

The health benefits of meditation and being mindful

Dr Craig Hassed MBBS, FRACGP
Senior Lecturer
Monash University
Department of General Practice
Email: craig.hassed@monash.edu

Mindfulness, the most scientifically investigated form of meditation, has been the subject of a huge growth of interest in clinical and scientific circles in recent years. The evidence is suggesting that learning to pay attention may be the most important skill we ever learn. Why? What are the health benefits of meditation? How are modern scientific methods being used to investigate meditation and its benefits? These and other questions will be explored in this introductory article.

The importance of paying attention is not a new concept as this quote from William James, the father of modern psychology, indicates.

"The faculty of voluntarily bringing back a wandering attention over and over again, is the very root of judgment, character, and will. No one is compos sui (competent) if he have it not. An education which should improve this faculty would be the education par excellence."¹

Mindfulness, in its simplest and most universal sense, is a mental discipline that involves training attention. It teaches us how to use the mind in a different way and to focus on the things that are most useful and helpful in our lives thus helping us to live more consciously and fully.

The importance of attention and the cost of inattention

Which of the following was associated with greatest self-reported happiness?

- Mind wandering to unpleasant topics

- Mind wandering to neutral topics
- Mind wandering to pleasant topics
- Mind not wandering from what one is currently doing

You might feel tempted to answer that we are happiest when the mind is wandering to pleasant topics. In fact, according to a study from Harvard University, people report being happiest while their mind is not wandering from what they are doing.² The authors of this study wrote,

"In conclusion, a human mind is a wandering mind, and a wandering mind is an unhappy mind. The ability to think about what is not happening is a cognitive achievement that comes at an emotional cost."

Why would that be?



A study into the effect of mobile phone use on the chance of having a Motor Vehicle Accident (MVA) found that within 5 minutes of using a mobile phone the risk of a motor vehicle accident is over 400% higher, that is, we are more than four times as likely to have an MVA.³

These two studies highlight some of the issues about inattention and the loss of focus associated with multitasking. Firstly, when our mind is wandering we are not paying attention to what we are doing. This results in more mistakes, less efficiency, and less enjoyment. Secondly, what is the mind doing when we are not paying attention? Well, we might be wishing to experience happiness resulting from the imagination, but this only gives us a very superficial experience of the life we are actually leading and never leads to a stable and deeply satisfying level of wellbeing. In fact, the constant desire to be somewhere else (some other place or time) can produce a slowly growing sense of dissatisfaction with where we are here and now. Furthermore, when we are not paying attention is the time when the mind gets up to 'mischief' in the form of worry and rumination which are at the very heart of anxiety and depression.

Mindfulness and the 'fight-or-flight' response

When we are not paying attention we often make mountains out of mole-hills and perceive stressors that don't even exist, except in our imaginations that is. This amplifies our level of stress enormously which takes a toll on our mental and physical health.

The "fight or flight response" is a natural, necessary and appropriate response to a threatening situation if it is based on a clearly perceived actual, real-time, threat – say confronting a person-eating tiger. This turbo-charge of energy is coded into our systems by nature in order to preserve life. It is associated with:

- Increased blood flow: dynamic circulation
 - Elevation of blood-pressure, heart rate
 - Diversion of blood-flow to the muscles and away from gut and skin (going pale)
- Increased metabolism
 - Increased metabolic rate
 - Increased respiration and opening up of airways
 - Mobilisation of energy (glucose and fat) stores
- Armed defences
 - Blood gets thicker (platelet adhesiveness) to stop bleeding faster
 - Mobilises immune cells

- Preparation for tissue repair
 - Mobilising inflammatory hormones (e.g. cortisol, cytokines, interleukins etc) to help repair tissues damaged while dealing with the threat
- Attention centres in the brain activated

The "fight or flight response" is appropriate and life protecting providing, it is only turned on when it needs to be, it is allowed to turn off when it is no longer needed and it is not prolonged. When appropriate we do not experience fight or flight so much as anxiety but rather as a surge of energy, like a turbo charger. When we activate it inappropriately on the other hand we experience it as anxiety as all these chemicals and changes are being switched on with nowhere to go.

