Mindfulness
DOI 10.1007/s12671-015-0385-8

ORIGINAL PAPER

Effects of a 9-Day *Shamatha* Buddhist Meditation Retreat on Attention, Mindfulness and Self-Compassion in Participants with a Broad Range of Meditation Experience

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Abstract These days, there are substantial number of papers published on the effects of meditation-based programs adapted for westerners involving different practices oriented toward mental and physical health. The study assessed the effects of a retreat which was solely focused on *Shamatha* practices (basic traditional Buddhist meditation practices). The participants on the retreat included those with 1 year of meditation practice or less (LP) and those with more than 1 year of meditation practice (MP). The objective of this study was to evaluate whether a traditional 9-day Shamatha Buddhist meditation retreat could change attention, mindfulness, and self-compassion levels in these participants. We also decided to investigate whether a meditation retreat, which could be intensive and exhaustive for beginners, could be equally beneficial for both LP and MP. The participants answered questionnaires before and after the retreat: Mindful Awareness Attention Scale (MAAS), Self-Compassion Scale (SCS), digit-symbol test, analog scales about stress, anxiety, frustration, perception and attention, and a question about their level of Shamatha based on a traditional Buddhist text. Participants showed improvements on most of the questionnaires and scales after the retreat. There were interaction effects (time and group) in perception (analog scale) and mindfulness. This study suggests that a traditional Shamatha retreat can improve mindfulness, attention, and self-compassion levels in the participants, irrespective of their experience. It also suggests that this kind of retreat could improve mindfulness and perception in participants with more than 1 year of meditation practice.

Keywords Meditation · Mindfulness · Attention · Compassion · *Shamatha*

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Introduction

Meditation is a form of mental training with cognitive and psychological effects such as attention regulation, body awareness, emotional regulation, and change in perspective of the self (Slagter et al. 2007; Hölze et al. 2011). Meditation practices are complex and involve many subjective parameters. There are some studies trying to establish an operational definition for meditation in the field of research. For example, in a five-round Delphi study with a panel of seven experts in meditation research, the participants agreed that the essence of meditation practice is its use of a defined technique and logic relaxation, and that it is a self-induced state. Meditation practice may also involve a state of psychophysical relaxation somewhere in the process; use of a self-focus skill or anchor;

Published online: 18 January 2015

involve an altered state/mode of consciousness, mystical experience, enlightenment, or suspension of logical thought processes; be embedded in a religious/spiritual/philosophical context; or involve an experience of mental silence (Bond et al. 2009).

An increase in the use of meditation was observed in a comparison of national surveys carried out between 2002 and 2007 in the USA (Barnes et al. 2007). These days, there is a substantial number of papers published about the effects of meditation-based programs involving different practices oriented toward mental and physical health and adapted for westerners (Gallegos et al. 2013; Geary and Rosenthal 2011). But there are only a few papers evaluating traditional meditation practices. A meta-analysis has suggested that there could be differences in the effects of mindfulness programs (such as Mindfulness-Based Stress Reduction) and meditation practiced in traditional centers (Eberth and Sedlmeier 2012), and so it could prove interesting to study meditation in its traditional context. Moreover, only a few papers have evaluated the effects of meditation retreats, intensive trainings, and especially traditional *Shamatha* Buddhist meditation practices.

During Shamatha practices, mindfulness—or the faculty of focusing continuously upon a familiar, chosen object without distraction, according to traditional Buddhist texts—is trained, and the practitioner develops the ability of keeping focused attention on a given object, such as the breath. Shamatha includes introductory meditation practices in the Buddhist context for the development of a relaxed, stable, and clear mind (Wallace 2007). Shamatha can be practiced for a few minutes daily or as an intensive meditation training—a retreat—for days, months, or even years.

As the meditation practitioner engages in Shamatha practice, he/she can improve the ability of having focused attention. A long time before the advent of our modern scales and questionnaires, Kamalashila proposed in the eighth century his classical work Stages of Meditation. The stages start with a mind, which cannot focus for more than a few seconds (stage 1), culminating in a state of stability and vividness, which can be sustained for hours (stage 9). Excitation and laxity are seen as imbalances and their effects are reduced during the progress in these stages (Wallace 2007).

