



You Can Lead an Adolescent to Mindfulness, but You Can't Make Them Mindful

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Abstract

Meta-analyses of mindfulness-based interventions (MBIs) in schools consistently show small, positive effects, but the field remains dominated by studies with low methodological rigour. Recent large randomised controlled trials in adolescents demonstrate poor traction in this age group together with some adverse effects, creating a crossroads for their future. In their recent commentary on the null effects of the MYRIAD trial (Kuyken et al., 2022), Strohmaier and Bailey (2023) postulated that making mindfulness practice available within the school day may increase the dosage and benefits of MBIs for adolescents, and called for funders to direct efforts at developing and testing this approach. We agree that identifying ways to increase dose beyond weekly classroom lessons is important, but explore whether this suggestion is practical or developmentally appropriate for secondary school settings. Our commentary broadens to group together other large and moderately large RCTs that have also shown disappointing results in adolescents, and presents seven barriers that together may be compounding the lack of effect in this age group. We offer alternative suggestions for future school-based research and delivery of MBIs.

Keywords Mindfulness · Schools · Adolescence · Prevention · Universal · Transdiagnostic

Mindfulness-based interventions (MBIs) have been used in schools as universal mental health approaches for nearly two decades, largely based on their success in adults (Galla, 2024). Meta-analyses focusing on MBIs in youth consistently show small, positive impacts across a wide range of outcomes (e.g. Dunning et al., 2019, 2022a; Kallapiran et al., 2015; Klingbeil et al., 2017; Phan et al., 2022; Pickrell et al., 2023; Zenner et al., 2014; Zoogman et al., 2015). However, these analyses rely heavily on studies of low methodological rigour (e.g. non- or quasi-experimental design, short or no follow-up, allegiance bias, lack of replication, heterogeneity of intervention content and of outcomes tested or reported, and small samples, Johnson & Wade, 2021;

Kuyken et al., 2022; Strohmaier & Bailey, 2023) which may have overestimated benefits (Volanen et al., 2020).

Ever since Burke's (2010) review of school-based MBIs, there has been an ongoing call for tighter experimental designs: "higher quality—not just increased quantity" (Phan et al., 2022, p. 1606). Recently, there have been a number of larger randomised controlled trials (RCTs) testing a universal approach with adolescent samples that speak to this gap. We broaden Strohmaier and Bailey's (2023) description of the most recent of these studies (Kuyken et al., 2022) to show a consistent trend across this combined body of work, and offer a suggested way forward that expands on their recommendations.

The largest two RCTs in secondary schools both used the manualised *Dot be* MBI curriculum (<https://mindfulnessinschools.org/>), where lessons are typically 40–60 min in length. Volanen et al. (2020) delivered the 9-week version to 3519 Finnish students across 56 schools in Years 6–8 (transition into secondary school; aged 12–15 years), with 6-month follow-up. External facilitators with extensive mindfulness experience delivered the intervention, versus both active (relaxation) and passive (usual curriculum) control groups. Compared to the control groups, there were no improvements in the mindfulness group for two of the primary

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outcomes (socioemotional functioning; depression), though a positive effect for resilience was noted at 6 months (effect size not reported). Gender and school grade as moderators showed inconsistent patterns, with lowered depression in girls (but not boys) who received the MBI at 6 months follow-up, and improved socioemotional functioning at post-intervention and 6-month follow-up for students in Year 7, but not those in Year 6 or 8. The researchers suggested that adaptations for early adolescents may be required, for example, classroom teacher delivery to support ongoing practice to strengthen effects.