When we get anxious about things that haven't happened yet, or have already come and gone, then we activate the system inappropriately and this takes its toll over time. The results of worrying about what has not happened is the main reason why there are more heart attacks on Monday mornings prior to work than at any other time in the week.⁴

The name given to the long-term over-activation of the stress response is allostatic load.⁵ It is like a physiological wear-and-tear on the body and is seen in chronic depression and anxiety. High allostatic load, among other things, leads to:

- Immune dysregulation (lowered defences against infections but increased inflammation)
- Hardening of the arteries (atherosclerosis) which leads to cardiovascular disease
- Metabolic syndrome (high blood pressure, high blood lipids, high blood glucose and putting on weight around the trunk)
- Thinning of the bones (osteoporosis)
- Loss of brain cells (accelerated ageing or atrophy) particularly in the hippocampus and prefrontal cortex (learning, memory and executive functioning areas of the brain) which predisposes to Alzheimer's Disease in later life^{6,7}
- Growth of the amygdala (the fear and stress centre of the brain)

If we wanted to accelerate the ageing process then this is a great way to do it. The good news is that these effects can all be reversed over time with the regular practice of meditation which starts to help us understand how it is that meditation has such widespread health benefits. The focusing of attention on the here and now helps us to see which stressors are actually present and which ones are only in our imagination.

Stress and Performance

Stress is often valued as a way of increasing performance and being too relaxed is often associated with poor performance and lack of motivation. To that extent, stress is good, or at least better than apathy as far as being productive is concerned; hence driven people often avoid meditation which they see as being counterproductive. The relaxation associated with apathy and lack of focus should, however, not be mistaken for the relaxation associated with the inner calm and focus as a result of meditation. Furthermore, too much stress is associated with lack of focus, poor performance and an increased number of mistakes. Depressed and stressed hospital doctors, for example, make more than six times as many clinical and prescribing errors compared to non-depressed and stressed doctors doing the same job.⁸

It is not stress but awareness (focus) and an appropriate level of arousal which are necessary for peak performance. These are not the same as the agitation or over-arousal associated with stress. Inner calmness is different from apathy. Peak performance is associated with a calm but perceptive mind and a relaxed body.

Mindfulness seems to enhance what are called our *executive functions* which are associated with an area of the brain called the pre-frontal cortex at the front of the brain. Executive functions include short-term memory, processing information, knowing what to pay attention to, making decisions, emotional regulation and prioritizing. Mindfulness training seems to stabilize this area of the brain and help it to function well whereas an overactive stress centre (amygdala) 'highjack's' this area of the brain making functioning effectively difficult if not impossible.

Applications of mindfulness

The list of applications of mindfulness / meditation for healthcare and personal development keep growing year upon year.⁹ The research into preventing relapse in depression has probably caused more interest than any other single application. Some of the benefits of mindfulness-based meditation are listed below and some of these will be described in more detail later.

- Mental health
 - E.g. depression relapse prevention, anxiety, panic disorder, stress, emotional
 - regulation, addiction, sleep
- Neuroscience
 - E.g. structural and functional changes in the brain, generation of new brain cells (neurogenesis) particularly in the memory and executive functioning centres, dementia prevention,

reduced activity in the amygdala

- Clinical
 - E.g. pain management, symptom control, coping with major illnesses like cancer, reduced allostatic load and metabolic benefits, hormonal changes, improved genetic function and repair and possibly slower ageing
- Improved performance
 - E.g. sport, academic, leadership
- Spiritual
 - E.g. deep peace, insight, oneness, transcendence

Academic Performance

We know from experience that when we are distracted, stressed, depressed or anxious we function far less effectively. This is because the regions of the brain that gather and process information are working poorly at such times. It is primarily a problem with attention but we don't have to be stressed to notice that much of the time we are not focused on the things we need to be focused on. For example, sitting in a lecture and the mind is out the door, or studying at the desk and the attention is out the window. Learning mindfulness not only helps us to function better under pressure but also helps us to utilise our time better, to focus, and to foster a growth mindset which is more conducive to learning.

Neuroplasticity

“Neurons that fire together, wire together.”

Hebbs's hypothesis

For better or for worse, how we consistently think and behave will 'wire' itself into the brain. We now understand that the brain is constantly rewiring itself right throughout our lives. From a therapeutic perspective, it also means that we can 'unwire' unhelpful patterns of thought and behaviour and wire in helpful ones. This has significant implications for the development and management of anxiety and depression. Meditation research is literally changing the way we understand the brain. The Mind and Life Institute is a collaboration of top scientists engaged in research in this field¹¹ and the book 'The Brain that Changes Itself' by Norman Doige gives a great overview for those who would like to read further on this topic.

