

Research Module Assignment 1: A critical appraisal of research studies into mindfulness-based interventions in an area of your choice; if appropriate, contextualise this within the wider evidence base for mindfulness-based interventions. January 2011.

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Mindfulness Interventions for Adolescents

A recent study (Marks, Sobanski, & Hine, 2010) shows that dispositional mindfulness moderates psychological dysfunction in adolescence. The authors suggest that interventions to increase dispositional mindfulness in childhood may support the well-being of adolescents confronted by the inevitable stresses of growing up. This implies that teaching adolescents mindfulness techniques at school might improving overall well-being. Here I critically appraise existing research on mindfulness interventions during adolescence in the context of assessing which research methods would be appropriate to apply in, for example, the Scottish school system.

The Burke Review

Since the work of Jon Kabat-Zinn in the 1980's (Kabat-Zinn, 1996) there has been a growing interest in the use of mindfulness based interventions for a range of conditions – notably recurrent depression (Segal, Williams, & Teasdale, 2002). There is now sufficient volume of work to justify a dedicated journal – *Mindfulness* Springer. Inevitably there have been many studies on interventions in children and adolescents but fortunately there is also a recent review of this work (Burke, 2009).

(Burke, 2009) searched major databases for studies published in English that used “secular contemplative mindfulness meditation techniques” (Burke, 2009, p. 135). She found 15 studies (1 with preschool, 6 with elementary school and 8 with high school age children). They were not uniform enough to perform a formal meta-analysis of data. Only five were controlled studies with pre-post test design (one with a non-random wait list). Of these five only three stated selection of control group was randomized. As the author points out the majority of the studies were of an exploratory nature testing the feasibility and acceptability of such interventions. This is appropriate considering much of this work is pioneering. All studies were supportive of mindfulness interventions with small to large effect sizes where reported. We should be aware though that this may only be indicative of

a positive publication bias.

Intention has been proposed as a major component of mindfulness (S. L. Shapiro, Carlson, Astin, & Freedman, 2006). We should therefore be cautious in extrapolating the results in Burke (2009) to a general population of school children. The challenges of using the standard mindfulness teaching tools, such as eating a raisin and of home practice, in a school setting have been outlined by Burnet (2009)

Need for Active Controls and Measurement of Adherence

One of the clinical studies in Burke (2009), (Biegel, Brown, Shauna L. Shapiro, & Schubert, 2009) stands out for being particularly thorough and for examining the time spent in mindfulness practice – although this wasn't its main aim. This study looked at 14-18 year olds who volunteered from a psychiatric outpatients department. The 104 recruits were randomized between a manualised Mindfulness Based Stress Reduction (MBSR) (Kabat-Zinn, 1996) course and a Treatment As Usual (TAU) wait list control. Both self-reported questionnaires and clinical measures of general psychological and social functioning pre-post treatment and at a three month followup were used. Significantly the non-self reported measures were blind. Treatment received from other sources was also monitored pre-post intervention and at followup.

All the self-reported measures showed improvements with medium to large (0.59 – 1.11 Cohen's d) effect sizes for all but sleep quality (0.14) by followup. The non self-reported clinical measures also showed significant results ($p < .005$) at followup with an effect size of -1.02. The results appear to be very positive. On the other hand there was no improvement in the treatment received from other sources in the MBSR group over TAU. Therapy as well as medication and hospitalisation remained un-changed. This may be an artefact of the short time scale of the study but does mean the study has not demonstrated reduced healthcare costs. Reliable change index scores are calculated for each of the self-reported measures (Biegel et al., 2009, p. 863). These show that although MBSR outperforms TAU on nine out of ten of the measures it only shows improvement for more than half the completing participants in two of the measures (State-Trait Anxiety Inventory – present and past) at 52.9% and 55.9% against 20% and 40% in TAU. For another measure that also looks at anxiety (SCL-90 – Anxiety) only 23.5% of the MBSR showed improvement against 20% in the TAU group. These figures would be lower if all ($n=104$)

participants had been included rather than just completers ($n=74$). An exploratory restricted maximum likelihood analysis tested the predictive role of frequency and duration of the different meditation techniques and suggested that increased frequency and duration of sitting meditation predicted positive outcomes in self-reported measures. The authors advise caution in interpretation of these results but they do indicate that those who were motivated enough to sit regularly benefitted from the course over those who didn't. This has been documented previously (Carmody & Baer, 2008).

