The Effect of a 'Mental Stillness' Meditation Intervention on the Mental Health Risk of Primary School Aged Children

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A thesis submitted in fulfilment of the requirements for the degree of

Masters Degree

Sydney Medical School,

The University of Sydney

April 2016

Declaration of Original Authorship

I Kabir Sattarshetty declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research. I confirm that this work was done wholly while in candidature for a research degree at the University of Sydney. Where I have consulted the published work of others it is clearly attributed and where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work. I have acknowledged all main sources of help and where the thesis is based on work done by myself or jointly with others, I have made clear exactly what was done by others and what I have contributed myself. None of this work has been published before submission.

Abstract

This thesis describes a field study utilising a 3-arm, control design to compare the effect of 2 different delivery models of “mental stillness” meditation (video vs face-to-face) with a no-intervention control on mental health risk of 132 primary school students from prep and first grade. The intervention period was 3 academic school terms (30 weeks). We assessed emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour, using the Strengths and Difficulties Questionnaire at baseline and post-intervention. Statistical analysis of the data demonstrated that the improvement of the video group was significantly greater than the improvement in the face-to-face group. Further, the improvement of the face-to-face group was significantly greater than the small improvement observed in the control group. We conclude: first, that mental stillness meditation can improve the mental health risk of primary school students. Second, the strategy is easily implemented in a real world, school context. Third, and most importantly, the low cost video-guided meditation delivery strategy is both feasible and possibly more effective than the more traditional face-to-face instruction method.

We systematically collected feedback from 2,000 professionals who work with children, and had the video resource demonstrated to them. Analysis of this data demonstrates strongly positive perceptions about the suitability of the resource as a primary preventative mental health strategy that can be implemented in the school environment.

Acknowledgments

The author wishes to express sincere gratitude to the one who put me here when I could not have imagined embarking on this academic endeavour. You are forever in my heart and I hope that I can live up to what you envision for me. To my wife, I know it's been a long road but we got there in the end – I can never thank you enough for all you do.

My sincere gratitude to Dr Ramesh Manocha for his mentorship, support, advice, guidance and friendship – without a doubt I could not have done this without you. Also thank you Eyal Karin for your invaluable advice and guidance on biostatistical matters. My humble thanks to Toorak Primary School, the students and staff for their wonderful support and enthusiasm. And lastly my heartfelt gratitude to the Sahaja yoga meditation instructors who volunteered their time. Their commitment to sharing the benefits of meditation freely is truly exemplary.

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Introduction

The present state of youth and children's mental health

Young people appear to be suffering mental health problems at an earlier age than before, at higher rates than older age groups, and retaining their increased risk into older age. The scientific observations on the state of youth mental health are reflected in the perceptions of parents and the public who feel that something is not quite right with our children. One Australian survey found parents felt childhood was 'increasingly less safe, stable and predictable' (Tucci, Mitchell & Goddard, 2005). Another survey found that around 60% of the Australian adult population felt that the youth of today were worse off in their physical and mental health with only 10% of respondents believing that they were better off than previous generations (Auspoll, 2009).

The evidence concerning the decline of youth mental health over the past few decades in the developing world has led many researchers in the field to believe that youth of today face unique, significant and historically unprecedented challenges to their wellbeing. Some of the key evidence is described in the next several paragraphs.

The Australian national health survey of mental health and wellbeing reported that at least 14% of adolescents younger than 18 years and 27% of adolescents 18–24 years had behavioural features consistent with a mental or substance use disorder (Sawyer, Baghurst, Clark, Graetz & Kosky, 2001).

Half of all mental illness begins before the age of 14 and up to 75% of those suffering a mental health disorder had an age of onset younger than 24 years (Rutter, Kim-Cohen & Maughan, 2006). Significantly, disorders likely to persist into adulthood, such as depression, anxiety, and eating and personality disorders, have a narrow age of onset, in the 12–24 age range (Patel, Flisher, Hetrick & McGorry, 2007).

A 2011 survey of 45,916 young Australians 15–21-years-old found the top 3 issues of concern were *school or study problems*, *coping with stress*, and *body image*. (Mission Australia,2011). The most recent survey by Mission Australia found that coping with stress is now the top concern of young people (Mission Australia, 2015).

A large Australian survey of 10,000 students examined the social and emotional characteristics of a non-randomly selected, Australia-wide, cross-sectional sample. It found that 40% of students, from prep school to year 12 displayed lower levels of social and emotional wellbeing (Bernard, Stephanou & Urbach, 2007). Approximately 48% found it

difficult to calm down when they were upset, 42% worried too much, 35% frequently lost their temper, 32% found it difficult to control how depressed they got, 31% were very stressed and 20% had recently stopped their regular activities due to feeling hopeless and depressed for a week. And lastly 18% of respondents were lonely. Most interestingly the data demonstrated a dichotomy between the problems students had and their self-reported resilience, positive social orientation and positive work orientation. Additionally a worrying inverse trend was observed where wellbeing tended to increase in primary school but decrease in high school.

In fact there is an emerging body of evidence that suggests a decline of youth mental health over several generations. Collishaw, Maughan, Natarajan, and Pickles (2010) compared 2 nationally representative cohorts of 16–17 year olds living in England twenty years apart. Using the same measures they found twice as many young people reported frequent feelings of depression and anxiety in 2006 compared to 1986. There were also increases in emotional problems especially among girls. These trends were significant despite controlling for parental divorce or separation, social disadvantage and ethnicity. Houtrow, Larson, Olson, Newacheck, & Halfon, (2014) examined trends of childhood disability in American children (younger than 18 years) over the past decade in a large nationally representative sample using National Health Interview Survey Data (NHIS) collected between 2001 and 2011. They assessed changes in severity, prevalence and composition of disability in relation to demographic and socioeconomic factors and found a nearly 21% increase in disabilities related to neurodevelopmental or mental health conditions. Unexpectedly they found a rise in purported prevalence is disproportionately occurring among socially advantaged families, the first time such a rise has occurred in this demographic since the NHIS started tracking childhood disability in 1957! In fact disability rates among children in households at >400% of the poverty level rose 28% over the decade, more than twice the rate of growth seen for children in households living below the poverty line. Drawing on data from various national surveys, Halfon, Houtrow, Larson, & Newacheck, (2012), find that childhood disability is increasing and that emotional, behavioral, and neurological disabilities are now more prevalent than physical impairments.

What can explain these trends and patterns? In a well-known study, Twenge and her colleagues analysed data from the Minnesota Multiphasic Personality Inventory (MMPI) and compared the results of college students from 1938 to 2007 and high school students from between 1951 and 2002 (Twenge et al., 2010). They found a steady rise and significantly more symptoms of psychopathology over the generations. The data suggested these changes

coincided with shifts in modern culture that placed increasingly greater importance on extrinsic goals such as material wealth, and less importance on intrinsic goals. In addition the psychopathology was relatively independent from economic cycles. They found 85% of the recent college students scored above the 1930s–1940s average on measures of psychopathology with 5 times as many college students now having high scores indicating psychological problems. Additionally they demonstrated higher levels of narcissism, self-centeredness, antisocial traits, moodiness, restlessness, dissatisfaction and instability; unrealistically positive self-appraisal, overactivity and low self-control, feeling isolated and misunderstood and sensitivity and sentimentality.

Twenge et al. in 2010, tested and rejected economic factors, and found the evidence strongest in favour of a cultural explanation. Namely, the shift in importance from intrinsic goals, that is from goals that focus on one's development as a person, their sense of self-worth, moral codes and collective purpose, to extrinsic goals such as material wealth, looks and status. Research tends to confirm this view suggesting intrinsic goals have decreased and extrinsic goals have increased. Putnam in 2001, found involvement in community groups significantly declined after the 1960s despite a surge between the 1930s to 1960. Surveys of high school and college students in the US found an increase in materialistic values since the 1970s with more students agreeing that 'having a lot of money' and being 'well off financially' was important. Conversely fewer college students agreed that it was important to 'develop a meaningful philosophy of life' (Pryor, Hurtado, Saenz, Santos & Korn, 2007). Narcissism has also increased as has expectations for jobs and education attainment (Reynolds, Stewart, MacDonald & Sischo, 2006; Twenge & Campbell, 2010). It has been argued that the emphasis on extrinsic goals and the growing disparity between expectations and reality are contributing to the rise of psychopathologic symptoms (Eckersley & Dear, 2002).

Young Australians reflect the cultural trends described by Twenge; for example, they are increasingly worried about the way they look (Mission Australia, 2015).

The rising prescription of anti-depressants and anti-psychotic medications for children and young people is perhaps another worrying indication of our over-reliance on medication for the mental wellbeing of our young people and the urgent need for effective preventative mental health interventions (Olfson, Druss & Marcus, 2015; Rutter et al., 2006). An Australian national survey in 2007 found that less than one in four 16–24 year olds diagnosed with a mental health disorder accessed health services in the previous year (Slade, Johnston, Oakley Browne, Andrews, & Whiteford, 2009). The present challenge is in engaging young people in effective mental health interventions. Though there are promising

mental health interventions presently available there remains reluctance among young people, especially young males, to seek professional help for mental illness (Gore et al., 2011). Reasons for this were explored in a recent systematic review by Sawyer et al. It identified inadequate knowledge regarding mental health, embarrassment and stigma as the primary obstacles preventing young people from seeking assistance for mental distress (Sawyer, Arney, Baghurst, Clark & Graetz, 2001).

The need for low-cost universal primary prevention strategies

In recent decades nationally and globally coordinated efforts in preventative strategies to reduce mortality, particularly in the areas of cardio-vascular disease and cancer mortality have significantly improved health outcomes. It has become almost received wisdom that prevention is not only better than cure but cheaper and more effective in the long term.

However this assumption has not been carried through when tackling our mental health. On the whole the primary focus has been on addressing mental illness, this is reflected in research funding which is considerably lower in the areas of prevention of common mental disorders compared to treatment, epidemiology and neurobiology. To compound the problem research funding in prevention is decreasing while the costs of mental illness are increasing (Kazdin & Rabbitt, 2013).

The expenditure on mental health services is significant and the increasing financial costs of these services in both developed and developing countries are well recognised (Eaton et al., 2011; Chan, 2010). Australia spent over $7.2 billion during 2011–12 on mental health related services, an increase of $322 per person from $282 per person in 2007–8 (AIHW, 2013). In the United States alone substance use disorders affect over 20 million Americans and cost approximately $500 billion annually (Horgan, Skwara, Strickler, & Andersen, 2004; Jason, Ferrari, & Davis, 2014). Its neighbour Canada has estimated the potential for a 6-fold increase in economic costs associated with mental illness over the next 30 years (Doran, 2013; Smetanin, Stiff, Briante, Adair, Ahmad & Khan, 2011). A comprehensive literature review of 45 studies examined the evidence for the cost and impact on the economy and productivity due to mental ill health (Doran, 2013). Across studies it found that mental disorder reduces the likelihood of completing school, getting a full-time job, working in a highly paid professional career and quality of life. In fact Australian individuals with a mental health condition were found to have unemployment rates up to 4 times higher than healthy people, ‘tended to use more medical resources, are reluctant or unable to join the labour force and, will predominantly rely on social welfare” (Doran, 2013, p. 8).

Patrick McGorry, 2010 Australian of the year and high-profile campaigner for youth mental health summarised this succinctly:

> This late intervention philosophy is associated with risk, preventable damage and stigma and for this reason access to appropriate, staged mental health care for young Australians with mild, moderate and serious mental ill-health is overwhelmingly supported by political parties and the health and social sectors. (Sweet, 2010)

Doran, on review of the evidence concluded:

> There is substantial economic gain to be made from optimising the prevention and treatment of mental ill health across the population. Various experts in the field recommend a plethora of strategies ranging from policies and interventions promoting prevention and early intervention to educational support for young people with psychiatric illness. (Doran, 2013, p. 27)

The focus on research funding for the treatment of illness has obvious commercial benefits but is not reflective of the mental health sector who agree that promotion and prevention are high priorities. (Kazdin & Rabbitt, 2013)

Jacka et al. (2013) examined multiple reviews on prevention strategies of common mental disorders and found the evidence supported the contention that preventing mental disorders across the lifespan can be both effective and cost effective.

Although there is a need for further research to identify and study the diversity of potentially modifiable risk factors such as substance use, biogenic factors, school environment, substance use, et cetera there is arguably a greater need to develop effective prevention strategies that can be delivered at a population level.

An additional reason why prevention is particularly important for mental health is the limited effectiveness of some drug treatments such as antidepressants whose benefits may well be overstated, narrow in the short term and understudied in their long-term benefits and harms (Ioannidis, 2008). What's more, the effects of psychotropic medications on childhood mental disorders are poorly studied with relatively few randomised control trials conducted (Weisz & Jensen, 1999). In fact Hoagwood and her colleagues in their examination of evidence-based practices in childhood and adolescent mental health services found choice of medication treatment was often simply based on the preference and experience of the individual practitioner or on standards of care for adults (Hoagwood, Burns, Kiser, Ringeisen & Schoenwald, 2001). This is worrying considering the increasing rates of prescription of psychotropic medications for children, even for preschoolers (Zito, Safer, Gardner, Boles & Lynch, 2000).

The early onset of mental health disorders and the limitations of drug therapy as treatment all indicate the need for low cost primary health preventions, especially considering its cost effectiveness. Where children obtain mental health services and how many of those in need of these services receive them are questions first asked by researchers in the late 1980's (Kutash, Duchnowski & Lynn, 2006; Hoagwood et al., 2001). Landmark studies such as the Great Smoky Mountains study (Costello et al., 1996a) and the studies of methods for the epidemiology of children and adolescents (Shaffer et al., 1996; Lahey et al., 1996) found that 4% to 8% of children between the ages of 9 and 17 years had severe psychiatric disorders. Costello and his colleagues (2005) in a later 10-year research update review found approximately 1 in 8 (12.5%) children manifesting a psychiatric disorder serious enough to cause significant functional impairment. Equally worrying is the failure to deliver mental health services to the majority of children with serious mental health needs, only 20% to 25% receive mental health services (Burns et al., 1995; National Institute of Mental Health, 2001). To compound the problem, evidence suggests that children who have serious presenting problems, and vulnerable children such as those living in poverty, from minority groups and those with single mothers, are less likely to stay in treatment beyond the first session and more likely to discontinue treatment prematurely (Kazdin, 1990). In fact various American studies have found between 40% to 60% of children receiving outpatient mental health services attend only a few sessions and drop out quickly (Andrade, Lambert & Bickman, 2000; Burns et al., 1995; DeBar, Clarke, O'Connor & Nichols, 2001;Goldston et al., 2003; Kazdin & Mazurick, 1994; Lavigne et al., 1998). In one study by McKay, Lynn and Bannon (2005) only 9% of children remained in treatment in urban inner-city clinics at the end of 12 weeks.

Schools

The school environment certainly has the most wide reaching ability to propagate and implement preventative mental health initiatives at a population level. The education sector is the most common point of entry into mental health services for youths (Farmer, Burns, Phillips, Angold, & Costello, 2003). It is estimated 70% to 80% of children who receive mental health services receive them at school and for a sizable number of children the school system is their only provider of mental health treatment (Burns et al., 1995; Costello et al., 1996b).

Beyond clinic walls school provides a captive population, eliminating the problems of retention suffered in the outpatient mental health settings. Schools are an essential environment in which to improve both engagement and access to mental health services (Bierman et al., 2010). In fact there is evidence that attendance and retention in out of school

mental health services is vastly improved when school-based mental health services are delivered concurrently with clinic services (Atkins et al., 2006; Bierman et al., 2010). Atkins et al. (2006) implemented the Positive Attitudes toward Learning in Schools program (PALS), a school-based and family-directed mental health service for children. They compared families that agreed to enrol versus families engaging in traditional clinic services. At 3 months, 100% of PALS families remained enrolled in the program, while 0% of control families continued to receive clinic-based services.

Preventative measures at school can be standardised and will target the population at ages when they are most vulnerable to mental illness that will persist into later life (Weare & Nind, 2011; Neil & Christensen, 2009). There is also evidence that interventions integrated in classroom settings are especially effective. Rones and Hoagwood (2000), reviewed 47 random controlled trials (RCTs) of school-based mental health services and found mental health strategies integrated into the classroom curricula were associated with more positive outcomes and were more effective than separate specialised lessons outside of school.

Jacka et al. (2013) in their analysis of prevention of common mental disorders described the particular importance of involving primary school aged children:

> There is also the imperative to ensure the matching of interventions to the most critical and plastic periods of development. Given the relatively small focus on preventions aimed at the perinatal and early childhood years, there is a need for further research on children under 8 years old, both in terms of risk factors and interventions to address these. (p. 925)

School-based interventions strategies indicate evidence for the prevention of anxiety, depression, stress, conduct problems and substance use in children and adolescents (Neil and Christensen, 2009; Rones & Hoagwood, 2000). Weare and Nind (2011) looked at all available systematic reviews and meta-analysis of mental health interventions in schools, including a large number of studies that had been trialled across the globe, and found support for the effectiveness of both universal and targeted interventions. They found a cumulative impact of small to moderate effect, particularly in the short term, and a greater impact on higher-risk children. Like Jacka and her colleagues (2013) they also found far fewer studies on preschool aged children than adolescents. The bulk of preventative mental health strategies on primary school children focus on preventing disruptive behaviours. Among high school youth interventions for mood disorders are most common (Rones & Hoagwood, 2000)

Taken together there is consistent evidence of the positive impact of mental health promotion and prevention programmes in schools on the mental health and associated risk factors in

children and adolescents. (Jacka et al., 2013; Weare & Nind, 2011; Neil & Christensen, 2009; Rones & Hoagwood, 2000).

In summary, to truly address mental health in children and adolescents evidence-based school mental health programs are essential. Yet the majority of programs being used have no evidence of impact (Rones & Hoagwood, 2000). There is a growing number of children with unmet mental health needs and schools remain the first port of call, have the widest reach, and enhance and complement out-of-school mental health services. It can be argued that evidence-based school mental health programs are most needed in the primary school setting, since it is widely agreed that children in that age group are developing their mental health resilience skills (Stewart, Sun, Patterson, Lemerle & Hardie, 2004), and yet there are considerably fewer studies on strategies in this age group compared to high-school aged children.

To understand how schools are being used to deliver mental health strategies it is worth examining an Australian example.

KidsMatter – a national government initiative to address children's mental health

Responding to a growing concern about children's mental health in Australia and abroad the Australian Government funded, supported and promoted a national mental health and wellbeing initiative called KidsMatter. It is now the Australian Government's premier national mental health and wellbeing initiative developed specifically for primary school students.

In collaboration with the Commonwealth Government Department of Health, *beyondblue*, the Australian Psychological Society, Principals Australia Institute (the then Australian Principals Associations Professional Development Council) and supported by the Australian Rotary Health Research Fund, KidsMatter Primary began pilot studies in 100 schools across Australia between 2006 and 2008. Almost 5000 children were involved. In 2009 Flinders University evaluated this trial and demonstrated that KidsMatter had a positive impact on the children, their parents and carers and on the school and its staff. A subsequent study found that KidsMatter schools had improved NAPLAN results.

