Learning and Instruction 58 (2018) 34–41

Contents lists available at ScienceDirect

Learning and Instruction

journal homepage: www.elsevier.com/locate/learninstruc

Audio-guided mindfulness training in schools and its effect on academic attainment: Contributing to theory and practice

Laura S. Bakosh[a], Jutta M. Tobias Mortlock[b,*], Dawn Querstret[c], Linda Morison[c]

[a] Inner Explorer, Inc., Franklin, MA 02038, United States
[b] School of Arts and Social Sciences, City, University of London, London EC1 0HB, United Kingdom
[c] School of Psychology, University of Surrey, Guildford GU2 7XH, United Kingdom

ARTICLE INFO

Keywords:
Mindfulness
Schools
Mindfulness-based intervention (MBI)
Academic attainment
Randomized controlled trial (RCT)

ABSTRACT

We report the results of a randomized trial (N = 337) examining the effectiveness of a daily audio-guided MBI in raising academic achievement in 16 volunteer classrooms across two socio-demographically diverse United States primary schools. The study's findings were that, over the intervention period, improvements in Math scores, Social Studies scores and Grade Point Averages (GPA) were generally higher for students in intervention classrooms. However, confidence intervals were wide and there was pre-existing variability between schools and grades, resulting in few significant differences as a result of the intervention and generally low effect sizes. Through a careful discussion of the study's results, the paper contributes to theory by generating a comprehensive agenda for follow-up research. The study also contributes to practice by reporting on the effectiveness of technology-enabled mindfulness training because participating teachers seemed able to implement the intervention with almost no further training or need for hiring external mindfulness experts.

1. Introduction

Mindfulness can be defined as a process of openly attending, with awareness, to one's present moment experience (Brown, Ryan, & Creswell, 2007). An exponentially increasing body of evidence accumulated since the 1990s suggests a solid link between mindfulness interventions and increased wellbeing and cognitive performance (Creswell, 2017).

In the face of this growing enthusiasm for mindfulness, scholars advise against taking too uncritical a stance towards the extensively reported salubrious effect of mindfulness training (Baltzell, 2016; van Dam et al., 2018), and call for more nuanced and balanced reporting of the research evidence in this field (Coronado-Montoya et al., 2016). Nonetheless, the potential of mindfulness and its capacity to increase attention and awareness (Brown et al., 2007) is especially relevant for education today, because it might help counteract the increasing tendency among students to get distracted by a proliferation of social media activity, shown to adversely affect academic achievement (Hollis & Was, 2016).

While mindfulness training may serve as a potential catalyst for higher student achievement, the evidence-base examining the potential link between Mindfulness-Based Interventions (MBIs) in schools and academic attainment is still patchy. The evidence from prior meta-analyses of MBIs in schools (Zenner, Herrnleben-Kurz, & Walach, 2014; Klingbeil et al., 2017) and with general youth populations (Zoogman, Goldberg, Hoyt, & Miller, 2015) points to broad potential benefits but more research is needed in this emerging field. In particular, Klingbeil et al.'s (2017, p. 5) comprehensive meta-analysis of 6121 children and youth participating in school and clinical MBIs found generally small, positive effects on young people's overall outcomes, as well as specifically on academic achievement, however the authors reported on varying research quality across the 76 papers included in the analysis. By the same token, the findings from recent systematic reviews on mindfulness training with children and adolescents in general (Black, 2015) and in school settings (Felver, Doerner, Jones, Kaye, & Merrell, 2015; Maynard, Solis, Miller, & Brendel, 2017, p. 5) report on considerable potential benefits in domains such as executive functioning as well as physical and mental health. However, Maynard et al.'s (2017, p. 5) systematic literature review suggests that not enough evidence exists to determine undisputable statistical effect on academic grades.

1.1. MBIs and academic attainment in schools

Programs designed to regulate emotional arousal and enhance cognitive functioning are collectively called Social Emotional Learning (SEL) programs and are increasingly considered foundational for

* Corresponding author.
E-mail addresses: jutta.tobias-mortlock@city.ac.uk (J.M. Tobias Mortlock), dawn.querstret@surrey.ac.uk (D. Querstret), l.morison@surrey.ac.uk (L. Morison).

https://doi.org/10.1016/j.learninstruc.2018.04.012
Received 30 September 2017; Received in revised form 25 April 2018; Accepted 30 April 2018

cognitive and intellectual development in schools because SEL promotes pre-frontal cortex development associated with executive functions (McClelland, Morrison, & Holmes, 2000; Payton et al., 2008; Pelco & Reed-Victor, 2007). A meta-analysis reviewing 213 school-based SEL interventions found that SEL was effective in increasing social and emotional skills, attitudes, and behaviors, and generated an 11% improvement in academic performance (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). SEL is a key predictor in school children's *readiness to learn,* in other words their ability to regulate emotions and behaviors and inhibit impulsivity (Diamond & Lee, 2011). Readiness to learn appears to be a critical ingredient in children's ability to translate classroom instruction and academic content into embodied learning (Blair, 2002; Scott-Little, Kagan, & Frelow, 2006). In a recent study of attainment of academically at-risk primary school students (Cerda, Im, & Hughes, 2015), suggest that readiness to learn can enhance academic achievement, because executive control functions in children's brains e.g. to modulate impulsive tendencies, or to shift and focus attention at will may interact with their capacity to self-regulate their behavior and their social competence skills.