The biggest drawback of the study, as well as other examinations of mindfulness-based interventions, is the lack of an active control group. A mindfulness-based course involves a significant commitment from the participant and is liable to have a strong placebo or Hawthorne effect. A recent review (Toneatto & Nguyen, 2007) examined fifteen controlled studies that used mindfulness-based approaches to treat anxiety and depression and concluded that MBSR does not have a reliable effect on anxiety and depression when active controls are used. In the face of this criticism future studies of mindfulness-based approaches must address this lack of active controls and examine the level of adherence to the training programme.

Non-clinical Interventions

A well designed pilot study has been carried out, since Burke 2009, on children in Florida USA (Liehr & Diaz, 2010). The sample size was small with only 18 participants who were randomly assigned to either a mindfulness-based programme designed by Mindful Schools ("Mindful Schools," n.d.) or a general health education class. Importantly the supervised interventions took place every day for two weeks giving a continuity of practice that isn't achieved in weekly based interventions where the participants may do nothing between lead sessions. Participants averaged 9.5 years of age and 64% were from Caribbean or Central American countries. Pre and post test self-reported questionnaires were used to assess levels of anxiety and depression. The authors report a significant improvement in the measure of depression ($p = .03$) but not quite for anxiety ($p = .07$).

Unfortunately the authors do not report effect sizes or standard deviations (SD) to allow effect sizes to be calculated. They do however report ranges for the different measures. By definition the SD of a sample is smaller than the range so it is possible to calculate the minimum effect size by taking the average of the ranges as the SD for calculating Cohen's d

– the most pessimistic assumption. Doing this gives a large effect for depressive symptoms (-0.97) but a small one for anxiety (-0.11). By including an active control and a measure of participation this small study provides good evidence of the efficacy of mindfulness-based approaches but is let down by the lack of a followup. We have no idea whether these effects lasted beyond the summer school in which the experiment took place.

Another study (Huppert & Johnson, 2010) looked at a very different set of school children – 155 fourteen and fifteen year old, predominantly caucasian boys at two English private schools. They were randomized by class with different teachers taking the treatment and control groups. The mindfulness training took the place of regular religious education lessons for four weeks. The control group continued with their regular lessons. This amounted to a TAU rather than active control. The study failed to find a significant difference between the intervention and control groups. This was attributed to the small exposure to MBSR – forty minutes a week instruction with a suggestion of just eight minutes of home practice. Post treatment mindfulness scores even decreased in the MBSR group compared to the TAU group. This was put down to one of the initial realisations of mindfulness training being that we aren't very mindful. The study included self-reported measure of personality as well as resilience, well-being and mindfulness. Multiple regression analyses of baseline data showed that some personality types (conscientiousness and emotional stability) had a significant contribution to mindfulness scores. The level of home practice was considered and found to significantly predict the change in mindfulness thus supporting the hypothesis that the amount of home practice was important. Two thirds of the intervention group practiced less than three times a week so there was very little continuity between lead sessions for the majority of participants. The lack of an initial significant result may have caused the authors to fish for significant correlations. It isn't clear that they set out to measure the effects of home practice. This doesn't mean the results should be ignored but they should be treated with caution.

Difficulty in Defining Active Controls

Although there are a limited number of studies carried out on high school children it is common for undergraduate volunteers at universities to be the subjects of non-clinical studies and these subjects are often only just out of their teens. The university environment

allows for more rigorous experimental design than would be possible in a school setting and so it is worth considering one such study (Delgado et al., 2010) whose results may be applicable to younger people. In this study the thirty six female volunteers ranged in aged from eighteen to twenty four years and had been selected from a larger sample ($n=438$) by scoring highly on a worry questionnaire. Participants were randomized between a twice weekly mindfulness programme and a progressive muscle relaxation programme. During the relaxation programme participants were asked to recognise when they were worrying and postpone this worry to a set period each day. Pre and post intervention psychological and psychophysiological measures were used. Most mindfulness studies use only psychological measures, often only self-reported psychological measures, so use of physiological measurements is of interest. They took the form of recording heart rate changes during periods of rest, meditation/relaxation, self-induced worry and white noise or picture stimuli.

The self reported psychological measures showed no difference between mindfulness and relaxation groups but both interventions had an effect. The averaged effect size across all seven indexes (calculated here pre and post intervention rather than control vs intervention) is 0.52 for the mindfulness intervention and 0.49 for the relaxation control. For some indexes the SD was higher than the average (e.g. the Beck Depression Inventory post intervention average = 4.9, SD = 6.5) which suggests the data was not normal and should be treated with care. The physiological measures produced similar results. The similarities in effect between treatment and control may be caused by the nature of the control. Relaxation training has similarities to the body scan in MBSR and becoming aware of ones worries is similar to the decentering of MBCT (Segal et al., 2002). Both mindfulness and relaxation interventions were delivered by an experienced meditator who may have embodied a mindful approach to both groups. This study should, perhaps, be considered a comparison between two mindfulness interventions with no control.