KidsMatter focuses on 4 components to effect school-wide change. The evaluation found evidence of improvement in each component although not all improved to the same extent.

The Limitations of KidsMatter

KidsMatter is a comprehensive program developed to effect the target areas identified in the literature that are most impactful on childhood mental health. Its well-rounded and culturally penetrative school-wide approach is both its strength and its weakness. A KidsMatter program takes between 18 months and 3 years to fully implement. Fundamentally it involves a cultural change that requires consistent engagement, interest and leadership from the principle, staff, parents and students. The simple fact is that many schools may be daunted by the challenge or perceived challenge of implementing such a comprehensive long-term program. According to the KidsMatter website as of 23 March 2016, 668 primary schools in NSW are engaged in its program. However there are 3136 primary schools in NSW (http://www.australianschoolsdirectory.com.au/sydney-schools.php). This means that approximately 80% of schools in NSW, Australia's most populous state, are either involved in alternative mental health initiatives or have no mental health program. Evidence-based, convenient, expedient, simple and easily implemented mental health strategies are desperately needed as essential additions to the mental health arsenal. I will explain below why I feel that meditation, and particularly the mental stillness video, is a mental health initiative that fills this important gap.

Meditation and mental health

In our search for novel strategies within the preventive paradigm in psychiatry, it is useful to look at social trends and popular ideas. If they can be harnessed for the benefit of public health, they can be potent strategies for promoting mental wellbeing and preventing mental disorders. The growing popularity of meditation is a phenomenon in popular culture that exemplifies this concept and that we believe is worthy of closer examination.

Meditation has been practiced for thousands of years. While it has its cultural origins in ancient India, the practice has spread throughout the orient and is now well accepted in Western countries both amongst consumers and health professionals.

An Australian study has revealed that 1.5 million adults had practised meditation in the past 12 months, with approximately 33% of Australians reporting praying or meditating at least weekly (Kaldor, Bellamy & Powell, 1999). In 2007 more than 20 million adults and 725,000 children in the United States had used meditation in the past 12 months (Barnes, Bloom & Nahin, 2008; Barnes, Powell-Griner, McFann & Nahin, 2004). Consumers are not alone in their enthusiasm for meditation—a 2011 survey of 23,000 US households found that 6.3 million Americans are being referred by doctors to practice activities like meditation (Nerurkar, Yeh, Davis, Birdee & Phillips, 2011). Indeed, a survey of Australian family

physicians reported that almost 80% had recommended meditation to patients at some time in the course of their practice (Pirotta, Cohen, Kotsirilos & Farish, 2000).

Surveys conducted by the US National Centre for Complementary and Alternative Medicine have shown that meditation is increasing in popularity. It was used by 7.6% of the US population in 2002, and by 8% (or roughly 18 million) US adults in 2012 (Clarke, Black, Stussman, Black, Clarke, Barnes, Stussman & Nahin, , 2015). The use of meditation in US children has also risen from an estimated 725,000 in 2007 to about 927,000 in 2012 (Clarke et al., 2015).

Meditation as a potential public health strategy offers some uniquely advantageous features:

- it can be easily taught
- it does not require drugs or technology to deliver its effect and therefore can be utilised regularly at relatively minimal or even zero cost
- it is rapidly growing in popularity
- meditation skills can be taught and transmitted by mass media, social media and other communication pathways that do not necessarily require face–to-face contact with health professionals
- meditation may be incorporated into larger lifestyle improvement programmes that can be implemented at the population level
- practitioners indicate that they enjoy meditation, hence unlike drug therapy, the practice of meditation can be self-motivating.

We will now examine some of the emerging ideas and evidence that indicate why meditative strategies might be useful in the prevention of the common mental disorders and their precursors.

Can meditation be useful?

Mindfulness is a specific approach to meditation with rapidly growing popularity amongst health professionals. Mindfulness practices are easily accommodated within a range of modern psycho-therapeutic approaches, and some new approaches, such as mindfulness based cognitive therapy (MBCT), use mindfulness as a central platform for treatment (Kuyken et al., 2010). MBCT is now recommended in the UK's National Institute for Health and Care Excellence (NICE) guidelines for the management of recurrent depression (NICE,

2009). A recent review of mindfulness-based interventions also suggests that their relevance might extend well beyond the treatment of depression, to include: (a) the enhancement of mental wellbeing and thus the primary prevention of mental health disorders, and (b) applications for the treatment and secondary prevention of mental health disorders (Fjorback, Arendt, Oernbol, Fink & Walach, 2011). However, it is unclear which components of mindfulness based treatments are responsible for their beneficial effects. A small randomised control trial comparing Mindfulness-Based Cognitive Therapy (MBCT) and Cognitive Behaviour Therapy (CBT) as treatments for non-melancholic depression found no significant differences in depression or anxiety between the two treatment conditions at 6- and 12-month follow-ups (Manicavasgar, Parker, & Perich, 2011). Moreover, while there are many clinical trials of MBCT, good quality random controlled trials (RCTs) of mindfulness meditation alone are scarce (Greenberg & Harris, 2012; Black, Milam & Sussman., 2009, Fjorbacket al., 2011).

A recent RCT compared MBCT with standard antidepressant treatment in individuals with histories of recurrent depression to determine which was superior in preventing a depressive relapse or recurrence over 24 months. It was the largest trial of any mindfulness based approach to date and found both groups equally effective at preventing relapse. Of 212 participants, 94 (44%) relapsed in the MBCT group compared to 100 out of 212 (47%) in the maintenance antidepressant group. However secondary measures of quality of life and cost effectiveness where found to be poorer in the MBCT group (Kuyken, Hayes, Barrett, Byng, Dalgleish, Kessler & Causley, 2015).

There are a few studies of the effects of mindfulness on adolescents (Thompson & Gauntlett-Gilbert, 2008) but even fewer on primary school aged children (Black, Milam & Sussman, 2009 Burke, 2010; Zenner, Herrnleben-Kurz & Walach, 2014).

Mindfulness is only one conceptual framework by which meditation might be defined and operationalised. There are other forms of meditation yielding promise. A survey of 343 long-term Australian meditators (Manocha, Black & Wilson, 2012), using a non-commercial, 'mental silence' approach to meditation, assessed long-term meditators (defined as those practicing meditation 'regularly' for more than 2 years) using the 36 – Item Short Term Survey (SF36) (McHorney, Ware & Raczek, 1993). It found that meditators had significantly better functional health scores compared to the general population, with the most prominent difference observed in scores on the mental health subscale (Manocha et al. 2012). Meditation in this study was specifically defined as the 'experience of mental silence' and there was a significant correlation between the self-reported frequency of 'experience of

mental silence' and mental health score, providing an important empirical clue in the search for an evidence-based definition of meditation.

In another RCT, the same mental silence orientated approach to meditation was compared to a standardised stress management programme in the adjunctive management of moderate–severe asthma. This study reported a positive impact on both mood and airway hyper-responsiveness, suggesting a physiological impact on inflammatory processes specific to the meditation intervention (Manocha, Marks, Kenchington, Peters & Salome, 2002). Chronic inflammation has been also been implicated as an aetiological factor in depression (Raison, Capuron & Miller, 2006). In a subsequent RCT in 178 full-time workers, the utility of the same mental silence definition of meditation for symptoms of stress and depression was compared to an active 'relaxation' orientated control and a wait list control (Manocha, Black, Sarris & Stough, 2011). The participants attended twice weekly instructional sessions for 8 weeks, along with daily practice at home using support materials. At the end of the study participants in the meditation arm manifested significantly lower depressive feelings and subjective stress, suggesting a specific effect on mood that extends beyond the benefits of simple relaxation, providing further empirical support for the mental silence definition.

These RCTs, amongst many other studies, with other forms of meditation, suggest that one of the primary pathways by which meditation may positively influence mental health is through a reduction in experienced stress. The Australian Psychological Society in their latest national survey found 26% of those surveyed reported having above normal levels of anxiety and moderate to extremely severe levels of depression. In addition younger people (18–25 year olds) had consistently lower levels of wellbeing than older Australians (Australian Psychological Society, 2015). A recent study in young healthy teenage girls revealed that even prior to the development of clinical syndromes, trait anxiety is related to neural changes that are antecedents to the onset of mental disorders such as anxiety and depression (Das et al. 2013). Given these data and the early age of onset of depressive and anxiety disorders (Kessler et al., 2005), preliminary data from an ongoing study of the preventive potential of meditation in children is worth noting. In an unpublished one year prospective trial of brief (10 minutes) daily meditation, the same as that used in the RCTs described above, administered to a whole class of 3rd and 4th grade (age 8 to 10 years) children as part of the daily routine to students in an Australian public school found that mental health risk, as measured by the mean of Strengths and Difficulties Questionnaire (SDQ), reduced from an initial level that was significantly higher than the national norm for this age group (SDQ score of 11) at the beginning of the school year to a level that was

significantly lower (SDQ score of 2, $p<0.01$) (unpublished paper by Manocha, Noble, Rubia, Malhi, Sheetu, Sattarshetty).

Quantitative and qualitative evaluation of this non-commercial initiative continues, including evaluation of instructions delivered by audio and video to large school populations, thereby eliminating reliance on instructors, hence driving down cost to access the resources to virtually nothing, while at the same time addressing challenges regarding treatment fidelity.

The promising outcomes of the study mentioned above lead to considerable interest from schools within Australia and this exposed a further, important practical limitation with the approach. Access to the resource is directly dependent on the availability of suitably capable instructors. Training instructors in meditation introduces a whole new level of complexity and cost to the concept. If however it is possible to teach meditation without instructors, then a low cost, population wide approach becomes attainable. The purpose of this study is to evaluate the impact of a video-based instructional strategy that can be distributed and played to large school populations, thereby eliminating reliance on instructors, hence driving down cost to access the resources to virtually nothing, while at the same time addressing challenges regarding treatment fidelity. To this end we designed a 3 armed field trial comparing DVD-based meditation instruction sequence to face-to-face instructors and to a 'no-intervention' control group in a primary school setting in Melbourne.

Meditation research challenges

The problem of definition

A large part of the difficulty with meditation research is definition. Modern Western researchers have struggled for decades to produce a coherent and widely acceptable definition of meditation for the purposes of clinical practice and research.

Present definitions of meditation tend to be broad and have changed over the years. In 1975 Herbert Benson an American cardiologist published *The Relaxation Response* an influential best-selling book describing meditation as the mental process that induced a set of physiologic responses such as decreased heart rate and blood pressure. His relaxation techniques are simpler secular versions of Transcendental Meditation, the predominant meditation technique at the time. Benson (1975) was a pioneer in the demystification of meditation; he introduced the term 'the relaxation response' as a scientific alternative to meditation and was the first to secularise meditation and introduce it into the mainstream of the Western world.

Influenced by this definition the National Centre for Complementary and Alternative Medicine (a department of the National Institutes of Health) in the United States in 2006 defined meditation as ‘a conscious mental process that induces a set of integrated physiological changes termed the “Relaxation Response” ’.

This definition was later modified, informed by the emergence of research into the ‘thoughtless awareness’ model; ‘In meditation, individuals learn to focus their attention and suspend the stream of thoughts that normally occupy the mind.’ (https://nccih.nih.gov/health/providers/camterms.htm)

The National Centre for Complementary and Alternative Medicine has again updated its definition of meditation moving away from the relaxation response, and thought cessation description to a more broad definition including clear influences from the mindfulness paradigm:

> [meditation is] a mind and body practice. There are many types of meditation, most of which originated in ancient religious and spiritual traditions. Some forms of meditation instruct the practitioner to become mindful of thoughts, feelings, and sensations and to observe them in a nonjudgmental way. (https://nccih.nih.gov/health/meditation)

There are fascinating parallels today between the popularity of the relaxation response method with the rise in popularity and prominence of the mindfulness technique. It too is a simpler secularised version of traditional meditation techniques (Buddhist) that have been innovated by Jon Kabat-Zinn. The mindfulness paradigm has as its central objective moment to moment awareness of thoughts and feelings in a non-judgmental way. Through the years the definition of meditation has remained versatile and certainly influenced by contemporary trends. The current definition of meditation has moved away from a more precise description to a very general one. This has continued to pose challenges to researchers seeking to study meditation. For this reason it is worth examining some of the most ancient definitions of meditation.

In one of India’s most ancient texts, the Mahabharata, which is as old as 400 BCE, meditation is described as follows: “He does not hear … smell … taste … see … or experience touch … his mind ceases to imagine … He desires nothing, and like a log **he does not think** …” (13.294.16)

The Upanishads are a collection of texts that contain some of the central philosophical concepts of Hindusism and are some hundreds of years younger than the Mahabharata. Juan Mascaro, an eminent Sanskrit scholar and translator of Indian spiritual texts, summarises the Upanishadic ideas on meditation and consciousness as follows:

> In the infinite struggle of man to know this world and the universe around him, and also to know the mind that allows him to think, he comes before the simple fact that life is above thought: when he sees a fruit he can think about the fruit but in the end he must eat it if he wants to know its taste: the pleasure and nourishment he may get from eating the fruit is not an act of thought. (Mascaro, 1965, pp. 1–47)

Mascaro's authoritative translations of the Upanishads further illustrate these points. In the Kena Upanishad it is stated:

> He (God) comes to the thought of those who know him beyond thought, not to those who imagine he can be attained by thought: he is unknown to the learned and known to the simple (p. 51)

Further, in the Kaushitaki Upanishad it is stated 'It is not thought which we should know: we should know the thinker' (Mascaro, 1965, p. 105).

Patanjali, a Vedic physician around 120 BCE attempted to synthesise the many disparate texts on yogic discipline into a single coherent practical guide for those aspiring to experience higher consciousness and self-realisation. According to the Yoga Sutras of Patanjali (Shearer, 2010), one of the oldest recorded scriptures on Meditation, "Yoga is a voluntary inhibition of irrelevant mental activity" in which one can glimpse and expand on "the silent void moments pervading *the emptiness between thoughts"*

Descriptions such as these suggest a specific understanding of meditation, specifically thought cessation and negation. Meditation as it is generally understood now has varying objectives from the relaxation response to present moment awareness in a non-judgemental way. Meditative techniques are generally seen as a way to focus and direct attention, develop a non-reactive, non-judgemental response to thought stimuli and improve emotional regulation and control. It is hypothesised that its regular practice positively conditions behaviour and emotions.

In the Eastern traditions the delay and eventual cessation of thoughts was the objective of meditation. For example, the hatha yoga tradition describes the gradual implementation of various physical yoga practices before ultimately arriving at the meditative state. Hatha yoga as it is practiced today almost exclusively focuses on the physical postures and breathing exercises when in reality it involves a myriad of practices aimed ultimately at facilitating and awakening the meditative state. The first chapter of the *Hatha Yoga Pradipika* describes a variety of bodily postures, diet and general topics. The second deals with the control of the life force to be achieved by breathing exercises. The third chapter describes the 10 mudras which are said 'to destroy ageing and death'. The fourth chapter describes the liberating experience of Samadhi (a meditative state) which is the culmination of the whole training

process wherein '… when the "great force", i.e. kundalini is awakened, the life force dissolves and mental activity ceases' (Swami Muktibodhananda Saraswati and Swami Satyananda Saraswati, 2000).

If the experience of being conscious and aware and yet have an absence of thought is the experience of true meditation then visualisations, breathing exercises, hymns, chanting and focusing attention are all means to that end.

Conversely the Western tradition generally views the meditative experience as a process involving deep and concentrated thought. In fact the Cartesian understanding of the mind does not accept that the self can exist without the thought, 'I think therefore I am'. Naturally the idea of achieving mental silence is deeply antithetical and even disturbing to some. Does it mean we reach a zombie like state, leaving us vulnerable and susceptible? Who am I without my thoughts? In fact the research into this area suggests that practitioners that regularly achieve thoughtless awareness have better mental health than the general population and furthermore there is a positive correlation between how regularly you achieve this state and your mental health and wellbeing (Manocha et al., 2012).

Interestingly the description of meditation as understood in the Vedic tradition has only recently been studied and appears to have specific effects. The experience of mental silence or thoughtless awareness is viewed by its practitioners as the key objective of meditation. In this method, present moment awareness and the relaxation response are the preludes to a deeper meditative state of thought cessation.

For the purpose of this study I have chosen to trial the thoughtless awareness method. Although based on the most ancient definition of meditation it is the newest emerging meditation method in the scientific literature.

Mixed method meditation – the problem of determining the active ingredient

Various literature reviews have found that meditation interventions are mostly practised in conjunction with other strategies (Burke, 2010; Black, Milam & Sussman, 2009; Harnett & Dawe, 2012; Zenner et al., 2014). The best example is the popular MBCT and MBSR programs that involve psycho-education, physical yoga, and cognitive therapy. Although MBCT and MBSR involve various methods unrelated to mindfulness the positive outcomes from these interventions are often ascribed to it. However benefits from MBCT or MBSR could equally be attributed to cognitive therapy or yoga.

In my own literature review of child and adolescent meditation studies (presented in the next chapter) I found a significant number of strategies used in conjunction with meditation such

as yoga, group education and debriefing, cognitive training, structured education, aromatherapy, biofeedback, dancing, drawing, colouring and written exercises, walking meditations, fishing, hiking and beading.

The only systematic review of published and unpublished mindfulness based strategies in schools reflected this diversity with only 4 of 24 studies using mindfulness practices alone, 83% used psycho-education, 75% used group discussion and 46% used body practices like yoga and mindful movement (Zenner et al., 2014). This led them to conclude:

> The precise role the element of mindfulness really plays is unknown, as is the extent of the effect that can be attributed to non-specific intervention factors, such as perceived group support, the specialty, and novelty of the intervention, of taking time out in school and at home, or of generic resting and relaxing. (Zenner et al., 2014, p. 17)

A recent systematic review of RCTs of MBCT and MBSR (Fjorback etal., 2011) questioned whether mindfulness itself was the active ingredient, stating, '… future research should primarily tackle the question of whether mindfulness itself is a decisive ingredient by controlling against other active control conditions or true treatments'. (p.17)

Certainly emerging evidence suggests that meditation based strategies hold promise. Although Zenner et al, 2013, noted in their systematic review that not a single study used a strong active control and that a large proportion of the effect size was derived from studies with small sample size and many studies were underpowered, mindfulness based practices in schools as a whole certainly hold promise with significant effect sizes in the domains of resilience measures (g = 36), stress (g = 0.39) and cognitive performance (g = 0.80). In addition acceptance is high with few reported adverse events.

However if we are to discover whether there are unique benefits to meditation, future research needs to restrict the addition of other strategies such as psycho-education, cognitive therapy or physical yoga postures to mention a few. Until we do this the most popular meditation methods of the day may be no better than other meditation methods, may be equally beneficial, or worse. In fact if you examine a typical mindfulness meditation practice called the body scan it is remarkably similar to Herbert Benson's relaxation response, both require progressive muscle relaxation, both use the breath as an anchor, both implore the meditator to passively observe the thoughts and avoid dwelling on them (see Table 3 in Appendix 3). The difference in outcomes in studies of various meditation methods may only be due to the ancillary strategies that are generally admixed into a meditation intervention.

