



**EVIDENCE
FOR LEARNING**



Student health & wellbeing

Systematic Review

**A systematic review of intervention research
examining effective student wellbeing in
schools and their academic outcomes**

Main Report and Executive Summary

September 2020



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Executive Summary

Purpose

Improving student wellbeing and building resilience are crucial in preventing and reducing the impact of mental health problems. Schools play a vital role in promoting student wellbeing. However, there is little clear evidence about the effectiveness of school-based wellbeing programs in terms of their impact on both students' wellbeing and on academic outcomes. Few systematic reviews consider academic outcomes, and previous reviews on wellbeing are narrow in scope. This review addresses these limitations, guided by the following research question: *“How effective are school-based wellbeing interventions for improving the academic and non-academic outcomes of children and young people in mainstream schools?”*

Current review

This review explored the research regarding the effects of school-based wellbeing interventions on student academic achievement (N = 320,505), as defined by numeracy, literacy or general performance, and wellbeing-related outcomes (N = 411,535) of social-emotional adjustment (e.g., relationships, connectedness), behavioural adjustment, cognitive adjustment (e.g., conduct problems, aggression), and internalising symptoms (e.g., decision making, executive function, resiliency). There were 75 studies that qualified and were included in the final analyses which involved 432 extracted outcomes from students 5 to 18 years of age.

Of high importance to this systematic review was that the evidence and findings reported had to be applicable to the Australian schooling context. The review was limited to interventions delivered in school or by a school teacher with appropriate professional development. Interventions that were strictly country specific (e.g., Charter Schools in the US) were excluded from the review. The majority of studies (51) were conducted in the US and five from the UK, with the remaining 26% coming from a diverse range of cultural backgrounds – Spain (3), Turkey (3), Democratic Republic of the Congo (2), Israel (2), Italy (2), Australia (1), Bhutan (1), Brazil (1), India (1), Mexico (1), Northern Ireland (1), Peru (1), Singapore (1), Sweden (1), and Tanzania (1) – reflective of the multicultural diversity in Australian communities.

Summary of the review method

A systematic review and meta-analysis was undertaken. Data sources A+ Education, ERIC, Education Research Complete, British Education Index, PsycInfo and Scopus (limited to the ‘Social Sciences’ Subject Area) were searched for experimental and quasi-experimental studies published between January 2004 and January 2020 investigating the effect of school-based interventions on student academic and wellbeing outcomes. Trial registries and grey literature sources were also searched.

Eligibility criteria for selecting studies included randomised controlled trials (RCTs), experimental and quasi-experimental studies comparing school-based wellbeing interventions with ‘business as usual’, typically delivered in a classroom context. Included studies involved school-aged children (5-18 years old), had measures of academic achievement and wellbeing (in the broadest sense), and was written in English. Two independent reviewers extracted the data and assessed the risk of bias of included studies. Random effects meta-analyses of the effect of intervention on student academic and wellbeing outcomes were performed.

This review adapted an Australian government framework of strategic imperatives for health and wellbeing promotion that related to improving mental wellbeing, encouraging physical activity, and preventing harm from substance abuse.