Few studies have evaluated the cognitive and psychological effects of meditation retreats. MacLean et al. (2010) showed an increase in perceptual sensitivity and improved vigilance in a sustained visual attention task after a meditation retreat lasting 3 months (mainly focused on Shamatha). In a pilot study, after 1 week of Zen meditation retreat, the participants showed an increased activation in the attention network (prefrontal cortex and anterior cingulated among other regions) in an attention task—the Stroop Word-Color Task—adapted for functional magnetic resonance imaging (Kozasa et al. 2008).

Less impulsiveness, tolerance to stressors, and heightened self-esteem were detected in young Thai participants after a 7-day Vipassana retreat, compared with a control group (Tori and Emavardhana 1997). Similarly, Sahdra et al. (2011) found an increased response inhibition after a 3-month retreat involving 6 to 10 h of daily meditation training. This response predicted adaptive socio-emotional functioning assessed through self-reported measures of anxiety, mindfulness, psychological well-being, and emotional regulation. The retreat (the same evaluated by MacLean et al. 2010) included Shamatha, loving-kindness, compassion, equanimity, and empathetic joy meditation practices. There is, therefore, an indication that meditation retreats may improve cognitive functions and emotional responses.

A meta-analysis has shown that a mindfulness-based program may reduce ruminative thinking and anxiety as well as increase empathy and self-compassion (Chiesa and Serretti 2009). "Self-compassion involves being kind and understanding toward oneself in instances of pain or failure rather than being harshly self-critical; perceiving one's experiences as part of the larger human experience rather than seeing them as isolating; and holding painful thoughts and feelings in mindful awareness rather than overidentifying with them" (Neff 2003). In a randomized controlled trial, Neff and Germer (2012) found that a program developed to enhance self-compassion with elements of mindfulness was able to enhance self-compassion, mindfulness, and well-being compared with a waitlist control group. The improvements were maintained after 1 year of follow-up. Meditation training may also reduce stress symptoms (Manocha et al. 2011) and mindfulness helps in the process of positive reappraisal to deal with stressful situations (Garland et al. 2009).

Studies also show that there are differences in measurements of attention, emotional regulation, well-being, and mindfulness between experienced and less experienced meditators (Kozasa et al. 2012; Taylor et al. 2011; Ortner et al. 2007). A retreat usually consists of many hours of focused attention in an erect sitting posture. This suggests that a previously established regular meditation practice may be an important requirement to maximize the benefits of retreats, as it can be excessive or even exhaustive for beginners. The differences in the cognitive and psychological improvements after a meditation retreat may be related to the amount of experience of meditation practice the participant has before engaging in intensive practice.

The objective of this study was to evaluate whether a traditional Buddhist 9-day Shamatha meditation retreat could change these variables in its participants after this short period of time. We also requested the participants to classify themselves according to the traditional Buddhist text about the stages of Shamatha. The purpose of applying this scale was two-fold. Firstly, it was an exploratory investigation into whether the participants would perceive their state of

meditation changing as described in this traditional text. Secondly, it was a way of seeing whether a scale originating from a traditional Buddhist context would point to changes in the stage of meditation before and after the retreat. Another aim of this study was to compare participants with 1 year of meditation practice or less (LP) with participants with more than 1 year of meditation practice (MP) and evaluate whether participation in a meditation retreat would be equally beneficial for these two groups.

Method

Participants

Participants aging from 18 to 65 years old took part in a 9-day Shamatha meditation retreat, which took place in Viamão—southern Brazil. They were invited to answer questionnaires before and after the retreat. In order to evaluate the effects of the meditation retreat and to avoid bias resulting from the use of drugs or other interventions, we excluded participants under psychological or psychiatric treatment, using psychotropic drugs, presenting previous history of neurological disease, or those having attended a previous retreat finishing immediately before this Shamatha retreat. We also excluded those who did not complete this 9-day retreat. The selected participants signed a consent form and the research protocol was approved by the Ethics Committee of the Universidade Nove de Julho, in São Paulo, Brazil.