Variability of intervention formats

With regard to meditation and young people there are 3 systematic reviews available in the literature. All 3 identified the need to adopt standardised formats of intervention. They found that in the majority of meditation studies, but particularly in mindfulness studies, meditation per say is admixed with many other elements such as psychotherapy, cognitive therapy, physical exercises and stretches, thereby making it difficult to ascertain which factor is actually responsible for the measured outcome.

Burke (2010) reviewed mindfulness based meditation studies for children and adolescents. Having examined 15 studies of mindfulness orientated methods which included MBSR and MBCT Burke concluded:

> Overall, the current research base provides support for the feasibility of mindfulness-based interventions with children and adolescents, however there is no generalized empirical evidence of the efficacy of these interventions. For the field to advance, I suggest that research needs to shift away from feasibility studies towards large, well-designed studies with robust methodologies, and **adopt standardized formats for interventions, allowing for replication and comparison studies**, to develop a firm research evidence base. (emphasis added, p. 133)

In 2009 Black conducted a systematic review of empirical studies for the health-related effects of 'sitting-meditative practices in youth' aged 6 to 18 years. He found 16 relevant studies. Once again there was wide variation in the interventions in their treatment length, dosage and delivery, especially in mindfulness studies. For example one study had 5–10 minutes of meditation 5 times a week for 5 weeks (Beauchemin, Hutchins & Patterson, 2008), another had a 2.5 hour session once per week for 8 weeks (Zylowska et al., 2008) and yet another had 45 minute bimonthly sessions for 24 weeks (Napoli, Krech & Holley, 2005). The TM studies were more consistent in their treatment length, setting and design yet still had serious limitations to their generalisability. Of 6 transcendental meditation (TM) studies 5 had exclusive cohorts of African American teenagers measuring physiological outcomes only such as heart rate and blood pressure.

Black, 2009 summarised:

> Seven studies contained samples with a majority of black adolescents, and all 5 studies that examined physiologic outcomes were mainly composed of black subjects at risk for cardiovascular problems. In addition, almost all the studies reviewed were completed with clinical populations that were recruited for participation on the basis of a pre-existing condition such as high-normal blood pressure, ADHD, learning disabilities, and/or conduct problems … Studies examining physiologic outcomes have all been RCTs; however, 50% of studies that examined psychosocial/ behavioural outcomes lacked a comparison group. (p. 538)

Despite various limitations to the quantity and quality of those studies, Black concluded that there is initial evidence that 'sitting meditation can be an effective intervention for the treatment of physiologic, psychosocial, and behavioural problems among children and adolescents'.(Black et al., 2009, p. 532)

The latest systematic review by Harnett and Dawe (2012) identified 24 studies that evaluated mindfulness based strategies targeting children, adolescents or families. Like Burke (2009), Harnett and Dawe (2012) found mindfulness to be generally acceptable and well-liked by participants with increasing evidence that mindfulness based strategies can have a positive impact. However it continues to suffer from the methodologic shortcomings of few controlled studies and only a handful of RCT with small numbers of participants. The other fundamental issue identified was the difficulty in ascribing 'mindfulness' as the psychological construct responsible for improved outcomes due to the large variations in both content and dosage. Thus far no mindfulness studies have employed methodologies to investigate mechanisms of change. (Harnett & Dawe, 2012). What we see in all these systematic reviews is an emerging pattern of heterogeneous meditation methods in both dose and delivery.

The systematic reviews by both Burke (2009) and Harnett and Dawe (2012) reiterate the need to adopt standardised formats of intervention. This is indicative of the whole field of preventative mental health strategies. Rones, and Hoagwood (2000) reviewed 47 RCTs of school-based mental health services and articulated the importance of replicability:

> There are still many questions yet unanswered about the active ingredients that lead to successful program implementation and dissemination. These must be identified. As the research base on effective programs continues to grow, **it will be important to determine elements of replicability to identify how these programs can be transferred to different schools, school systems, and populations of students,** and to identify barriers to successful implementation. (Emphasis added, p.238)

These methodological failings make it difficult to determine an ideal length and duration of a meditation intervention or determine their specific active ingredients.

The importance of active controls

A fundamental part of experimental science is the importance of excluding non-specific effects when studying a phenomenonon. Within the context of clinical research this means using strategies to control for the confounding factors that collectively contribute to 'the placebo effect' such as plausibility of the intervention, therapeutic contact, researcher expectations, patient expectations, regression to the mean et cetera. The confounding potential of non-specific effects has been well demonstrated by meditation researchers. So it

should be accepted that trials using strategies such as ‘wait list’ and ‘no treatment’ control methods are unlikely to generate reliable findings. Yet, Ospina et al. (2007), in their US Department of Health and Human Services funded study, examining 813 studies, found that ‘almost half’ of the controlled trials and RCTs had used a wait list or no treatment control group!

To address these issues researchers such as Manocha (2011) stress the importance of using active controls that mimic meditation in every possible way, while at the same time excluding only the purported ‘essential active ingredients’ (this of course raises another unanswered question about what those ingredients might be!). Until this issue is widely understood and addressed we can confidently predict that most interventions existing within the meditation rubric will generate an outcome that is statistically significant and apparently favourable when trialled in comparison to an inactive/no-treatment control group. Furthermore, any intervention that vaguely resembles meditation can thus predictably attain pseudo-scientific legitimacy using what would superficially appear to be legitimate scientific methods.

When active controls are applied researchers have found that the efficacy of one method over another has not been demonstrated. For example Ospina and her colleagues (2007) noted that yoga was no better than mindfulness-based stress reduction at reducing anxiety in patients with cardiovascular diseases, relaxation response was no better than biofeedback in reducing blood pressure in hypertensive patients and Zen Buddhist meditation was no better than blood pressure checks in reducing systolic blood pressure in hypertensive patients.

Contextualising meditation within current conceptual frameworks for mental health

There are many ways in which to understand how meditation complements pre-existing conceptual frameworks for mental health promotion. Some of the key frameworks are public health (for example, the Ottowa Charter for Health Promotion), new movements such as the ‘mental wellness’ concept and the field of positive psychology, and developmental ideas such as prosocial learning and emotional regulation. These frameworks and how meditation fits in within them are described briefly below.

The Ottowa Charter is a useful framework for the promotion of youth mental health. It is categorised into 5 areas of focus or platforms:

1) Public policy
2) Supportive environments

3) Community action
4) Personal skills
5) Reorientation of health services.

Platform 4, the development of personal skills, is the area where meditation can be taught as a simple set of skills or life tools and that could be taught and practiced at school. Platform 5, the reorientation of health services, is also an area that can be affected by introducing meditation as a primary health prevention strategy in youth. As I will discuss next there is a need to reorient the focus in schools from 'mental illness' to 'mental health'.

In various ways Australia has been at the forefront of developing innovative resources to improve youth mental health. For example, Australia was one of the first proponents of online mental health information aimed specifically at young people. Now, mental health information online is available from a variety of websites, of which beyondblue, ReachOut and headroom15 are just some examples.

Moving beyond the provision of information, researchers are now finding that the internet can also deliver skills and even therapy. For example, the Mental Health First Aid initiative offers free online courses and face-to-face courses that teach the public to identify and appropriately respond to mental health problems. It has been implemented in a range of settings including schools and workplaces. Online cognitive behaviour therapy (CBT) is now being validated using RCT methodology with current outcomes indicating that it can be as effective as face-to-face CBT. Other examples of such therapeutic online platforms include MoodGYM and THIS WAY UP (http://thiswayup.org).

Online and audio-visual models of mental health delivery have great potential as cost effective, resource efficient and wide reaching mental health initiatives. The online CBT websites clearly demonstrate that the internet is a viable platform to deliver other kinds of skills, of which meditation is an example. Indeed, online meditation interventions have already started emerging such as Smiling Mind. Meditation interventions have yet to be trialled online, but could prove to be a widely accessible and effective preventative mental health intervention. The popularity of these audio-visual platforms make online meditation intervention an ideal, cost effective tool to be used in schools. The vital component of any online meditation resource is of course the meditation technique itself. It is the development and evaluation of this component that is a focus of this thesis.

Mental illness vs mental health

There is a growing school of thought that has developed out of a reaction to the overemphasis on mental pathology and problems as opposed to mental health. It recognises the importance of actively fostering mental health. The positive psychology movement is one such example. It acknowledges that mental illness and mental health are distinct constructs and that the absence of mental illness does not necessarily imply the presence of mental health. With evidence-based research used as its guiding force positive psychology examines causes and correlates of optimal human functioning. It advocates a change from the current fixation with addressing deficits to promoting mental health and wellbeing. Although in its emergent stages a growing literature base is contributing to our understanding of optimal functioning in children. School-based programs more often focus on preventing 'pathology' rather than cultivating 'wellbeing' (Furlong, Gilman & Huebner, 2014). For this reason schools are the ideal place to implement preventative mental health strategies that promote mental health.

Areas for positive psychology interventions

The effects of positive psychology interventions on children have been investigated in numerous areas. Self-efficacy, gratitude, flow, mindfulness, resilience, school climate, emotional intelligence, hope, optimism, empathy and prosocial behaviour to name a few. There are too many to examine them all in detail here. As my primary measure is the Strengths and Difficulties Questionnaire I will examine some of the areas directly measured by it, such as prosocial behaviour and emotional regulation. The Strengths and Difficulties Questionnaire is a brief behavioural screening questionnaire for 3–16 year olds. It is added to give a total score as an indicator of mental health risk but can also be examined by scoring its subscales which measure emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour.

Prosocial behaviour

Prosocial behaviour in children, such as their empathy and sympathy for others, has been correlated with positive peer relationships and interactions (Attili, Vermigli & Roazzi, 2015; Caprara, Barbaranelli, Pastorelli, Bandura & Zimbardo, 2000; Denham et al., 2003; Warden & Mackinnon, 2003). They are also more likely to be popular with their peers, have supportive peer relationships and engage in less solitary play (Nelson, Hart, Yang, Wu & Jin, 2012; Clark & Ladd, 2000; Sebanc, 2003).

Emotional regulation

The ability to regulate emotions is an attribute that has significant implications for children in their developmental years. Emotional regulation is the ability to 'recognise, regulate and express emotions adeptly' (Furlong et al., 2014). Affective emotional regulation involves both conscious effortful regulation and unconscious automatic regulation; however there is some debate on just how much emphasis should be given to influences from extrinsic sources versus intrinsic sources. *Extrinsic* influences on a child's emotional regulation might include parents, peers, the environment they live in, things outside their self. The *intrinsic* ability to regulate emotion is conceptualised by Gross and Thompson (2007) as:

> a) selecting situations and/or modifying situations so as to be able to functionally regulate emotion, b) deploying attention in such a way so as to regulate emotion c) altering the cognitive appraisal or meaning of events and d) altering the response to an emotion-evocative event. (p.12)

Meditative strategies are worthwhile exploring as a way to develop both effortful or conscious and effortless or unconscious emotional regulation. Extrinsic influences on a child's emotional regulation such as parents and peers are often beyond our ability to influence in the school environment. On the other hand children's intrinsic ability to regulate emotions could perhaps be enhanced and strengthened by teaching them introspective practices such as meditation. If such practises can develop attributes such as attention deployment they could prove to be of significant value to children. Children's intrinsic ability to regulate emotions are significant predictors of future wellbeing. Tentcosta and Shaw (2009) studied 122 boys in a longitudinal study investigating the relationship between emotional self-regulation, peer rejection and antisocial behaviour. An ambitious study that followed them from the ages of 3 to 12, it found lower use of active distraction during a frustrating task in early childhood predicted greater peer rejection in middle childhood. This in turn had a negative domino effect, where rejection in middle school predicted antisocial behaviour in early adolescence. Poor emotional regulation of negative emotions in children, such as anger, has shown to predict a greater likelihood of peer victimisation (Champion, 2009). In turn, victimised children have a poorer ability to regulate the expression of negative emotions (Champion & Clay, 2007). It is easy to see how a vicious cycle occurs. It is a good illustration of how profoundly emotional regulation can effect children into the future and its knock-on effects. Interventions that could improve emotional regulation at the earliest ages could be highly beneficial for children's future wellbeing.

We know that there are poor developmental outcomes in children with difficulty regulating their emotions, such as impulsivity, mood and anxiety disorders, academic difficulties, peer victimisation and problematic social relationships. Conversely, adaptive emotion regulation

abilities positively influence peer acceptance, academic and emotional outcomes. (Furlong et al., 2014)

It is for these reasons interventions such as mindfulness have started to be introduced in schools as a way to promote emotional regulation. Theoretically it appears to be a good fit, teaching many of the attentional deployment and regulation strategies suggested by researchers in the field. Mindfulness aims to develop the ability to witness internal mental and emotional content without reacting and in a non-judgemental way. This practice may help in cognitive reappraisal, response modulation, attentional deployment and mood regulation. The present research holds some promise but has various limitations such as the multimodal nature of the mindfulness interventions, primarily adolescent populations, small sample sizes and other methodological weaknesses which I will discuss in detail in later chapters.

Unfortunately there are only a handful of studies exploring the effects of sitting meditation on preschool and primary school children (Zenner et al., 2014; Burke, 2010; Black et al., 2009). Emotional regulation in early childhood has significant ramifications on a child's development yet only a handful of meditation studies measure effect on the emotional regulation on children. A 2007 study by Graziano and colleagues examined 325 5-year-old students in a longitudinal study exploring the role of emotional regulation on children's early academic success. It found the children with better emotional regulation had better academic success and productivity in the classroom, had improved parent-reported behaviour problems and better quality of student teacher relationships (Graziano, Reavis, Keane & Calkins, 2007). It is an area that would benefit from further study; meditation is a skill that could be potentially taught to help regulate emotion which has been found to be associated with positive social development even at the early preschool and primary school level (Chang, Shelleby, Cheong & Shaw, 2012).

Literature Review

Meditation studies with primary school aged children

Descriptive

Looking through the literature mindfulness and Transcendental Meditation (TM) are the most commonly studied forms of meditation. Meditation has been the subject of scientific research since the late 1960's. A casual search of Medline, PschINFO and Scopus quickly reveals that since that time thousands of peer reviewed papers have been written on the topic in many different disciplines including medicine, psychology and nursing. The cross-disciplinary nature of the extant research, and the fact that it covers so many different clinical and non-clinical outcomes has made it difficult for researchers to review the entirety of the literature in a single publication.

I searched the following databases for studies of meditation with children: Medline, PsychINFO, Cochrane Reviews and Google Scholar. Search terms included "Meditation", "Mindfulness", "MBCT", "MBSR", "Transcendental Meditation", "Qigong", "Yoga", "Sahaja Yoga", "Children", Adolescents", "Youth", "School", "deep breathing". The process included first gathering all meditation studies in children and adolescents. Next all studies that did not involve a sitting form of meditation where excluded. After this all studies were divided between unimodal and multimodal meditation methods. And lastly all the studies with a unimodal meditation method in children were separated and examined.

This yielded a total of 56 studies involving meditation interventions in children and adolescents of which 27 were conducted in schools. Of the meditation studies trialled in schools, mindfulness based practices were the most numerous (n = 17), followed by TM (n = 5), yoga (n = 2), Qigong (n = 1), and unspecified (n = 2). More meditation studies were carried out in the adolescent population (n = 30) compared to children of primary school age (n = 26).

Approximately 70% of the meditation studies in children and adolescents involved a mixture of methods – what I will call 'multimodal' meditation studies. The intervention in these multimodal studies is a conglomerate of at least 2, and usually several interventions combined into a single package. They often included psycho-education methods, exercises such as yoga, group education and debriefing, cognitive training, structured education, aromatherapy, biofeedback, dancing, drawing and written exercises, and walking meditations. One study by Le and Gobert (2013) even had beading, fishing and hiking in conjunction with formal mindfulness practice. Practically speaking, these kinds of treatment

packages have several real world advantages however from a scientific perspective it becomes impossible to discern which component or components of the package is actually are generating the effect.

Studies with sitting meditations that did not involve the adjunct practices such as those cited above I will call 'unimodal' meditation studies. There were 9 unimodal meditation studies in adolescent populations. Of these 5 studies exclusively involved African American populations and measured physiological parameters such as ambulatory blood pressure, cardiovascular reactivity, heart rate and sodium excretion. Five studies included the TM technique. The remaining 4 included the mindfulness technique.

A total of 26 meditation studies were found to include primary school children. Of these only 7 were unimodal (see table 1). As the cohort for my study are primary school children, and because my study implemented a simple sitting meditation without heterogeneous activities, I chose to look at these studies in greater detail. The remaining 19 studies were multimodal meditation studies and were thus excluded.

Intervention type

Of the 7 studies meeting the inclusion criteria 3 used mindfulness (Corbett, 2011; Joyce et al., 2010, Hilt & Pollak, 2012), one used Sahaja yoga (Harrison, Manocha, & Rubia, 2004), one is an author developed 'brain respiration' breathing orientated meditation (Kim et al., 2002) and the remaining 2 studies are unspecified secular forms of meditation using deep breathing and mantras (Kratter & Hogan, 1982; Linden, 1973). Three studies were conducted in school (Corbett, 2011; Joyce, Etty-Leal, Zazryn & Hamilton, 2010; Linden, 1973).

Control type

Two studies were uncontrolled (Harrison et al., 2004; Joyce et al., 2010); the remaining 5 had controls. One study had an active control (Kratter & Hogan, 1982). Three studies had a 3-armed randomised design (Hilt & Pollak, 2012; Kratter & Hogan, 1982; Linden, 1973). The most common control is wait list control (3 studies), with other control groups including progressive muscle relaxation, distraction, guidance counselling and problem solving. Ages ranged from 4–13-years-old with the mean age being 9.

Study Populations

Two studies examined cohorts with an existing clinical condition; Attention Deficit Hyperactive Disorder (ADHD) in both cases (Harrison et al., 2004; Kratter & Hogan, 1982). Harrison et al. studied a diverse range of 48 Australian children between the ages 4–12-years-old, and Kratter and Hogan (1982) studied 24 American children between the ages of 7

and 12. Linden (1973) studied a cohort of 26 African American and Puerto Rican 8–9-year-olds from an economically disadvantaged neighbourhood. Kim et al. (2002) examined 24 Korean primary school students aged 9. Hilt and Pollak (2012) had a diverse group of 9 to 14-year-olds; 68% were Caucasian, 18% African American, 10% Asian American, 3% Hispanic and 1% Native American. Corbett (2011) had a cohort of 107 American primary school students between 8 and 11-years-old. And lastly Joyce et al. (2010) studied a cohort of 129 Australian primary school students between the ages of 10 and 11-years-old.

Outcome measures

A wide range of measurements where used to examine a diverse range of psychosocial and behavioural outcomes.