Brain scans measuring the thickness of the 'grey matter' in long-term mindfulness meditators indicates that it is thicker particularly in the areas associated with the senses, memory and executive functioning. This may be slowing down the ageing of the brain and reversing the negative effects of long term stress and depression.^{12 13}

Default mental activity

There are two main modes of brain activity.

1. Active tasks: tasks associated with paying attention
2. Default states: when mind is inattentive, idle, recalling past, daydreaming, ruminating ...

Interestingly, brain regions active in 'default states' in young adults also show the early changes found in the elderly with Alzheimer's Disease (AD).¹⁴ The reason is not known but it may have to do with wear and tear on the brain through too much default activity, or we may be practicing inattention, or perhaps it relates to the stressful effects of going over the past almost constantly. We do know that inattention is not healthy for the brain – it is like physical inactivity for the body.

Having leisure activities where we don't pay attention (principally watching television) also seems to be associated with an unhealthy brain and a lifelong risk of AD. According to one of a number of studies, those who have less than average diversity in leisure activities, spend less time on them, and practice more passive leisure activities (principally TV) were nearly four times as likely to develop dementia over 40-year follow-up compared to those who rate higher than average on these parameters.^{15 16} "Among leisure activities, reading, playing board games, playing musical instruments, and dancing were associated with a reduced risk of dementia."¹⁷

A high level of default mental activity is associated with poorer mental health such as depression and anxiety. In people who are trained in mindfulness meditation however it has been found that the level of default mental activity is reduced. Even when default mental activity is present the areas of the brain involved with self-monitoring are also active, meaning that the person is aware of this mental activity and is able to be more objective about it and not be so drawn into it.¹⁸

Training attention

Attention, like any other skill, can be trained. When we first start formal meditation practice we tend to find that we are on automatic pilot much of the time and are unaware of moment-to-moment experience. Development of attention is gradual, progressive and requires regular practice.¹⁹ Impatience for progress is a distraction and an impediment to progress in itself, so it's best to be patient and gentle on ourselves and allow benefits to come in their own time. The benefits do not come without effort – unhelpful habits on the other hand do not take any effort to reinforce.

Mindfulness is a mental discipline involving training attention. It is not a method of distracting ourselves or tuning out, it is about tuning in – hence people perform better when they are most mindful, sometimes called 'the zone' or a 'flow state'. The anxious, stressed or depressed state of mind is the distracted state, hence the negative impact upon performance. It is not primarily a relaxation exercise although relaxation is a common 'side-effect'.

Mindfulness and depression

Mindfulness-Based Cognitive Therapy (MBCT) was developed by some prominent psychologists from the work of Jon Kabat-Zinn. Mindfulness is more than just having a time out from worry for a few minutes a couple of times a day, it is a way of teaching us to use the mind in a different way and to live more consciously. MBCT more than halves the relapse rate for people who have had depression in the past from 78% to 36%.²⁰

MBCT reduces relapse by changing relationships to negative thoughts and emotions (non-attachment to them) rather than by changing belief in thought content as is the case with conventional cognitive therapy.²¹ In a sense, we don't have to control negative thoughts and emotions, but we don't have to be controlled by them either.

Mindfulness not only reduces depressive symptoms but it also reduces the reactivity of the amygdala which tends to be very overactive in people with depression.²²

In adolescents, mindfulness reduced symptoms of anxiety, depression, and somatic distress, and increased self-esteem and sleep quality.²³

Mindfulness has also been found to enhance doctors' wellbeing, and reduce mood disturbance and burnout (the three hallmarks of burnout being emotional exhaustion, depersonalization and a lack of personal accomplishment). It also increased empathy, responsiveness to their patients, greater conscientiousness and more emotional stability.²⁴

Meditation and ageing

Work by the team led by Australia's Nobel Prize winning researcher, Elizabeth Blackburn, has found that meditation may slow genetic ageing and enhance genetic repair.²⁵ If one considers all of the affects of allostatic load mentioned before, it is probably not surprising that something such as meditation would help to slow and possibly even reverse to some extent the ageing process.