Study registration: PROSPERO CRD42020176599, 28/04/2020, www.york.ac.uk/inst/crd

Key conclusions

1. This review found that school-based wellbeing programs had small to moderate positive impacts on student academic achievement, compared to similar students in control groups engaged in their usual activities with general academic performance equivalent to three months of additional learning gain ($g = 0.26$), numeracy achievement equivalent to two months gain ($g = 0.10$), and literacy achievement equivalent to one month gain ($g = 0.07$). Wellbeing programs had small to moderate effects on wellbeing-related measures: social-emotional adjustment ($g = 0.14$), behavioural adjustment ($g = 0.15$), cognitive adjustment ($g = 0.18$), and a moderate impact on internalising symptoms ($g = 0.20$) compared to students in control groups, consistent with previous reviews.
2. Evidence showed that specific student belonging and engagement programs in school had the greatest impact on academic achievement. Programs that supported social-emotional skills were more effective for promoting student wellbeing and were associated with better literacy outcomes and those that encouraged physical activity, exercise and relaxation were associated with better numeracy outcomes.
3. Research indicated that students from disadvantaged backgrounds may benefit most from a combination of universal whole-school programs supported by targeted programs. Findings were not conclusive and should be interpreted with caution for interventions targeting students with special needs, as the effect was not statistically significant.
4. Evidence suggests that wellbeing programs delivered by 'trained' classroom teachers (e.g., a program designed to build the capacity of the teacher first, supported by resources for students) were marginally more effective in impacting students' wellbeing outcomes than programs delivered by external professionals. This finding highlights the importance of teacher professional learning and their essential role and capacity to influence student wellbeing outcomes. No difference was found on academic outcomes due to the mode of delivery.
5. Programs designed for Secondary schools (of which there were relatively few) appeared to have greater impact on outcomes than programs in other settings (e.g., Primary school), as did universal programs (versus targeted) delivered to students in medium-sized groupings of 11 to 20 students (versus one-on-one or large groups).
6. While the quality of included studies is among the best in the field of educational RCT and quasi-experimental designs, there is still a high risk of bias due to the inability to blind participants, study personnel and outcome assessment. It reflects the often, unavoidable complexities in educational research.
7. While there is a plethora of wellbeing programs and interventions available for schools to implement, only one Australian study was included in this systematic review which suggests that high-quality studies using robust research designs are scarce. There is also an increasing need to demonstrate evidence of impact for program funding. More high-quality program evaluations are needed across Australia in order to identify programs that show promise or validate those that are widely used.

Findings

Of the 75 included studies, 57 examined interventions that focused on improving mental wellbeing (behavioural, cognitive, social-emotional, belonging and engagement, mentoring, resilience), 14 studies considered a physical approach (exercise, relaxation techniques), and four studies examined interventions designed to prevent harm from tobacco, alcohol and drugs abuse. Meta-analysis of the results found that wellbeing interventions had very small positive effects on academic achievement (Hedge's $g = 0.17$, equivalent to two months learning gain), social-emotional adjustment ($g = 0.14$), behavioural adjustment ($g = 0.15$), cognitive adjustment ($g = 0.18$), and internalising symptoms ($g = 0.20$) compared to 'business as usual', consistent with previous reviews.

Interventions that were indirectly delivered to students usually via classroom teachers who were trained to deliver a specific wellbeing program, were marginally more effective than direct-delivery by an external professional in impacting wellbeing-related outcomes. No difference was found for the mode of delivery on academic achievement. This implies the importance of upskilling teachers and the longer lasting impact it may have on student wellbeing as compared to programs delivered by external professionals with less direct teachers' support.

Belonging and engagement interventions were more effective for promoting academic achievement ($g = 0.31$, equivalent to four months additional learning), while social-emotional skills programs were more effective for promoting student wellbeing outcomes ($g = 0.23$). Shorter programs of up to one school term had a greater impact on student academic and wellbeing outcomes than programs of longer duration. While interventions have a positive impact on all school levels, evidence suggests those that were designed for Secondary schools appeared to have greater impact on outcomes than in other school settings, compared to the comparison conditions, as did universal interventions delivered to students in medium-sized groupings. This may suggest that programs in Secondary schools were more effective in targeting wellbeing issues which may manifest more prominently in upper school years and students' capacity to understand and benefit from such programs is better as compared to students in Primary schools. However, there was substantial inconsistency across study results due to the diverse range of assessment tools used ($I^2 = 89\%$). All of the included studies were at high risk of bias in at least one domain, mainly due to the inability to blind participant to the treatment group or lacked random assignment. As the quality of the included studies was mostly low (relative to the high standards set in RCTs in health), the findings should be interpreted with caution.

Wellbeing programs in Australia

A general review of school-based wellbeing programs in Australia was conducted. According to a national programs directory (beyou.edu.au/resources/programs-directory), Australian schools and early learning services can access over 200 school-based wellbeing programs (see the [Addendum](#) for a full list of programs as at August 2020). Over half (56%) had 'low' quality evidence, where only an underlying theoretical framework was identified but no study had been undertaken or published. One-fifth of programs (22%) were rated as having a 'medium' quality evidence-base, by referencing some related research. Only 23% of programs gave concrete evidence of their impact in the form of published studies or reports (first author and date provided).

Clearly there are many good wellbeing programs and interventions available for schools to implement, as evidenced by the programs directory (see the [Addendum](#)) and a sample of the whole-school wellbeing frameworks (see Table 2 of report). However, there are very few studies that have been published on any of these programs and frameworks that adopt an experimental or quasi-experimental research design favoured in high-quality systematic reviews. Of the 200 plus programs listed, only two

(*You Can Do it!* – an Australian program, and *Tribes* – a US program) had sufficient quality of evidence to be included in this current systematic review. The other programs named in the included studies were not listed in the Australian directory. While there is clearly significant activity in the wellbeing intervention space, this implies a lack of high-quality evidence of impact.