Twenty eight different measures where used across 7 studies. They measured child parent relationships, rumination, mindfulness, reflection and impulsivity, selective deployment of attention and locus of control, hyperactivity, child emotional and behavioural control/regulation, medication administration, state and test anxiety, sustained attention, field independence, reading and comprehension. Two studies measured physiological outcomes: EEG changes and salivary cortisol levels. Two studies examined anxiety (Corbett, 2011; Linden, 1973), 2 assessed selective deployment of attention (Harrison et al., 2004; Kratter & Hogan, 1982) and 2 assessed emotional regulation (Corbett, 2011; Joyce et al., 2010). Apart from these studies there was no overlap in studied outcome measures.

Intervention period

The intervention period varied widely between studies from 10 to 90 minutes over 5 to 18 weeks. Two studies had a single meditation session only (Kim et al., 2002; Hilt & Pollak, 2012). No 2 studies are alike. Interventions ranged from 1 to 18 weeks in duration with 10 to 90 minutes lessons anywhere from 1 to 5 times a week. On average meditation interventions ran for 6 weeks with 20 minute sessions 2 to 3 times a week.

Intervention delivery

Two studies had meditation instruction delivered by a class teacher (Corbett, 2011; Joyce et al., 2010). Corbett (2011) had mindfulness meditation delivered by the class teachers after being trained in a single session by a mindfulness teacher. Four studies involved a meditation instructor or instructors with unspecified experience and training (Harrison et al., 2004; Kratter & Hogan, 1982; Linden, 1973; Joyce et al., 2010). One study had the meditation instruction delivered by the researcher (Kratter & Hogan, 1982), 3 studies were conducted by a single instructor (Linden, 1973; Hilt and Pollak) and 2 studies involved multiple instructors

(Harrison et al., 2004; Kim et al., 2002). Hilt and Pollak, 2012, had a one-off 8 minute audio recording of mindfulness modified from a script and Kim et al. (2002) had meditation instructors who had received between 4 and 14 months practise. Joyce et al. (2010) had the teacher conduct meditation instruction after an unspecified number of training sessions. Whereas all other studies described here were prescriptive there are difficulties in the study by Joyce et al. (2010) in discerning the type of meditation delivery due to the broad and general description of the intervention.

Results

All studies except one found improvements in outcomes. Of all the unimodal meditation studies in children the most robust study design was by Kratter and Hogan (1982). It was the only study design that compared meditation to an active control, however it is limited in its generalisability by its small sample size (n = 24) and a cohort of children with a pre-existing condition (ADHD). Kratter and Hogan (1982) conducted a randomised control study, with 3 arms including an active control of progressive muscle relaxation and a wait list control. Using 5 separate measures they assessed impulsivity, selective deployment of attention, locus of control and hyperactivity. Of its 5 measures only one demonstrated any improvements in the meditation group compared to controls. A further 3 measures found improvement in both the relaxation response group and the meditation group compared to wait list control and one measure found no significant between group differences. Impulsivity and behaviour at home was improved in both the relaxation and meditation groups compared to wait list control. Across all groups there was no change in the ability of the hyperactive children to develop a greater sense of internal control over their behaviour. The single difference in the meditation group was their improvement in their ability to selectively deploy attention – that is to focus and refocus attention.

Though improving one's ability to focus attention has beneficial implications, dwelling on negative feelings or 'rumination' is detrimental and shown to be a risk factor for the development of depression and other forms of psychopathology (Nolen-Hoeksema, Wisco & Lyubomirsky, 2008). Hilt and Pollak (2012) studied the effects of distraction, mindfulness and problem solving on rumination on 102 students between 10 and 14-years-old. It found that both distraction and mindfulness successfully helped the children escape a ruminative state but problem solving did not. In this case the mindfulness intervention was delivered from a modified script that had been used in a study of college students, delivered by an untrained instructor.

A third 3-armed study by Linden (1973) randomised and separated 90 (7–9-year-olds) into a meditation group, a guidance group and a wait list control. The intervention lasted for 18

weeks. The meditation group met twice a week for 15–25 minutes of meditation, a single instructor followed a standardised strict script and protocols, and made a concerted effort to ensure that the group atmosphere was conducive to meditation and the students were engaged in the activity. The guidance group met a guidance counsellor once a week for 45 minutes and focused on study skills and the problems children encounter in developing them. Field independence, the ability to distinguish figures from a distracting or confusing background/field, was measured by the Children's Embedded Figures Test, test anxiety was measured with the Test Anxiety Scale for Children (TASC) and reading achievement was measured by the Metropolitan Achievement Test (MAT). The meditation group improved in their field independence and had reduced test anxiety compared to guidance counselling and wait list control. There was no significant difference among groups on the measure of reading achievement.

Corbett (2011) assessed the effectiveness of a 5-week mindfulness intervention on 107 10–11 year olds, with self-reported levels of positive and negative affect, state anxiety, test anxiety, and salivary cortisol levels as they key outcomes. Daily mindfulness meditations of approximately 15 minutes were conducted during school days. A control group was allowed unstructured reading time. No significant between group differences were found on any measure.

Harrison et al. (2004), studied the effect of Sahaja yoga meditation (SYM) on children with ADHD. In a no control, pre–post study participants underwent 6 weeks of twice weekly meditation sessions with regular meditation at home. Measurements included a range of parent and child self-ratings of ADHD symptoms, self-esteem and child parent relationship quality, changes in psycho-stimulant medication use and perceptions of the program. After the treatment period there were significant changes to ADHD related symptoms with a mean decrease of 35% in attention, hyperactivity and impulsivity as measured by the Conners Parent-Teacher Questionnaire. Medication use also decreased with 11 of 20 children reducing their ADHD medication dose during the Sahaja yoga meditation treatment. Parent perceptions of the outcomes of the SYM were positive, 92% of parents rated its benefits highly. Using a 5-point scale parents found their children 'more confident in him/herself' ($M = 3.35$, $SD = 0.93$) and 'more cooperative' ($M = 3.18$, $SD = 1.01$). Benefits relating to school included 'less difficulty with the teacher' ($M = 3.64$, $SD = 0.92$), 'more able to manage school work' ($M = 3.56$, $SD = 1.03$), 'more able to manage homework' ($M = 3.47$, $SD = 1.33$), and 'positive about going to school' ($M = 3.43$, $SD = 1.09$). Other associated symptoms of ADHD such as anxiety and poor confidence were reduced and parent ratings of child self-esteem showed significant improvements ($p < 0.001$). And lastly the child-parent

relationship improved through a significant reduction in the level of conflicted interactions ($p < 0.01$).

Kim et al. (2002) found that a single episode of Brain Respiration-training (a form of breathing exercise) had a positive short-term impact on electroencephalogram (EEG) patterns related to emotional stability and educational achievement.

Joyce et al. (2010) conducted a pre–post, no control study in mindfulness meditation at 2 primary schools in Melbourne. Lessons conducted by teachers trained in mindfulness delivered a 10 week mindfulness curriculum. Mental health risk and prosocial skills were measured with the Strengths and Difficulties Questionnaire (SDQ) and depression was measured with the Children's Depression Inventory (CDI). There were improvements in mental health risk (effect size 0.38) and depression (effect size 0.27) but no significant change in prosocial skills.

Discussion

On close inspection of these studies a variety of methodological weaknesses have emerged. Most studies failed to describe the level of experience of their meditation instructors or detail the amount of training meditation instructors had in preparation for the delivery of the intervention. This has significant implications on the possible effectiveness of a meditation intervention. The quality and experience of the meditation instructor can profoundly influence the study outcomes. A fact Corbett (2011) acknowledged as a possible reason for her study results, which found no significant between group differences:

> Only a small amount of time was allotted by the school for the initial Mindfulness Meditation training conducted by Mr. Giorgi to take place, and perhaps this was not enough to firmly instil the principles on mindfulness that are necessary to propel the practice. (p. 52)

Corbett (2011) further explained the real world difficulties with obtaining professional meditation instructors, 'It also wasn't feasible to have a professional meditation instructor in the classroom every day, so the teachers, who are novices themselves, acted as the instructors' (p. 52).

This highlights a significant impediment to meditation research in schools – well trained professional meditation instructors cannot feasibly be used in every school and yet the quality of the instructor can profoundly influence the outcome benefits. More comprehensive training of class teachers may be required but this is difficult in the real world where teachers are already time poor and where the school may not be sufficiently self-motivated or adequately funded to provide this training.

Another uniform issue is the failure to describe the details of the meditation method used. These details are important to objectively determine the true differences or similarities in meditation techniques. Four studies provided incomplete or vague descriptions. Hilt and Pollak (2012) used mindfulness meditation modified from a script for college students but did not provide details in the text or appendix, only stating that 'the original script focused on present-moment awareness, acceptance, and awareness of breath' (p. 1161). Harrison et al. (2004) described Sahaja yoga meditation as a simple method, that can easily be taught to children and adults, involving 'practising techniques whereby participants were helped to achieve a state of thoughtless awareness. Instructors directed participants to become aware of this state within themselves by becoming silent and focusing their attention inside' (p. 484). Again no further description of method is described. Kim et al. (2002) provided no detail of their Brain Respiration-training technique in either the text or in an appendix, stating only that it was a 'unique form of breathing exercise' developed by Seung Heun Lee to 'awaken human potential ability'. Joyce et al. (2010) utilised mindfulness meditation, and its descriptions are quite broad and vague. Along with techniques such as body breath awareness the program may have involved a significant amount of psycho-education with a

> descriptive rather than prescriptive approach … allowing teachers to tailor their lessons personally' and 'specific exploration of the stress response, words and emotional links … each session allowed for group discussion and exploration of themes. (p. 20).

Examining these studies we also find that the benefits cannot be easily generalised. Of the 7 studies 4 had small sample sizes between 24 and 48 (Harrison et al., 2004; Linden, 1973; Kratter & Hogan, 1982; Kim et al., 2002). Two had homogenous racial populations: African Americans and Puerto Ricans (Linden, 1973) and Koreans (Kim et al., 2002). Additionally 2 studies examined cohorts with a pre-existing condition, ADHD in both studies (Harrison et al., 2004; Kratter & Hogan, 1982). Also problematic is the wide variety of outcome measures and intervention periods. Three areas were most commonly studied: anxiety, selective deployment of attention and emotional regulation. Two studies examined anxiety (Corbett, 2011; Linden, 1973), two assessed selective deployment of attention (Harrison et al., 2004; Kratter & Hogan, 1982) and two assessed emotional regulation (Corbett, 2011; Joyce et al., 2010). There was improvement in anxiety in one study (Kratter & Hogan, 1982) but not the other (Corbett, 2011). Kratter and Hogan (1982) found improvement in the ability to selectively deploy attention and Linden (1973) found improvements in field independence – the perceptual skill of 'seeing the forest for the trees'. Emotional regulation was found to improve in a study without control (Joyce et al., 2010) but there was no effect on emotional regulation in a controlled study by Corbett (2011). In terms of intervention period it is hard to ascertain what an ideal dose is; no 2 studies are alike; ranging from 1 to 18 weeks in

duration with 10 to 90 minutes lessons anywhere from 1 to 5 times a week. On average meditation interventions run for 6 weeks with 20 minutely sessions 2 to 3 times a week.

It appears that active controls such as relaxation methods are as effective as meditation at improving the impulsivity and behaviour at home of ADHD children (Harrison et al., 2004; Kratter & Hogan, 1982). In disrupting 'rumination' distraction is as effective as meditation. Meditation however does appear to be uniquely beneficial in improving selective deployment of attention compared to relaxation methods and distraction. Consistent with the body of meditation research studies in adult populations, active controls are rare. Only one unimodal meditation study in primary school children had an active control (Kratter & Hogan, 1982). Of its 5 measures only one demonstrated any improvements in the meditation group compared to controls. A further 3 measures found improvement in both the relaxation response group and the meditation group compared to wait list control suggesting that active controls such as relaxation methods are as effective as meditation at improving the impulsivity and behaviour at home of ADHD children. Pertinently there have been no unimodal meditation studies in children with an active control since 1982 – 33 years ago!

From these studies it is clear a few simple improvements to methodological rigour could improve our understanding of the effects and benefits of meditation. Namely meditation techniques need to be described in detail, the experience and level of training of instructors need to be detailed and if possible novice instructors need more comprehensive training if professional meditation instructors are not used. To move away from reliance on instructors, audio-visual meditation methods need to be explored as possible alternatives. Larger sample sizes of representative cohorts, replicating previous outcome measures as well as using control studies with active controls will all contribute to a better understanding of the efficacy of meditation as a preventative mental health measure.

Smiling Mind – a case study of a popular meditation mental health program

Having reviewed the literature and come to a better understanding of the conceptual and methodological challenges that must be resolved to generate reliable data and hence insights into meditation, we are now in a better position to analyse some of the popular meditation resources currently being promoted for school-aged children.

Smiling Mind is a free web and app based mindfulness meditation program designed for children and adolescents. It is endorsed by KidsMatter and used in conjunction with it; however it has been widely used as a stand-alone preventative mental health strategy.

Smiling Mind has an ambitious stated mission to have mindfulness meditation on the Australian curriculum by 2020 and has recently expanded its reach to schools in the UK. Smiling Mind launched in 2012 and has enjoyed enormous support from the media, celebrities, the health and education sector and numerous corporate sponsors. It is undoubtedly a well-funded, well-promoted and professionally delivered resource. However since its introduction in 2012, almost 4 years ago, the Smiling Mind resource has yet to be clinically evaluated. Promisingly, according to the KidsMatter website there is presently a large multi-school study in progress:

> Smiling Mind is currently being trialled and evaluated for effectiveness both within classroom environments and as an early intervention tool. A randomised controlled trial is currently underway with 13 partner schools using pre/post evaluation of mindfulness, wellbeing and schoolwork engagement, and 3 month follow-up to assess whether improvements are sustained over time.
> (https://www.kidsmatter.edu.au/primary/programs/smiling-mind-1)

This study has yet to be released. Presently evidence cited by Smiling Mind to support the benefits of its intervention include various studies in children and adolescents with a large variety of methodologies, measures and varying mindfulness based strategies. I will look at some of these studies in more detail below to help illuminate the present limitations of inferring their benefits on the Smiling Mind resource.

Applicability of the benefits of mindfulness based practices to Smiling Mind

Although mindfulness based practices demonstrate benefit there is a fundamental issue with Smiling Mind being used as a stand-alone preventative mental health tool. Mindfulness practices alone have not demonstrated efficacy and Smiling Mind has yet to be trialled in the school environment. Of the mindfulness studies presently cited by Smiling Mind to support its benefits only 2 or 3 out of 20 were unimodal and therefore similar in their method of delivery. The best designed of these was a 3-armed RCT; controls included a life skills training group and health education group. They measured the effect of mindful breathing meditation on 166 African American adolescents at risk of cardiovascular disease. After 12 weeks of mindfulness intervention breathing awareness meditation produced greater reductions in systolic blood pressure than did regular life skills training or health education programmes. Participants taught breathing meditation also showed greater reductions for 24 hour diastolic blood pressure and heart rate compared to the life skills group (Gregoski, Barnes, Tingen, Harshfield & Treiber, 2011). The study has limited applicability to Smiling Mind as its benefits are solely physiological and did not measure effects on stress, resilience, attention, focus, empathy, awareness of negative emotional states or academic performance, all areas the Smiling Mind program aims to improve. Its sample was also limited to African

American adolescents, a population quite distinct from Australian demographics. Moreover the study was conducted in the context of a summer camp not a school.

The second study by Joyce, Etty-Leal, Zazryn, Hamilton, and Hassed (2010) is a better fit demographically. It conducted mindfulness meditation in 2 Australian primary schools on children 10–13 years. They showed improvements in their SDQ scores (effect size 0.38) a measure of emotional and behavioural problems and showed modest improvements in depression (effect size 0.27). However the study poorly described procedure and likely included psycho education and may have included physical exercises. For example,

> the program was written as ten 45 minute lessons covering an introduction to relaxation and meditation, body and breath awareness with further exploration of the stress response, *words and emotional links*, sensual awareness, observation of thought, *creative approaches to meditation*, and stillness meditation. (Joyce, Etty-Leal, Zazryn, Hamilton & Hassed, 2010, p. 20)

No additional descriptions of procedure or methods was given in an appendix or otherwise. It too had no control group and did not control for other concomitant mental health interventions conducted in the schools.

Beauchemin et al. (2008) looked at the outcomes of a no control 5 week mindfulness meditation program on 34 adolescents diagnosed with learning difficulties. Meditation of 5–10 minutes was taught at the beginning of each school day. They measured social skills and anxiety and found improvements from pre- to post-intervention. The use of sitting body scan and breathing meditations in this study are similar to Smiling Mind meditations. The classroom teacher did however receive training by an expert in mindfulness meditation and the first class was delivered to the students by the expert instructor in an intensive 45 minute lesson. Again the transferability to primary school children is disputable due to the adolescent sample with learning difficulties and the fact that teachers and students would have received more training than participants in Smiling Mind.

The above 3 examined studies resemble the Smiling Mind meditation program closest and yet they diverge significantly in various ways. The main similarity is that these studies implemented a unimodal meditation intervention and one study had a primary school cohort. However the similarities practically end there. None of these studies were audio or DVD meditation instructions, all were face-to-face. Two of these studies examined adolescent populations only, one with a cohort of adolescents with pre-existing problems (learning difficulties). One study only measured physiological outcomes. And 2 studies had no control. It is therefore reasonable to conclude that the benefits of Smiling Mind as inferred by these

studies is questionable at best and a good illustration of the need for evidence-based meditation strategies and evaluation of audio-visual methods of delivery.

Why Sahaja yoga meditation and the mental stillness method?

In the field of meditation research mindfulness has by far the most dominant body of research. It has exploded into the public awareness with best-selling colouring books and popular apps. Before mindfulness Transcendental Meditation had an equally prominent place in popular culture, being endorsed by popular musicians The Beatles.

However despite directions for future research into the effects of mindfulness on children and adolescents being clearly outlined in 2009 and later in 2012 the field has still not addressed many of the methodological weaknesses outlined by Burke (2010) and later Harnett and Dawe (2012). However there are other forms of meditation that warrant exploration and are conceptually distinct from mindfulness. The Sahaja yoga method with its focus on mental silence is one such method.

As discussed earlier most mindfulness studies are multimodal and therefore the positive effects that can be ascribed to mindfulness are hard to ascertain and in need of further studies with methodological designs to address these weaknesses. As the state of the literature stands amongst the thoroughly controlled mindfulness studies in primary school children there is little difference between treatment and control (Corbett, 2011; Lau & Hue, 2011; Hilt & Pollak, 2012).