In a second large trial, Kuyken et al. (2022) delivered the 10-lesson version of this program via trained classroom teachers to 8376 students aged 11–14, across 85 schools in the UK. Teachers adhered to 83% of content, and were video-rated as competent in delivery. Results showed no evidence that mindfulness lessons were superior to teaching as usual across the primary outcomes of depression, socioemotional-behavioural functioning and wellbeing. Further, the mindfulness group were worse in five secondary outcome measures (hyperactivity/inattention, panic disorder, obsessive compulsion, emotional symptoms and mindfulness), and for those with higher mental health concerns at baseline, there was an increased risk of depression and lower wellbeing (Montero-Marin et al., 2022). Student acceptability measures showed considerable heterogeneity, suggesting the MBI curriculum was not consistently more acceptable than teaching-as-usual, and there was also low engagement with home practice. Given the training required for teachers to deliver the program, plus the potential for adverse effects in some students, the authors suggested the need to pause universal application of MBIs in schools. They proposed the following modifications of MBIs for future research: (1) increasing intensity through more home practice; (2) use of expert facilitators rather than classroom teachers; (3) providing a clearer link of the content to student needs to increase motivation; and (4) moving program delivery to mid-late rather than their early adolescent target as a potentially more receptive time developmentally.

A further three moderately large RCTs have been conducted with adolescents in mainstream schools recently. Dunning et al. (2022b) tested an eight-lesson version of the *Dot be* curriculum with 11–16-year-old students ($n=460$, $M_{\text{age}} = 13.8$ years, $SD = 1.3$), delivered by trained classroom teachers in small groups (10–13 students) in the UK. In a parallel non-inferiority design, this study compared mindfulness training to an equivalent length psychoeducation programme covering cognitive, social and self-management skills. Students were paid up to £100 based on session attendance and homework completion to promote a full dose of the intervention. No adverse events were reported, but there were no benefits to mindfulness training versus psychoeducation on the primary outcome of affective

executive control, or on mental health outcomes, including when tested mid-COVID-19 pandemic as an extension to the trial, 16–30 months later.

Scafuto et al. (2022) tested a 12-week mindfulness intervention (the Gaia programme) led by trained classroom teachers in seven Italian schools with 234 early adolescents ($M_{\text{age}} = 14$ years). Scores on total, internalising and externalising problems remained stable over time for the mindfulness group but increased (worsened) for the control group. However, these effects might be interpreted with caution, given the mindfulness group scored significantly higher at baseline across all three measures, but both groups were equivalent at post-test.

Bogaert et al. (2023) conducted an RCT ($n=231$) with trained external mindfulness facilitators delivering an 8-week MBI to mid-adolescents (15–18 years) across 11 Belgian schools, with longer weekly lessons (90–100 min) supplemented by a Smartphone app to support home practice. No improvements were found on the primary outcomes (anhedonia, emotional distress) nor on the hypothesised mediators (suppression of emotions, or perceived social pressure to do so).

The general lack of improvement described mimics earlier findings from four moderately sized RCTs in Australian schools (Johnson & Wade, 2019, 2021; Johnson et al., 2016, 2017). At the time, these results appeared to be outliers to the meta-analyses, but now add to the emerging disappointing picture of MBIs as universal adolescent approaches when tested in rigorous experimental designs, and may also offer preliminary answers to some of the questions raised by Kuyken et al. (2022). The first two of these Australian studies used the 8-week iteration of the *Dot be* program, delivered by one expert external facilitator across four schools with a combined 863 early adolescent students ($M_{\text{age}} = 13.6$ years), with lesson length varying from 35 to 60 min to suit school timetables. The first trial had 3-month follow-up (Johnson et al., 2016) with the second trial adding a third arm (MBI + parental education via weekly brief online videos), and following up students 12 months later (Johnson et al., 2017). In these fully powered RCTs, there were no improvements at any timepoint across a wide range of primary (anxiety, depression, eating disorder risk, wellbeing) or secondary (self-compassion, emotional regulation, mindfulness) outcomes.

The second pair of Australian studies piloted ($n=90$; Johnson & Wade, 2019) and then ran a fully powered RCT ($n=434$; Johnson & Wade, 2021) using a more intensive curriculum that had shown promise with older adolescents (Raes et al., 2014), and comparing two age groups (early adolescence, $M_{\text{age}} = 13.5$ years and mid-adolescence, $M_{\text{age}} = 15.5$ years) with 3–9-month follow-up. This design investigated issues of dose and different developmental receptivity across adolescence. To address concerns about a single

instructor delivering lessons, instructor competence and fidelity were rated via Mindfulness-Based Interventions Teaching Assessment Criteria (MBI-TAC, Crane et al., 2013) modified for school delivery, using audio-recordings randomly selected and reviewed by the program developer. Rating was in the “proficient” band (average 5.2/6). Although the pilot trial had suggested improvements in the older adolescent group, this subgroup analysis was underpowered with wide confidence intervals, and improvements did not replicate in the second fully powered trial. Here, results showed no change in the older students, but worsening in the younger adolescents in wellbeing and two aspects of mindfulness (Awareness of external environment; Decentering and non-reactivity) at 3- and 9-month follow-up ($d=0.35$ – 0.43).