Mindfulness-based SEL programs (MBSEL), used to focus and sustain attention and self-awareness, can be considered a sub-type of SEL programs (Bakosh, Snow, Tobias, Houlihan, & Barbosa-Leiker, 2015; Klingbeil et al., 2017). These programs can positively impact readiness to learn, by reducing limbic arousal and enhancing pre-frontal cortex activity, therefore improving academic aptitude and achievement (Black, Milam, & Sussman, 2009; Diamond & Lee, 2011; Meikeljohn et al., 2012). Mindfulness practices have also been shown to improve executive functions including self-regulation skills, attention, cognitive flexibility, and working memory, which all have been linked to academic outcomes in specific clinical student populations (Semple, Lee, Rosa, & Miller, 2010).

The first scientific publication on the potential link between MBIs and attainment was designed as a pre-post design without control group and consisted of a 5-week Mindfulness-Based Stress Reduction (MBSR) program for 34 volunteer pupils with learning difficulties aged 13–16 (Beauchemin, Hutchins, & Patterson, 2008). Teachers participating alongside the students rated their academic performance indirectly via a behavior survey on student functioning, with t-ttests suggesting a significant improvement, despite considerable measurement bias (no effect size was given). Subsequently, Sibinga et al. (2011) conducted a 9-week MBSR program for 59 HIV-infected and at-risk urban youth and used qualitative interviews with 10 participants to point to self-perceived improvements in school achievement (Sibinga et al., 2011). Furthermore, in Wisner and Norton's (2013) small uncontrolled pilot study, mindfulness meditation was added to an 8-week school counselling program with 28 volunteer student participants, and t-tests indicated a significant improvement in various wellbeing-related outcomes including school functioning with moderate to large effect sizes. However, it is impossible to say whether any of these positive changes were due to the MBIs under study or rather to non-specific group effects.

Four peer-reviewed research studies with control group designs examined the link between MBIs and academic achievement. A non-randomized MBSR feasibility study by Bennett and Dorjee (2015) examined attainment among 23 sixth-form volunteer participants aged 16–18, and reported a non-significant difference in grade achievement for the 13 volunteers in the MBSR condition compared to the 11 students in the control group three months after completing the course. In addition, no significant group differences could be detected immediately after completing the 8 MBSR sessions. Another non-randomized trial using technology-enabled mindfulness training among elementary students (N = 191) found that in the four classrooms assigned to the intervention group, quarterly grade performance increased significantly compared to the four classrooms in the control group in two subjects (Reading and Science; small effect size), but the grade trajectory remained constant across the other subjects examined (Bakosh et al., 2015).

Franco, Mañas, Cangas, and Gallego (2011) published the first RCT assessing the impact of a MBI on academic achievement with a volunteer sample of 61 high school students from three schools in Spain who participated in 10 weekly mindfulness sessions. This study reports very large effect size increases for overall quarterly grades and for Spanish language, yet different effect sizes for philosophy (large effect size) and in foreign language (medium effect size), and its authors encourage further research to examine potential differential effects of mindfulness on different subject types. The most recent peer-reviewed RCT was conducted with 99 Canadian 4th and 5th graders in 4 classrooms across 4 schools, and compared the effect of a 12-week mindfulness program on Math grades compared to an active control condition (Schonert-Reichl et al., 2015). The authors reported a small (non-significant) growth trend in Math for the intervention participants, yet echoed prior scholarly calls for follow-up research with larger samples.

1.2. Addressing practical implementation challenges of MBIs in schools through technology

Scholars reviewing MBIs in schools have increasingly called attention to the potential moderating effects of intervention administration characteristics, such as dosage of the training, or instructor characteristics (Klingbeil et al., 2017; Renshaw & Cook, 2017).

For instance, Renshaw, Fischer, and Klingbeil (2017) suggest that it is yet unknown how much training or experience is necessary for teaching mindfulness in classrooms with fidelity. The large majority of MBIs in schools are delivered by mindfulness experts whose expertise has developed over several years. Out of the seven studies reviewed in the previous section, external trainers had facilitated four MBIs (Bennett & Dorjee, 2015; Franco et al., 2011; Sibinga et al., 2011; Wisner & Norton, 2013). Many mindfulness scholars suggest that a mindfulness program must be taught with fidelity to the underlying principles and foundations to be successful (Crane et al., 2011; Kabat-Zinn, 2003), which suggests that a person needs to go through extensive training to become proficient in passing mindfulness skills on to others. This requirement may work against more MBIs being embedded in schools, with some schools unable to develop mindfulness expertise in-house or to hire external expert mindfulness teachers.

One research avenue to pursue in this context relies on technology as delivery vehicle for mindfulness training and ongoing mindfulness practice. A consistent formal practice is a primary driver of improved outcomes in mindfulness programs (Biegel, Brown, Shapiro, & Schubert, 2009; Kabat-Zinn, 2003). Therefore, technology-based intervention administration may be a helpful enabler of effective MBIs in schools, for at least two reasons: first, schoolchildren may be particularly open to technology-enabled mindfulness training especially in its capacity to foster consistent mindfulness practice; and second, such intervention delivery modes may help embed mindfulness in schools without the resources available to train or bring in mindfulness teachers. In fact, emerging evidence suggests that technology-based mindfulness training interventions may be as effective as face-to-face mindfulness instruction (Hulsheger, Feinholdt, & Nubold, 2015; Krusche, Cyhlarova, King, & Williams, 2012; Querstret, Cropley, & Fife-Schaw, 2016; Wolever et al., 2012). A recent meta-analysis specifically of online MBIs revealed that this delivery format tends to generate small yet significantly improved mental health outcomes for participants, especially stress reduction (Spijkerman, Pots, & Bohlmeijer, 2016). If technology can be leveraged for this purpose, then more schools may benefit from the potential that mindfulness represents for their students and teachers.

1.3. The present study

While the evidence-base linking MBIs with attainment is still unreliable, there is nonetheless some prior evidence supporting our overall proposition that a MBI may generate a small positive effect on