Implications for policy and practice

The large number of studies included in this systematic review afforded the opportunity to explore the moderating effect of intervention characteristics on student academic and wellbeing outcomes. In the context of universal school-based wellbeing programs, indirect program delivery by the trained classroom teacher supported by program resources for students as an enhancement to standard curriculum, may be marginally more effective and have a longer lasting impact, than directly-delivered, often targeted programs by an external professional. However, the evidence suggests that a combination of a universal whole-school approach supported by targeted programs for ‘at risk’ students is optimal.

However, the sheer diversity of interventions considered in this systematic review makes it difficult to isolate the specific set of characteristics that typify a successful intervention designed to promote both academic achievement and wellbeing outcomes. In short, there is no silver bullet. Nevertheless, a set of characteristics that emerged from the moderator meta-analyses suggest that effective wellbeing promotion is systemic and usually involves programs that are:

- **short: delivered within a Term** – thus manageable and sustainable in a crowded curriculum;
- **universal program** – building awareness and capacity of the whole community, reduces stigma;
- **explicitly taught by the trained classroom teacher** – building the teacher’s capacity first;
- **delivered in regular sessions** – building the student’s capacity through practice and repetition;
- **delivered to groups of students** – ranging from 11 students up to classroom size, and
- **developmentally differentiated** – recognising that wellbeing is influenced by stages in life, particularly during transition and adolescence.

Implications for research

This systematic review presents the best evidence but not necessarily the best school-based wellbeing programs. In other words, wellbeing programs have been selected for inclusion in this systematic review because they met selection criteria that minimises reporting bias, not because it was an exceptional program. This needs to be kept in mind when interpreting findings.

This systematic review provides the most robust evidence to date that attempts to broadly quantify the positive impact that wellbeing interventions have on, not only student wellbeing outcomes but also student academic achievement, testing the widely-held belief that ‘happy kids are better learners’.

While only one Australian study was included in the meta-analyses¹, the review was grounded in the current offerings of whole-school mental health promotion initiatives in Australia, as well as the plethora of wellbeing programs available to schools. The lack of Australian studies in this systematic

¹ Ashdown, D. M., & Bernard, M. E. (2012). Can explicit instruction in social and emotional learning skills benefit the social-emotional development, well-being, and academic achievement of young children? *Early Childhood Education Journal*, 39(6), 397-405.

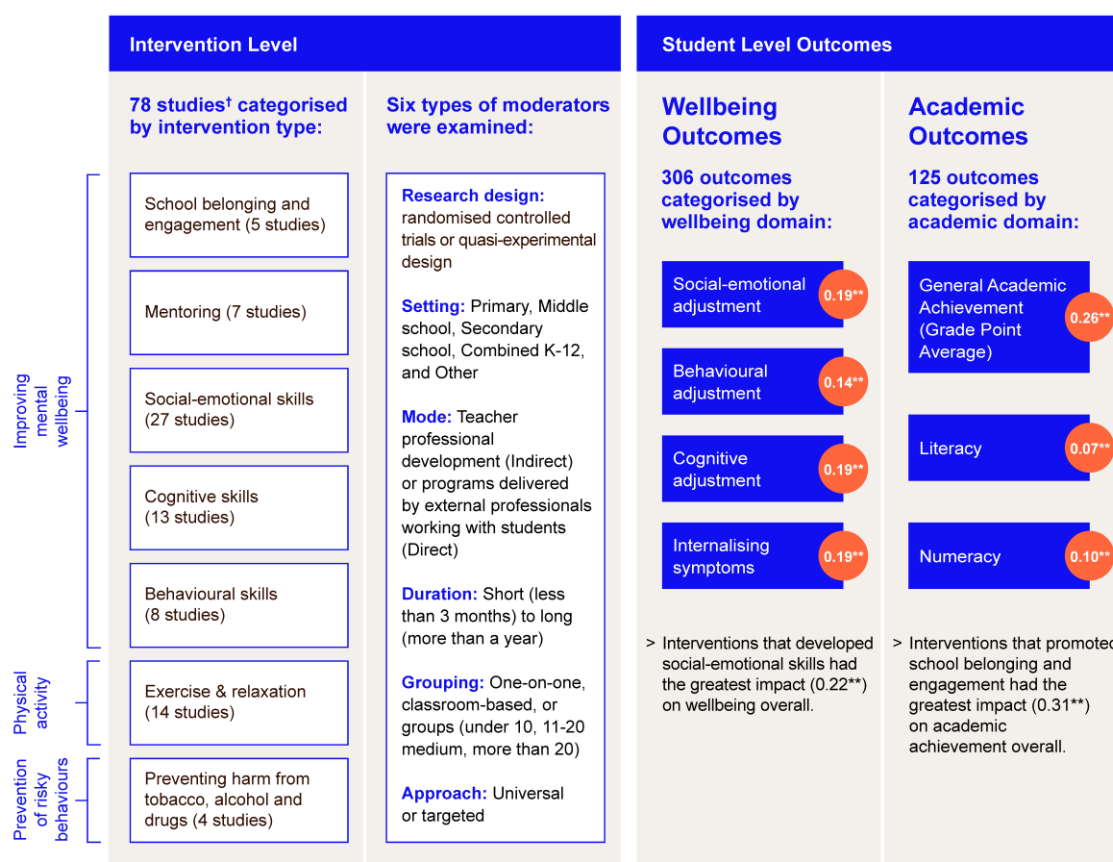
review suggests that high-quality and large-scale research is needed across Australia in order to robustly test many more programs and interventions that show promise or are widely used even in the absence of evidence (See [Addendum](#) for full list of over 200 wellbeing programs used in Australian educational settings).