Across the rigorous experimental designs we have presented in this commentary, we believe the accumulated evidence suggests that adolescence may not be the optimal time for a universal mindfulness approach. In their commentary, Strohmaier and Bailey (2023) allude to a current “cross-roads” for universal school-based MBIs with adolescents following publication of the Kuyken et al. (2022) study. They describe a split, where one group of mindfulness researchers believe that further investment into an at least ineffective and at most potentially harmful approach in adolescents may not be justified, while other researchers believe the approach to still hold promise when taught well in a way that engages youth. For example, Strohmaier and Bailey recommend evaluating the addition of regular mindfulness practice within the school day to counter the poor uptake of

home practice by conscript adolescents, thereby increasing dose and potentially effectiveness. However, they concede that barriers to this approach exist, such as the packed school curriculum, student motivation and lack of teachers skilled in teaching mindfulness.

Based on our collective experience not only in designing and conducting research trials but also delivering mindfulness in classrooms, we consider alternatives to Strohmaier and Bailey’s (2023) recommendations, reflecting on seven reasons why MBIs in this age-band may not have been effective. Figure 1 shows a proposed range of developmental and structural barriers to MBIs in schools, and how combinations of these might differ across four age bands from pre-school to senior secondary school, favouring implementation of universal mindfulness approaches in the pre-school and primary years. We discuss each barrier, and offer some suggestions for future research and school-based delivery of MBIs.

Classroom Structure and Lay Facilitators

Research on MBIs in adults has largely centered around 8-week models based on the original Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990) and Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002) programmes. These courses entail a weekly 2-hr group session, supported by a recommended 40 min of daily home practice and a day-long retreat during the latter half of the course. The successful adult structure has

Fig. 1 Developmental barriers to universal school-based mindfulness interventions

	Key			
	Barrier	Lesser barrier	No barrier	
	Preschool/ Primary (e.g., 3–11)	Early secondary (e.g., 12–14)	Mid secondary (e.g., 15–16)	Senior secondary (e.g., 17–18)
Classroom structure facilitates				
Lay facilitator adequate				
Emotion regulation capacity				
Metacognitive capacity				
Push for autonomy				
Relevance				
Absence of competing demands on time				

been modified in adolescent MBIs, in order to be digestible for shorter attention spans (e.g. briefer lessons, in-class meditations and home practice expectations) and be more engaging (e.g. animations and videoclips describing key ideas). Although home practice is usually supported by guided recordings and encouraged via homework diaries and classroom teacher reminders, it is not mandated nor assessed by classroom teachers, unlike homework for other subjects. This is reflected in consistently low rates of home practice across studies (e.g. Kuyken et al., 2022). Thus, we agree with Strohmaier and Bailey (2023) that one explanation for the lack of impact is a simple dosage effect—within a diluted 8- (or 10-) week programme, youth are simply not receiving the same input or practice effects compared to adults.

Strohmaier and Bailey (2023) suggested creating opportunities for mindfulness practice at school rather than relying on home practice, to increase exposure to mindfulness practice and boost the effects of weekly classroom lessons. An alternative way to increase dose beyond formal lessons is via ongoing classroom modelling of a curious, friendly, non-judgmental attitude towards self and experience, regular sensory grounding practices as part of the classroom day and scaffolded application of newly formed regulating skills during real-life classroom or social challenges. Indeed, Roeser et al. (2023) describe mindfulness as a social practice that develops organically through interaction with a more knowledgeable other. Although perhaps the ideal Vygotskian model, this approach is difficult to implement in the secondary school setting with rotating class schedules (Cook-Cottone, 2017), and would rely on buy-in and upskilling from multiple staff with whom students are in contact across the day to reinforce concepts (Scholz et al., 2024). While whole-school, relational approaches driven by teachers might be ideal (Weare, 2023), generating staff-wide interest in a consistent, contemplative approach such as mindfulness while competing with pressure to meet other lesson requirements may render this an unrealistic goal in most secondary schools.