From 67 participants who filled in the preliminary questionnaires, 44 were included. Their average age was 44.14 (±12.22 *SD*), 27 females and 17 males. Half of them were postgraduates, 38.6 % graduates, 9.1 % undergraduates, and 2.3 % had finished high school. Almost 60 % had been meditating for more than a year, 11.4 % from 6 to 12 months, 6.8 % from 3 to 6 months, 15.9 % less than 3 months, and 6.8 % were not meditating.

Among the participants who answered that they had been practicing meditation, 26.8 % had been meditating more than five times a week, 12.3 % four times a week, 36.6 % three times a week, 9.8 % two, 7.3 % one, and 7.3 % less than once a week. When they were asked about how long their regular practice was, 2.4 % answered they meditate for 2–3 h, 4.9 % for 1–2 h, 12.2 % for 45–60 min, 41.5 % for 30–45 min, 31.7 % for 15–30 min, 7.3 % less than 15 min.

Procedure

All participants practiced meditation for 4 h and received additional theoretical information for another 3 h during 9 days in the retreat center. The training included (a) mindfulness of breathing, (b) observing mental events ("settling the mind in its natural state"), and (c) observing the nature of consciousness ("awareness of awareness"). The training aimed to achieve body relaxation, inner silence, attentional stability, and vividness (Wallace 2006).

Measures

General Data First, we applied a questionnaire about demographic data, meditation practice profile, and personal health. Then, participants completed the questionnaires below immediately before and after the retreat.

Mindful Attention Awareness Scale This is a 15-item scale. The subject has to choose from a 1–6 point Likert scale, how frequently or infrequently he/she currently experiences each of the 15 items in his/her everyday life. The questions explore how aware or attentive someone is during his/her life experiences. Examples: "I could be experiencing some emotion and not be conscious of it until sometime later"; "I find it difficult to stay focused on what's happening in the present." The test-retest reliability coefficient is 0.81 (Brown and Ryan 2003). Mindful Attention Awareness Scale (MAAS) was chosen because it measures attention and awareness more than other aspects of mindfulness.

Self-Compassion Scale This is a 26-item scale which measures how someone typically acts toward himself/herself in difficult times. The subject has to choose from a 1–6 point Likert scale on how often he/she behaves in the stated manner, ranging from almost never to almost always. There are six subscales: self-kindness (Ex: "*I*'m kind to myself when I'm experiencing suffering"), *self-judgment* (Ex: "When times are really difficult, I tend to be tough on myself"), *common humanity* (Ex: "I try to see my failings as part of the human condition"), *isolation* (Ex: "When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world), *mindfulness* (Ex: When I'm feeling down I try to approach my feelings with curiosity and openness"), *overidentification* (Ex: "When I'm feeling down I tend to obsess and fixate on everything that's wrong"). Self-judgment, isolation, and overidentification subscales are scored inversely. The test-retest reliability coefficient is 0.93 (Neff 2003).

Digit-Symbol Test (Wechsler Adult Intelligence Scale-III) This is a classic neuropsychological test, which consists of digit-symbol pairs and a list of digits. Under each digit, the subject should write down the corresponding symbol as fast as possible. A maximum of 133 correct responses can be reached in 2 min. It is an objective measure of attention and motor coordination. The test-retest reliability coefficient is 0.82 (Wechsler 2004).

Analog Scales Each analog scale has a line of 10 cm and the participant should identify his/her level of stress, tension, attention, perception, frustration, and anxiety in the present moment, marking a dot on the line from 0 to 10 cm. The participants were trained beforehand to respond to the scale. Stress-related symptoms and attention have been shown to improve in the literature about meditation (see the "Introduction"). Instead of asking the participants to complete many different questionnaires—which would take too much time and may interfere in the routine of the retreat—we developed analog scales of perceived stress, tension, frustration, attention, and perception for the present study.

