, quality of life) and attentional functioning (6 neuropsychological tasks, EEG recordings). MBSR was found at least as efficacious as PE. Preliminary results suggest that MBSR exerts a positive effect on attention. To date no comparison with an established intervention has been performed: this was the first exploratory study on such issue, and the first to consider the specific effects of mindfulness on attentional processes. New confidence is gained in applying MBSR as an effective component in treating emotional disorders.

Part I: Introduction and some general considerations

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1. Radicals and incorporationists

> *It becomes critically important that those persons coming to the field with professional interest and enthusiasm recognize the unique qualities and characteristics of mindfulness as a meditative practice, with all that implies, so that mindfulness is not simply sized upon as the next promising cognitive behavioral technique or exercise, decontextualized, and "plugged" into a behaviorist paradigm with the aim of driving desirable changes, or of fixing what is broken* (Kabat-Zinn, 2003, p.145).

Despite the fact that the use of mindfulness-based approaches is very recent, it is already possible to outline a map and pick out some of the trendlines. In the recent cognitivist community's fast growth of interest in mindfulness, two different approaches can be discerned. They are profoundly different and potentially divergent in perspective. There are those who view the expression mindfulness-based in a 'radical' manner: i.e. in the actual sense of placing mindfulness at the very root and heart of therapeutic interventions, whenever founded on mindfulness. These researchers see the meaning and value of mindfulness in the opportunity it provides to explore new clinical directions, broadening the conceptual and epistemological categories of present-day cognitivism, and opening the way for a constructive exchange with meditative traditions that study the nature of the mind. I call them 'radicals' and I reckon this list might include Segal, Williams, Teasdale, Linehan, and Schwartz. I believe that most radicals are generally recognizable, and characterized by the fact that they refer more or less directly to the fundamental experiences of Kabat-Zinn's Mindfulness-Based Stress Reduction (MBSR) program. This is based on mindfulness and on the knowledge that comes from the Buddhist tradition, *and that's it*. Without the addition of cognitive techniques and models, even though it does make precious use of scientific research (e.g. on stress). Another characteristic is that they all have a non-superficial familiarity with the practice of meditation, particularly Vipassana – insight or mindfulness meditation – and its core ideas. For them it is perfectly clear that any talk about the development of mindfulness has no plausible meaning other than within direct, personal experience.

On the other hand, it seems that a second group of researchers, whom I shall refer to as 'incorporationists', can be characterized by the fact that they seem to consider mindfulness as a concept or a procedure that might be usefully incorporated in existing clinical protocols *if* translated in cognitive-behavioral conceptualizations. These researchers tend to reformulate and accept mindfulness' perspective in as far as it fits into the already existing conceptual framework. For them, cognitive-behavioral theories come first and from this starting point it is possible to explore the clinical utility of mindfulness. Their attitude towards meditation seems, all things considered, somewhat perplexed; some of them actively seek alternative methods, using cognitive 'technologies' other than meditation, to develop mindfulness. I believe that a list of incorporationists would include Wells, Roemer, and Orsillo, who work particularly with cognitive psychopathological models to treat anxiety. Another name stemming from the area of behaviorism is Hayes.

It seems to me that the radicalists' approach is more fruitful: if we take mindfulness seriously (and indeed, mindfulness is just a consequence of 'taking consciousness seriously'; Chalmers, 1996), this might open up innovative and promising horizons for the cognitive approach. The study presented in the second part of this chapter exemplifies a radicalist's stance. This is the first comparison study to date showing that a mindfulness-based program is at least as effective as a well-established psychiatric treatment in reducing symptoms in a mixed sample of patients with depressive and anxious disorders. This study corroborates the literature suggesting that a wide range of psychological disorders are positively affected by mindfulness. This indicates that mindfulness operates in processes at a basic/transversal level of various kinds of emotional disorders. Mindfulness seems to be a general factor that affects the mechanism of emotional change. Which are these processes be and what might be the

factor capable to affect them? In trying to outline an answer, it appears quite clear that mindfulness challenges some of clinical cognitivism's basic tenets. We shall here consider two of these challenges.

2. De-automatizing versus changing cognitions

Mindfulness operates by modifying not the contents of the mind but our relationship with them. Experience teaches that by means of an intuitive, immediate 'seeing' - and accepting attitude - the coercive force of some cognitive-affective mental contents gradually becomes weaker and fades away. The central issue of cure then becomes that of *dis-indentification from our own thoughts-emotions through awareness*. In conjunction, the central theme of 'neurotic' disorders appears to revolve around the *automatization* of cognitive and emotional processes and around the crystalization, at various levels, of thoughts, feelings, and body-reaction patterns, which automatize outside awareness and volition/intention. Segal, Williams, and Teasdale (2002) point out that *de facto* traditional Cognitive Therapy (CT) itself is probably effective especially as a result of this! This runs counter to the declared purpose of CT: to modify beliefs regarding the *content* of dysfunctional thoughts. However, this objective actually promotes an implicit process that first (and perhaps foremost) involves a change in the *relationship* with dysfunctional thoughts and emotions, leaving them to be perceived increasingly as events in the mind, and thus not as reality (Teasdale, Hayhurst, Pope, et al., 2002; Barber, & DeRubeis, 1989).

Decentering, considered by classic CT as a means to change content, could be the factual therapeutic factor. There is a huge amount of experimental studies showing the effects of automatic biases induced by anxiety and depression on the perceptive processes during the initial phases of information processing (Gotlib & MacLeod, 1997). Studies have also examined the creation of automaticity in higher cognitive processes and its consequences (Bargh & Ferguson, 2000). A study on CT revealed that the intensity levels of depressive thought in terms of content are not predictive for relapse, whereas their form (i.e. the *automaticity and rapidity* of depressive thoughts in respect of their deliberation and intentionality) is (Teasdale, 1999). Worrying and ruminating are unproductive, repetitive thinking styles that contribute to anxiety and depression, respectively. In another study it was hypothesized that *repetitive thought* itself is a general concomitant and a predictive factor of negative mood (Segerstrom, Tsao, Alden, & Craske, 2000).

The mindfulness perspective highlights that automaticity (cognitive, perceptual, or mnemonic) leads to the bias characteristic of dysfunctional thoughts, depressive ruminations, anxious worries, and obsessional thinking. Mindfulness operates in the opposite direction to automaticity and is likely able to do so in low-level perceptual as well as in high-level cognitive/memory processes (Ramel, Goldin, Caroma, & McQuaid, 2004). One might wonder: is it really that simple? Yes, it is, but this seeming simplicity conceals profound implications, which when viewed in perspective involve not only clinical aspects but also our conceptualization of the mind and its nature. The repeated dis-identification/detachment through non-discursive mindful awareness from what we *believe* is real, is the fundament of the therapy. This core aspect has been recognized and referred to by the Buddhist tradition. The *Anguttara Nikaya*, an Early Buddhist text attributed to the Buddha, states: 'It is not through actions or words that one gains freedom

from mental afflictions but through seeing and acknowledging them over and over again.'

