

Current Contributions of Psychological Research to General Health: The Case of Mindfulness Training

Bruno Cayoun
University of Tasmania

*“The nature of the body can only be understood as a whole,
for it is the great error of our day in the treatment of the human body,
that physicians separate the soul from the body”*

HIPPOCRATES

Over two thousand years after the message of Hippocrates on the importance of considering the entire organism rather than indulging in dualistic rationales to restore health, the interconnectedness of psychological and physiological events remains a key to health for caregivers of all orientations. Since the 1970s, the expanding fields of behavioural medicine and health psychology demonstrate the role of psychological factors and interventions on the person’s health, and propose that promoting healthy habits and preventing disease are just as important tasks as are therapeutic interventions. Research shows that the mindfulness approach, an attentional control technique dating from ancient Eastern traditions, has the potential to improve recovery from mental and physical illnesses, and to maintain a healthier lifestyle. This paper reviews some of the relevant empirical mindfulness literature and proposes that an increase in mindfulness can facilitate and improve medical treatment, initiate recovery, prevent relapse, and even prolong life in the elderly. It is concluded that the current conceptualisation of health needs to take into account the contribution of mindfulness as a health enhancing state of mind.

A Non-Dualistic Approach to Health

Psychological investigations have enabled a greater understanding of what influences health, one of which is the notion of control over one’s health (e.g., Bandura, 1997). In terms of control, health is contingent upon two types of factors, those under the voluntary control of the

individual and those that are not, whether they are internally or externally manifested. Psychological research has generally found that unrealistic and arousal-provoking evaluations tend to worsen the condition, whereas a more objective appraisal tends to improve coping abilities during the stressful event and eases the recovery process (Langer & Rodin, 1976; Lazarus & Folkman, 1984; Teasdale, 1999). Thus, for the best or the worst, physical and mental states tend to interact.

Investigations of mind and body interaction have often contributed to new conceptualisations of the human experience and to the health-decision making process (e.g., Cannon, 1932). As this interactive linkage extended to ecological factors, new paradigms emerged and the contributions increased (Capra, 1996). One such paradigm draws on physical laws and conceptualises health as a complex dynamic system in its most stable state (homeostasis), dependant upon numerous subsystems (e.g., Maturana & Varela, 1980; Varela, 1999). This view implies that health depends on the stability of each subsystem, including environment, social demands, peer and family pressures, one’s thoughts and self-concept, bodily functions, organs, cells, and molecules. Health psychologists, psychiatrists and other caregivers who endorse this biopsychosocial conceptualisation (Engel, 1977; Schwartz, 1982) are working in line with the World Health Organisation’s perception of health, as “a complete state of physical, mental, and social well-being and not merely the absence of disease or infirmity” (1948).

Accordingly, they tend to pay attention to as many health-related factors as possible, and this at each level of the system.

In line with the systems approach, a recent development in psychotherapeutic conceptualisation and practice highlights the importance for the client to pay attention to as many aspects of thought and behaviour within an experience (Teasdale & Barnard, 1993; Teasdale, Segal, & Williams, 1995). This is a skill proposed by the mindfulness approach, an attentional control technique originating from the most ancient (Theravada) Buddhist meditative tradition. Research shows that by increasing their ability to control attention and attend objectively to various levels in which a cognitive, emotional, behavioural, physical, or interpersonal experience emerges, ill-health sufferers discover new aspects of the presenting problem (Kabat-Zinn, 1990). There is also evidence that in doing so, they acquire a greater sense of self-control, self-efficacy and well-being (e.g., Brown & Ryan, 2003; Kabat-Zinn, 1982; Langer, 1989; Teasdale et al., 2000).