Stages of Shamatha When the retreat finished, the participants were asked to compare their stage of Shamatha before and after the event. In order to answer this question, they were requested to check a summary of the stages, taught during the retreat. These stages, from one to nine, were described by Kamalashila in his classical work Stages of Meditation. The stages start with a mind, which cannot focus for more than a few seconds (stage 1), culminating in a state of stability and vividness which can be sustained for hours (stage 9) (Wallace 2007). This is a classification scale from a Buddhist traditional text, therefore, there is no reliability score.

Data Analysis

We compared LP and MP participants before and after the retreat by using ANOVA with repeated measures and Bonferroni adjustment for multiple comparisons. We also carried out a Pearson's correlation followed by partial correlation and a linear regression analysis.

Results

We compared participants who had 1 year of meditation practice or less (LP; $N=18$) with participants who had more than 1 year of meditation practice (MP; $N=26$) in order to evaluate who might benefit more from the retreat (Table 1). When we asked the participants about their experience of practice, the variables were

Table 1 Variance analysis for repeated measures comparing participants with 1 year of meditation practice or less (LP) with those with more than 1 year of meditation practice (MP), before and after the Shamatha retreat

Variable	Group	N	Mean ± SD (before retreat)	Mean ± SD (after retreat)	Differences in time (before X after) p value[a] (Effect Size)	Differences between groups p value[a] (Effect Size)	Interaction (time and group) p value[a] (Effect Size)
Stress in the present moment*	MP	26	3.43±2.62	0.90±1.51	<0.001*	0.084	0.577
	LP	18	4.03±2.77	1.53±1.60	(0.371)	(0.069)	(0.007)
Tension in the present moment*	MP	26	3.46±2.78	0.89±1.17	<0.001*	0.111	0.659
	LP	18	4.09±2.84	1.67±2.15	(0.411)	(0.059)	(0.005)
Anxiety in the present moment*	MP	26	3.97±2.83	1.24±1.69	<0.001*	0.280	0.721
	LP	18	4.14±2.59	1.52±1.16	(0.425)	(0.028)	(0.003)
Attention in the present moment	MP	26	5.57±1.91	7.67±1.35	<0.001*	0.001*	0.132
	LP	18	4.68±1.69	5.64±2.16	(0.290)	(0.239)	(0.053)
Perception in the present moment	MP	26	5.39±2.11	7.72±1.37	<0.001*	0.028*	0.018*
	LP	18	5.30±1.47	4.37±1.73	(0.265)	(0.110)	(0.126)
Frustration in the present moment	MP	26	3.48±2.28	0.79±1.20	0.053	0.384	0.580
	LP	18	2.91±2.58	3.79±2.25	(0.086)	(0.018)	(0.007)
Self-compassion-total score	MP	26	76.53±17.51	83.11±17.40	0.006*	0.029*	0.123
	LP	18	68.55±12.14	70.50±12.55	(0.166)	(0.109)	(0.056)
Digit-symbol total score	MP	25	74.63±16.19	78.96±16.31	0.021*	0.873	0.062
	LP	17	75.78±13.51	76.53±13.32	(0.129)	(0.001)	(0.087)
MAAS	MP	26	55.65±11.08	63.62±8.27	<0.001*	0.095	0.030*
	LP	18	54.00±7,54	56.83±7.11	(0.348)	(0.065)	(0.108)
Stage of Shamatha	MP	21	2.29±1.23	3.95±1.71	<0.001*	0.010*	0.656
	LP	14	1.29±0.61	2.79±0.98	(0.688)	(0.184)	(0.006)

LP—participants with 1 year of meditation practice or less, *MP*—participants with more than 1 year of meditation practice

*$p<0.05$

[a] Adjustment for multiple comparisons: Bonferroni; Effect size was measured by Partial Eta Squared

categorical: no practice; 0–3 months; 3–6 months; 6–12 months; or more than 1 year (those in this latter category were also asked to state how many years of practice they had). One year of practice was calculated as the median. We, therefore, decided to establish 1 year of practice as the division time between LP and MP.