Sahaja Yoga meditation (SYM) is a sitting unimodal form of traditional meditation. Studies of mental silence oriented meditation, including some rigorous ones, have shown some evidence for a specific effect. A study by Aftanas and Golosheykin (2005) found that long-term SY meditators were more resilient to stressful stimuli, a key facet of personal feelings of wellbeing. In their study, 25 long-term SY meditators and a group of non-meditators, matched controls, when exposed to a stressful film clip, showed reduced psychological, physiological and electrophysiological reactivity to the stressful stimuli. Similar findings have been observed in a study using evoked response potentials as well as heart rate variability (Pavlov, Reva, Loktev, Korenyok & Aftanas, 2015; Reva, Pavlov, Loktev, Korenyok & Aftanas, 2014). These findings provide, for the first time, neurophysiological evidence to support the hypothesis that meditation leads to ‘detachment’, emotional stability and greater emotional resilience to stressful life events. Interestingly, long-term SYM practitioners were also found to score significantly lower than non-meditators in the trait personality features of anxiety, neuroticism, psychoticism, and depression, and to score

higher in emotion recognition and expression (Aftanas & Golosheykin, 2005). These findings are reflected in a study of more than 300 long-term SY meditators that showed substantially higher levels of quality of life and particularly mental wellbeing compared to the background population. Interestingly, a significant correlation was observed between higher frequency of mental silence experience and higher mental health scores (Manocha et al., 2012). SYM has also been effective in improving clinical features in a number of settings. A rigorous randomised trial of this approach, when compared to an active control, demonstrated significant effects on measures of work-related stress, anxiety and depression (Manocha et al., 2011). Other trials of the same approach have demonstrated promising effects in depression/anxiety (Sharma, Das, Mondal, Goswami & Gandhi, 2005), asthma (Manocha et al., 2002) and epilepsy (Gupta, Dudani, Singh, Surange & Selvamurthy, 1991; Panjwani, Gupta, Singh, Selvamurthy & Rai, 1995; Panjwani et al., 2000; Panjwaniet al., 1996).

As stated earlier (in the Meditation studies with primary school aged children Section) the study by (Harrison et al., 2004) has also shown significant improvements in inattentive and hyperactive behaviours in children with ADHD after 6 months of SYM.

Given this benefit of SYM on the cognitive, emotional and social function of this clinical population of children it seems reasonable to hypothesise that SYM would likely also have a positive effect on attention, emotional and social functions in healthy children of the same age range. A further pilot study in Ashfield Primary School is described below. They practised a secular version of the SYM method called mental stillness and had impressive results**.**

Ashfield study

In a no control pre post uncontrolled, observational trial design Manocha , Noble, Rubia, Malhi, Arora & Sattarshetty conducted a pilot study of Mental Stillness meditation to an class of 21 year 3 and year 4 children over one school year. Ages ranged from 8 to 10 years. The study was conducted at Ashfield primary school, a public state-funded school in a low socio-economic area.

Intervention

The children received 10 minutes of meditation instruction on every school day in their classroom for 4 school terms (i.e., for ~10 months). The meditation session was held in the morning before the beginning of formal classwork. Children sat on the floor and the

meditation instructor sat at the front of the room on a chair. A roster of instructors trained in this form of meditation conducted the meditation sessions.

A typical meditation session involved encouraging the children to engage in good posture, use breathing techniques and calming silence based on the Sahaja yoga meditation technique.

Design

This study was a 10 month longitudinal study. Data was collected in 5 waves; at baseline, on completion, and at approximately 2½ month intervals between. The aim was to ascertain whether levels of wellbeing, as measured by a scale testing emotional difficulties and conduct problems, would improve across the intervention.

Measures

The class teacher, who was already familiar with each child in the class, filled out the Strengths and Difficulties Questionnaire (SDQ) for each child in week 3 of term one (before the commencement of the program), and then again at the end of each school term. Two professional meditation instructors facilitated the daily sessions on a rotating basis, in terms 1, 2 and 4. In the 3rd term meditation instruction was taken over by the class teacher in order to test whether such an intervention was feasible with a lay instructor.

Qualitative measures, including a detailed research journal, was kept over the 10 months of the intervention. Comments made by the teachers and students about their experiences of the meditation intervention were entered daily by the attending researcher.

Results

There was a significant decrease from baseline scores of 35% at the end of the first term. The reduction in symptoms was observed to further decrease by the end of the second term to 69.9%, when compared to baseline. At the end of the third term, during which the teacher had assumed the role of the instructor, the gains made diminished to 50.9% (i.e., there was a 19% increase in negative symptomology). At the conclusion of fourth term, during which a trained instructor had been reintroduced into the class room, there was a further reduction in scores of 27.2%. Thus, at the conclusion of the study there was a total reduction in negative symptomology of 78.1% compared to baseline levels.

The loss of wellbeing gains during term 3 when the class teacher ran the meditation class raises some interesting questions. Was the class teacher less skilled than the trained meditation teachers? Did her students perceive that she was less skilled because they did not

associate her with teaching meditation? Can only trained meditation teachers run mental stillness?

If the implementation of meditation classes relies on well-trained and practising meditation teachers for its success, then it would appear to limit the opportunities to run meditation classes in regular classrooms with all children. However, it is possible that a meditation program delivered by highly-trained instructors via video may be an effective alternative that could be trialled. It has already been shown that mental health services delivered online (such as MindSpot in Australia) can be successful (Dear et al., 2013), and it is possible that meditation delivered via video or online could also be effective.

In spite of its methodological weaknesses such as lack of control group and small sample size the present pilot study shows that a 10 minute daily meditation program of mental stillness based on Sahaja yoga meditation can have a significant effect on student wellbeing, provided the instructor is well trained. In this sample, the children improved significantly over the year in terms of their emotional difficulties, conduct problems, hyperactivity/inattention and peer relationship problems, and also showed clear gains in prosocial behaviour. Importantly, over the course of the intervention most children enjoyed the experience, a significant number were able to use the skills gained in other spheres of life, and the teacher could observe positive differences in class behaviour.

This study, whilst limited, demonstrates the feasibility of meditation-based interventions in schools to benefit student wellbeing and has highlighted the benefits of a meditation program delivered by highly trained instructors. This in turn warrants the exploration of alternative methods of high quality meditation instruction via video as broad applicability of this meditation is hindered by the sparsity of available and appropriately trained meditation instructors.

Sahaja yoga meditation

Sahaja Yoga Meditation (SYM) was first developed and taught by Shri Mataji Nirmala Devi in the 1970's. It has since spread worldwide and is freely available in over 90 countries. The practice of SYM stresses the importance of attaining thoughtless awareness or mental silence as the primary objective of meditation. In addition it is a sitting form of meditation without cognitive or physical posture (yogic) components. For this reason it is simpler to study as any effect can more definitively be attributed to the meditation itself.

The Sahaja yoga definition of meditation is thought emptiness, the mindfulness paradigm conceives meditation as primarily thought mindfulness. Sahaja yoga sees the gradual delay

and eventual cessation of thought while being alert as the primary objective of meditation, hence the term ‘thoughtless awareness’.

Although it is a burgeoning area of meditation research SYM’s effects appear to have unique pathways of action which are perhaps different than other forms such as Transcendental Meditation (TM) and mindfulness.

SY meditation research as discussed above has demonstrated effects in a mainly adult population, with only 2 existing studies using this form of meditation in children. This is consistent with the trend in all forms of sitting meditation where adult populations are far more extensively studied. Mindfulness has been the most studied form of meditation in children and adolescents but it too has mostly demonstrated its effectiveness in the adult population.

Building on adapted SYM techniques developed for children in the unpublished pilot study conducted in Ashfield Primary School (Manocha, Noble, Rubia, Malhi, Arora & Sattarshetty), I embarked on a process of developing a SY meditation suitable for primary school children in a school setting.

Table 1. Unimodal Primary School Studies

n	Age (years)	Intervention			Random-ised	Control Group	Arms	Control 1	Control 2	Measures
		Type	Time	Period						
Corbett, 2011										
107	10–11	Mindfulness	10–15 minutes	Daily meditation for 5 weeks	no	yes	2	Wait List Control	–	State-Trait Anxiety for Children, Test Anxiety Scale for Children, Positive & Negative Affect Schedule for Children, Child Acceptance & Mindfulness, Children's Colour Trail Test, Salivary cortisol levels
Harrisonet al., 2004										
48	4–12	Sahaja yoga	60–90 minutes	Once a week for 6 weeks	no	no	0	–	–	Conners Parent–Teacher Questionnaire, Perceived outcomes of SYM for the child, Psycho-stimulant medication use, Burnett's 13-item Bio-behavioural Indicators of Self-Esteem, Child–Parent Relationship Scale, Peabody Picture Vocabulary Test–3rd ed, Child interviews, Perceived outcomes of SYM for the parent,
Hilt & Pollak, 2012										
102	10–11	Mindfulness	10–30 minutes	Single exposure	yes	yes	3	Distraction	Problem solving	State rumination assessment
Kim, et al., 2001										
24	9–10	Own style breathing meditation	10 minutes	Single exposure	no	yes	2	Wait List Control	–	EEG analysis
Kratter & Hogan, 1982										
24	7–12	Unclassif'd breathing & mantra meditation	20 minutes	4 weeks, 2 sessions weekly	yes	yes	3	Progress-ive Muscle Relaxation	Wait List Control	Matching familiar Figures Test, Fruit Distraction Test, Nowicki Strickland Locus of Control Scale, Abbreviated Parent teacher questionnaire, Werry Weiss Peters Activity Scale
Linden, 1973										
26	7–8	other	20–30 minutes	18 weeks, 2 sessions weekly	yes	yes	3	Guidanc e	Wait List Control	Children Embedded Figures Test, Test Anxiety Scale for Children, Metropolitan Achievement Test
Joyce, Etty-Leal, Zazryn, Hamilton & Hassad, 2010										
129	10–13	Mindfulness	45 minutes	10x45 min classes over 10 weeks	no	no	0	–	–	Strengths and Difficulties Questionnaire, and Children's Depression Inventory

Project 1: Toorak Primary School: Non-randomized - observational controlled study

Hypothesis/Aim

Two key issues – fidelity and quality of instruction – can be easily overcome if instruction is via a high quality video. This method also has the advantage of being low cost and being able to be utilised widely, including at schools where there are no suitably trained staff.

To test if such a strategy is viable, the purpose of the current study was to produce and evaluate a video-based meditation instruction program suitable for large school populations. A high quality instructional video teaching mental silence techniques was produced and its efficacy in promoting mental wellbeing was compared to that of face-to-face instruction in the same technique, and a no-intervention control group.

Participants

The study was approved by the Victorian Department of Education and Early Childhood Development and human ethics approval received from Sydney University. All parents of students recruited from Toorak Primary School in Melbourne who were in prep and class 1 were invited to provide consent. They were informed that their children would be involved in a 3-arm study including a control group and meditation intervention delivered as either face-to-face instruction or DVD instruction. Participants were 132 prep (age 4–5) and class 1 students (age 5–6). Seventy participants (53%) were in class 1 and 62 (47%) were in prep class. The control group was also offered the option to participate in meditation at the end of the study. Females constituted 67 (50.75%) of the cohort while 65 (49.25%) were male. Our sample included 92 participants in the face-to-face group, 27 in the video group and 13 in the control group.

Outcome measures

The teacher version of the Strengths and Difficulties Questionnaire (Goodman, 1999) is a brief measure of psychological functioning for 3–16 year olds. It has 5 key subscales with 5 items for each – emotional symptoms (‘many fears, easily scared’), conduct problems (‘often fights with other children or bullies them’), hyperactivity/inattention (‘constantly fidgeting or squirming’), peer relationship problems (‘rather solitary, prefers to play alone’) and prosocial behaviour (‘kind to younger children’). Teachers rate items on a 3-point scale, ranging from 0 = Not true to 2 = Certainly true. The total score can be used as an indicator of mental

health risk, or subscales can be used to ascertain an indication of problems in specific areas. The SDQ has good psychometric properties (Goodman, 2001) and has been widely used as a screening and assessment tool to detect mental distress and mental health risk in Australia (Hawes & Dadds, 2004), the UK (Goodman, Ford, Simmons, Gatward & Meltzer, 2000) and many other countries. Australian norms for the SDQ are available (Mellor, 2005).

The meditation intervention

For the purposes of this study a mental silence approach to meditation was used. This technique was an adaptation of a Sahaja yoga meditation technique, which focuses on developing the experience of mental silence that was piloted in a smaller unpublished uncontrolled study of grade 3 children (Manocha, Noble, Rubia, Malhi, Sheetu, Sattarshetty, unpublished). In this study, students demonstrated substantial improvements in SDQ scores over the period of a school year, but teachers, parents and children reported that a more simplified 'secular' meditation approach was preferable. Manocha and colleagues subsequently modified some of the more esoteric and 'spiritual' terminology to suite the secular school environment and produced a similar technique that used universal terminology and was non-denominational and non-culture-specific. This new technique, which they labelled 'mental stillness', was then trialled informally in several different school settings across Australia, and seemed to produce benefits for mental health and resilience over a 2 year period.

The mental stillness technique had been delivered face-to-face by trained instructors only. In consultation with long-term experienced Sahaja Yoga meditators and instructors (who had previously delivered the mental stillness meditation for children in schools) we developed then trialled an audio-visual version of the mental stillness meditation on a cohort of school children. Because the mental stillness approach had appeared to be successful when delivered face-to-face by well-trained practitioners, the most popular sequences were adapted to a video format to see if the benefits of this technique could be delivered en masse and at low cost. We then received feedback from teachers and instructors on how to improve the intervention delivery. Three major considerations lead us to create and evaluate an audio-visual meditation sequence to be used in schools. Firstly we recognised that treatment fidelity could be attained by effectively using an audio-visual/DVD meditation instruction. Secondly it freed us from relying on instructors who are generally difficult to recruit and can rarely conduct daily sessions especially during the regular school hours. Additionally we did not have the funds to pay instructors and so we relied on volunteers. And thirdly there is no known trial of an audio-visual meditation resource used for children or adolescents in the literature.

The DVD meditation sequence underwent a 3 stage process before being used for the current study. First, a meditation sequence was developed in collaboration with Sahaja yoga practitioners that aimed to utilise techniques that facilitated the mental silence experience but from which were removed any spiritual or religious language. Based on the recommendations of meditation researchers Fodor and Hooker (2008), the sessions were also shortened.

After this secular version was developed, the meditation instruction was filmed using an experienced live instructor. This was made into a DVD and trialled at Ashfield Primary School on prep and first class students over the course of one term (10 weeks). Students participated in 2–3 guided video meditations per week. Feedback was gathered in qualitative interviews from teachers and students. These indicated the instruction DVD could be improved with some changes in timing, intonation and format. For example it was agreed that a cartoon animation would be more engaging. Taking on board these suggestions an updated version was produced using a cartoon animation for instruction, and again trialled over 2 terms, this time at Holy Family Primary School in Merewether, Newcastle. Feedback was positive and student engagement was high. The children and staff did not report any difficulties following the instructions.

The last phase of development involved evaluating the perceived suitability of the video meditation resource by surveying a wide variety of professionals working with young people. The respondents were recruited from various conferences, seminars and professional development events. At each event, after they were given a brief explanation as to the purpose of the video, delegates undertook the guided audio-visual meditation and then completed brief surveys that assessed their experience of, perceptions about, and thoughts regarding, the video and its suitability for use with children. The details of this project is discussed in the next chapter.

Feedback from the surveys suggested the DVD would likely have wide appeal and efficacy for school children, the final version of the video used in these trials was the version used for the study described here. For the purposes of this study, the video was provided in both DVD and USB format to allow teachers to play it on school smart boards.

Procedures

Participants were allocated to either face-to-face meditation instruction, DVD instruction or no intervention (control group). The control group were also offered the option to participate in meditation at the end of the study. Children in the 2 intervention groups attended a

minimum of 3 meditation classes per week for 30 weeks. Each intervention session was typically conducted immediately after lunch in the class room, and lasted 10–15 minutes. However, due to the length of the study, session times were flexible and on occasion were adjusted to other times if this was necessary for the smooth functioning of the class. The control class continued their school lessons as normal and as such were purely a wait list control group.

Face-to-face instruction

Three different instructors delivered the face-to-face meditation intervention on alternate days (approximately 3 days a week). All instructors had at least 8 year's experience in meditation instruction and volunteered their time for the project. With the help of the class teacher the students were settled and seated comfortably. A mental silence guided meditation that lasted between 10 and 15 minutes was then led by the meditation instructor. Instructors were given some flexibility to reiterate or repeat aspects of the meditation to encourage further engagement with the meditation and enhance the experience. All meditation instructors had a day of orientation run by the researcher to standardise the delivery of the developed mental silence instruction with an emphasis on its secular nature and age appropriate terms and language. One instructor was male and two were female. See Appendix 1 for details of face-to-face meditation instruction.

DVD instruction

This group had meditations between 3 and 5 times per week depending on the teacher's discretion and circumstances. Students were ordered by the class teacher to sit comfortably in their chairs or cross-legged on the floor. The class teacher then asked the students to sit straight with their palms on their laps facing upwards. Once there was complete silence in the classroom and students had stopped fidgeting, the teacher told them to pay attention to the meditation video and follow its instructions. Ten minute and fifteen minute meditation DVDs were alternated to match the exposure time taken in the face-to-face instruction condition. The DVD meditation instruction was then played. The class teacher sat at the front of the class in view of the students and performed the meditation with the class, gently correcting students or settling them if necessary. At the end of the meditation the students were asked to sit still and quiet for a further minute before resuming regular class. For details of DVD instruction see Appendix 2.

Pre- and post-intervention assessments were completed by the class teachers of the participating students. The primary researcher visited the school before commencement of the study to educate the participating staff on the correct way to fill out the SDQ and the

questionnaires were read out aloud to participating teachers to facilitate comprehension. Teachers then rated children twice: before the intervention and after the intervention (i.e., 30 weeks later). It should be noted that students were encouraged to practice meditation at home during the school break between terms but that no record of conformity was kept during that period.

Analytic plan

In this study, the ability of the interventions to facilitate for change in SDQ symptoms over time is emphasised. Change over time within the children's total SDQ scores, and each of the 4 subscales, hyperactivity, conduct, peer behaviour, and emotional symptoms subscales were of interest, and considered for separate analyses.

Particular emphasis was made to compare the equivalence, or superiority of any symptom improvement between the 2 interventions conditions, as well as the comparison of symptom change above any nonspecific change observed within the control condition. Superiority, equivalence or inferiority of symptom improvement was tested through the comparison of symptom improvement rate over time between groups, tested using a time by group interaction term in a longitudinal model of SDQ scores. The average change over time in symptoms within each of 3 conditions (video, face-to-face, control) was modelled using a generalised equation estimate (GEE). GEE models, emphasise the change between the group conditions after accounting for within subjects variance (Hubbard et al., 2010), and are preferable for the purposes of longitudinal comparison between means of randomised groups.

The GEE model included a group by time interaction, and a gamma scale with log link function to facilitate for positive skewness observed in symptom scales distributions, as well as the proportional change in symptoms. For this reason, the dependent variables were modified with a small constant added (0.001), to ensure that plausible values of zero symptoms are represented in the model when using a multiplicative function. The terms in each model include a time by group interaction, with baseline and control group used as reference categories. The model also specified a compound symmetric working correlations matrix, a maximum likelihood scale parameter estimate and a robust covariance matrix estimator.