The Mindfulness Approach: A Brief Overview

Five years ago, Salmon, Santorelli and Kabat-Zinn (1998) commented on the fast growing interest for the mindfulness approach since its earliest integration with Western psychotherapy in 1979, with over 240 mindfulness-based programs implemented in North America and Europe. Mindfulness has been defined as the act of “paying attention in a particular way: on purpose, in the present moment, and nonjudgementally” (Kabat-Zinn, 1994, p.4). It has been proposed that mindfulness is a common factor across various therapeutic orientations (e.g., Martin, 1997). The basis for this view is that the development of mindfulness promotes access to new perspectives and the disengagement from habitual response sets, including automatic thoughts and behaviours (Langer, 1989, 1992; Roemer, & Orsillo, 2002; Teasdale et al., 1995; Wells, 2002; see also Cayoun, 2003, for detailed description of the practice). In terms of categorisation processes, a distinction between ‘mindfulness’ and ‘mindlessness’ is described as follows:

Mindlessness can be defined as a cognitive state in which an individual relies rigidly on categories and distinctions created in the past. Mindlessness involves acting on the basis of a formalized set of rules and attitudes. Each new event or situation is classified into a preexisting category. On the basis of that category, behavioural and attitudinal responses are prescribed. Mindfulness, on the other hand, can be defined as a state of continuous category formation. A mindful individual creates new approaches to events and situations. He or she is not bound by previously formed rigid attitudes; rather, the mindful person, situated in the present, explores a situation from several perspectives” (Margolis & Langer, 1990, p. 107).

The ability to remain in the present is facilitated by the integration of an important ecological reality and its consequences: the changing nature of all things, the consequent understanding of selflessness, and the understanding that suffering springs from a lack of awareness of the impermanent nature of the self and its aggregate components (Genther & Kawamura, 1975). From this perspective, being mindful is applying these ecologically-based notions to all encountered internal and external events experienced from moment to moment, knowing (not just thinking or hoping) that “this is also bound to change”. Thus, the mindfulness approach incorporates the *applied* notion of a natural law, impermanence (i.e., the omnipresence of continuous and uncontrollable change), and its consequence in daily living (see Marlatt, 2002, for applications to treatment of addictive behaviour).

The mechanisms of action proposed include exposure, cognitive change, self-management, relaxation, and acceptance (Baer, 2003). They have also been described in terms of their neurophenomenological bases via a more comprehensive model of reinforcement, the co-emergence model (Cayoun, 2003). The model posits that reinforcement is dependent upon learned reactions toward intrinsically coupled cognitions and body-sensations. In accordance with eastern conceptualisation of mind and recent connectionist models of information

processing, associations stored in memory can manifest spontaneously in the form of co-emerging thought networks and body sensations. In other words, the model offers a non-dualistic explanation of reinforcement where mind and body constantly interact to process information and are systematically experienced at once, whether or not one is aware of it. Conscious and active disengagement from such spontaneous co-emergence through a systematic acceptance-based attentional training (i.e., mindfulness) leads to the development of equanimity¹ and extinction of learned responses. This method is conceptualised as a form of generalised interoceptive exposure and response prevention systematically applied to all experiences as they manifest themselves from moment to moment.

By observing fleeting thoughts and corresponding (co-emerging) body sensations objectively, without reacting to any experience, clients experiencing psychological disorders gain sufficient insight to realise and accept that all experiences (including rumination, anxiety symptoms, even physical pain) are in essence transient and impersonal events. With each experience, the trainee reminds himself or herself that “this experience will change provided I don’t react to it” (reinforce the response). Accordingly, the notion of impermanence/extinction is emphasised to foster the development of equanimity, and used as an empirical means for reality testing. This approach increases the client’s ability to reappraise undesirable situations more objectively and accept change.

Although the research in mindfulness has generally focussed on the treatment of psychopathology (e.g., Kabat-Zinn et al., 1992 [anxiety disorders], Roemer & Orsillo, 2002 [Generalised Anxiety Disorder (GAD)]; Segal, Williams, & Teasdale, 2002 [depression]; Singh, Wahler, Adkins, Myers, & the Mindfulness Research Group, 2003 [impulse control/mental retardation]; Witkiewitz, Marlatt, & Walker, in

press [addiction]), and specific information processing issues (Langer, 1992; Teasdale, 1999; Teasdale & Barnard, 1993; Wells & Matthews, 1994), several studies have investigated its effects on physical illness. Because the scope of this paper does not permit a comprehensive review of these studies, only the most cited are reported.