3. Non-conceptual conscious knowing versus metacognitive knowledge

Is it possible to conceive a kind of knowledge that goes beyond conceptual thought? The mindfulness perspective shows us that there may be a form of knowledge that only appears when the ongoing discursive activity of the mind calms down and a space is created that permits the spontaneous emergence of silent awareness, a *presence* beyond words, concepts, thinking, and meaning. This non-conceptual mode of comprehension and of conscious attention to what appears in the mind opens the way for dis-identification from the content of the mind: an act of immense therapeutic potential as was recently discovered by cognitive-behavior therapists. To refer to this kind of knowledge the notion of 'metacognitive awareness' has been coined, derived from the concept of metacognition. This has been reformulated to show that exists a knowledge which encompasses the different processes of thinking, and yet consists of an intuitive knowing, and immediate *awareness*. Metacognitive insight implies experiencing thoughts as thoughts as they occur (Teasdale, 1999). Teasdale, Hayhurst, Pope, and others (2002, p.227) pointed out that 'It is important to distinguish *metacognitive awareness* from *metacognitive belief*, as the latter has figured prominently in recent theorizing on emotional disorders and their psychological treatments. Metacognitive beliefs refer to how much individuals believe particular thoughts about cognition to be true… and is concerned with thoughts about thoughts or feelings ... By contrast, metacognitive awareness refers to the extent to which thoughts are experienced as thoughts (mental events) rather than as aspects of self or direct reflections of truth.'

As Pensa (2002, pp.50-51) has observed, we are totally captivated by the indiscriminate fascination of thinking: 'It is a sort of blind faith, in which we abandon ourselves to the supposedly magical power of thought and of rethinking, of compulsive cogitation or mental proliferation... It is precisely our attachment to proliferation that makes us blind to fundamental capabilities of the mind other than thought – in particular *sati* (awareness/mindfulness) and *metta* (unconditional loving kindness) – in other words the ability to confer upon the objects an affectionate and accepting awareness that is equally silent and non-judging.' What is obscured by the proliferation of the discursive thought is precisely awareness, the very factor that is able to show us that *thoughts are just thoughts* and the possibilities of the mind are not just confined to thinking. This faculty of intuition embarrasses contemporary cognitive psychology as it is hard to categorize it within standard models of the mind, even though it was early recognized in western tradition, at least until the beginning of Modern Age. In none of Plato's dialogues did Socrates, the quintessential symbol of discursive thought in modern philosophy, comprehensively define an Idea in purely logical-linguistic terms. Acute, discerning analysis was instead used to loosen up the intellectual 'cramps' that prevent an aperture towards the experience of an intuitive insight of the Idea (Friedlander, 1969). One way of make use of discursive reasoning still in use today is the Zen *koan* that utilizes paradoxes to go beyond discursive thinking. In Tibetan monasteries monks spend years exercising meticulous logical analysis and dialectics in order to be able to see *beyond*. Will a deeper understanding of mindfulness help reacquire mental faculties that make us more fully human?

Part II: Mindfulness-based training as an effective component in treating emotional disorders

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1. Introduction

We adopted Kabat-Zinn's (1990) MBSR program that has been applied in a variety of health care settings by several researchers (Kabat-Zinn, Massion, Kristeller, et al., 1992; Teasdale, Segal, Williams, 1995; Schwartz, 1997) in slightly different ways. A growing number of studies show significant reduction in medical and stress-related symptoms, including chronic pain, breast and prostate cancer, psoriasis. Baer's (2003) review suggests that mindfulness is an effective component in treating a wide spectrum of emotional and psychiatric disorders. This includes decreasing Generalized Anxiety Disorder and Panic Disorder (Miller, Fletcher, & Kabat-Zinn (1995), anxiety in non-clinical populations exposed to stressful conditions (Astin, 1997; Shapiro, Schwartz, & Bonner, 1998), heterogeneous physical and psychological symptoms in a clinical population (Reibel, Greenson, Brainard, & Rosenzweig, 2001), mood disturbances and stress symptoms in cancer diagnosed patients (Speca, Carlson, Goodey, & Angen, 2000). In addition, several cognitive-behavioral programs that incorporate a substantial mindfulness component could reduce self-harm in Borderline Personality Disorder (Linehan, Armstrong, Suarez, et al., 1991), Obsessive-Compulsive Disorder (Schwartz, 1997, 1998), and Binge-Eating Disorder (Kristeller, & Hallet, 1999). Recently, Segal, Teasdale, and Williams (2002) has developed Mindfulness-Based Cognitive Therapy (MBCT) that combines Kabat-Zinn's method with techniques drawn from CT, which has led to conceptual advances in the modeling of affective change in mood disorders (Teasdale, 1997; Sheppard & Teasdale, 2001). MBCT has turned out to be quite effective in the prevention of relapse in major depression (Teasdale, Segal, Williams, et al., 2000; Ma & Teasdale, 2004). However, the claimed effectiveness of mindfulness training needs to be investigated further (Bishop, 2002). Baer (2003), in her recent review incorporating meta-analytic procedures, concluded that in spite of significant methodological flaws, the current literature suggests that mindfulness-based interventions do help in a variety of mental health problems and improve psychological functioning. But, she insists that additional research and more rigorous tests should compare mindfulness-based

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interventions with established treatments and that the effect of mindfulness needs to be investigated within a broader range of outcomes to further determine the mechanism through which mindfulness brings about clinical change.

To our knowledge, no randomized controlled studies have ever been conducted to compare MBSR with other interventions, nor have neuropsychological measurements been included in order to investigate the attentional processes that are supposed to be specifically involved in mindfulness. The purpose of our study was to explore these issues. MBSR is a highly structured, manualized program. During the 8-week course participants attended a weekly 2.5 hour group session, in which they were guided through the program, motivated, inspired and supported by an MBSR experienced trainer (J.T.) educated at Kabat-Zinn's Centre. As a comparison, we offered Psychoeducation (PE), which as MBSR has a manualized group format and is widely used as a structured psychosocial intervention for in- and out-patient psychiatric populations. It consisted of 8 weekly group meetings of 2.5 hours. In each session a psychiatrist (T.v.B.) educated and discussed with participants about their individual disorder's characteristics (natural history, diagnosis, treatment, etc.) as well as on early detection and problem-solving techniques. The goal of PE was to promote the patients' knowledge and understanding and to teach them how to improve their managing-capability of their symptoms. Outcome research supports PE's designation as a 'probably efficacious' treatment and its use as an adjunct to pharmacotherapy for emotional disorders (Barton, 1999). In unipolar depression PE increased treatment adherence and significantly reduced symptomatology (van Dam, Hosman, Hoogduin, & Schaap, 2003; Rush, 1999; for a review see Cuijpers, 1998). A large multicentre, randomized, controlled trial with depressives in the community showed reduction in number of cases and significant improvement in subjective and social functioning (Dowrick, Dunn, Ayuso-Mateos, et al., 2000). In bipolar disorders several studies showed PE to be an effective adjunct to pharmacological treatment that improves clinical outcome (Gonzales-Pinto, Gonzalez, Enjunto, et al., 2004; Parikh, Kusumakar, & Haslam, 1997); a large randomized trial found a significant reduction of recurrence and a lasting effect (Colom, Vieta, Reinares, et al., 2003) that goes beyond mere compliance enhancement (Colom, Vitea, Martinez-Aran, et al., 2003). Although PE's application in anxiety disorders was less studied, symptoms were significantly reduced following PE in elderly female depressives (Schimmel-Spreeuw, Linssen, Heeren, 2000); significant changes were found in youths with generalized social anxiety disorder (Chavira, & Stein, 2002).