By contrast, in the preschool and early primary (elementary school) years, in addition to greater class contact with a single teacher, there is also a major curricular focus on socioemotional learning before the balance shifts to academic content. It may therefore be more congruent to posit universal MBIs in this age bracket. At its most basic, this may simply be a matter of adding mindfulness-specific tools to an approach already emphasising socioemotional learning. Formal meditation (e.g. observing thoughts) is not used in this age group, nor is the post-meditation inquiry that requires extensive personal meditation experience. Thus, training of classroom teachers as

facilitators may be less intensive, which suggests a more scalable approach.

Emotion Regulation and Metacognitive Capacity

Beyond school structures that may not support reinforcement of mindfulness concepts, we believe that early-mid adolescence also presents a unique combination of developmental barriers to MBIs. Emotion regulation refers to a set of skills to identify, recognise and manage our emotions in adaptive ways. Development progresses through childhood (see Crowell, 2021 for a full description); however, a developmental “dip” in emotional regulation skills occurs at around 12–16 years compared to prepubescent and older youth (Cracco et al., 2017; Hagler et al., 2016; Zimmermann & Iwanski, 2014). During this adolescent period, the limbic system, which is associated with the frequency and intensity with which emotional responses are experienced, matures before the prefrontal cortex, which is responsible for exerting cognitive control over emotions. Thus, adolescents tend to experience more fluctuations in heightened emotional states (Anniko et al., 2018; Riediger & Klipker, 2014). The period of early-mid adolescence, as social and academic challenges begin to emerge, and coinciding with the peak age of onset for mental health disorders (14.5 years; Solmi et al., 2022) has been suggested as a key window to develop self-regulation skills (Broderick & Metz, 2009; Kuyken et al., 2013). However, the poor responsiveness to MBIs in the RCTs presented in this paper might suggest that emotion regulation skills need to be targeted *before* this period of developmental turbulence (Johnson & Wade, 2021). A recent study supports this idea: 5 weeks of mindfulness meditation training improved performance on an affective inhibitory control task (Emotional Stroop) in children but not adolescents (Rezende et al., 2023). Targeting pre-pubescent children may prove to be a more fertile time for emotion regulation skills training, repeatedly pairing activation between the prefrontal cortex and limbic system (Zelazo & Lyons, 2012) to strengthen neural connections and embed skills, in readiness for adolescence (Johnson & Wade, 2021). Ongoing rigorous mindfulness research with a focus on emotional regulation in pre-adolescent children and long-term follow-up is recommended.

Since Flavell (1979) introduced “thinking about thinking”, definitions of metacognition have expanded into many sub-concepts (Schneider, 2008), with ongoing debate about how each element develops and how to measure them (Gascoine et al., 2017). Adult MBIs cultivate observation of unhelpful thoughts without engaging with them, which requires both emotional regulation

and cognitive monitoring. The latter capacity is proposed to first emerge around age 8 (recognition that thinking is a process), and by about age 13, adolescents are usually aware that thoughts can arise spontaneously, and can be regulated (Garber et al., 2016). However, rates and degree of development are heterogeneous, with not all adolescents able to grasp these abstract constructs (Garber et al., 2016). We agree with Montero-Marín et al. (2022) and Jennings (2023) that monitoring and decentering from thoughts may be developmentally challenging for many early-mid adolescents—and we suggest that this may be particularly difficult when combined with emotionally charged situations, given the afore-mentioned developmental dip in regulatory abilities. The full range of adult mindfulness skills requiring meta-cognitive capacity may not be appropriate or effective to introduce until senior school years (e.g. 16–18 years). This remains an area for future research.

Further, inviting cognitive awareness of difficult thoughts and emotions in an unscreened class setting, without providing expert guidance, increasingly appears unwise due to the associated risk for exposure to negative thinking without effective management skills. This likely explains the adverse effects from mindfulness training in some students (e.g. Johnson & Wade, 2021; Montero-Marín et al., 2023). While short, body-based grounding practices may be appropriate, we recommend caution with the use of extended periods of breath awareness, or any meditation focusing on emotions or thoughts in conscript classroom situations.