Mindfulness in General Health

Pain

The pioneering work of Jon Kabat-Zinn, a proponent of behavioural medicine (at the time Director of the University of Massachusetts Medical Center), has paved the way to what has now become a new paradigm in numerous Western health care settings. The integration of mindfulness skills in his Stress Reduction and Relaxation Program (SR&RP) was initially motivated by the need to provide alternatives to outpatients with chronic pain ($N = 51$) who were neither improving in their medical condition nor satisfied with the way in which the traditional medical system managed their condition (Kabat-Zinn, 1982). On completion of the program, the participants showed a 33% decrease on the total Pain Rating Index of the McGill Pain Questionnaire (Melsack, 1975), independent of the pain category, and a decrease of 60% in the mean total mood disturbance on the Profile of Mood States. In addition, on the General Severity Index of the SCL-90-R (Derogatis, 1977), the mean summary measure of psychiatric symptomatology decreased significantly by over 34%, and was stable at four months follow up. The data suggest a marked decrease in the severity and frequency of pain and mood disturbance over a 10-week period and these improvements were relatively stable up to one and a half years later. The author concluded that since chronic pain symptoms were sufficiently reduced, the clients were exercising self-regulation and wellness behaviour.

These results were replicated in two other studies, one ($N = 90$) which also showed improvement on a measure of negative body image (Kabat-Zinn, Lipworth, & Burney, 1985), the other ($N = 142$) which involved an extensive

¹ In this context, equanimity is the ability to remain unperturbed by an event experienced within the framework of one’s body and thoughts as a result of objective observation. This implies that unless one is aware of an actual (internal) experience, one cannot be equanimous towards it. Thus defined, equanimity relies on awareness of one’s thoughts and body sensations (Cayoun, 2003).

series of follow-up evaluations of chronic pain patients who had completed the program over the preceding several years, including patients in the previous two studies (Kabat-Zinn, Lipworth, Burney, & Sellers, 1987). In a more recent study using an essential mindfulness skill (acceptance), Hayes et al. (1999) measured the effects of 'control' versus 'acceptance' rationales on pain tolerance in university students, divided in experimental, control-based, and placebo groups. Using a cold pressor task to produce pain artificially, the participants in the acceptance group demonstrated significantly greater tolerance of pain compared to the other groups.

Stress and the immune system

Several studies have investigated the influence of mindfulness on psychological stress (e.g., Astin, 1997). In contrast, Solberg, Halvorsen, Sundgot-Borgen, Ingjer, and Holen (1995) explored the effects of meditation on the immune system after strenuous physical stress in six meditating and six non-meditating male runners. Observing that the increase in CD8+ cells after VO₂max was significantly less in the experimental group than in the control group, the authors concluded that meditation may modify the suppressive influence of strenuous physical stress on the immune system.

Psoriasis

In a study of patients with moderate to severe psoriasis, Kabat-Zinn et al. (1998) observed that those who listened to the mindfulness meditation audiotapes during individual phototherapy (UVB) and photochemotherapy (PUVA) sessions showed significantly quicker clearing of their skin (*Mdn* = 65 days) than those who received light therapy alone (*Mdn* = 97 days).

Cancer

Specia, Carlson, Goodey, and Angen (2000) implemented the mindfulness-based stress reduction program in an attempt to reduce mood disturbance and other symptoms of stress in ninety cancer outpatients (mean age, 51 years) using a random, wait-list controlled procedure. Participants in the treatment group reported significantly lower scores on total mood disturbance and subscales of depression, anxiety,

anger, and confusion, and more vigour than control participants. The treatment group had also fewer symptoms of stress, fewer cardiopulmonary and gastrointestinal symptoms, less emotional irritability and cognitive disorganisation, and fewer habitual patterns of stress. The overall reduction in mood disturbance was 65%, with a 31% reduction in stress symptoms. Subsequent follow-up measures showed that these changes were maintained 6 months later (Carlson, Ursuliak, Goodey, Agen, & Specia, 2001).