The greatest limiter to the inclusion of studies (75 out of 4850) was the lack of an academic outcome. Studies of interventions purporting to improve academic outcomes need to include robust standardised measures of academic performance to strengthen the evidence base around the relationship between health and education. Of greater concern, however, is the sheer diversity of unvalidated wellbeing measures. It reflects the diversity of wellbeing programs on offer and complexity in field of educational research. Locally and internationally, we still lack standardised benchmark indicators of student wellbeing because, in part, we still lack a globally accepted definition.

This comprehensive systematic review of 75 included studies is designed to summarise the evidence and present an overall assessment of the impact of health and wellbeing interventions on both academic and wellbeing outcomes. This review presents an important starting point to conduct further analyses and examine features of interventions and their effectiveness. Section 3.6 in the report provides a discussion on some 'emerging examples' of effective interventions.

Systematic review outcomes overview

Figure 1. Intervention and outcomes overview



†Two of the 75 included articles reported multiple studies.

**Effect sizes shown as Hedge's g , $p < 0.01$ significance

Impact map

Table 1 presents a heat map of the estimated impact of interventions on student academic and wellbeing outcomes, moderated by contextual and program characteristics. Shading of each outcome reflects the level of impact according to the statistical effect size, Hedge's *g*. Detailed results and full presentation of the risk analyses can be found in the report. An interactive version of the Impact Map with estimates of months learning gain and the evidence behind the results are available [here](#).