The present exploration aims at corroborating previous findings, suggesting that MBSR is an effective component in the treatment of emotional disorders, by comparing MBSR to PE, by investigating whether MBSR is able to improve attentional performance, and by collecting additional evidence to support mindfulness' broad-spectrum efficacy claim. The specific questions addressed are: (1) Is MBSR effective in a sample of emotionally disordered patients in terms of pre-post clinical measurements on depression and anxiety symptoms and on perceived quality of life as compared to PE, a standard treatment used in psychiatric settings? (2) Is MBSR able to enhance attentional performance on standard neuropsychological tests? (3) Are EEG pre-post changes in this sample comparable to those drawn from previous research on meditation in non-clinical populations?

2. Method

2.1. Participants and Design. 2.1.1. Sample. At the onset we selected a sample of 25 patients suffering from disturbances that met DSM-IV criteria for Anxiety or Mood Disorders. They were recruited at an institute for mental health care (GGZ, Oost-Brabant, Netherlands) and were either hospitalized during the research or within the five preceding years. During the study patients continued receiving medical Treatment As Usual (TAU). Exclusion criteria were any psychotic state related to a diagnosis of schizophrenia or mania. Patients gave their informed consent. No-one showed any signs of alcohol or drug abuse at the time of testing and none had severe neurological or physical illnesses that might influence the task performances.

2.1.2. Design. We adopted a randomized pre-post comparison design with two comparison groups. According to Dutch legislation and recommendations of its ethical committee it was mandatory to give each control group an extra treatment besides the usual (medication) therapy. Therefore, no TAU or placebo control group was allowed.

2.1.3. Assignment. Data were derived from a sample of 5 males and 20 females who met inclusion criteria and who attended the pre- and post- measurements. Participants were allotted to MBSR or PE through a matched random assignment. First, clients' names were coded by using numbers, subsequently, a number was extracted randomly and the data corresponding with that specific number was paired with another number. Each pair was matched on the following variables: Sex, Age, Education, Hamilton Depression Scale and Continuous Performance Test scores. The average age was 41.00 (SD 11.42, range 22-69); the median of educational level was 4 (on a 7-point scale), which corresponds to a secondary education level. Of the 25, 14 were in-patients and 11 out-patients; 19 (76%) had a diagnosis related to Mood Disorders, and 6 (24%) to Anxiety Disorders. None of the Bipolar Mood Disorder patients was in a maniacal state at the time of the study. In the MBSR group (n = 14), 10 subjects had been diagnosed with Mood Disorder (4 Unipolar Major Depressive Disorder, 3 with Dysthymic Disorder, 3 with Bipolar Disorder), and 4 with Anxiety Disorders (1 Anxiety Disorder NAO, 1 Post Traumatic Stress Disorder, 2 Panic Disorder with Agoraphobia). In the PE group (n = 11), 9 had been diagnosed with Mood Disorder (7 Unipolar Major Depression, 2 Dysthymic Disorder) and 2 with Anxiety Disorder (1 Anxiety Disorder NAO, 1 Panic Disorder without Agoraphobia). To check the random assignment procedure, the two groups were compared by one-way ANOVA on the matched variables. No significant differences between groups were found on Sex (p .442), Age (p .823), Education (p .466), on the first session of Hamilton Depression Scale (p .464), and on Continuous Performance Test (p .831).

2.2. Measurements. During two sessions, both pre- and post-, we measured 13 outcome variables: 5 derived from clinical symptoms rating-scales, 2 related to a quality of life questionnaire, and 6 variables derived from 5 different neuropsychological tests. In the present text the clinical variables are sometimes referred to as C1… C5; the quality of life as Q1, Q2; and the neuropsychological-attentional ones as N1… N6.

2.2.1. Clinical variables. To assess treatment effects, we administered five standard rating scales. C1: the Hamilton Rating Scale for Depression (17-items; score range: 0 - 52) (Hamilton, 1960; Williams, 1998). C2: the Hamilton Rating Scale for Anxiety (14-items; score range: 0 - 56) (Hamilton, 1959). Both are interviewer-scales and scored by a psychiatrist (M.R.). C3: the Zung Self-Rating Depression Scale is a self-

administered rating scale (20 items; score range: 20 – 80) (Zung, 1965). C4 and C5: the Visual Analogue Scales for Depression and for Anxiety are self-rating analogue indicators: symptom intensity is rated along a 0 to 100 line (Aitken, Zealley, & Rosenthal, 1969); they were administered by a psychiatrist (M.R.).

2.2.2. Quality of life assessment. To evaluate changes in perceived quality of life, we used the extended Dutch version of the Lancashire Quality of Life Profile (LQLP). This questionnaire consists of 156 items, covering 11 different domains related to various aspects of life (van Nieuwenhuizen, 1998). Domains 1 to 6 are rated according to a 7-point satisfaction scale (they refer to the perception of the different socio-economic aspects of life) and domains 7 to 11 are rated on a 3-point scale (they refer to the perception of more 'self-related' aspects of life). The psychometric properties of the extended Dutch version were found to be sound and in agreement with the original (Olivier, Huxley, Priebe, & Kaiser, 1997). We derived from this version two outcome variables: LQLP-3 (expressing the mean of the scores of the self-related domains) and LQLP-7 (incorporating the means of the external-related aspects). Two trained clinical researchers (L.O. and M.P.) administered the questionnaire.