Relevance and Competing Demands

Adults attend MBIs voluntarily, actively seeking different ways to be in the world or to solve particular challenges. Adults are therefore motivated to practice mindfulness skills, and apply these directly to the difficulties they face. A different approach is needed to engage conscript adolescent audiences. As described by Strohmaier and Bailey (2023), competing demands also escalate in mid adolescence, with increased academic pressure, extracurricular activities, more serious sporting commitments, part-time jobs, socialising and the pull of social media to fill any remaining down time.

More investment in building a case for MBIs (or other wellbeing programmes) may be required during initial sessions for this age group. This might include quizzes regarding age-related challenges and stressors to highlight potential personal benefits. There may need to be more convincing brain science presented that is explicitly linked to and relevant for adolescent experiences (e.g. multi-tasking myths, brain function during dysregulation) or provision of opportunities for biofeedback regarding attention wandering (e.g. Vekety et al., 2022) to demonstrate the nature of the mind,

allow teens to quantifiably track progress and increase appetite for home practice. Motivational interviewing (MI) techniques may be worthy of inclusion, given MI's focus on supporting autonomy in decision-making (Mutschler et al., 2018).

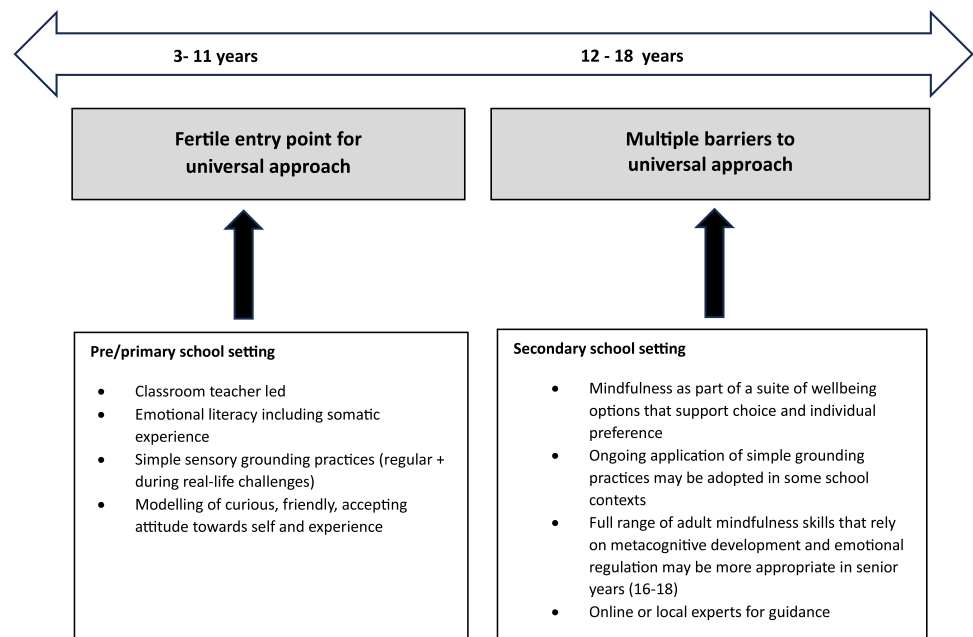
Further, instead of being seen by students as unimportant compared to graded lessons (e.g. Strohmaier & Bailey, 2023), we may need to posit wellbeing education more generally as an equal and critical partner to academic curricula for life success. This idea is frequently espoused in school mission statements but in our experience does not routinely translate to the required emphasis at the curricular level. This would require a system level (e.g. school-based) change in emphasis, but may also be tackled at a smaller scale by considering assessment in line with valued academic subjects. This need not measure “success” per se (e.g. ability to meditate), but rather might require students to scientifically apply and measure the outcome of using selected skills for a personally relevant challenge (e.g. behavioural experiments over the course of the programme that are assessable assignments). A further potential contributor to system level change is improving the extent to which training and professional development programs for educators include a specific focus on the connections between wellbeing-related skills and academic engagement and performance, and opportunities to develop personal skills in these areas. These are fertile areas for future research.