Table 1. Summary of findings

Moderators	Academic overall	Numeracy	Literacy	GPA/Other	Wellbeing overall	Social-emotional	Behavioural	Cognitive	Internalising
Intervention type									
Improving mental wellbeing: Belonging & engagement	0.31	-0.03	0.12	0.36	0.21	0.18	0.10	0.24	0.23
Improving mental wellbeing: Mentoring	0.17	0.11	0.03	0.35	0.16	0.15	0.05	0.26	
Improving mental wellbeing: Social-emotional skills	0.16	0.10	0.10	0.35	0.22	0.16	0.22	0.23	0.24
Improving mental wellbeing: Cognitive skills	0.11	0.04	0.04	0.21	0.09	0.16	0.03	0.09	0.08
Improving mental wellbeing: Behavioral skills	0.10	0.04	0.05	0.17	0.12	0.06	0.11	0.14	0.20
Encouraging physical activity: Exercise & relaxation	0.20	0.24	0.10	0.21	0.18	0.13	0.23	0.21	0.13
Preventing harm from tobacco, alcohol & drugs	0.13	0.15	0.00	0.13	0.16	0.04	0.13	0.19	
School setting									
Primary	0.10	0.08	0.07	0.21	0.19	0.15	0.18	0.20	0.18
Middle	0.18	0.24	0.07	0.22	0.18	0.13	0.14	0.20	0.21
Secondary	0.28	0.24	0.24	0.28	0.23	0.13	0.02	0.20	0.19
Combined K-12	0.15	-0.01	-0.02	0.44	0.06	0.12	0.01	0.10	0.06
Other	0.09			0.09	0.12	0.19	0.13	0.03	0.06
Intervention mode									
Direct	0.16	0.09	0.03	0.26	0.16	0.14	0.16	0.19	0.15
Indirect	0.16	0.11	0.09	0.26	0.18	0.13	0.13	0.18	0.22
Program duration									
Short (< 3 months)	0.22	0.25	0.14	0.27	0.23	0.24	0.30	0.17	0.31
Moderate (< year)	0.15	0.08	0.07	0.26	0.16	0.18	0.13	0.16	0.15
Long (> year)	0.11	0.03	0.05	0.23	0.16	0.07	0.11	0.23	0.19
Grouping size									
One-on-one	0.18	0.06	0.02	0.33	0.15	0.13	0.18	0.17	0.08
Classroom	0.16	0.09	0.05	0.30	0.18	0.13	0.13	0.20	0.19
Small (<11)	0.15	0.13	0.15	0.12	0.27	0.30	0.11	0.21	0.21
Medium (11-20)	0.24	0.28	0.38	0.00	0.24	0.00	0.21	0.24	0.36
Large (>20)	0.11			0.11	0.08			0.02	0.30
Intervention approach									
Targeted: Academic risk	0.17	0.09	0.07	0.31	0.16	0.11	0.12	0.18	0.12
Targeted: Disadvantaged	0.16	0.25	0.20	0.07	0.27	0.26	0.52	0.23	0.74
Targeted: Special needs	-0.03			-0.03	0.10	0.19	0.13	-0.04	0.06
Universal	0.18	0.08	0.01	0.31	0.22	0.16	0.13	0.20	0.24

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1 Background

This report presents a systematic review examining the effectiveness of school-based wellbeing interventions for improving academic and wellbeing outcomes in children and young people.

1.1 Rationale

Schools are primarily seen as places where young people acquire academic skills. However, they also provide the platform where people connect with others, build their personality, and experience life, all of which can influence their subjective-wellbeing (OECD, 2017; Bücker et al., 2018; National Wellness Institute, 2018; Mahoney et al., 2020). Australian Education Departments operationalize student wellbeing as ‘a sustainable positive mood and attitude, health, resilience and satisfaction with self, relationships and experiences at school’. *VicHealth’s Action Agenda Framework, 2019-2023*, is committed to five ‘strategic imperatives’ for improving health and wellbeing outcomes, which include – (i) improving mental wellbeing, (ii) encouraging regular physical activity, (iii) promoting healthy eating, (iv) preventing tobacco use, and (iv) preventing harm from alcohol. This review is structured around these strategic areas to consider wellbeing in its broadest terms.

Improving student wellbeing and building resilience are crucial in preventing and reducing the impact of mental health problems. Educating children about protective behaviour and teaching them the coping skills can help them react positively to change and obstacles in life, allowing greater mental, social and academic success. However, the majority of systematic reviews investigating the effectiveness of wellbeing interventions on student outcomes, only consider the impact on indicators of wellbeing but stop short of examining impact on academic achievement. Moreover, of the few systematic reviews that do consider academic outcomes (e.g., Langford et al., 2015; Corcoran et al., 2018), wellbeing is narrowly defined. Accordingly, there is a lack of clarity of the link between student wellbeing programs and academic outcomes, and whilst a vast number of factors (and types of programs) can influence student wellbeing, no overarching document integrates the best evidence to show impact on academic outcomes. This systematic review aims to address this gap.

1.2 Objectives

Schools play a vital role in promoting student wellbeing – operationalized as ‘a sustainable positive mood and attitude, health, resilience and satisfaction with self, relationships and experiences at school’. While general consensus holds that school-based wellbeing programs have the potential to help children and young people attain the social-emotional skills they need to succeed academically (e.g., Mahoney et al., 2020), there is little clear evidence available (e.g., Taylor et al., 2017). Previous systematic reviews on wellbeing interventions are narrow in scope, often focusing on social-emotional learning, and very few go beyond examining wellbeing-related outcomes to also consider improved academic outcomes. This review addresses these limitations, guided by the following research question.