2.2.3. Neuropsychological variables. To assess treatment effect on attentional processes, we administered a test battery. It comprises five neuropsychological tests; from these we selected six variables - one task producing two different measurements. N1: the Stroop Color-Word Test is considered to measure selectivity of attention and executive function: a decrease in performance time means improvement. N2: Continuous Performance Test is designed to measure sustained attention and involves a rapid identification of a target while withholding response to distracting stimuli. The correct-positive (hit) and incorrect-positive (false alarm) are registered. Perceptual sensitivity (d') was the outcome variable: such index of overall signal/noise discrimination (Nuechterlein, Edell, Norris, & Dawson, 1988) is considered to be closely related to the level of attentional arousal: high scores indicate better performances. In addition to the previous tests, we also used three tasks linked to executive and psychomotor functioning. The term psychomotor characterizes a variety of actions involving both attentional and sensorimotor processes. These three tasks were administered on a digitizing tablet allowing the precise recording of the pen movements made during the tests. This technique has recently been applied in psychiatric research to increase precision (Sabbe, Hulstijn, van Hoof, & Zitman, 1997). N3: the Trail Making Test B, from the Halstead-Reitan Battery, is widely employed to specify test flexibility of attention, set-switching, visuomotor speed and working memory. The outcome measure consists of the time required to complete the task: the lower the score, the better the performance. N4: WISC-Maze Test that is part of the Wechsler Adult Intelligence Scale-Dutch version (de Bruyn & Hakvoort-Koomen, 1986), is considered to measure planning ability. The time needed to complete the mazes is the outcome variable: the lower the time, the better the performance. N5 and N6: the Digit Symbol Substitution Test is another subset of the Wechsler Scale; subjects are requested to substitute symbols for digits as quick as possible according to a key, for 90 seconds. The measure of this performance is the number of correct responses obtained and is referred to as 'raw score'. The DST owes its clinical sensitivity in requiring selective attention, sustained attention, working memory, and visuomotor coordination; however, standard DST gives only the raw score, which make it impossible to identify the contributions of the different processes. By means of

the digitizing tablet, we could differentiate between the motor component, (the time taken to write a symbol) and the cognitive component (sustained and selective attention, i.e. the time needed to match the current digit with the proper symbol). Thus, we have two outcome variables from DST. N5: Raw-score, the standard DST outcome: higher scores indicate better performance and N6: Matching-time, the specific attentional component: lower scores indicate improvement.

2.2.4. EEG Measurements. 21 patients' EEGs (16 with Mood Disorders and 5 with Anxiety Disorders) were recorded before and after the two treatments. Electrodes were placed according to the International 10-20 System on eleven locations (F3, F4, C3, C4, P3, T3, T4, P4, Fz, Cz, Pz); the right mastoid was used as reference. During recording the patients were quietly laying on a medical bed in a room isolated from the recording equipment. After placing the electrodes, a rest period of 15 minutes was considered. Then the EEG was recorded during 5 minutes with eyes open and subsequently 5 minutes with eyes closed.

2.3. Procedure. Two cycles have been completed: the first including 14 patients, the second 19 patients. All subjects in the first cycle were inpatients; in the second were 3 in-patients and 16 out-patients. Interventions have been offered at the same hospital where all the patients had their health care. At the beginning of each cycle, patients were informed that they would be assigned randomly to one of the groups after the first general session of measurements had been completed. Each participant had four individual consultations within a seven days' span, prior to the first week of treatment: to complete the clinical ratings scales, to perform the neuropsychological tests and the LQLP, to get instruction from the MBSR or PE trainer, and to have the EEG measurements. This sequence was randomly alternated. Following the same procedure, the second set of measurements was completed within two weeks after the end of the trainings. To minimize biases related to expectancy of change, we calculated the neuropsychological results only after all the data had been collected. To avoid the experimenter effect as much as possible, neither the clinical researchers who administered the rating scales and the tests, nor the MBSR and PE trainers were involved in the research design or interpretation.

3. Results

3.1. Data. To summarize: 13 outcome variables and EEG alpha-power have been determined in this study. Four variables (N1, N3, N4, N6) were checked as not being normally distributed and have been normalized by applying a natural-logarithmic transformation, indicated in the tables with Ln.

Unfortunately, due to unintentional reasons, it was not possible to obtain a complete data set for eight of the patients who had been initially included in this study. Two patients missed their post appointment for the clinical ratings scales because they were involved at the same time in other hospital activities, whereas another misunderstood the instructions about the VAS scales. Technical problems with the tablet apparatus arose during the recording of the pre-training measurements of N3 in one case, and of N5 and N6 in another. Similarly, the post-training data of N3, N5, and N6 were not available for one case. A patient's Q2 assessment was misplaced and the C4, C5, N5 and N6 post-training records of one other subject were accidentally damaged. Therefore, full pre-post data set were obtained in 17 out of 25 cases. The descriptive statistics of this

sample is shown in Table I. Due to the considerable number of cases with missing data, the 25-case sample obtained through standard missing-analysis procedure, resulted to differ too much from the 17-case sample. Moreover, after a trial we realized that such procedure destroyed part of the correlation structure between the different variables and therefore it did alter the real multivariate nature of the training effects. Thus, we decided not to make use of a missing-analysis procedure and to perform our comparison on the raw-data sample of 17 cases. We have not taken any stance regarding the missing data, except for the fact that the missings are supposed not to be related to the value that would have been measured. This implies that we consider a missing datum neither related to the value that would have been measured, nor to the other measurements of the subject.

Table I: MBSR and PE – Descriptive statistics and mean differences

Outcome variables [a, d]	MBSR Mean, SD [b]		PE Mean, SD [c]		MBSR and PE Mean Difference, SD	
Hamilton Depression PRE	17.66	4.97	17.50	7.01		
Hamilton Depression POST	13.33	6.5	10.50	6.96	4.33 (5.57)*	7.0 (4.38)*
Hamilton Anxiety PRE	16.22	4.76	16.12	7.25		
Hamilton Anxiety POST	11.66	7.66	9.50	5.37	4.56 (6.19)*	6.63 (4.84)*
Zung Depression PRE	56.00	8.45	52.37	9.31		
Zung Depression POST	48.88	11.87	46.25	11.92	7.11 (10.43)*	6.13 (7.53)*
VAS Anxiety PRE	61.33	18.91	52.50	25.34		
VAS Anxiety POST	41.77	22.17	59.75	28.39	-19.56 (29.85)*	7.25 (28.65)
VAS Depression PRE	77.00	16.30	60.5	24.82		
VAS Depression POST	56.33	30.65	57.75	30.70	-20.67 (22.14)*	-2.75 (28.30)*
Lglp_7 PRE	4.30	.65	4.62	0.70		
Lglp_7 POST	4.41	.69	4.92	0.81	12 (.39)*	30 (.42)*
Lglp_3 PRE	1.76	.25	1.79	.27		
Lglp_3 POST	1.96	.36	2.02	.42	21 (.23)*	24 (.34)*
Stroop Test (Ln) PRE	3.72	.45	3.29	.29		
Stroop Test (Ln) POST	3.53	.44	3.34	.30	-.19 (.49)*	05 (.24)
CPT_d' PRE	3.36	.94	3.35	1.07		
CPT_d' POST	3.85	.74	3.62	.95	49 (.58)*	27 (.36)*
Trail Making B (Ln) PRE	4.52	.58	4.31	.41		
Trail Making B (Ln) POST	4.37	.39	4.17	.28	15 (.30)*	14 (.24)*
WISC-Maze (Ln) PRE	3.37	.34	3.53	.50		
WISC-Maze (Ln) POST	3.33	.41	3.51	.54	04 (.18)*	02 (.19)*
DST Raw-score PRE	41.56	13.18	49.75	15.07		
DST Raw-score POST	44.77	11.76	53.25	16.23	3.22 (4.35)*	3.50 (2.98)*
DST Matching-time (Ln) PRE	.544	.388	.270	.439		
DST Matching-time (Ln) POST	.40	.320	.192	.429	.14 (.15)*	.08 (.12)*