When comparing scores before and after the retreat, we found a significant improvement in both groups in levels of stress, tension, anxiety, attention, perception (analog scales), as well as in the self-compassion, digit-symbol, mindfulness scores, and in the stages of Shamatha (Table 1). There were group differences in attention, perception (analog scales), self-compassion, and in the *Stage of Shamatha* (35 of the 44 participants answered the question about the stages of Shamatha). There were also interaction effects (interaction time and group) in perception (analog scale) and mindfulness, indicating improvements in MP.

In our exploratory analysis of the stages of Shamatha, the correlation analysis of the differences of the scores of Shamatha (before and after the retreat) was carried out in relation to the differences in the scores of the other variables. There were no correlations. We carried out the regression analysis of the Shamatha score before the retreat as an independent variable and found that it could not predict any other score of the other variables after the retreat. This indicates that Shamatha stages are unable to predict any results in the other variables. Other variables such as age, frequency, and experience in meditation practice were also included as independent variables. The frequency of practice (less than once a week, once a week, twice a week, three time a week, four time a week, or five or more times a week) before the retreat had a positive relationship with mindfulness (β=2.650; p=0.002), self-compassion (β=4.159; p=0.017), and Shamatha after the retreat (β=0.460; p=0.012); it had a negative relationship with frustration (β=−0.280; p=0.048) and anxiety scores (β=−0.328; p=0.039). Age had a positive relationship with anxiety (β=0.056; p=0.003) and a negative with digit-symbol results, after the retreat (β=−0.506; p=0020).

Discussion

This study aimed to evaluate whether a traditional Buddhist 9-day Shamatha meditation retreat could change attention, mindfulness, and self-compassion in its participants. Another objective was to evaluate whether the effects of this retreat would differ between LP and MP groups.

The participants, in general, improved in most of the assessments. According to the literature, meditation training can reduce stress related symptoms (Manocha et al. 2011); and mindfulness has a central role in the process of positive reappraisal to cope with stressful situations (Garland et al. 2009). In this study, after the retreat, there was a decrease in stress, tension, anxiety, attention, and perception in the analog scales.

There is evidence that meditation training results in increased efficiency in attention tasks. For example, a group who participated in a 5-day meditation training improved conflict scores on the Attention Network Test relative to a relaxation control group (Tang et al. 2007). In our study, the Shamatha meditation retreat resulted in higher scores in attention, perception (analog scales), mindfulness, self-compassion, digit-symbol scores, and also in the stages of Shamatha comparing before and after the event. It should be noted that only 35 of the 44 participants answered the question about the stages of Shamatha (some, in LP and MP groups, did not answer this question; for example, some of those in the LP group were not sure about their level of Shamatha and others considered it too complex; in the MP group there was some uncertainty about their level of Shamatha).

Most of the literature regarding meditation, in the last decades, has been devoted to Mindfulness-based meditation programs adapted for westerners to reduce stress, pain, and a number of disorders (Kabat-Zinn 1982; Arch et al. 2013). However, the literature lacks an evaluation of the root traditional practices, like Shamatha Buddhist practices from which modern Mindfulness-based meditation programs were derived. In the present study, we decided to ask the participants not only to fill in psychological questionnaires but also to classify their attention level according to the traditional classification on the Stages of Shamatha from the eighth century (Wallace 2007). It was interesting to observe that improvements in this traditional classification were reflected in the improvements in modern psychological tests such as the Mindful Attention Awareness Scale and the objective measure of attention and motor speed coordination, the digit-symbol test. Our results may point out that the improvements expected by the ancient Buddhists through meditation practices, could be related to improvements in modern psychological tests.