Aging

Investigating the effects of mindfulness on aging has been the main focus of Langer and colleagues for over two decades (e.g., Langer, Rodin, Beck, Weinman, & Spitzer, 1979). In one study, Alexander, Langer, Newman, Chandler, and Davies (1989) assessed a cognitive intervention in promoting longevity. Seventy-three residents of eight nursing homes were assigned randomly to one of four conditions: a no-treatment control group, a relaxation-only control group, a transcendental meditation (TM) group, and a mindfulness training group. All participants, except those in the no-treatment group, sat with their eyes closed twice a day for 20 minutes for 12 weeks and practised their instructions. As mentioned subsequently by Langer (1992), this was nowhere near an ideal mindfulness program given that it overly decreased the amount of the usual mindfulness practice periods to match that of TM practice periods, but the design had the merit of including useful control parameters.

After 3 months of practice, those in the mindfulness group significantly outperformed all participants on cognitive flexibility and health measures. Eighteen months following the initiation of the training, nurses providing patient care, who were blind to participant's experimental condition, were asked to rate the mental health of the patients. Participants in the TM and mindfulness groups received significantly higher ratings than those in the two control groups. Interestingly, improvement in cognitive flexibility and health measures correlated. More importantly, 36 months after the initiation of the training, the survival rate of

participants in the TM and mindfulness groups significantly exceeded those in the two control groups as well as the average survival rate of the eight institutions studied. The percentage of those who were still alive after 3 years is as follows: 100% of the TM group, 87.5% of the mindfulness group, 77.3% of the non-treatment control group, and 65% of the relaxation-only control group. Note that the overall survival rate during this same period for all eight nursing homes was 62.6%. Langer (1992) points out that the effect in the mindfulness group would have been more dramatic had the design included the usual (recommended) practice duration.

Besides cognitive flexibility and health measures, the authors collected data on measurements of impatience and perceived control. Participants in the mindfulness group scored significantly higher than those of the other groups on the revised Internal Locus of Control Scale (Levenson, 1974), but did not differ significantly from the controls on the impatience measure. Rather than accepting a given situation, the mindfulness group appeared interested in mastering it. After reviewing this and other studies measuring health in the elderly and individuals with addiction, Langer (1992) proposed this challenging view:

The findings from our research thus far suggest that mindfulness/mindlessness may be a dimension not only central to cognitive functioning but central to physiological functioning as well. Conscious awareness of both the psychological and the physiological ramifications of scripted behavioural processes, such as alcoholism or aging, can free us from premature cognitive commitments to these scripted behaviors. Mindfulness involves a state of mind that suggests that a clear division between the psychological and the physiological is not tenable. In fact, the mind-body distinction may be one of the deepest premature cognitive commitments in Western culture. If so, the most extreme consequence of mindlessness may be a belief in natural limitations on human potential that are more adequately understood as self-imposed restrictions that never reach conscious awareness (p. 302).

A Paradigm Shift

It is becoming evident for some of the most respected biological, medical psychological, and social scientists that the conceptualisation of health and its contributing factors is changing (e.g., Varela, 1999). Authors in the fields of cellular physiology, immunology, and psychiatry have defined meditation as a “voluntary hypometabolic state of biological estivation”, and argue that “plasticity of consciousness remains a key factor in successful biological adaptation” (Ding-E Young & Taylor, 1998, p.149). In the medical profession, authors such as Connelly (1999) are proposing that busy medical practitioners develop mindfulness skills to decrease distractibility and cope better with the numerous disruptions and demands that prevent more humanistic care for patients. Other authors recommend that clinicians in psychiatric settings practise mindfulness to improve quality of professional life (e.g., Elliston, 2001).

Healthcare providers are also likely to undergo significant shifts as they become increasingly constrained by economic forces. Ways of cutting costs are constantly sought by governments. With this in mind, investigators in the USA examined inner-city patients' healthcare utilisation before and after an eight-week mindfulness-based stress reduction program. The results showed a significant decrease in the number of total medical visits and chronic care visits. It was concluded that mindfulness training may help contain costs by decreasing the number of visits made by inner-city patients to their primary care providers (Roth & Stanley, 2002).