a. (Ln) = natural logarithmic transformation

b. n = 9 (listwise)

c. n = 8 (listwise)

d. The * indicates a positive change/improvement of the PO post mean

3.2. Analysis. 3.2.1 Between-groups comparison. The main purpose of the analysis was to compare the outcome of MBSR and PE (grouping variable) on multiple variables. An alpha level of .05 was set. We considered that different subsets of the outcome variables were measuring, in a likely overlapping manner, the same constructs, such as depression and anxiety. Thus, we decided to adopt a multivariate approach. To compare the overall effect of MBSR with that of PE, MANOVA was run (SPSS10; GLM-Multivariate). For each outcome variable, the effect of the interventions was considered to be the difference of the measurement after the training minus those before the training. Therefore, the goal of this analysis was to look specifically at the Group X Time interaction to determine whether one group improved more than the other. The result, Wilks' Lambda = .006 (F 35,589; df [1,19]; p .0067; eta-squared .994), shows a very significant difference in the sample means and a large effect size value, indicating that the effect may be considered as a clinically relevant one (Huberty & Petoskey, 2000, p.197).

How, then, can such a multivariate difference be analyzed?

Table II: MANOVAs between MBSR and PE groups

Class of variables	Wilks' Lambda	df	p-value	eta-squared
All 13 variables	.006	(1,19)	p = .0067*	.994
Depression var.	.850	(1,19)	p = .418**	.150
Anxiety var.	.705	(1,19)	p = .042**	.295
Quality of Life var.	.945	(1,22)	p = .551**	.055
Attentional var.	.622	(1,18)	p = .316**	.378

***Alpha = .05; * *Alpha = .0125 (Bonferroni);**

(a) Consistent with our multivariate approach the 13 variables can be conceptually separated into different classes of partially overlapping measures, each class measuring a different construct; we defined four classes: depression (C1, C3, C4), anxiety (C2, C5); quality of life (Q1, Q2), and attentional processes (N1, N2, N3, N4, N5, N6). To examine whether the overall difference between treatments can be attributed to one or more of these four distinguished classes, we conducted a between-groups MANOVA on the pre-post mean differences, for each class. We set an alpha value of .0125 adjusting (Bonferroni) for multiple comparisons. Results: the effect did not attain statistical significance for any class (see Table II).
To further investigate between-group differences, additional (univariate) ANOVAs were conducted on each variable; none of the differences reached significance.

(b) We then assessed the multivariate distinct (within) effect of each intervention on the 13 pre-post mean differences by mean of an extension of the MANOVA procedure based on the homoscedasticity assumption that is already implicit in the MANOVA procedure for assessing the difference between trainings. The extension was needed because the sample sizes of the two trainings were too small to make inference on them separately. An adjusted alpha value of 0.025 (Bonferroni) was set. Results: both treatments showed a (very) significant effect.[2]

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[2] A slight modification is used of the test described in Muirhead (1982), Theorem 3.2.13, p. 98. In the formula we use $T^2 = N(\overline{X})\ S^{-1}\overline{X}$ with $\overline{X}$ being the average effect of a given Training, say Training 1, and S the estimated covariance structure of the effect of both Trainings. Hence, given the individual effects $X_1 \ldots X_k$ for the patients of Training 1, and $Y_1 \ldots Y_l$ for Training 2, one may take

$$S = \frac{1}{k-1+l-1}(\Sigma(X_i - \overline{X})\ X_i - (\overline{X}) + \Sigma(Y_j - \overline{Y})\ Y_j - (\overline{Y}))$$

and $N = k$. Moreover, m denotes the dimensionality of the $\overline{X}$ values, $m = 13$ when considering all variables. Then under the null-hypothesis that the expected value of X is 0, the statistic $\frac{T^2}{k+l-2}\frac{k+l-m-1}{m}$ is Fisher distributed with degrees of freedom $m, k+l-m-1$. The

For MBSR: Hotelling's T Squared = 8175.22 (F 125,772; df [13,3]; p .0010). For PE: Hotelling's T Squared = 22500.30; (F 346,158; df [13,3]; p .0002). Differences were in the expected direction: both MBSR and PE resulted in a within-group significant positive effect, corroborating previous research suggesting their efficacy.

(c) In order to consider the clinical significance of the comparison of MBSR with PE, we analyzed the effect sizes of the between-group MANOVAs on each class of variables (see Table II). Notably, the between-groups eta-squared values – a multivariate effect size measure - evidenced that two classes exhibited a remarkable effect magnitude (Discussion 4.1c). The anxiety class showed a small but not trivial value of .295, while the attentional class showed a small-to-medium value of .378.[3]
Both these effect sizes might be interpreted as evidence in support of a larger clinical efficacy of MBSR. In the attentional class MBSR showed pre-post mean differences larger than PE on five out of six variables (see Table I). In the anxiety class a small difference unfavorable to MBSR on the variable C2 is balanced by a huge difference in favor to it on C5.
Besides the between-group effect sizes, we considered the magnitude and the directions of the pre-post mean changes of each outcome variables: MBSR induced larger improvements than PE on three of the five clinical variables (C3, C4, C5) and on five of the six attentional variables (N1, N2, N4, N5, N6) (see Table I). Moreover, a close scrutiny evidenced that MBSR univocally induced a positive, systematic change in *all* the variables of *all* the four classes, whereas for PE such consistent improvement on all the variables of a given class is limited to depression and quality of life.

TABLE III: MBSR pairwise descriptive statistic and pre-post mean difference

	Mindfulness-based Training					
				95% Confidence Interval of the Difference		N
Outcome Variables	Pre Mean, SD	Post Mean ,SD	Pre-Post Mean Difference, SD	Lower	Upper	(pairwise)
Hamilton Depression	18.75 (6.28)	14.50 (6.62)	-4.25* (4.99)	1.077	7.423	12
Hamilton Anxiety	18.33 (6.28)	12.08 (6.81)	-6.25* (6.22)	2.295	10.205	12
Zung Depression	56.75 (8.41)	50.25 (10.46)	-6.50* (9.55)	.427	12.573	12
VAS Anxiety	64.30 (20.14)	44.90 (23.12)	-19.40* (28.15)	-.738	39.538	10
VAS Depression	77.30 (15.39)	59.10 (30.20)	-18.20* (22.28)	2.262	34.138	10
Lglp 7	4.23 (.66)	4.31 (.66)	.07* (.40)	-.310	.156	14
Lglp 3	1.70 (.22)	1.83 (.36)	.14* (.21)	-.264	-.011	14
Stroop Test (Ln)	3.86 (.60)	3.55 (.52)	-.31* (.48)	.030	.589	14
CPT d'	3.19 (.98)	3.52 (1.01)	.33* (.56)	-.653	-.002	14
Trail-Making B (Ln)	4.56 (.53)	4.39 (.43)	-.16* (.26)	.013	.315	14
WISC-Maze (Ln)	3.39 (.37)	3.34 (.45)	-.05* (.16)	-.043	.149	14
DST Raw-score	40.58 (13.06)	43.67 (13.70)	3.08* (4.62)	-6.020	-.147	12
DST Matching-time	60 (.37)	49 (.35)	-.11* (.15)	.003	.209	11

The * indicates a positive change/improvement of the Mean Difference

descriptive statistics of the MBSR group, that takes into account a larger set of data for

formula has been implemented by means of a Splus program.