The use of the evaluation of Shamatha stages did not predict any results in the other variables, including the amount of experience of meditation practice for a given individual, which suggests that it did not have an impact on the variables measured in this study. Age predicted anxiety and digit-symbol results after the retreat: older participants considered themselves less anxious after the retreat. However, they scored less than younger participants in the digit-symbol test. The digit-symbol test evaluates the level of attention and motor speed, which suggests that it did not have an impact on the results of this study. The frequency of practice (less than once a week, once a week, twice a week, three time a week, four time a week, or five or more times a week) before the retreat were positively associated to the mindfulness, frustration, anxiety scores, self-compassion and Shamatha after the retreat. Frequency of practice seems to be the most important factor which influenced the results after the retreat. When

immersed in everyday activity someone who practices meditation frequently has the skills required to stabilize the mind more quickly compared with someone who practices with less regularity. In other words, skills that have been steadily developed under less ideal but regular conditions make it much easier to settle attention on the object of meditation when in more ideal settings, such as during a closed retreat. This may explain the reason why practitioners who have more hours of meditation practice can potentially benefit more from a 9-day retreat (at least in perception and mindfulness) compared with participants who only had up to 1 year of experience. Of course, more experiments along these lines in the future may also be helpful to research the various influences that doing retreats can have on different populations: on helping novices establish a regular practice, for example.

A recent review showed that self-compassion can increase after a Mindfulness-Based Stress Reduction Program (MBSR) (Chiesa and Serretti 2009). In our study, after this retreat there were increases in the Self-compassion Scale (SCS) total score. This result may be due to the fact that increasing awareness of inner and outer experiences can help one become gentler with oneself, recognizing one's humanity and becoming less overidentified with oneself.

In Table 1, there are also interaction effects (time and group) showing that MP have greater improvement in perception (analog scale) and mindfulness than LP.

According to the literature, meditators have better attentional performance (Moore and Malinowski 2009). Our study supports this finding, as greater improvements in perception and MAAS were observed in MP. This indicates that the length of meditation practice is related to improvements in the attention process—a key feature of MAAS. However, there were no differences in the digit-symbol results. This task is comprised of two components: attention and motor speed. We suggest that this result reflects differences in attention, but no difference in motor speed between MP and LP after the retreat.

This study is limited by a small sample. Improvements to the study design could have been made by having a control group outside the retreat—with the same characteristics as the retreat group—and by randomizing between these two groups. Another improvement could be a bigger sample and the possibility of stratifying the participants according to their meditation expertise into more categories. Most of the scales and questionnaires were based on self-report. This could be a bias if we take into account the fact that meditators probably believe that they will experience improvements after a meditation retreat. However, it is also possible to observe a difference in the objective measure of the digit-symbol test.

In summary, a short 9-day Shamatha retreat may improve mindfulness, self-compassion, attention, perception, stress, tension anxiety, and the stage of Shamatha in all of the participants. This study also suggests that meditators with more than 1 year of practice can benefit more than meditators with less time of practice in perception and mindfulness.

Acknowledgments We would like to thank Lama Samten and Centro de Estudos Budistas Bodhisatva for allowing the participant's evaluation during the Shamatha retreat, Alexandra Camilo and Teresa Maria dos Santos for helping in the data collection.

References

Arch, J. J., Ayers, C. R., Baker, A., Almoklov, E., Dena, D. J., & Craske, M. G. (2013). Randomized clinical trial of adapted mindfulness-based stress reduction versus group cognitive behavioral therapy for heterogeneous anxiety disorders. *Behavioral Research Theray, 51*, 185–196.

Barnes, P. M., Bloom, B., & Nahim, R. L. (2007). Complementary and alternative medicine use among adults and children: United States, 2007. *National Health Statistics Report, 10*, 1–23.

Bond, K., Ospina, M. B., Hooton, N., Bialy, L., Dryden, D. M., Buscemi, N., Shannahoff-Khalsa, D., Dusek, J., & Carlson, L. E. (2009). Defining a complex intervention: the development of demarcation criteria for "meditation". *Psychology of Religion and Spirituality, 1*, 129–137.