Conclusion

The impact of cognitive, emotional and social factors and the benefits of psychological interventions on the person's health have been demonstrated for over three decades. More than ever, in the current economic climate, promoting healthy habits and preventing disease are just as important tasks as are therapeutic interventions. The mindfulness approach has been shown to improve recovery from mental

and physical illnesses and to help maintain a healthier lifestyle even after years following treatment. The literature indicates that increasing mindfulness in any age group can facilitate medical treatment, initiate recovery, prevent relapse, and prolong life in the elderly. Given the increasing evidence for the link between mindfulness and both mental and physical health, taking into account the person's level of mindfulness as a health-contributing factor seems an advantageous modification in future modelling of the health concept.

References

- Alexander, C., Langer, E., Newman, R., Chandler, H., & Davies, J. (1989). Aging, mindfulness and meditation. *Journal of Personality and Social Psychology, 57*, 950-964.
- Astin, J. (1997). Stress reduction through mindfulness meditation: effects on psychological experiences. *Psychotherapy and Psychosomatics, 66*, 97-106.
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*, 125-143.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman & Company.
- Brown K. W., & Ryan, R. M. (2003). The benefits of being in the present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.
- Cannon, W. B. (1932). *The wisdom of the body*. New York: Norton.
- Capra, F. (1996). *The web of life*. London, UK: Harper Collins.
- Carlson, L. E., Ursuliak, Z., Goodey, E., Agen, M., & Specca, M. (2001). The effects of a mindfulness meditation-based stress reduction program on mood and symptoms of stressing cancer outpatients: 6-month follow-up. *Supportive Care in Cancer, 9*, 112-123.
- Cayoun, B. A. (2003). *Equanimity Theory: Integration of active mechanisms in mindfulness and cognitive-behavioural therapies*. Manuscript submitted for publication.
- Connelly, J. (1999). Being in the present moment: developing the capacity for mindfulness in medicine. *Academic Medicine, 74*, 420-424.
- Derogatis, L. R. (1977). *SCL-90-R Manual I*. Baltimore: Johns Hopkins University School of Medicine.
- Ding-E Young, J., & Taylor, E. (1998). Meditation as a voluntary hypometabolic state of biological estivation. *News in Physiological Science, 13*, 149-153.
- Elliston, P. (2001). Mindfulness in medicine and everyday life. *British Medical Journal Classified*, 17 November, 2-3.
- Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*, 129-136.
- Genther, H. V., & Kawamura, L. S. (1975). *Mind in Buddhist psychology*. Emeryville, CA: Dharma Publishing.
- Hayes, S. C., Bissett, R. T., Korn, Z., Zettle, R. T., et al. (1999). The impact of acceptance versus control rationales on pain tolerance. *The Psychological Record, 49*, 33-47.
- Kabat-Zinn, J. (1982). An outpatient program in behavioural medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*, 33-42.
- Kabat-Zinn, J. (1990). *Full catastrophe living: The program of the Stress-Reduction Clinic at the University of Massachusetts Medical Center*. New York: Delta.
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York: Hyperion.
- Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine, 8*, 163-190.
- Kabat-Zinn, J., Lipworth, L., Burney, R., & Sellers, W. (1987). Four-year follow-up of a meditation-based program for the self-regulation of chronic pain: Treatment outcome and compliance. *Clinical Journal of Pain, 2*, 159-173.
- Kabat-Zinn, J., Massion, A., Kristeller, J., Peterson, L., Fletcher, K., Pbert, L., Lenderking, W., & Santorelli, S. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry, 149*, 936-943.
- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., Hosmer, D., & Bernhard, J. D. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine, 60*, 625-632.
- Langer, E. J. (1989). *Mindfulness*. New-York: Addison-Wesley.
- Langer, E. J. (1992). Matters of mind: mindfulness/mindlessness in perspective. *Consciousness and Cognition, 1*, 289-305.

- Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged. *Journal of Personality and Social Psychology, 34*, 191-198.
- Langer, E. J., Rodin, J., Beck, P., Weinman, C., & Spitzer, L. (1979). Environmental determinants of memory improvement in late adulthood. *Journal of Personality and Social Psychology, 37*, 2003-2013.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Levenson, H. (1974). Activism and powerful others: Distinctions within the concept of internal-external control. *Journal of Personality Assessment, 38*, 377-383.
- Margolis, J., & Langer, E. (1990). An analysis of addictions from a mindful/mindless perspective. *Psychology of Addictive Behavior, 4*, 107-115.
- Marlatt, G. A. (2002). Buddhist philosophy and the treatment of addictive behavior. *Cognitive and Behavioral Practice, 9*, 42-50.
- Martin, J. R. (1997). Mindfulness: A proposed common factor. *Journal of Psychotherapy Integration, 7*, 291-312.
- Maturana, H., & Varela, F. (1980). *Autopoiesis and cognition*. Dordrecht, Holland: Reidel.
- Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. *Pain, 1*, 277-299.
- Roemer, L., & Orsillo, S. M. (2002). Expanding our conceptualization of and treatment for generalized anxiety disorder: Integrating mindfulness/acceptance-based approaches with existing cognitive-behavioural models. *Clinical Psychology: Science and Practice, 9*, 54-68.
- Roth, B., & Stanley, T-W. (2002). Mindfulness-based stress reduction and healthcare utilization in the inner city: Preliminary findings. *Alternative Therapies, 8*, 60-66.
- Salmon, P. G., Santorelli, S. F., & Kabat-Zinn, J. (1998). Intervention elements promoting adherence to mindfulness-based stress reduction programs in the clinical behavioral medicine setting. In S. A. Shumaker, E. B. Schron, J. K. Ockene, & W. L. McBee (Eds.), *The handbook of health behavior change* (pp. 239-266). New York: Springer.
- 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 Press.
- Singh, N. N., Wahler, R. G., Adkins, A. D., Myers, R. E., & the Mindfulness Research Group (2003). Soles of the feet: a mindfulness-based self-control intervention for aggression by an individual with mild mental retardation and mental illness. *Research in Developmental Disability, 24*, 158-169.
- Specia, M., Carlson, L., Goodey, E., & Angen, M. A. (2000). A randomised wait-list controlled trial: The effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. *Psychosomatic Medicine, 62*, 613-622.
- Solberg, E. E., Halvorsen, R., Sundgot-Borgen, J., Ingjer, F., & Holen, A. (1995). Meditation: a modulator of the immune response to physical stress? A brief report. *British Journal of Sport and Medicine, 29*, 255-257.
- Schwartz, G. E. (1982). Testing the biopsychosocial model: The ultimate challenge facing behavioural medicine? *Journal of Consulting and Clinical Psychology, 50*, 1040-1053.
- Teasdale, J. D. (1999). Metacognition, mindfulness, and the modification of mood disorders. *Clinical Psychology and Psychotherapy, 6*, 146-155.
- Teasdale, J. D., & Barnard, P. J. (1993). *Affect, cognition and change*. Hove: LEA.
- Teasdale, J. D., Segal, Z. V., Williams, J. M. G. (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., Segal, Z. V., Williams, J. M. G., 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.
- Varela, F. J. (1999). Steps to a science of inter-being: Unfolding the Dharma implicit in modern cognitive science. In G. Watson, S. Batchelor, & G. Claxton (Eds.), *The psychology of awakening* (pp. 71-89). London: Rider.
- Wells, A. (2002). GAD, metacognition, and mindfulness: An information processing analysis. *Clinical Psychology: Science and Practice, 9*, 95-100.
- Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Hove, UK: Erlbaum.
- Witkiewitz, K., Marlatt, G. A., & Walker, D. E. (in press). Mindfulness-based relapse prevention for alcohol and substance use disorders: The meditative tortoise wins the race. To appear in the *Journal of Cognitive Psychotherapy*.
- World Health Organization. (1946/1948). *Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference*. New York: Records of the World Health Organization, No.2, 100.