Mindfulness and craving

Meditation can be very helpful in making healthy lifestyle changes. Stopping smoking, for example, is not easy and one has to learn to deal with cravings. The normal way is to suppress them but this comes at a cost as far as our mental health is concerned. A study looked at the effectiveness of suppression compared to mindfulness for coping with cigarette cravings. Both groups reported a significantly reduced amount of smoking and increased effectiveness in coping with smoking urges but only participants in the mindfulness group demonstrated reductions in negative affect (mood) and depressive symptoms.²⁶

Mindfulness and cancer patients

Where cancer patients learn mindfulness in their cancer management they were found to have significantly lower scores for low mood, depression, anxiety, anger, and confusion but they also had more vigour with fewer overall physical and stress symptoms.²⁷ Mindfulness has also been shown to reduce cortisol levels in cancer patients – a sign of a poor prognosis – and improve quality of life.²⁸

Meditation and compassion

The ability to feel compassion and empathy are increased by mindfulness as well as reducing 'carer- fatigue' or 'carer burnout'.²⁹ This really should make sense when one considers that paying more attention to who is in front of us will help us to be in touch with them and what is going on for them. Compassion may be a natural side-effect of attention and a lack of compassion a side-effect of inattention.

Chronic pain

Mindfulness meditation has been found to be associated with a significant reduction in pain, fatigue, and sleeplessness, but improved functioning, mood and general health for people with chronic pain syndromes.^{30 31 32}

Mindfulness and eating disorders

Mindfulness looks to be a promising approach for helping in the management of binge-eating disorders. It possibly does this by increasing awareness of the behaviour and physical cues, helping to deal with

self-criticism and negative self-image and assisting with managing eating impulses and difficult emotions.³³

Meditation and sleep

Although meditation is about cultivating restful awareness it can help to significantly improve sleep – i.e. better sleep quality, being able to go to sleep more easily, a longer sleep duration and less use of sleep medications³⁴ which may be responsible for also reducing depression in those with chronic insomnia.³⁵

Meditation and immunity

Among cancer patients, the significant improvements seen in overall quality of life, symptoms of stress, and sleep quality are associated with improvements in immunity with lower levels of the inflammatory hormones which can accelerate cancer growth.³⁶ People also show better immune response to vaccinations and increases in antibodies.³⁷

Meditation and control

Feeling out of control is one of the most unpleasant aspects of having a major illness. We cannot always control the things happening to us, but we can have more control of ourselves in choosing our response to these events and our attitude to them. Put another way, it helps us to have a more adaptive and less avoidant coping style.^{38 39}

Cultivating mindfulness

No sooner do we start formally practicing mindfulness meditation than we may discover that we have been largely unaware of the nature, extent and effect of mental activity in our minds. It tends to make itself obvious when we try to concentrate but notice that unconsciously our attention is almost constantly being taken away. This distracted or unmindful state of mind has a number of effects particularly on performance and enjoyment.

1. Wasting time through lack of focus
2. Inefficiency and increased errors
3. Poor communication
4. Lack of engagement and enjoyment of life
5. Misreading what is taking place around us

But what is the mind up to when we are not paying attention? Whether we call it worry or rumination or daydreaming, much of this

incessant 'thinking' is behind many of our anxieties, negativity, anger and fears and unless we become aware of its presence and effect we have no choice about whether to engage in it or not. To be free of it we must first be aware of it, detached from it, consciously examine it and let go of what is irrelevant. To be free of it we must first be aware of it, detached from it, consciously examine it and let go of what is irrelevant.

Mindfulness is more than learning to pay attention – it also implies cultivating an attitude of openness, interest and acceptance. One trick is that when we fight with the thoughts and feelings we would rather not be having we actually feed them with more attention and increase the impact that they have. So learning to notice them and be non-reactive and non-judgmental of them is an important aspect of learning to be free of them.

Most meditative techniques rely on the attention being focussed restfully; hence the term 'restful alertness.' In order to do this one need not struggle with the distracting stream of circular, habitual, repetitive and imaginary mental activity. One cannot 'stop the mind from thinking' and any attempt to do so generally leads to heightened tension and frustration. We can, however, learn not to be so reactive to it. This takes the emotive force out of it. Analogously, many trains of thought come into our minds but we can learn not to be moved by them not by trying to stop them or fight with them, but by learning that we don't need to get on board any old train of thought that comes into our minds. That takes a lot of awareness.