[3] Cohen described effect sizes larger than d = .20 as small, d = .50 as medium, and d = .80 as large.

each variable (see Table III).
The effect sizes of the MBSR within-group differences assessed by mean of Cohen's d evidenced improvements of a substantial effect (i.e. larger than .20) on 12 of the 13 variables, while PE showed substantial effects on 8 variables (see Table IV). Moreover, on the Hamilton Depression and Hamilton Anxiety Scales, the pre-post mean reductions were 23% and 36% respectively. This is in line with the 23% and 34% reductions on the Hamilton Depression and Hamilton Anxiety scales observed in previous research on MBSR with anxiety disorders (Miller, Fletcher, & Kabat-Zinn, 1995).

Table IV: MBSR and PE pre-post within effect sizes (d)

	MBSR			PE		
Outcome variables	**N (pairwise)**	**Cohen's d**		**N (pairwise)**	**Cohen's d**	
Hamilton Depression	12	.85	large	11	1.25	large
Hamilton Anxiety	12	1.00	large	11	1.00	large
Zung Depression	12	.67	medium	11	.64	medium
VAS Anxiety	10	.69	medium	11	.19	*
VAS Depression	10	.82	large	11	.44	small
Lqlp_7	14	.18	*	11	.64	medium
Lqlp_3	14	.64	medium	10	.61	medium
Stroop Test (Ln)	14	.64	medium	11	.15	*
CPT_d'	14	.59	medium	11	.72	medium
Trail-Making B (Ln)	14	.62	medium	9	.73	medium
WISC-Maze (Ln)	14	.29	small	10	.11	*
DST Raw-score	12	.67	medium	10	.17	*
DST Matching-time(Ln)	11	.72	medium	10	.04	*

* Not relevant effect in Cohen's terms

The mean reductions on the Zung and VAS Depression / Anxiety were 11%, 24%, and 30%, respectively; these instruments were not used in previous research. The MBSR size effects were large for three variables and medium for two, whereas those of PE: large for two, medium for two others, and not meaningful for one (see Table IV). As to the attentional variables, in MBSR five out of six showed within-group improvements with effect sizes of medium magnitude, whereas in PE only two did.

3.2.3. EEG. The alpha power was calculated as the mean power of frequencies in the range 8-13 Hz. Data were log transformed for statistical analysis. To determine the experimental effects, repeated measures ANOVA with pre-post, conditions (eyes-open, eyes-closed), and electrode placement as within-subjects factors, and treatment (MBSR, PE) as between-subjects factor, was carried out. A significant increase in alpha power as a result of both treatments was found at all electrode locations for the whole sample (both groups): F = 6,060 (df [1,19]; p .023).

4. Discussion

4.1. Between-groups comparison. It might seem odd that the overall significant variability - as revealed by the Group X Time MANOVA between treatments - has not been resolved to a significant degree in any of the distinguished classes of variables (3.2.1. a and b). However, such result seems to support the conclusion that the difference that results in comparing the two trainings are of a very multivariate nature, crossing through all the classes of variables. In addition, it must be considered that on the one hand both MBSR and PE showed to be effective treatments (3.2.1. b), improving as a consequence most of the outcome variables of the two groups toward the same “positive” direction, and therefore reducing between-group differences. On the other hand, due to the previously described practical and ethical constrains to our clinical trial, the sample size and the statistical power of our study were rather limited. These two conjoint factors are likely to reduce the probability obtaining statistically significant differences in the between-groups multivariate comparisons on the distinct classes of variables, as well as in the univariate comparisons on single variables.

In order to provide a more reliable interpretation of our data we decided to consider also their clinical and practical significance (3.2.1. c). Referring to the size of the effects provides useful information that can be used in judgments of practical and scientific importance of an effect (Hallahan, & Rosenthal, 2000, p.136). Consequently the magnitude of an effect might provide some support to a scientific hypothesis even when statistical significance has not been obtained. Moreover, Kirk (1966) remarked that Cohen's meaning of small, medium, and large effect (Cohen, 1997) remains approximately the same across the several different measures of effect sizes. In the present study the between-groups effect sizes evidenced that MBSR exhibited remarkable magnitudes in the anxiety and attentional classes: this result supports MBSR clinical efficacy.

4.2. MBSR clinical significance. The MBSR within-group effect sizes evidence improvements of a substantial effect on 12 of the 13 variables, while PE shows substantial effects on 8 variables (see Table IV). For the clinical variables such magnitudes are consistent with those found in the literature on mindfulness training with anxious and depressed patients (Baer, 2003). These findings confirmed MBSR efficacy in decreaseing levels of psychological symptoms. Furthermore, because our sample included patients with several diagnoses, this result brings new evidence in favor of the claimed wide-range efficacy that appears to be peculiar for mindfulness.

To date, no study has specifically investigated the effect of the MBSR on attentional processes, neither in normal subjects, nor in clinical populations. One aim was to explore

the hypothesis that low-level automatic attentional processes may also, as was already shown for memory and metacognitive higher processes (Teasdale, 1999; Williams, 1996), be modified by mean of mindfulness. The between-group MANOVA on the attentional class did not reach statistical significance (see Table II): this result did not support the hypothesis of a specific, differential effect of MBSR on attentional processes. However, once we considered the clinical meaning of the effect sizes observed in the MBSR group, it seems possible to collect some useful clues. Although between-groups comparison on the attention class was not statistically significant, it showed nonetheless a small-to-medium effect of .378 in favor of MBSR (Table II). Moreover, in the MBSR group, five of the six attention-related variables induced within-group improvements of medium magnitude, whereas in PE only two did (Table IV). All in all, these data seem to support the hypothesis that MBSR was able to specifically promote improvements in the low-level attentional processes involved in the neuropsychological tasks. However, this support is indirect, drawn from considerations based on the clinical significance of the observed effects sizes. Further study is needed.

4.3. EEG. In adults the power in alpha frequencies band is inversely related to cortical activation (Davidson, 1995). The alpha power increase in the sample is interpreted as enhancement of the amount of relaxation or a decrease in tension or distress (Coenen, 1995). Both treatments are to be regarded as effective. This is consistent with previous research on meditation, which repeatedly indicates an increase of alpha power waves in non-clinical populations while practicing different forms of meditation (for a review: Jevning, Wallace, & Beidebach, 1992). Although the alpha power increased more in the MBSR group, no significant between-groups difference could be established.