Finally, power calculations which consider the available sample indicate some risk of under detecting between groups effect, however, with a sample of over 100 participants over 2 time points, between 3 groups, the sample size is within the range of previous randomised clinical

trials standards in the mental health literature (Andersson, Cuijpers, Carlbring, Riper & Hedman, 2014).

Missing values

Some participant attrition occurred at post-treatment, with 14 out of the 132 (10.6%) participants presenting missing data. Missing data rates did not differ between groups (χ = 5.004, df = 2,p = 0.082) when the likelihood of observing a missing values is compared between conditions using a logistic regression. To compensate for the few missing values, a relatively conservative last observation carried forward (LOCF) measure was used instead of either ignoring the missing cases or introducing simulated data, with statistical assumptions about those cases that became missing.

Results

Initially, the SDQ total symptom scores at pre- and post-intervention were explored. Groups did not differ on SDQ scores at baseline (Wald = 1.464, df = 2, p = 0.481; see Figure 1) suggesting that the children participating in each condition can be considered randomised between conditions. Outliers, or gaps in the distribution of scores were not observed.

Results from the analyses of symptom change in each intervention are collated in Table 2. In this table each group's marginal means are presented with baseline and post-treatment scores for both the SDQ total symptoms, the 4 subscales, and a measure of pro-social behaviour. Table 2 also includes the treatment effects of percentage reduction from baseline, as well as the significance of the time by group interaction term, and these allow the sizing and testing of the symptom change over time between groups.

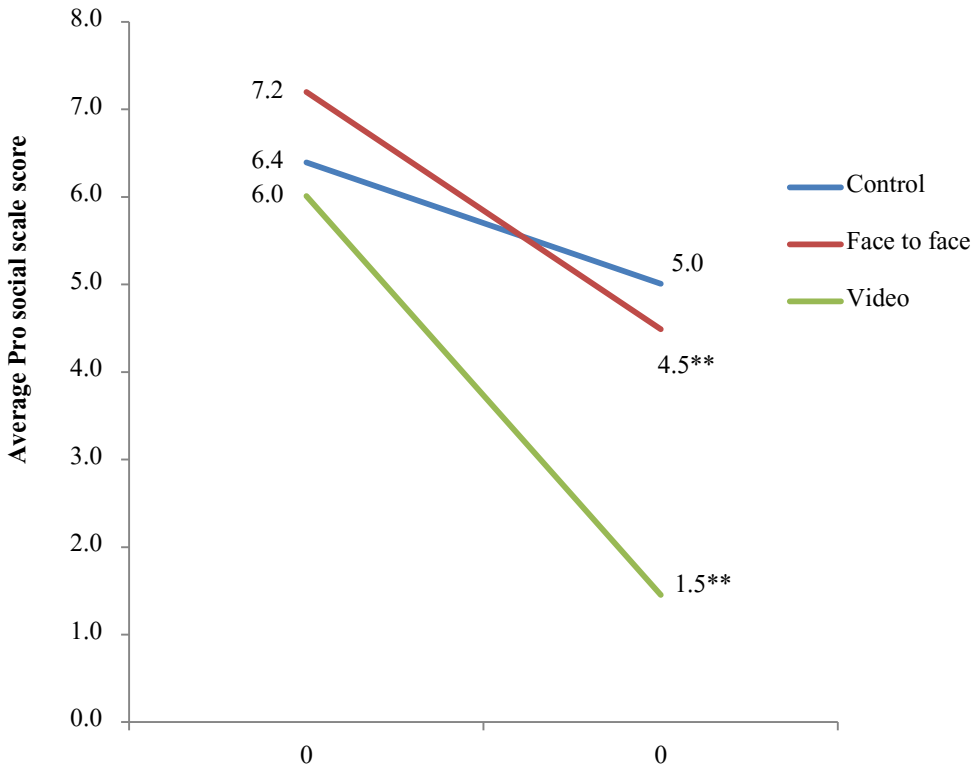
From Table 2 both the face-to-face condition and the video condition show significant reductions in symptoms above and beyond the reduction that might be experienced within the control group. The measure of total SDQ scores demonstrates significant reductions in symptoms are observed within both the video group (76%) and the face-to-face condition (36%), but not the control group which does not significantly estimate a reduction above 0% (between −12% and 45% change).

Within the subscales of SDQ a more diverse pattern of change is demonstrated. Peer-related symptoms show an increase within the control group (112%) that is not reflected in either of the treatment conditions, with the video condition. The scores of the peers subscales do appear to change significantly, although both are showing a trend to decrease. The subscale of conduct related symptoms is also demonstrating a trend reduction that is not significantly different from zero change. A pattern of symptom reduction is demonstrated for the subscale

of emotional related symptoms, with the video condition demonstrating a significant reduction in symptoms (79%), and to lesser extent, the face-to-face condition (37%). The subscale of hyperactivity related symptoms also show a decrease over the course of the intervention, however a significantly larger decrease in symptoms is observed within the video condition (77%). Finally, the measure of positive pro-social behaviour is showing an increase in all 3 conditions, both the video (34%), and face-to-face (30%) intervention conditions, demonstrating equivocal and significant increases in scores above the change observed within the control condition (15%).

The model result was screened for residuals and unusual cases of influence, using the standard of residual exceeding ±3 standard deviations from the model prediction values. No cases were observed in the diagnostics of the model.

Illustrative figures of the model means are presented in Figures 1 (total SDQ symptom scores), and 2–6 (presenting the change within the separate subscales).



For figures 1-6 ** represents statistically significant change over time p<0.05. See table 2.

Figure 1. Total SDQ scale change

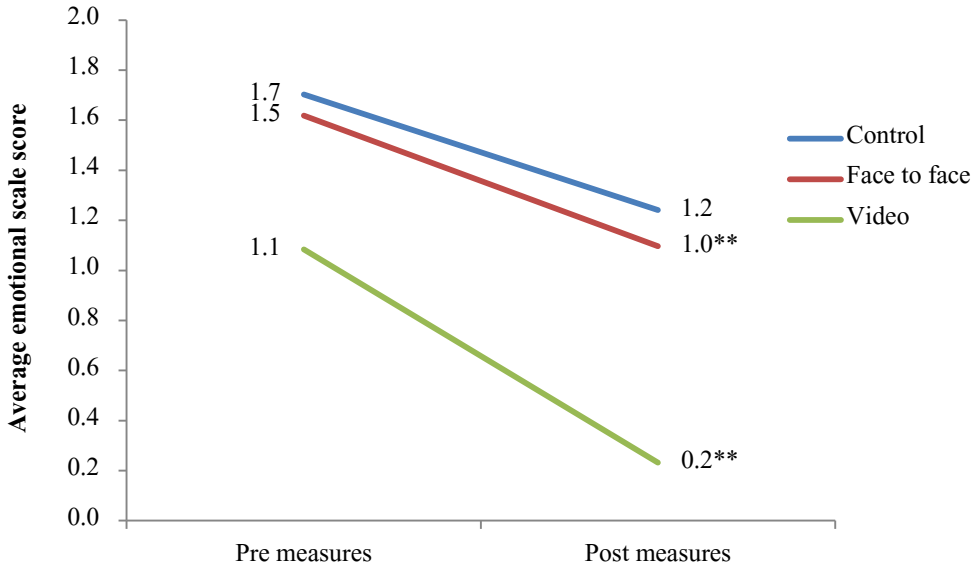


Figure 2. Emotional scale change

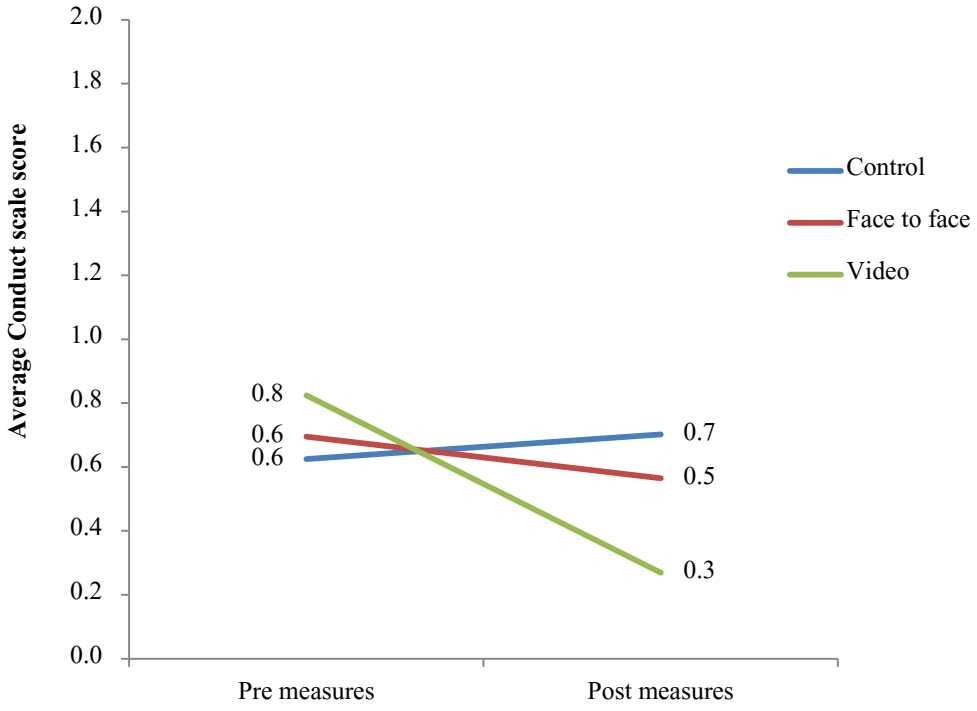


Figure 3. Conduct scale change

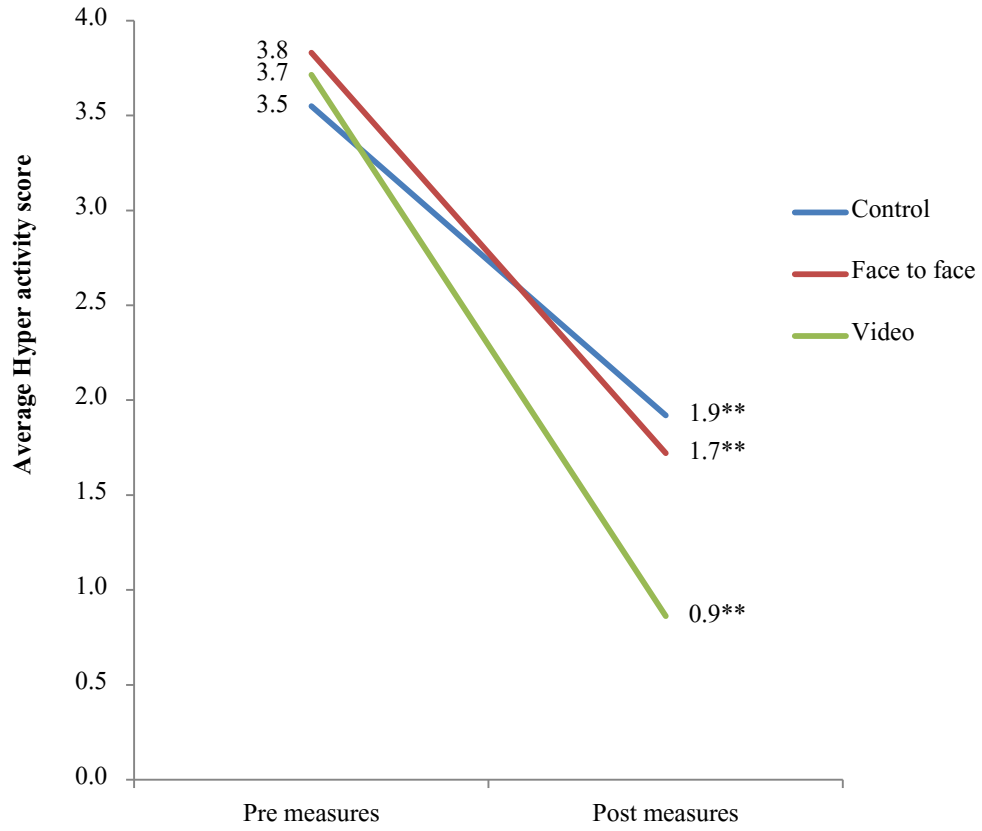


Figure 4. Hyperactivity scale change

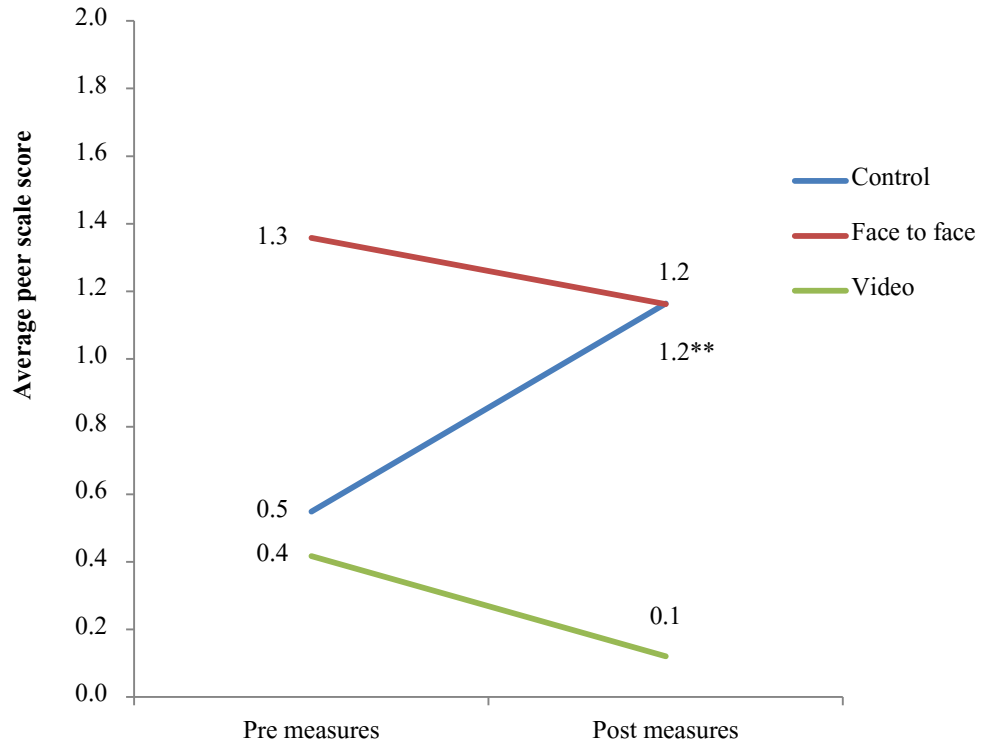


Figure 5. Peer scale change

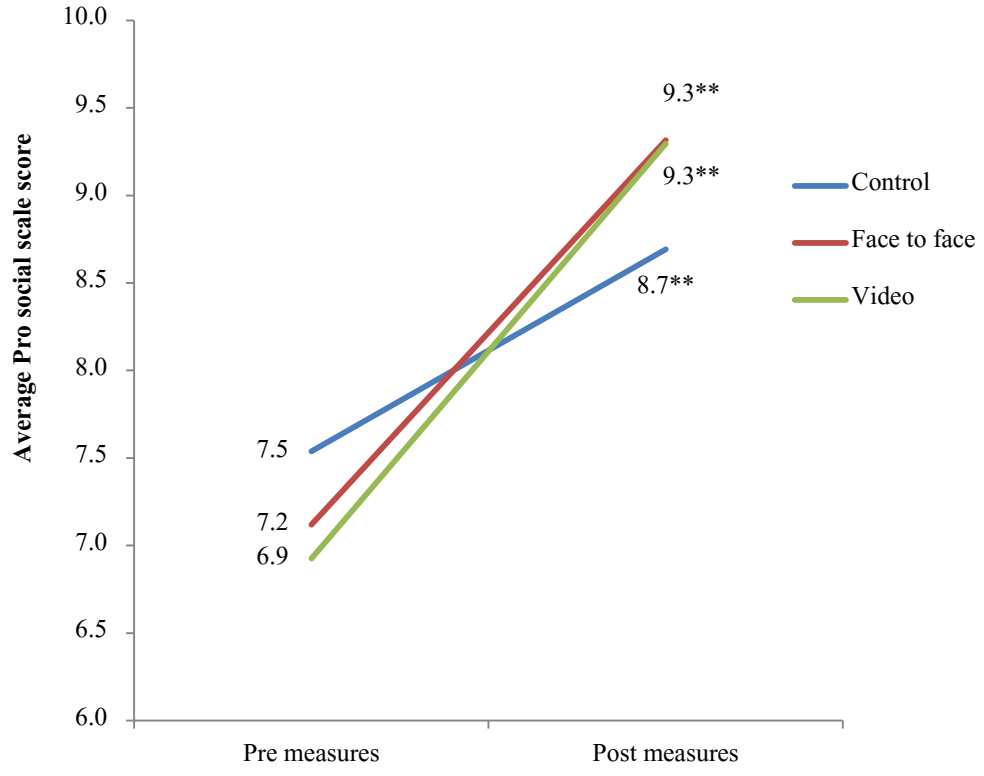


Figure 6. Pro social scale change

Table 2. Model means of change over time within each group condition

	Means (95% CI)						Test statistics of time by group interactions			
	Pre-treatment		Post-treatment		% change†		Contrast with control		Contrast with face-to-face	
Total SDQ scores							***Wald χ2***	***p***	***Wald χ2***	***p***
Control	**6.4**	4.8 – 8.5	**5.0**	3.5 – 7.1	**−22**	−45 – 12	–	–	–	–
Face-to-face instruction	**7.2**	6.4 – 8.1	**4.5**	3.6 – 5.6	****−38**	−50 – −22	4.381	0.036	–	–
Video resource	**6.0**	4.6 – 7.9	**1.5**	0.7 – 3.1	****−75**	−89 – −49	9.286	0.002	5.608	0.018
SDQ subscales										
Pro-social										
Control	**7.5**	6.8 – 8.3	**8.7**	7.8 – 9.6	****15**	4 – 28	–	–	–	–
Face-to-face instruction	**7.2**	6.9 – 7.6	**9.3**	9.1 – 9.6	****30**	26 – 33	6.156	0.013	–	–
Video resource	**6.9**	6.4 – 7.6	**9.3**	8.8 – 9.8	****34**	27 – 41	6.262	0.012	0.351	0.553
Peer										
Control	**0.5**	0.3 – 1.1	**1.2**	0.9 – 1.5	****112**	65 – 172	–	–	–	–
Face-to-face instruction	**1.3**	1.0 – 1.6	**1.1**	0.8 – 1.4	**−16**	−37 – 10	8.010	0.005	–	–
Video resource	**0.4**	0.2 – 0.8	**0.1**	0.0 – 0.4	**−71**	−92 – 6	7.001	0.008	1.624	0.008
Conduct										
Control	**0.6**	0.2 – 1.9	**0.7**	0.2 – 2.1	**12**	−63 – 241	–	–	–	–
Face-to-face instruction	**0.6**	0.4 – 0.8	**0.5**	0.3 – 0.7	**−19**	−57 – 19	2.832	0.092	–	–
Video resource	**0.8**	0.5 – 1.4	**0.3**	0.1 – 0.9	**−67**	−90 – 6	5.758	0.016	2.781	0.095
Hyperactivity										
Control	**3.5**	2.5 – 4.9	**1.9**	0.8 – 3.1	****−46**	−78 – −13	–	–	–	–
Face-to-face instruction	**3.8**	3.4 – 4.3	**1.7**	1.2 – 2.2	****−55**	−68 – −42	1.344	0.246	–	–
Video resource	**3.7**	2.9 – 4.7	**0.9**	0.3 – 2.3	****−77**	−91 – −38	4.430	0.035	2.374	0.123
Emotional										
Control	**1.7**	1.0 – 3.0	**1.2**	0.6 – 2.5	**−27**	−64 – 49	–	–	–	–
Face-to-face instruction	**1.5**	1.1 – 2.0	**1.0**	0.7 – 1.4	****−37**	−57 – −7	252	0.615	–	–
Video resource	**1.1**	0.5 – 2.2	**0.2**	0.1 – 0.6	****−79**	−91 – −46	11.479	0.001	12.645	< 0.001

** Statistically significant change over time p<0.05; estimated quantities shifts exceed zero

Project 2: Evaluation of the Audio-Visual Mental Stillness Meditation

Aim

The aim of this study was to evaluate the perceived suitability of the video meditation resource by surveying a wide variety of professionals working with young people.