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

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

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

Gallegos, A. M., Hoerger, M., Talbot, N. L., Krasner, M. S., Knight, J. M., Moynihan, J. A., & Duberstein, P. R. (2013). Toward identifying the effects of the specific components of mindfulness-based stress reduction on biologic and emotional outcomes among older adults. *Journal of Alternative and Complementary Medicine, 19*(10), 787–92.

Garland, E., Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore, 5*, 37–44.

Geary, C., & Rosenthal, S. L. (2011). Sustained impact of MBSR on stress, well-being, and daily spiritual experiences for 1 year in academic health care employees. *Journal of Alternative and Complementary Medicine, 1*, 939–44.

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science, 6*, 537–59.

Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiaty, 4*, 33–47.

Kozasa, E. H., Radvany, J., Barreiros, M. A., Leite, J. R., & Amaro, E., Jr. (2008). Preliminary functional magnetic resonance imaging Stroop task results before and after a Zen meditation retreat. *Psychiatry and Clinical Neurosciences, 62*, 366.

Kozasa, E. H., Sato, J. R., Lacerda, S. S., Barreiros, M. A., Radvany, J., Russell, T. A., Sanches, L. G., Mello, L. E., & Amaro, E., Jr. (2012). Meditation training increases brain efficiency in an attention task. *NeuroImage, 59*, 745–9.

MacLean, K. A., Ferrer, E., Aichele, S. R., Bridwell, D. A., Zanesco, A. P., Jacobs, T. L., King, B. G., Rosenberg, E. L., Sahdra, B. K., Shaver, P.

R., Wallace, B. A., Mangun, G. R., & Saron, C. D. (2010). Intensive meditation training improves perceptual discrimination and sustained attention. *Psychological Science, 21*, 829–39.

Manocha, R., Black, D., Sarris, J., & Stough, C. (2003). A randomized, controlled trial of meditation for work stress, anxiety and depressed mood in full-time workers. *Evidence Based Complementary and Alternaternative Medicine*, 2011, 960583. doi:10.1155/2011/960583.

Moore, A., & Malinowski, P. (2009). Meditation, mindfulness and cognitive flexibility. *Consciousness and Cognition, 18*, 176–186.

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

Neff, K. D., & Germer, C. K. (2012). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology, 69*, 28–44.

Ortner, C. N. M., Kilner, S. J., & Zelazo, P. D. (2007). Mindfulness meditation and reduced emotional interference on a cognitive task. *Motivation and Emotion, 31*, 271–283.

Sahdra, B. K., MacLean, K. A., Ferrer, E., Shaver, P. R., Rosenberg, E. L., Jacobs, T. L., & Saron, C. D. (2011). Enhanced response inhibition during intensive meditation training predicts improvements in self-reported adaptive socioemotional functioning. *Emotion, 11*, 299–312.

Slagter, H. A., Lutz, A., Greischar, L. L., Francis, A. D., Nieuwenhuis, S., Davis, J. M., & Davidson, R. J. (2007). Mental training affects distribution of limited resources. *PLoS Biology, 5*, e138.

Tang, Y. Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., & Posner, M. I. (2007). Short-term meditation training improves attention and self-regulation. *Proceedings of the National Academy of Sciences, 104*, 17152–17156.

Taylor, V. A., Grant, J., Daneault, V., Scavone, G., Breton, E., Roffe-Vidal, S., Courtemanche, J., Lavarenne, A. S., & Beauregard, M. (2011). Impact of mindfulness on the neural responses to emotional pictures in experienced and beginner meditators. *NeuroImage, 57*, 1524–33.

Tori, C. D., & Emavardhana, T. (1997). Changes in self-concept, ego defense mechanism, and religiosity following seven-day Vipassana Meditation retreats. *Journal for the Scientific Study of Religion, 36*, 194–206.

Wallace, B. A. (2006). *The attention revolution*. Somerville: Wisdom Publications.

Wallace, B. A. (2007). *Genuine happiness: meditation as the path to fulfillment*. Hoboken: Wiley.

Wechsler, D. (2004). *WAIS-III Escala de inteligência Wechsler para adultos: Manual* (3ªth ed.). São Paulo: Casa do Psicólogo.