4.4. Limitations of this study. Four main limitations need to be discussed: (1) To obtain a larger sample we included different emotional disordered patients; this implies a mixed nature of our sample. In the outcome literature, it is usually accepted that the effectiveness of an intervention is studied only in relation to a specific clinical disorder. The rationale: it is unlikely that any one intervention is equally effective for different disorders. By mixing different diagnoses it might be possible to conceal the effects of the intervention on one disorder in the lack of effectiveness on other disorders. However, because we are interested in the proclaimed characteristic of MBSR as a wide-ranging treatment, this limitation might even be useful to study this aspect. (2) It was not in the scope of this study to assess long-term effects; thus, it cannot be concluded that the short-term changes are lasting: this question should be answered by future longitudinal research. (3) The impossibility, due to ethical constrains, to set a TAU control group requires the necessary prudence with pre-post designs: other factors could have favored the positive changes. (4) The small sample size affected the statistical power and subsequently the chance to achieve statistical significance, particularly in the between-group comparisons.

4.5 Conclusions. A Group X Time MANOVA comparison between MBSR and PE revealed a significant difference. However, on the one hand, the between-groups MANOVA comparisons on the distinct classes of variables did not attain statistical significance; on the other hand, in the anxiety and attentional areas the effect sizes of such comparisons evidenced meaningful differences favorable to MBSR. This inconsistency might be explained by the both fact that both interventions produced

distinct (within) significant improvements and the fact that the low statistical power (due to the small sample size) made it unlikely to detect possible significant yet small differences. Such results, together with the comprehensive consideration of the mean differences of the single outcome variables discussed above, might represent a hint for interpreting the significant difference revealed by the between-group MANOVA as a larger effect of MBSR compared to PE. Nevertheless, in spite of these clues in favor of MBSR, our conclusion is prudential: the present comparison study shows that MBSR resulted in being *at least as efficacious as* PE in promoting improvements in a number of outcome variables in a sample of patients suffering from emotional disorders. It is the first time, to our knowledge, that a comparison study has been conducted to evaluate the effects of MBSR in respect to a standard intervention established as 'probably efficacious' (Baer, 2003). Such conclusion provides new confidence in addition to what has already been found in research on MBSR as an effective component in treating emotional disorders. Furthermore, this is as yet the first study that explored attention-related neuropsychological measures. Research on emotional disordered patients has evidenced neuropsychological attentional deficits on the same tasks we have used in the present study (Schatzberg, Posener, DeBattista, et al., 2000; MacLeod & Rutherford, 1998). Our study yields support, even if only indirectly, to the hypothesis that MBSR might exert a positive effect on attentional processes. Our results indicate that further research is needed to determine the clinical effectiveness of mindfulness in the context of our present knowledge of mind (Barendregt, 1998).

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Part I & II: References

Aitken, R., Zealley, A., & Rosenthal, S. (1969). Psychological and physiological measures of emotion in chronic asthmatic patients. *Journal of Psychosomatic Research*, *13*, 289-297.

Astin, A. (1997). Stress reduction through mindfulness meditation: Effect of psychosocial symptomatology, sense of control, and spiritual experiences. *Psychotherapy and Psychosomatic*, *66*, 97-106.

Baer, R. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice*, *10*, 125-143.

Barber, J., & DeRubeis, R. (1989). On second thought: Where the action is in cognitive therapy. *Cognitive Therapy & Research*, *13*, 441-457.

Barendregt, H. (1998). Buddhist phenomenology. In Dalla Chiara (Ed.), *Proceedings of the conference on topics and perspectives of contemporary logic and philosophy of science.* Bologna, Italy: CLUEB. < www.cs.kun.nl/~henk/BP/bp1.htlm >

Bargh, J., & Ferguson, M. (2000). Beyond behaviorism: On the automaticity of higher mental processes. *Psychology Review*, *126*, 925-945.

Barton, R. (1999). Psychosocial rehabilitation services in community support systems: A review of outcomes and policy recommendations. *Psychiatric Services, 50*, 525-534.

Bishop, S. (2002). What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine, 64*, 71-83.

Bruyn, B. de, & Hakvoort-Koomen, E. (1986). The Dutch WISC-R and it predecessor. *Kind en Adoloscent, 10*, 175-182.

Chalmers, D. (1996). *The conscious mind*. Oxford: University Press.

Chavira, D., & Stein, M. (2002). Combined psychoeducation and treatment with selective serotonin reuptake inhibitors for youth with generalized social anxiety disorder. *Journal of Child and Adolescent Psychopharmacology, 12*, 47-54.

Coenen, A.M. (1995). Neuronal Activities Underlying the Electroencephalogram and Evoked Potentials of Sleeping and Waking: Implication for Information Processing. *Neuroscience and Biobehavioural Reviews, 19*, 447-463.

Cohen, J. (1997). *Statistical power analysis for the behavioral science* (2nd ed.). Hillsdale, NJ: Erlbaum.

Colom, C., Vitea, E., Martinez-Aran, A., et al. (2003). A randomized trial on the efficacy of group psychoeducation in the prophylaxis of recurrences in bipolar patients whose disease is in remission. *Archives of General Psychiatry, 60*, 402-407.

Colom, F., Vieta, E., Reinares, M., et al. (2003). Psychoeducation efficacy in bipolar disorders: Beyond compliance enhancement. *Journal of Clinical Psychiatry, 64*, 1101-1106.

Cuijpers, P.A. (1998). Psychoeducational approach to the treatment of depression: A meta-analysis of Lewinsohn's "Coping with depression" course. *Behavior Therapy , 29*, 521-533.

Dam, A. van, Hosman, C., Hoogduin, C., & Schaap, C. (2003). The Coping With Depression course: Short-term outcomes and mediating effects of a randomized controlled trial in the treatment of subclinical depression. *Behavior Therapy, 34*, 381-396.

Davidson, R.J. (1995). Cerebral Asymmetry, emotion and affective style. In R. J. Davidson & K. Hugdahl (Eds.), *Brain asymmetry*. Cambridge Mass: MIT Press.

Dowrick, C., Dunn, G., Ayuso-Mateos, J., et al. (2000). Problem solving treatment and group psychoeducation for depression: multicentre randomized controlled trial. Outcomes of Depression International Network (ODIN) Group. *BMJ Clinical Research, 32*, 1450-1454.

Friedlander, P. (1969). *Plato: An introduction*, (2nd ed.). Princeton, NJ: University Press.

Gotlib, I., & MacLeod, C. (1997). Information processing in anxiety and depression: A cognitive-developmental perspective. In J. Burack & J. Enns (Eds.), *Attention, Development, and Psychopathology*. New York: Guilford.

Gonzales-Pinto, A., Gonzalez, C., Enjunto, S., et al. (2004). Psychoeducation and cognitive-behavior therapy in bipolar disorder: an update. *Acta Psychologica Scandinavica, 109*, 83-90.