Introduction

Previous studies of the mental stillness technique have demonstrated that it is a potentially effective way of reducing mental health risk. The value of this strategy is best understood within a context of universal primary prevention / early intervention and secondary prevention. Meditation can be seen as beneficial in health promotion and enhancing general wellbeing as well as curtailing the mental health risk in children that may be at the threshold of poor or dysfunctional mental health.

However the fundamental barrier to the delivery of population benefit is the insufficient instructors and limited resources to train them. Another follow-on issue is treatment fidelity, due to the possible variability in the quality and delivery of meditation instruction. Generally there has been 3 ways schools have delivered meditation instruction to their students:

1) Trained meditation instructors instruct students at the participating school during school hours or outside of school hours.
2) Teachers are trained in meditation and then in turn instruct their students.
3) Some form of multimedia is used to instruct the participating students. Such as DVD/video or audio/app.

The first 2 above mentioned strategies of delivery have been scientifically evaluated in a school setting. The third strategy has yet to be formally evaluated. However this third mode of delivery is perhaps the most important to evaluate for feasibility and effectiveness. Its low cost and its ability to be widely disseminated and easily accessed without the need for a trained instructor or teacher has no doubt contributed to the growing enthusiasm for audio meditation instruction mediums. One popular example is the mindfulness Smiling Mind app which is already widely used in Australian schools. Furthermore it is arguably the best way to deliver a consistent intervention, in that it enables us to maintain treatment fidelity.

To evaluate the effects of a DVD meditation instruction compared to face-to-face instruction and control groups we developed a DVD resource and successfully trialled it at a local

primary school. However it was unclear how the general population of professionals would perceive this resource and whether or not they would engage with it. To determine how the resource would be perceived we designed a study in which the DVD was practically demonstrated following a brief presentation. The survey questions were then delivered to participants and the responses collected. A sample of survey questions can be seen in table 3.

Methods

To gauge the level of interest amongst professionals working with young people and to gather feedback to inform the development of our survey, the DVD resource was demonstrated at a national guidance conference as part of a general lecture on the use of meditation in schools. An informal survey of participants was conducted to gauge their perception of the resource. The vast majority indicated that the resource was potentially very useful and with broad ranging relevance and application. A survey was developed as a result of the feedback from the national guidance conference and with general feedback and discussion with professionals who work with young people in school and non-school environments.

A more formal strategy was then developed to capture broader professional groups known to work with young people.

A presentation was then organised after developing a working alliance with the non-profit Generation Next seminar circuit who hold country-wide educational lectures addressing the social, emotional and cultural challenges facing young people.

At each of their state events a presentation was delivered by a senior teacher who had been using this resource in the school at which she worked. The presentation comprised three parts. Part one involved a general description by the speaker of the potential benefits of meditation in school and her experience of using it as a resource at her own school. Part two was the practical description of how to use it in the classroom. And part three was an actual practical session in which the audience was invited to follow the instructional sequence to receive a tangible experience of the meditation instruction. At the start of the Generation Next seminars the survey was disseminated to all delegates in their conference handbook.

Afterwards the participants were invited to fill out the survey on a voluntary, anonymous basis. Survey forms were collected at the end of the seminar and subsequently collated for data analysis on completion of the national seminar circuit in 2014.

Results

The total sample of respondents was 2597. The sample itself was a national convenience sample comprised of respondents from all the major states of Australia including NSW, Victoria, Western Australia and Queensland. They were mainly women (female = 84%, male = 16%) with a mean age of 43.8 years. The sample included a very large group of cross disciplinary professionals who work with a wide range of young people. Teachers were the majority of professionals represented (33%), followed by nurse/midwives 15%, school counsellors and community workers both at 9%, deputy principles and psychologists, both at 6%, and principles and GPs at 1% each. The remaining 21% of the sample cohort identified as 'other' and did not subscribe to any of the above professions. The majority of the group work with secondary school age children.

Almost everyone (82%) had tried meditation before and 27% had some kind of formal education in meditation. Regarding their current level of meditation, 10% stated they meditated regularly, 30% occasionally, 30% rarely meditated and 30% never meditated.

Sample's attitude/perception of meditation

The understanding of the primary purpose of meditation varied with 66% perceiving it as a method of relaxation, 25% viewed it as a mood management skill and 17% viewed it as a concentration skill. A greater proportion (20%) viewed meditation as a spiritual practice with only 4% viewing it as secular. Yet most (46%) viewed it as either harmonious with their religious/spiritual beliefs or neither harmonious nor conflicting (21%). Only 7% felt there was conflict with their religious beliefs.

Seventy six per cent felt that meditation was very much or somewhat backed by scientific evidence whereas 10% felt it had little or no supporting evidence. Fourteen per cent were undecided about the evidence level.

Regarding its safety most, 89%, felt it was completely or mostly safe, 7% said that it sometimes or often could be unsafe and 4% were undecided. However 10% felt that the meditation can lead to adverse effects.

Potential impact of the resource

They almost unanimously (92%) felt that the mental health impact of this resource would be very positive or somewhat positive and 80% felt it appropriate to be used in their school. Most of them (84%) also felt the resource should be made available to all school staff as an optional resource and 82% felt training in how to use this resource would be useful to them.

The majority of respondents (64.6%) felt it was most suitable to primary and secondary students.

Scope of application

Amongst the many potential applications of meditation the ones most strongly endorsed were: general stress reduction, exam stress, general anxiety, focus and engagement. The respondents felt that the least applicable potential applications of meditation were empathy, interpersonal skills, relationship difficulties and social exclusion.

When asked about preferred mode of delivery of the meditation resource 44% wanted a DVD/CD, 30% a USB memory stick, 17% a website or YouTube video, 5% a download and 2% an app.

Discussion

This survey suggests that a practical meditation resource for children has broad positive appeal, is appropriate and potentially beneficial. Meditation itself has reached a broad level of acceptance within this section and is generally perceived as having potential benefits for practitioners. Furthermore the majority of people feel that meditation has a good scientific/evidence basis and do not feel that it is in conflict with their religious/spiritual beliefs.

It is also evident that an audio-visual meditation instruction has broad appeal, with most preferring a DVD/CD to deliver the meditation instruction. After viewing and participating in the audio-visual meditation resource most felt it would be most relevant in primary and secondary school aged children and that it ought to be made available in their place of work.

General stress reduction, exam stress, general anxiety, focus and engagement were the areas that respondents felt were most likely to improve with regular meditation practice. The implications of stress reduction in young people are significant considering coping with stress has consistently been the top concern for them (Mission Australia, 2015). Furthermore stress is commonly perceived to be a risk factor for more serious mental health problems (Cooper & Baglioni, 2013).

Strengths

This survey has a large sample size and is a nationally representative cohort covering a large cross section of professionals working with young people in school and community. These professionals are the target demographic for which this DVD is aimed at. These front line professionals have good insight into suitable resources. They are ultimately the gatekeepers

of acceptable mental health interventions for young people and their support is essential for any mental health intervention to be successful. This is the only survey of its kind designed to evaluate the way in which its target users would engage with a DVD resource.

Additionally their feedback is in direct response to a practical demonstration of the resource and is therefore good indicator of how professionals working with young people are likely to regard and receive the resource.

Weaknesses

Although the sample is large it reflects approximately a 50% response rate. It is also a convenience sample and the respondents will likely have selection bias. Their attendance at educational conferences such as Generation Next is a likely indicator that they are self-motivated and are more likely to review this initiative in a favourable light. In addition the presentation prior to DVD instruction perhaps primed the participants for a positive response.

Professionals, school administrators and parents were involved in feedback but we did not have feedback from children/adolescents regarding their view on its appropriateness. Further research could explore its approval and suitability as perceived by the targets of the intervention as compared to its disseminators. This is a topic requiring further investigation once the DVD instruction is being used by children.

Table 3. Sample of Survey Questions

***With regard to the guided meditation video session, please give us your feedback on the following (please tick appropriate box)*:**

Compared to my usual mental/thinking activity, at the end of the meditation session, I was	Completely silent inside, no thinking at all	Mostly silent inside, a lot less thinking than usual	Somewhat silent inside, slightly less thinking than usual	No noticeable difference, my usual thinking activity	Not at all silent inside, More thinking activity than usual
With regard to the suitability of this resource for the mental health and wellbeing of YOUNG PEOPLE you work with	Very suitable	Somewhat suitable	Neither suitable nor unsuitable	Somewhat Unsuitable	Very Unsuitable
With regard to the suitability of this as a PERSONAL mental health and wellbeing resource	Very suitable	Somewhat suitable	Neither suitable nor unsuitable	Somewhat Unsuitable	Very Unsuitable
My age is (this information is for research purposes only):			My gender is:	male	female

Discussion

Developed nations like Australia enjoy a level of affluence unprecedented in history. Yet in Australia and much of the developed world many researchers are concerned with what appears to be a generational decline in our wellbeing (Twenge et al., 2010). Some experts explain that as the cost of material affluence and the time and resources this material affluence requires of us has led to a commensurate loss in our ability to attend to our non-material needs – the social, emotional and spiritual (Eckersley, 2009). It appears that the youth of today are facing the brunt of this change and this is expressed in the rising rate of mental disorders in this demographic group (Collishaw et al., 2010; Twenge et al., 2010). Youth today face a social and cultural environment that is dramatically different from what their parents faced when they were the same age. Many of these changes are without cultural or historical precedent. And it is these changes that contribute to the mental pressure of the modern world that seems to be uniquely challenging to today's young minds. Researchers such as Wayne Warburton (Anderson & Warburton, 2012) point to the pervasive media saturation and its deleterious effects on children, including premature sexualisation (Strasburger, 2009), poorer general health (Iannotti, Kogan, Janssen & Boyce, 2009), poorer sleep (Cain & Gradisar, 2010), poorer attention (Swing, Gentile, Anderson, Walsh, 2010), and declines in general mental health (Mathers et al., 2009). An Australian study undertaken by the Australian Communications and Media Authority (Rutherford & Bittman, 2007) found Australian children spend around 5 hours a day on various media. A more recent and comprehensive study by Rideout and colleagues (Rideout, Foehr & Roberts, 2010) found American children aged 8–18 had an average daily media exposure (excluding screen use at school and mobile phone use) of 10.75 hours. Electronic media use has been shown in various studies to be predictors of poorer wellbeing (Hinkley et al., 2014; Iannotti et al., 2009). It is increasingly evident that the many unique mental pressures of the modern world have exposed the vulnerability of young minds doing too much, too soon, too fast.

The developed nations are experts at dealing with the tangible causes of illness – yet we are far less competent at recognising and confronting the intangible illnesses and their multitude of causes. We spend huge amounts of intellectual and financial capital in our quest to understand disease and battle pathology. Public health resources are traditionally directed at mental illness when it is at its most fully developed, and destructive form. And this consumes a massive proportion of the mental health budget despite the fact that mental illness at this stage is often impossible to cure and treatment involves primarily palliation and harm minimisation. If the same resources were directed at prevention (similar to childhood vaccination programs in the prevention of infectious disease) the benefits, though

perhaps not immediately evident, are potentially profound. We know that mental illness is a very large and growing problem. We know that most mental illness develops in the early years of life and often endure for long afterwards, sometimes for life. And yet universal preventative mental health strategies are grossly inadequate. In the face of this crisis universal mental health prevention strategies ought to be evaluated. Those that are promising need to be implemented.

Meditation is one such strategy that is particularly suited as a universal preventative strategy because it is free, easily implemented and was originally designed not as treatment but as a resilience builder. Moreover meditation is something that is widely understood to be relatively easily taught, understood and practised without requiring expensive technology or large amounts of time and resources.

Western research and academics already recognise the need for some kind of mental health skills program. So in this context meditation seems to be a very reasonable option with the added advantage of being well developed and refined in Eastern culture.

A universal primary prevention method like meditation must necessarily be taught at a population level and schools are an ideal platform for this. There is no better place than schools to ensure widespread dissemination – population level inoculation. The question therefore is whether or not meditation confers any preventative benefit on children who practice it.

In my literature review I uncovered 56 studies of meditation in young people of which 27 were delivered within schools. In the course of examining these papers it became obvious to me that there are several unanswered questions about meditation. These questions endure despite the huge number of meditation studies present in the literature and with more emerging all the time. These questions have escaped answers due to widespread methodological and conceptual deficiencies in the vast majority of the meditation literature. These deficiencies boil down to 2 questions. First, how do we define meditation? And second, does meditation have a specific effect beyond placebo? My literature review revealed neither of these questions have yet been answered. In fact even large reviews conducted by Ospina et al. (2007), Manocha (2011) and others confirm that these questions persist, not just in mediation studies in youth, but meditation studies in general.

Despite these lingering questions about meditation the idea of meditation as mindfulness has rapidly risen in popularity and has appeared to produce such a momentum of enthusiasm that professionals and consumers are embracing mindfulness, not realising that there is still no rigorous proof for its specific effectiveness. This observation is particularly relevant as it

relates to schools and young people as we see the emergence of initiatives such as Smiling Mind. The Smiling Mind app has been downloaded more than half a million times and dozens of schools have subscribed to its program, yet there is no published data examining the effectiveness of that particular product. The evidence cited by the developers of Smiling Mind are all appropriated from studies of mindfulness in other contexts and using different delivery systems. Paradoxically the vast majority of these studies, if not all of them, have not taken the necessary methodological steps to exclude non-specific effects. In fact there is even considerable variance in the definition of mindfulness (the independent variable) making it hazardous to even assume that the results of these studies can be generalised across all other studies conducted under the mindfulness banner.

In an important discussion paper dealing with the deficiencies in the meditation evidence base the idea has remerged that mindfulness is in fact only one kind of meditation amongst many (Manocha, 2011). A group of researchers here in Australia have actively worked towards resolving the 2 major questions about meditation (specific effect and definition). They proposed that a definition involving the experience of mental silence as the key definition rather than mindfulness is more consistent with the ancient tradition of meditation and more conceptually robust. In 2 RCTs with this definition significant differences where observed in favour of the mental silence based meditation strategy in comparison to active control methods (Manocha et al., 2011; Manocha, 2003). They were rigorously designed to exclude non-specific effects. A pilot study of mental stillness at Ashfield Primary School, described earlier, produced a substantial reduction in mental health risk. These 2 sets of evidence led me to believe that this approach to meditation was worthy of further investigation as a primary mental health prevention method for young people. Although the body of evidence is smaller than the mountain of data on mindfulness it is considerably more rigorous and conceptually coherent.

In addition to these considerations is the larger logistical consideration – if we were to discover a meditation suitable to wide spread dissemination, how could this be done effectively? The RCTs and Ashfield study relied on a large pool of face-to-face volunteer instructors. Subsequent publicity about the Ashfield initiative led to many inquiries from schools all requesting meditation instructors to visit them, it soon became obvious that there were simply not enough instructors available. The Ashfield study also confirmed that the teach the teacher strategy would not be very effective. Therefore we became increasingly convinced that an instructional format that was independent of live instructors was the crucial next step in the development in our understanding of how to translate the benefits to the wider community. In the Toorak chapter I describe the process we used to develop the

video intervention. Our study was designed in the hope that the video instruction would be equivalent to face-to-face so we were pleasantly surprised to find it was in fact more effective. Indicating its considerable potential as part of a universal prevention strategy. Our search of the literature has not found any other study of meditation video instruction for children. Smiling Mind uses an audio based format however there is no specific evaluation of this resource to date. Nevertheless Smiling Mind has declared its intention to have its intervention in all schools by 2020.

In contrast our mental stillness study provides very promising evidence for effectiveness within the Australian school context. The purpose of this study was to ascertain whether meditation instruction is a viable way to prevent mental health issues in children, and whether instruction delivered via video recording has the potential to be a cost effective way of delivering such an intervention to large numbers of children in schools. Overall, the results were supportive on both fronts. As hypothesised, meditation instruction delivered by live instructors resulted in a significantly greater improvement in SDQ scores, a measure of general mental wellbeing, than was experienced by children in a no intervention control. It was also expected that instruction delivered by video would also result in SDQ score improvements, but that these improvements would be less than those found when using live instructors. In this sample, instruction by video had an even stronger impact on mental health improvements than did live instruction, providing strong initial support for the notion that this approach may be a viable, low cost preventative mental health strategy.

The next question was to determine whether the resource would be willingly disseminated by health professionals. To this end we developed a survey, the largest survey of its kind, and gathered responses from 2597 cross disciplinary professionals who work with a wide range of young people. Teachers were the majority of professionals represented followed by nurse/midwives, school counsellors and community workers, deputy principles and psychologists, principles and GPs. The sample was a national convenience sample comprised of respondents from all the major states of Australia including NSW, Victoria, Western Australia and Queensland. The evaluation of the resource in this large national cohort of professionals working with children found it to have broad positive appeal; it was considered to be both appropriate and potentially beneficial. Meditation itself received a broad level of acceptance within this section and is generally perceived as having potential benefits for practitioners. In general professionals working with children considered this resource useful in combatting anxiety and exam stress and enhancing focus and engagement. Most professionals working with children felt the mental stillness meditation was suitable for children and suitable in the school context. The almost complete acceptance of the potential

benefits of this resource and its suitability for school children suggest that the mental stillness audio-visual resource would be willingly disseminated by health professionals.