How effective are school-based wellbeing interventions for improving the academic and non-academic outcomes of children and young people in mainstream schools?

The review also seeks to summarise the evidence for characteristics of effective interventions and provide an understanding of successful elements (e.g., design, program duration and implementation) that schools and systems might consider when implementing health and wellbeing interventions in schools.

1.3 The context of the current review

Wellbeing and academic achievement are both fundamental to positive psychological functioning and therefore these are seen as key variables of interest for evaluating the performance of an education system (Suldo et al., 2006). For young people, higher wellbeing is associated with better physical health, positive thinking and healthy behaviours (Frisch, 2000). Wellbeing is negatively related to drug use such as alcohol, marijuana and smoking (Zullig, 2001). In an educational context, higher wellbeing is also associated with teachers reporting fewer student conduct problems (McKnight et al., 2002), and greater levels of self-control, self-esteem and intrinsic motivation (Huebner, 1991).

This systematic review complements system-wide strategic imperatives for health and wellbeing promotion by providing robust evidence to inform policy and practice supporting student wellbeing. For example, *VicHealth's Action Agenda Framework, 2019-2023*, is committed to five 'strategic imperatives' for improving health and wellbeing outcomes, which include – (i) improving mental wellbeing, (ii) encouraging regular physical activity, (iii) promoting healthy eating, (iv) preventing tobacco use, and (v) preventing harm from alcohol, as summarised in Figure 2. This review is structured around these strategic areas to consider wellbeing in its broadest terms. For the purposes of this review, tobacco use and alcohol (iv and v) have been grouped together in order to reflect the drug/alcohol interventions, which tend to cover across these risky behaviours together.

Figure 2. VicHealth's strategic imperatives for health and wellbeing promotion



1.4 Previous systematic reviews

Several cross-sectional studies (Crede et al., 2015; Kirkcaldy et al., 2004; Suldo et al., 2008) have suggested an association between wellbeing and academic achievement. Some researchers have reported that higher academic performance is expected to improve wellbeing and lower psychological problems (Suldo et al., 2008), while others suggest that students' grade-point-average (GPA) positively impacts life satisfaction (Steinmayr et al., 2016). Moreover, a recent systematic review in the US on effective universal school-based social-emotional learning (SEL) programs in Kindergarten to Grade12 classrooms reported that SEL interventions in schools were found to have an impact on mathematics and reading (Corcoran et al., 2018). A few studies also noted that wellbeing and achievement were not significantly correlated (Huebner, 1991). As such, it is possible that high academic achievement does not result in happiness and positive mental wellbeing, and likewise, performing poorly at school does not necessarily mean someone is at risk of poor mental health. General consensus holds, however, that school-based wellbeing programs have the potential to help children and young people attain the skills they need to succeed academically (Brooks, 2014).

There are a number of reviews which have focused on the four wellbeing areas central to this review (see Figure 2 above, e.g., Blank et al., 2009) and some have gone further to explore the relationship of these wellbeing interventions for improving academic outcomes (e.g., Corcoran et al., 2018). However, some of these reviews lack sufficient focus on the topic being explored or have included

papers which used non-experimental designs, such as case-studies. This review of previous systematic reviews was an additional approach we used to identify possible studies for inclusion.

Table 2 presents a summary of previous systematic reviews that have some over-lap with the current systematic review by examining the effectiveness of interventions that fall into one of the four wellbeing areas: Improving mental wellbeing, Encouraging regular physical activity, Promoting healthy eating; and Preventing tobacco use and harm from alcohol. The type of setting – in school, out-of-school, or early-learning preschool – is also indicated, along with the studies in common with the current systematic review.

Table 2. Examples of previous systematic reviews (SR) of relevance to the current review