What we give our attention to is important because we give the power to whatever the attention is directed to. In giving attention to fearful, anxious, angry or depressing thoughts we almost 'meditate' upon them progressively making them more 'real' and compelling. When we take such imaginings and mental projections to be real they govern our lives, behaviour and responses to events and, over time, they can change the brain's chemistry, set up a cascade of events throughout the body, and accelerate illness. Obviously one cannot 'meditate our problems away'. Mindfulness is therefore not a method of tuning out but rather tuning in. It is not a method of distraction but rather a method of engagement. It is the stressed, anxious, angry and depressed state of mind that is the distracted state – mindfulness is the remedy.

Therefore, if we are interested in results then we should first be interested in paying attention. If we are interested in the best results then we should also practice being so present with the process that we cease to be anxious about the outcome.

This is the zone and it is when we are most happy, effective and mindful.

Formal mindfulness practice

A day is just like a book. If it isn't punctuated it becomes a blur and makes little sense. These 'punctuation marks' are times of consciously coming to rest so that we can remind ourselves to be present and pay attention. For this reason the two following practices are suggested. The 'full stop' could be practiced anything from 5 to 30 minutes twice a day depending on motivation and opportunity, and the 'comma' for 15 seconds to 2 minutes as often as you remember throughout the day. The comma is particularly useful between having completed one activity and beginning another.

Conclusion

In summary, what meditation can teach us may have tremendously useful effects on our physical and psychological wellbeing because it:

1. Improves how effectively we function
2. Has direct benefits by changing the body physiologically and metabolically
3. Has indirect benefits by improving our lifestyle
4. Enhances relationships and compassion
5. Improves the way we cope with life challenges
6. Enriches our enjoyment of life

Further reading

- Full Catastrophe Living: Kabat-Zinn
- Meditation, Pure and Simple: Gawler
- Mindfulness-Based CBT: Segal et al
- Know Thyself: Hassed
- The Essence of Health: Hassed
- The Mindful Way Through Depression: Williams et al
- The Mindful Brain: Siegal
- The Brain that Changes Itself: Doige
- PubMed: A database which you can use to search for studies and medical research. <http://www.ncbi.nlm.nih.gov/pubmed/>

Exercise 1 - "The full stop"

Sit the body in a chair so that the spine is upright and balanced but relaxed. Have the body symmetrical and allow the eyes to gently close.

Now, move the attention gently through each step. Be conscious of the body and its connection with the chair. Feel the feet on the floor. Notice if the feet are tense. If so allow them to relax if they want to. Similarly, be aware of the legs and allow them to relax if they wish, and so gently move up through each part of the body: the stomach, hands, arms, shoulders, neck and face. If tension or discomfort remains, just notice the presence of tension or discomfort without judgment.

Now take in a deep breath and slowly and gently let the breath out. Repeat this twice more then just allow the breathing to settle into its own natural rhythm without having to control it in any way. If you observe a tendency to try and control the breath, just impartially notice that. Simply be conscious of the breath as the air flows in and out of the nose. If thoughts come to your awareness allow them to come and go without judgment and let the attention return to the breathing. There is no need to struggle with the activity of the mind, nor even wish that it wasn't there. Like 'trains of thought', just let them come and go.

After a time, let the attention move to the listening. Hear whatever sounds there are to hear without having to analyse the sounds. Once again, if thoughts come let them pass. If the mind becomes distracted, for example by listening to some mental commentary or chatter, simply notice and return to the sounds as a gentle way of returning to the present moment.

At the end of this exercise simply be aware of the body again and then slowly allow the eyes to open. After a few moments quietly move into whatever activities await you.

Exercise 2 - "The comma"

This exercise can take anywhere from a few seconds to a couple of minutes. It is a short punctuation in a busy day between finishing one activity and starting another, for example before starting the car, beginning a meal, before an interview, or between patients. It helps to "clean the slate" making us fresher for the next activity.

The steps and principles are the same as above but just much shorter. Be aware of the body and allow the posture to be balanced and relaxed but upright. Let the body relax generally by taking one or two deep breaths and breathing the tension out. Then let the breath settle and allow the attention to rest with it. Then be aware of the environment and the sounds in it as they come and go. Do not prolong the comma past what is appropriate for that moment, then move quietly into whatever awaits you.

If you are in a busy office and it would be conspicuous to close your eyes just keep them open but rest them on a point as you practice.