Push for Autonomy

Mindfulness practitioners are invited to adopt a “beginner’s mind” (Kabat-Zinn, 1990), a child-like willingness to see everything as if for the first time, free of expectations based on past experience. A stance of non-judgement is also encouraged, noticing the automatic human preoccupation with liking or disliking, clinging or aversion. These attitudinal pillars may be incongruent with adolescents’ formation of their identity as an emerging adult, establishing personal likes and dislikes.

During this developmental period, there is also a normative push for autonomy where choice, perceived control and setting of personal goals become increasingly important (Noom et al., 2001). Mainstream modern education recognises that student agency is critical; when deciding what and how they will learn, students show greater motivation (OECD, 2019). Within school wellbeing programs, qualitative interviews indicate unique individual needs, with more learning occurring when students are allowed to explore topics most relevant to them (Scholz et al., 2024). Accommodating individual preference in psychotherapy also strongly predicts completion rates and positive outcomes (Swift et al., 2018). Further, mindfulness

Fig. 2 Proposed developmental model of mindfulness interventions in schools



has been conceptualised as comprising intention, attention and attitude (Shapiro et al., 2006), and therefore conscript student audiences may lack the critical first component. By mandating a contemplative practice that may not be universally appealing even to different adult personalities, it is perhaps unsurprising that mindfulness concepts and meditation practices may not land well or gain traction with many adolescents.

In terms of reducing risk for the onset of mental ill health during adolescence, we believe it is time to move away from holding mindfulness (or indeed, any one particular approach) too tightly as the best option, and mandating it through universal application. Building on Strohmaier and Bailey’s (2023) suggestion of choice for teens, we support a “suite” of offerings (Cuijpers, 2021) that foster emotional competence and wellbeing in ways that support varying temperaments, interests, maturity and baseline levels of mental wellbeing.

Utilising single-session interventions (SSIs) may be one approach, offering busy secondary students bite-sized introductions to a range of transdiagnostic, evidence-based and indirect approaches (e.g. perfectionism, growth mindset, distress tolerance, body neutrality; Cuijpers, 2021; Schleider et al., 2020), with many of these available online, abrogating the need for extensive local skillsets. Single-session interventions are designed to offer benefit as a stand-alone program, but may also offer entry points that lead to students seeking more information or help. Developing mindfulness SSIs as adolescent “tasters”, rather than mandatory courses, with follow-up resources for those interested in developing their practice further, is another suggestion for future research. In some schools, experienced mindfulness

practitioners may be available on staff to offer more extensive mindfulness courses for volunteer (self-selected) senior students, as one option for wellbeing.

For all alternatives, involving adolescent students in their development through co-design is recommended (Kuyken et al., 2022; Strohmaier & Bailey, 2023). In this way, we may move from wellbeing programmes that are frequently seen by adolescents as irrelevant, a chore and taking time away from more important goals, towards offerings that are seen as relevant and worthwhile, individually chosen and enjoyable (Burrows, 2022).

Summary

Taken together, the suggestions presented in our paper provide a number of avenues for fruitful research. Figure 2 provides a proposal for divergence of mindfulness offerings in schools based on developmental age. This model proposes moving away from classroom-based universal approaches presented uniformly across developmental levels, to more developmentally tailored approaches, in order to address barriers to implementation and student engagement.

Conclusion

Despite benefits for adults, and early promise for youth in low-quality studies, recent more rigorous RCTs of school-based universal MBIs have shown few positive effects for adolescents. We have expanded on reasons of insufficient dosage proposed by Strohmaier and Bailey (2023) to put

forward a range of reasons why this might be the case, focusing on adolescent developmental capacity (emotion regulation dip, nascent meta-cognitive skills, drive for autonomy) and secondary school environment factors (academic focus and rotating classroom structure). We propose that continued rigorous research investigating universal MBIs in the primary years is a worthy endeavour, but that we move away from any one mandated approach to wellbeing during adolescence, and explore co-design with this age band to improve wellbeing offerings that respect the normative drive for autonomy.

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DD: conceptualisation, writing—review and editing.

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