To our knowledge this is only the second school-based meditation study with mental silence as its core objective and the only study to evaluate the effects of a DVD meditation instruction on primary school children. It is also a needed addition to the very limited number of research papers involving meditation as a primary mental health initiative in primary school children, let alone a unimodal meditation intervention. It is hard to compare these findings to previous studies. Only 5 previous controlled studies using a meditation (or similar) intervention with children were found by the authors, and these typically differed from the current study in methodology. Hilt and Pollak (2012), who found meditation and distraction were equally effective in reducing induced rumination, used an untrained instructor. Corbett (2011) found meditation instruction did not lead to improvements in a range of relevant outcomes (self-reported levels of positive and negative affect, state anxiety, test anxiety, and salivary cortisol level) but used teachers who had received just a single training session to deliver the intervention. Kim et al. (2002), who found that Brain Respiration-training had a positive short-term impact on EEG patterns related to emotional stability and educational achievement, used a breathing exercise that was not described in any detail, and used a single trial intervention. Kratter and Hogan (1982) used a meditation modelled closely on Bensons relaxation response but solely examined children with a pre-existing disorder, ADHD in this case. In addition this cohort was seen in an outpatient setting, not in schools and their sample size was small, just 24. The similar study in terms of design, by Linden (1973), produced similar results. Linden used a single meditation instructor and followed a standardised strict script and protocols, and found that, compared to a wait list control and a guidance group, the students who meditated had improved attentional focus and less test anxiety. Thus, the closer the methodology of previous studies to the current study, the more similar the results. Although methodologically different, Joyce et al. (2010), was most similar to our study in their study population and measures. Using mindfulness meditation in an uncontrolled trial they used the Strengths and Difficulties Questionnaire, the same measure of mental health risk as our Toorak study. In addition its cohort were all Australian primary school children. Without a control it is reasonable to expect a greater reduction in SDQ scores compared to a controlled trial. However we found that its effects were more modest than our study. The total SDQ scores reduced by 12.4% in Joyce et al.(2010), compared to a 38% decrease in total SDQ scores in our studies face to face group and a 75% reduction in our video group. Additionally Joyce et al. (2011) found no statistically significant improvements in the prosocial scale. The Toorak study on the other hand found statistically significant improvements in the prosocial scale in both the

video (34% improvement), and face-to-face (30% improvement) meditation groups. This compares favourably to other mental health interventions that are generally more resource intensive and use a variety of interventions to effect change. Powell, Gilchrist and Stapley (2008) studied 107 8–11 year olds with identified emotional and behavioural difficulties or at risk of exclusion. In a school study, children in the intervention group participated in a self-discovery program involving massage, yoga and relaxation once a week for 45 minutes over 12 weeks. The control group participated in school as usual. The SDQ was used as a measure. The total difficulties score at the end of the intervention showed statistically significant reductions compared to control (19% improvement $p = 0.031$), however these reductions were inferior to those experienced by the video group in our Toorak study ($p = 0.002$) and roughly equal to the face–to-face meditation group ($p = 0.036$). Significantly the resources needed to deliver the self-discovery program were far more complicated, intensive, time consuming and costly compared to the Toorak study. The long-term viability of such interventions are questionable due to the inherent difficulties in having trained professionals to deliver its program and its cost to schools to implement.

In terms of the finding that the video intervention was more effective than the face-to-face intervention, there are several factors that could account for the finding. First, administration via DVD allowed for a more standardised, consistent delivery of instruction, and thus greater treatment fidelity. Second, although face-to-face instructors might seem theoretically preferable, practical feedback from the students and teachers provided anecdotal evidence that different instructors achieved different levels of rapport and inspired different levels of confidence with different groups of children. Third, feedback discussions with teachers and children provided anecdotal evidence that the DVD, which used cartoon-based instruction was found more engaging and less distracting than live instruction. If true, this may be due, to some extent, to the prior training of the instructors used in this study, who had more experience with adult than child tuition. Given the inherent difficulties in guiding a group of school children to sit still, focus, and maintain their attention, this task may have stretched the abilities of those instructors least experienced with teaching children. To clarify the finding of greater efficacy via video delivery, replications of this study would benefit from empirically testing children's differential experiences with their live instructors, and children's experiences of cartoon versus live instruction.

There are several methodological reasons to accept the validity of the current findings. The current study, building on findings from previous studies, was able to use a much stronger study design. A single, well-validated global measure of mental health risk, the SDQ, was used. The sample size is the largest so far reported in the literature for a study of this kind.

Full standardisation and high program fidelity was possible using the DVD intervention, and the face-to-face instructors were highly trained.

This study is the first to assess the effects of recorded (DVD) meditation instruction. We argue that this is an important mode of delivery to consider for population-wide implementation because our findings show it is effective, and because this study demonstrates that such an intervention can be delivered at low cost. Thus such an intervention could be delivered widely, and even children in remote areas could benefit. Also, this approach, if properly implemented, would overcome the important issues of instructor competence and treatment fidelity which can represent serious impediments to the successful implementation of large scale meditation strategy. Corbett (2011), who failed to find a positive effect for meditation, commented that professional instructors, although preferable, were not feasible for her study. This is a key reason she may have failed to find an effect, and demonstrates precisely the reason why meditation in schools necessarily depends on a strategy that does not involve the cost associated with live, professional/competent instructors.

In 3 of 4 controlled studies which were conducted in schools, full randomisation was not feasible. Although our study was also not randomised the advantage of our real-world study is that it demonstrated the immediate potential for practical implementation of a low-cost meditation program in a school environment. Ideally a later RCT with a larger control sample would address the deficiencies that non-randomisation and uneven group sizes presented in this study. Such a study should also consider using a sample population broader than just prep (kindergarten) and first class students. Another possible study limitation is that there was some potential for teacher bias. Teachers filling out the questionnaires were not blinded to the intervention groups, and therefore the subjective measures were susceptible to various biases depending on the teacher's attitude to meditation. Our results would also have been strengthened if we had both teachers and parents filling out the SDQ for participants. Along with randomisation, this would help control for the impact of the home environment on participating students.

Despite these limitations, the implications from this study are clear. Meditation instruction via DVD has the potential to be effective in improving child mental health and thus preventing mental health issues developing further into adulthood. Additionally this study could be easily replicated, DVD instruction standardises delivery, negating the difficulty in replicating meditation studies that vary widely in their various meditation techniques and the individual instructor's style of delivery and generally fail to describe in detail their method of meditation delivery. Such an intervention can also be delivered widely and at low cost.

This compares favourably to other initiatives. For example, the flagship government initiative in Australia is the KidsMatter program which can take from 18 months to 3 years to be firmly embedded and implemented. It seems reasonable to suggest that such a program is more likely to be implemented by highly motivated and well-resourced schools because of the level of commitment required. Thus, there seems to be a clear need for simple mental health interventions that are quickly and easily implemented, cost effective and demand little extra time or education from the teachers and staff. The mental stillness program could be one such intervention. It could be used as a stand-alone program or in conjunction with a larger more comprehensive school program like KidsMatter. However, before such an approach is taken, the evidence base for meditation intervention via video needs to be strengthened, and further studies to replicate these findings in a larger, wider RCT should be undertaken.

Future directions

Random control studies, though logistically difficult to conduct in a school setting, will help eliminate potential confounders. Other confounders can be removed by having more unimodal meditation studies in children; this will eliminate the confounding influences of admixed strategies in meditation studies. Additionally RCTs with an active control will be essential to advancing our understanding of meditation's unique potential and effects beyond placebo. Comparing the mental stillness method with mindfulness or Benson's relaxation response for example will help determine the differences, if any, between meditation methods. Unfortunately we could not recruit volunteer instructors to teach mindfulness or relaxation techniques to our control group. Teachers filling out the questionnaires were not blinded to the intervention groups, and therefore the subjective measures were susceptible to various biases depending on the teacher's attitude to meditation. To avoid teacher bias future studies utilising the SDQ would be strengthened if both teachers and parents filled out the SDQ for participants. Along with randomisation, this would help control for the impact of the home environment on participating students.

Future studies should also consider carefully the level of experience and training a meditation instructor has before committing to a meditation study. As quality meditation instructors are difficult to recruit audio-visual meditation resources are well worth consideration. Further study of the mental stillness audio-visual resource will be necessary to answer the important question of replicability. Finding more schools willing to implement and evaluate the mental stillness audio-visual resource will be a necessary progression in further testing its effectiveness. In addition evaluating the mental stillness audio-visual resource on various age groups is needed to prove its applicability beyond lower primary

school children. Further development of the resource may be needed to make it suitable for various age groups, from lower primary, to upper primary, junior high school, senior high school to young adults.

Lastly, delivery platforms and strategies for dissemination can be further developed. Possible modes of dissemination and delivery beyond a DVD might include a website, app or podcast.

Appendices

Appendix 1. Face-to-face instruction – mental stillness exercises for KG children

Initial management included settling the class, asking them to sit on the ground cross legged or comfortably on their chairs. Students were directed to have space between each other of at least an arm's length. Students that tended to distract each other were separated. The class teacher was asked to sit at the front with the instructor to meditate in full view of the class. Depending on the instructor's preference one of the following sequences was used.

Traditional Affirmation Meditation

- To start let's take a few deep breaths in and out very slowly and just pay attention to how you feel inside. To begin we place our right hand on the lower part of our stomach just above our left hip. Now we say silently inside ourselves, not out load 'I am the true knowledge' say this just a few times.
- Now we move our right hand to the left hand side of the upper part of our stomach just below the ribs and we say inside ourselves a few times 'I am my own master'.
- Now we move our right hand to our heart. Say to ourselves a few times 'I am pure awareness, I am pure awareness'.
- Now we place our right hand where our left shoulder joins our neck, now we say a few times 'I am not guilty'.
- Now put our right hand flat on our forehead grasping the temples gently, now we say a few times 'I forgive everyone and I forgive myself'.
- Now we place the centre of the palm of our hand on the top of our head in the spot where we would balance a ball while sitting really straight. Say a few times 'I am the pure silence or please make me silent inside' say this a few times 'please give me the feeling of complete silence inside'.
- Now we keep our attention gently focused where our hand is pressing at the top of our head then slowly raise that hand up a few inches and allow our attention to flow up into the silent space between our hand and the top of our head.
- Bring your hands back down to rest on our lap with the palm facing upwards keeping our attention gently focused at the top of our head or in the silent space just above the top of our head.

- And now just sit quietly with both hands on our lap with the palms facing up sitting nice and straight. Now let's sit for a few minutes and see if we can experience the silence. If you feel your mind wandering please bring your attention back to the top of your head, put your right hand on the top of your head as we did before and say 'I am the pure silence or please make me silent inside'.
- We will sit in complete silence for a little while.

Simon Says

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Put your right hand on your tummy.
- Put your hand on your heart.
- Put your hand on your neck.
- Put your hand on your forehead.
- Put your hand on the top of your head.
- Put your hand above your head.
- Put your hand on your lap.
- Feel the wind in the sky above.

Flowers

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Imagine a flower in your tummy, no slowly let it open and let the peace and calm come out.
- Imagine a flower in your heart, no slowly let it open and let the love come out.
- Imagine a flower in your neck, no slowly let it open and let the sweetness come out.
- Imagine a flower in your forehead, now slowly let it open and let the silence come out.
- Imagine a flower on top of your head, no slowly let it open and let the joy come out.
- Let the flower on the top of your head open really wide, let all the thousands of colourful rainbow petals move in the breeze.

Golden String

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Imagine a golden string curled up at the bottom of your back.
- Let that string slowly uncurl and start moving up through your body.
- The string is moving through your tummy.
- Now it's moving through your heart and chest.
- Now it's moving up through your neck.
- Now through your head.
- Now it's coming out of the top of your head.
- It's going up into the sky.
- Follow it up as it reaches the clouds.
- Feel all quiet and cool inside, surrounded by fluffy clouds.
- Raise your hands towards the sky, wiggle your fingers a little bit and see if you can feel the cool clouds moving around your hands and fingers.

Tree

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Imagine your legs are the roots of a tree that goes into the mother earth.
- Body is the trunk.
- Your arms are the branches.
- Let your branches (arms) grow up and out till they are touching the top of your head.
- Now let your branches (arms) grow up into the sky, your fingers are the leaves, let them move in the breeze.
- Put your arms down, but keep feeling the branches and leaves moving in the sky above your head.
- Feel the water from the earth move up into your body, into your head and out into the branches and leaves.

Tying up Our Attention

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Hold your hands out, palm up in front of you.
- Put your attention in your hands. It's very important that we always know where our attention is. It should be at the top of our head.
- Now winding up your attention along your body to the top of the head.
- Tie a knot to keep your attention above your head.
- Now sit and quietly with your attention above your head.

Rainbow

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Hold your hands out, palm up in front of you.
- Now put a rainbow around your body, each movement has a different colour.
- This yellow colour looks after my legs, this green colour looks after my tummy, this red colour looks after my heart, this blue colour looks after my neck, this white colour looks after my forehead, this beautiful rainbow colour looks after the top of my whole body.
- The rainbow protects us from all the bad thoughts and feelings by keeping them out.

Rainbow power

- Whenever we start having bad thoughts or feelings that won't go away, we can put a rainbow on ourselves.
- If we have a bad thought or funny idea in our head we can put a mini-rainbow on our head, that will catch that bad thought/feeling and then we just throw it out of the window.
- If we see someone who is not happy or if they are doing something wrong we can write their name on our left hand, using our right hand and then put a rainbow on it.

The Magic Bubble/Golden Ball

- Eyes closed.
- Breathing slowly, in through your nose and out through your mouth.
- Put your hands on your lap, palms up, back straight, legs crossed.
- Put you right hand, palm up, just in front of your tummy.
- Imagine a golden ball / delicate bubble balancing in your hand.
- Raise your right hand up while very carefully balancing the ball/bubble on your hand so that it doesn't fall off / float away.
- Very carefully put the ball/bubble on the top of your head.
- Press gently on the top of your head so that you can feel the ball/bubble balancing there.
- Let the ball/bubble balance carefully on the top of your head.
- After some time, feel the ball/bubble float up just above your head, then up to the roof, then through the roof into the sky.
- Follow it up, feel the ball/bubble floating in the cool clouds.

Appendix 2. Transcript of the video instructions

We are going to take some time to feel the silence inside ourselves. It is simple and easy and very relaxing and will help you feel good inside. First of all please sit comfortably, you can either sit on a chair with your feet flat on the floor and a little bit apart or sit on the floor with your legs crossed. Then place both your hands on your lap with the palms of your hands facing upwards.

Now you can either close your eyes and follow the instructions by just listening or you can open your eyes and follow the pictures if you haven't done it before or if you need help remembering. It shows you where to put your right hand and your attention. And listen for my instructions as we go through the exercise.

Along with the hand positions there are some affirmations which are just silent statements that we say to ourselves inside to help us become more balanced and quiet within. There is no need to say them out load and we just say each one only a few times.

To start let's take a few deep breaths in and out very slowly and just pay attention to how you feel inside. To begin we place our right hand on the lower part of our stomach just above our left hip.

Now we say silently inside ourselves, not out load, 'I am the true knowledge', say this just a few times.

Now we move our right hand to the left hand side of the upper part of our stomach just below the ribs and we say inside ourselves a few times, 'I am my own master'.

Now we move our right hand to our heart.

Say to ourselves a few times, ‘I am pure awareness, I am pure awareness’.

Now we place our right hand where our left shoulder joins our neck, now we say a few times, ‘I am not guilty’.

Now put our right hand flat on our forehead grasping the temples gently, now we say a few times, ‘I forgive everyone and I forgive myself’.

Now we place the centre of the palm of our hand on the top of our head in the spot where we would balance a ball while sitting really straight.

Say a few times, ‘I am the pure silence or please make me silent inside’, say this a few times, ‘please give me the feeling of complete silence inside’.

Now we keep our attention gently focused where our hand is pressing at the top of our head then slowly raise that hand up a few inches and allow our attention to flow up into the silent space between our hand and the top of our head.

After a short while we can bring our hand back down to rest on our lap with the palm facing upwards but let’s keep our attention gently focused at the top of our head or in the silent space just above the top of our head.

And now just sit quietly with both hands on our lap with the palms facing up sitting nice and straight. If you haven't already closed your eyes you can close them now. See if you can feel the silence starting to grow inside yourselves. If any thoughts come into our attention just ignore them. If the thoughts persist we can try saying silently ourselves, 'I forgive these thoughts' or 'I am not these thoughts' or 'please take away these thoughts'.

Now let's sit for a few minutes and see if we can experience the silence. If you feel your mind wandering please bring your attention back to the top of your head, put your right hand on the top of your head as we did before and say, 'I am the pure silence or please make me silent inside'.

We will sit in complete silence for a little while.

[Gentle ocean sounds play for a few minutes.]

Now let's gently open our eyes and try to hold on to that quietness inside while we get on with the rest of the day.

[End of video]

Appendix 3. Benson's relaxation response vs mindfulness body scan

Table 3. Comparison of Benson's relaxation response and mindfulness body scan

Benson's relaxation response	Mindfulness body scan
1. Sit quietly in a comfortable position. 2. Close your eyes. 3. Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed. [Relax your tongue—and thoughts will cease.] 4. Breathe through your nose. Become aware of your breathing. As you breathe out, say the word "one"***** silently to yourself. For example, breathe in, and then out, and say "one"*****, in and out, and repeat "one."***** Breathe easily and naturally. 5. Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed and later with your eyes opened. Do not stand up for a few minutes. 6. Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "one."***** 7. With practice, the response should come with little effort. Practice the technique once or twice daily, but not within 2 hours after any meal, since the digestive processes seem to interfere with the elicitation of the relaxation response. *****Choose any soothing, mellifluous sounding word, preferably with no meaning or association, in order to avoid stimulation of unnecessary thoughts.	• Start to disengage the mind from busy thoughts and ideas. Close your eyes softly. • Gently gather all your attention into the centre of your body. • Try to reel in all thoughts that take you to the outside world • Allow the outside world to gradually melt away and dissolve into empty space. • Begin by bringing your attention to the area around the crown of your head and gradually work down through your body to the tips of your toes. • Focus on the area around the crown of your head. Gradually focusing on this area imagine that all the tension in the muscles gradually dissolves away. • Then focus on the temples and forehead, imagining any tension headache or pain dissolves away, disappearing as you place your mind on this part of the body – imagine the tension draining down through your body into the ground. • All the tension in your head drains down through your body into the ground. • Then imagine the tension in your jaw and ears gradually melts away – as you place your mind on this area, imagine any tension draining down through your body into the ground… • Pause for a short while and then think to yourself my head is now comfortable and relaxed. • We gently work our way down the body relaxing each part and letting the tension drain away. • Focus on the area of tension around your neck and shoulders. • Try to relax the shoulders … lift them up gently and as they drop, imagine all the tension dissolving down into the ground, do this several times. • As you do this try to feel that any tension or weight that you are carrying in your shoulders melts away … feel as though you are really letting go of all the tension that is being held in your shoulders. • Think to yourself … my neck and shoulders are now comfortable and relaxed. • Relax your arms and hands imagining all the tension in these areas drains out of your fingertips and far into the distance. • Focus on the back and bring your mind to the top of the spine focus on any area of tension that may have built up around the spine. Place your mind on these areas of tension and allow the knots to unravel as you focus on them and the

	tension dissolves down your spine out through the soles of your feet, into the ground.

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