References

- ¹ William James, Principles of Psychology, 1890.
- ² Killingsworth MA, Gilbert DT. Science 12 November 2010: Vol. 330, no. 6006, p. 932 DOI: 10.1126/science.1192439
- ³ McEvoy SP, Stevenson MR, Woodward M. Accid Anal Prev. 2007 Nov;39(6):1170-6.
- ⁴ Manfredini R, et al. American Journal of Medicine 2001;111(5):401-3.
- ⁵ McEwen BS. Ann N Y Acad Sci. 2004;1032:1-7.
- ⁶ Wilson RS, et al. Neurology. 2003;61(11):1479-85.
- ⁷ Pedersen WA, Wan R, Mattson MP. Mechanisms of Ageing & Development 2001;122(9):963-83.
- ⁸ Fahrenkopf AM, Sectish TC, Barger LK, et al. BMJ. doi:10.1136/bmj.39469.763218.BE
- ⁹ Grossman P. J Psychosomatic Research. 2004;57(1):35-43
- ¹⁰ Pawlak R, Margarinos AM, Melchor J et al. Nature Neuroscience 2003;6(2):168-74.
- ¹¹ <http://www.mindandlife.org/>
- ¹² Lazar SW, Kerr CE, Wasserman RH, et al. Neuroreport. 2005;16(17):1893-1897.
- ¹³ Luders E, Toga AW, Lepore N, Gaser C. Neuroimage. 2009 Apr 15;45(3):672-8.
- ¹⁴ Buckner RL, et al. J Neurosci. 2005;25(34):7709-17.
- ¹⁵ Friedland RP et al. Proc Nat Acad Sci USA. 10.1073/pnas.061002998
- ¹⁶ Scarmeas N et al. Neurology 2001;57(12):2236-42.
- ¹⁷ Verghese J et al. N Engl J Med. 2003;348(25):2508-16.
- ¹⁸ Brewer JA, Worhunsky PD, Gray JR, et al. Proc Natl Acad Sci U S A. 2011 Dec 13;108(50):20254-9.
- ¹⁹ Grossman P et al. J Psychosomatic Research 2004;57:35-43.
- ²⁰ Ma SH, Teasdale JD. J Consult Clin Psychol. 2004;72(1):31-40.
- ²¹ Teasdale JD, et al. J Consult Clin Psychol. 2002;70(2):275-87.
- ²² Way BM, Creswell JD, Eisenberger NI, Lieberman MD. Emotion. Vol 10(1), Feb 2010, 12-24.
- ²³ Biegel et al. Journal of consulting and clinical psychology (2009) vol. 77 (5) pp. 855-66. <http://dx.doi.org/10.1037/a0016241>
- ²⁴ Krasner MS, Epstein RM, Beckman H, et al. JAMA. 2009 Sep 23;302(12):1338-40.
- ²⁵ Epel E, Daubenmier J, Moskowitz JT, Folkman S, Blackburn E. Ann N Y Acad Sci. 2009 Aug;1172:34-53.
- ²⁶ Rogojanski J, Vettese LC, Antony MM. Mindfulness 2011;2(1):14-26. DOI: 10.1007/s12671-010-0038-x
- ²⁷ Specia M, et al. Psychosom Med. 2000;62(5):613-22.
- ²⁸ Carlson LE, Specia M, Patel KD, Goodey E. Psychoneuroendocrinology. 2004;29(4):448-74.
- ²⁹ Lutz A, et al. PLoS ONE. 2008 Mar 26;3(3):e1897.
- ³⁰ Kabat-Zinn J et al. J Behav Med. 1985;8(2):163-90.
- ³¹ Singh BB, et al. Altern Ther Health Med. 1998;4(2):67-70.
- ³² Astin JA, et al. J Rheumatol. 2003;30(10):2257-62.
- ³³ Kristeller J, Hallett C. J Health Psychol 1999;4:357-63.
- ³⁴ Cohen L, et al. Cancer. 2004;100(10):2253-60.
- ³⁵ Britton WB, Haynes PL, Fridel KW, Bootzin RR. Psychosom Med. 2010 Jul;72(6):539-48.
- ³⁶ Carlson LE, Specia M, Patel KD, Goodey E. Psychosomatic Medicine. 2003;65(4):571-81.
- ³⁷ Davidson RJ Psychosom Med. 2003;65(4):564-70.
- ³⁸ Tacon AM, Et al. Family & Comm Health. 2003;26(1):25-33.
- ³⁹ Astin JA. Psychother Psychosom. 1997;66(2):97-106.

Dr Craig Hassed MBBS, FRACGP
Senior Lecturer
Monash University
Department of General Practice
Email: craig.hassed@monash.edu