Author date & setting	Title of the SR	Focus and Outcomes of interest		Studies in common
Improving mental wellbeing (23 reviews)				
Adi 2007 In-school	Systematic review of the effectiveness of interventions to promote mental wellbeing in children in primary education	Mental wellbeing and changes in aspects of mental well-being (emotional, psychological and social)		–
Langford 2015 in-school cuts across all 4 domains	The World Health Organization’s Health Promoting Schools framework: A Cochrane systematic review and meta-analysis	Health promoting school (HPS): Body mass index (BMI), physical activity, physical fitness, fruit and vegetable intake, tobacco use, being bullied and educational outcomes (absenteeism, attendance, motivation)		–
Bikic 2017 in-school	Meta-analysis of organizational skills interventions for children and adolescents with ADHD	Organizational skills, attention, and academic performance		Evans 2016 Evans 2014
Blank 2009 in-school	Systematic review of the effectiveness of universal interventions which aim to promote emotional and social wellbeing in secondary schools	Psychological, social and emotional wellbeing - Prosocial skills and behaviours, bullying and disruptive behaviours, and mental wellbeing		–
Bücker 2018 in-school	Subjective well-being and academic achievement: A meta-analysis	Subjective wellbeing, academic achievement		–
Corcoran 2018 in-school	Effective universal school-based social and emotional learning programs for improving academic achievement: A systematic review and meta-analysis of 50 years of research	Social and emotional learning (SEL); Student performance: reading, mathematics, and/or science	Allen 2011, Bavarian 2013, Brigman 2007, Campbell 2005, Challen 2011, Diperna 2016, Dynarski 2004, Hanson 2011, Hanson 2012	
Durlak 2011 in-school	The Impact of Enhancing Students’ Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions	SEL skills, attitudes, and positive social behaviours, conduct problems, emotional Distress and academic performance		Battistich 2004
Dray 2017 in-school	Systematic Review of Universal Resilience-Focused Interventions Targeting Child and Adolescent Mental Health in the School Setting	Resilience protective factors; Anxiety symptoms, depressive symptoms, hyperactivity, conduct problems, internalizing problems, externalizing problems, and general psychological distress		–
Earnshaw 2018 in-school	Stigma-based bullying interventions: A systematic review	Bullying Behaviours, attitudes, and knowledge related to stigma-based bullying		Espelage 2016
Garcia-Carrion 2019 in-school	Children and Adolescents Mental Health: A Systematic Review of Interaction-Based Interventions in Schools and Communities	Mental health: depression and anxiety, aggression and behavioural issues, self-concept, self-esteem, self-efficacy, and empowerment, classroom climate and teacher-student and peer interactions,		–
Goldberg 2019 in-school	Effectiveness of interventions adopting a whole school approach to enhancing social and emotional development: a meta-analysis	SEL Skills: Social and emotional adjustment, behavioural adjustment, school performance and internalising symptoms		Bavarian 2013
Mackenzie 2018 in-school	Universal, school-based interventions to promote mental and emotional well-being: What is being done in the UK and does it work? A systematic review	Promote mental health, emotional wellbeing or psychological resilience		