Hallahan, M., & Rosenthal, R. (2000). Interpreting and reporting results. In H. Tinsley & S. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling*. San Diego, CA: Academic Press.

Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology, 32*, 50-55.
Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology and Neurosurgery, 12*, 56-62.
Huberty, C., & Petoskey, M. (2000). Multivariate analysis of variance and covariance. In H. Tinsley & S. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling*. San Diego, CA: Academic Press.
Jevning, R., Wallace, R., & Beidebach, M. (1992). The Pysiology of meditation: areview. A wakeful hypometabolic integrated response. *Neuroscience and Biobehavioral Review, 16*, 415-424.
Kabat-Zinn, J. (1990). *Full catastrophe living: The program of the Stress Reduction Clinic at the University of Massachusset Medical Center*. New York: Delta.
Kabat-Zinn, J. (2003). Mindfulness-Based Interventions in Context: Past, Present, and Future. *Clinical Psychology: Science and Practice, 10*, 145-148.
Kabat-Zinn, J., Massion, A.O., Kristeller, J., et al. (1992). Effectiveness of a meditation based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry, 149*, 936-943
Kirk, R. (1996). Practical significance: a concept whose time has come. *Educational & Psychological Measurement, 56*, 746-759.
Kristeller, J.L., & Hallet, C.B. (1999). An exploratory study of a meditation-based intervention for binge eating disorder. *Journal of Health Psychology, 4*, 357 363.
Linehan, M.M., Armstrong, H., Suarez, A., et al. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry, 48*, 1060-1064.
Ma, H., & Teasdale, J.D. (2004). Mindfulness-Based Cognitive Therapy: Replication and exploration of differential relapse prevention efforts. *Journal of Consulting and Clinical Psychology*, 72, 31-40.
MacLeod, C., & Rutherford, E. (1998). Automatic and strategic cognitive biases in anxiety and depression. In K. Kisner (Ed.). *Implicit and explicit mental processes*. London: Erlbaum.
Miller, J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry, 17*, 192-200.
Nieuwenhuizen, C. van (1998). *Quality of life of persons with severe mental illness: An instrument*. Amsterdam: Thesis Publishers.
Nuechterlein, K., Edell, W., Norris, M., & Dawson, M. (1988). Attentional vulnerability indicators, thought disorder, and negative symptoms. *Schizophrenia Bulletin, 12*, 408-426.
Olivier, J., Huxley, P., Priebe, S., & Kaiser, W. (1997). Measuring the quality of life of severe mentally ill people using the Lancashire Quality of Life Profile. *Social Psychiatry and Psychiatric Epidemiology, 37*, 76-83.
Parikh, S., Kusumakar, V., & Haslam, D. (1997). Psychosocial intervention as an adjunct to pharmacotherapy in bipolar disorder. *Canadian Journal of Psychiatry, 42*, 745-785.
Pensa, C. (2002). *L'intelligenza spirituale*. Roma: Ubaldini.
Ramel, W., Goldin, P., Caroma, P., & Mc Quaid, J. (2004). The effects of mindfulness

meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research, 28*, 433-455.

Reibel, D.K., Greenson, J.M., Brainard, G.C., & Rosenzweig, S. (2001). Mindfulness based stress reduction and health-related quality of life in a heterogeneous patient population. *General Hospital Psychiatry, 23*,183-192.

Rush, A. (1999). Strategies and tactics in the management of maintenance treatment for depressed patients. *Journal of Clinical Psychiatry, 60*, 21-26.

Sabbe, B.G., Hulstijn, W., Hoof, J.J.van, & Zitman, F.G. (1997). Depressive retardation and treatment with fluoxetine: Assessment for the motor component. *Journal of Affective Disorders, 43*, 53-62.

Schatzberg, A.F., Posener, J.A., DeBattista, C., et al. (2000). Neuropshychological deficits in psychotic versus non-psychotic major depression and no mental illness. *American Journal of Psychiatry, 157*, 1095-1100.

Schimmel-Spreeuw, A., Linssen, A., & Heeren, T. (2000). Coping with depression and anxiety: Preliminary results of a standardized course for elderly depressed women. *International Psychogeriatry, 12*, 77-86.

Schwartz, J.M. (1997). Obsessive Compulsive Disorder. *Science & Medicine, 4*, 14-23.

Schwartz, J.M (1998). Neuroanatomical aspects of cognitive-behavioral therapy response in obsessive-compulsive disorder: An evolving perspective on brain and behavior. *British Journal of Psychiatry, 173*, 38-44.

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

Segerstrom, S., Tsao, J., Alden, L., & Craske, M. (2000). Repetitive thought as a concomitant and predictor of negative mood. *Cognitive Therapy and Research, 24*, 671-688.

Shapiro, S.L., Schwartz, G.E., & Bonner, J. (1998). Effects of Mindfulness-Based Stress Reduction on medical and premedical students. *Journal of Behavioural Medicine, 21*, 581-598.

Sheppard, L.C., & Teasdale, J.D. (2001). Disfunctional thinking in major depressive disorder: A deficit in metacognitive monitoring? *Journal of Abnormal Psycholgy, 109*, 768-776.

Speca, M., Carlson, L., Goodey, E., & Angen, M. (2000). A randomized, wait-list controlled clinical trial: The effect of a mindfulness meditation-based stress reduction program on mood and symptom of stress in cancer patients. *Psychosomatic Medicine, 62*, 613-622.

Teasdale, J.D. (1997). The relationship between cognition and emotion: The mind-in place in mood disorder. In M.D. Clark & C.G. Fairburn (Eds.), *Science and practice of cognitive behavior therapy*. Oxford: University Press.

Teasdale, J.D. (1999). Metacognition, mindfulness and the modification of mood disorders. *Clinical Psychology and Psychotherapy, 6*, 146-55.

Teasdale, J.D., Segal, Z., Williams, J.M. (1995). How does Cognitive Therapy prevent depressive relapse and why should attentional control mindfulness training help? *Behaviour Research and Therapy, 33*, 25-39.

Teasdale, J.D., Hayhurst, H., Pope, M., et al. (2002). Metacognitive Awareness and prevention of relapse in depression: empirical evidence. *Journal of Consulting*

and Clinical Psychology, 70, 275-287.
Teasdale, J.D., Segal, Z.V., Williams, J.M., Ridgeway, V.A., Soulsby, J.M., Lau, M.A. (2000). Prevention of relapse/recurrence in Major Depression by Mindfulness Based Cognitive Therapy. *Journal of Consulting and Clinical Psychology, 68*, 615-623.
Williams, J.M. (1996). Autobiographical memory in depression. In D. Rubin (Ed.). *Remembering our past: studies in autobiographical memory*. Cambridge: University Press.
Williams, J.W. (1998). A structured interview guide for the Hamilton Depression Rating Scale. *Archives of General Psychiatry, 45*, 742-747.
Zung, W. (1965). A self-rating depression scale. *Archives of General Psychiatry, 12*, 65-70.