Conclusions

The paper that inspired this report (Marks et al., 2010) was not a trial but a descriptive study based on a survey of 317 high school pupils between fourteen and nineteen years of age with an approximately equal gender mix. They completed questionnaires that assessed recent life stressors, ruminative thought style, mindful attention, depression, anxiety and

stress. Correlation analyses showed a relationship between personality types and mindfulness. Moderation analyses demonstrated that a disposition to ruminate exacerbated the relationship between stressful life events and symptoms of anxiety and depression whilst a disposition for mindfulness attenuated this relationship. As this is a descriptive study it is not appropriate to draw conclusions regarding causal relationships. An intervention, that showed temporal priority and eliminated plausible alternative explanations, would be required to demonstrate that. The other studies mentioned here illustrate that designing interventions that could demonstrate causality but fall short in various respects that should be taken into account in future studies.

Some form of **active control** is necessary that does not involve mindfulness. A TAU group should also be included or the relative benefit of mindfulness over other approaches can not be assessed.

If the intention is to benefit adolescent's well-being into their adult lives then **followup** assessments are necessary to demonstrate long term benefits – ideally over a period of years.

Some **personality types** appear to benefit more from mindfulness interventions than others. Measures should be included to test if the interventions are only suitable for a subset of the population so they may be targeted.

Many studies have been based on MBSR or MBCT eight week interventions. These same tools are now being applied in other contexts. This allows comparisons between studies but there is little work on whether the **format of interventions** is appropriate for different audiences – notably non-clinical participants. As the Florida study above (Liehr & Diaz, 2010) illustrates large effect sizes can be achieved with short, intense interventions. Such interventions may be more practical and cost effective to administer when the participants aren't motivated to practice at home. **Adherence** to practice regimes should be measured or estimated.

References

Biegel, G. M., Brown, K. W., Shapiro, S. L., & Schubert, C. M. (2009). Mindfulness-Based Stress Reduction for the Treatment of Adolescent Psychiatric Outpatients: A Randomized Clinical Trial. *Journal of Consulting and Clinical Psychology*, 77(5), 855-866.

doi:10.1037/a0016241

Burke, C. A. (2009). Mindfulness-Based Approaches with Children and Adolescents: A Preliminary Review of Current Research in an Emergent Field. *Journal of Child and Family Studies*, 19(2), 133-144. doi:10.1007/s10826-009-9282-x

Burnet, R. (2009, October). *Mindfulness in Schools Learning lessons from the adults - secular and Buddhist* (MA Disertation). University of Sunderland. Retrieved from http://mindfulnessinschools.org/images/stories/keyDocuments/Mindfulness_inSchools_Burnett.pdf

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioural Medicine*, 31(1), 23-33. doi:10.1007/s10865-007-9130-7

Delgado, L. C., Guerra, P., Perakakis, P., Vera, M. N., Reyes del Paso, G., & Vila, J. (2010). Treating chronic worry: Psychological and physiological effects of a training programme based on mindfulness. *Behaviour Research and Therapy*, 48(9), 873-882. doi:10.1016/j.brat.2010.05.012

Huppert, F. A., & Johnson, D. M. (2010). A controlled trial of mindfulness training in schools: The importance of practice for an impact on well-being. *The Journal of Positive Psychology: Dedicated to furthering research and promoting good practice*, 5(4), 264. doi:10.1080/17439761003794148

Kabat-Zinn, J. (1996). *Full Catastrophe Living: How to Cope with Stress, Pain and Illness Using Mindfulness Meditation*. London: Piatkus Books.

Liehr, P., & Diaz, N. (2010). A Pilot Study Examining the Effect of Mindfulness on Depression and

Anxiety for Minority Children. *Archives of Psychiatric Nursing*, 24(1), 69-71.

doi:10.1016/j.apnu.2009.10.001

Marks, A. D. G., Sobanski, D. J., & Hine, D. W. (2010). Do dispositional rumination and/or mindfulness moderate the relationship between life hassles and psychological dysfunction in adolescents? *The Australian and New Zealand Journal of Psychiatry*, 44(9), 831-838.

doi:10.3109/00048674.2010.487478

Mindful Schools. (n.d.). Retrieved December 2, 2010, from <http://mindfulschools.org/>

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based Cognitive Therapy for Depression: A New Approach to Preventing Relapse* (1st ed.). Guilford Press.

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 373-386.

Toneatto, T., & Nguyen, L. (2007). Does mindfulness meditation improve anxiety and mood symptoms? A review of the controlled research. *Canadian Journal of Psychiatry. Revue Canadienne De Psychiatrie*, 52(4), 260-266.

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