Author date & setting	Title of the SR	Focus and Outcomes of interest	Studies in common
McKeering 2019 in-school	A Systematic Review of Mindfulness-Based School Interventions with Early Adolescents.	Mindfulness: Positive mental health traits for the student (e.g., optimism, coping, self-compassion, self-concept and emotion regulation), negative mental health traits (e.g., anxiety, depression and stress), physiological measures (e.g., blood pressure, heart rate), cognitive functioning	—
Payton 2008 in-school	The Positive Impact of Social and Emotional Learning for Kindergarten to Eighth-Grade Students	SEL skills: Students' social-emotional skills; attitudes towards self, school, and others; social behaviours; conduct problems; emotional distress; and academic success	—
Sancassiani 2015 in-school	Enhancing the Emotional and Social Skills of the Youth to Promote their Wellbeing and Positive Development: A Systematic Review of Universal School-based RCTs	SEL & Life Skills Training (LST): Healthy behaviours, emotional and social skills, academic performance, and psychological wellbeing	—
Sklad 2012 in-school	Effectiveness of school-based universal social, emotional, and behavioral programs: do they enhance students' development in the area of skill, behavior and adjustment?	SEL skills: positive self-image, behavioural adjustment - antisocial behaviour, prosocial behaviour, substance abuse, mental health disorders, and academic achievement	Murray 2005
Wigelsworth 2016 in-school	The impact of trial stage, developer involvement and international transferability on universal social and emotional learning programme outcomes: a meta-analysis	SEL Skills: Social-emotional competence, attitudes towards self, pro-social behaviour, conduct problems, emotional distress, academic attainment and emotional competence only	Brackett 2012 Ashdown 2012
Wood 2012 in-school	School-Based Mentoring for Adolescents: A Systematic Review and Meta-Analysis	Mentoring: Academic achievement, school attendance, attitude, behaviour (e.g., substance use), and self-esteem	Bernstein 2009 Portwood 2005
Durlak 2007 out-of-school	The Impact of After-School Programs that Promote Personal and Social Skills	Personal or social skills: Self-perceptions, school bonding, social behaviours, problem behaviours, drug use, school performance (achievement tests, grades attendance)	—
Jones 2017 out-of-school	Social and Emotional Learning in Out-of-School Time Settings	SEL Skills: Cognitive regulation, emotional processes, interpersonal skills, mindset	—
Baron 2017 preschool	The Tools of the Mind curriculum for improving self-regulation in early childhood: a systematic review	Tools of the Mind (Tools) curriculum: Children's self-regulatory and academic skills	—
Murano 2020 preschool	A Meta-Analytic Review of Preschool Social & Emotional Learning Interventions	SEL Skills, problem behaviours	—
Encouraging regular physical activity (6 reviews)			
Fedewa 2011 in-school	The Effects of Physical Activity and Physical Fitness on Children's Achievement and Cognitive Outcomes	Physical activity and physical fitness: Cognitive outcomes- math/reading achievement, grade point average, Intellectual quotient	—
Ferreira-Vorkapic 2015 in-school	Are There Benefits from Teaching Yoga at Schools? A Systematic Review of RCTs of Yoga-Based Interventions	Yoga or yoga-based: Psychological well-being and cognitive functions, such as attention and memory	—
Janssen 2010 in-school	Systematic review of the health benefits of physical activity and fitness in school-aged children and youth	Physical health (cholesterol blood lipids, high blood pressure, metabolic syndrome, overweight, obesity, bone mineral density), depression symptoms	—
Lees 2013 in-school	Effect of aerobic exercise on cognition, academic achievement, and psychosocial function in children: a systematic review of RCTs	Physical activity: Cognition, academic achievement, behaviour, and psychosocial functioning	—
Rasberry 2011 in-school	The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature	Physical education and/or physical activity or extracurricular physical activities (including school sports): Academic performance including cognitive skills, attitudes, and academic behaviours	—

Author date & setting	Title of the SR	Focus and Outcomes of interest	Studies in common
Singh 2012 in-school	Physical activity and performance at school: a systematic review of the literature including a methodological quality assessment	Physical activity: Academic performance, cognition	—
Promoting healthy eating (often includes physical activity) (4 reviews)			
Hendrie 2012 in-school	Combined home and school obesity prevention interventions for children: what behavior change strategies and intervention characteristics are associated with effectiveness?	Obesity prevention: BMI, blood pressure, increased consumption of fruit and vegetable, reduction in fat, total energy intake, physical activity, television viewing	—
Markow 2012 in-school	Enhancing food literacy through school-based cooking programs-What's working and what's not?	Cooking class: Self-efficacy in food preparation and cooking, food preparation skills and safety practices, cooking skills	—
Ohly 2016 in-school	A systematic review of the health and well-being impacts of school gardening: Synthesis of quantitative and qualitative evidence.	School gardening: Fruit and vegetable intakes, nutrient intakes (and other dietary outcomes), food preferences, knowledge and attitudes towards food, physical health and activity and well-being	—
Price 2017 in-school	Nutrition Education and Body Mass Index in Grades K-12: A Systematic Review	Nutrition education: BMI percentile or BMI z-score	—
Preventing tobacco use and harm from alcohol (3 reviews)			
Allen 2016 in-school	Effective Parenting Interventions to Reduce Youth Substance Use: A Systematic Review	Decreasing tobacco, alcohol, and illicit substance use: Smoking initiation; alcohol use and initiation, Smoking, substance, poly-substance, Alcohol use	—
Hindmarsh 2015 in-school	Effectiveness of alcohol media literacy programmes: a systematic literature review	Media literacy education on underage drinking: Pre-drinking behaviour, persuasion knowledge, realism, social norms, similarity, desirability, identification, expectancies, behavioural intention, alcohol consumption, deconstruction skills	—
Tolan 2013 in-school	Mentoring Interventions to Affect Juvenile Delinquency and Associated Problems: A Systematic Review	Mentoring: Delinquency, academic achievement, drug use and aggression	Clarke 2009 Holt 2008

As can be seen in Table 2, the majority of systematic reviews focus on improving mental wellbeing (59%), with fewer reviews considering physical activity (19%), healthy eating (13%) and preventing tobacco/alcohol use (9%). While a number of the reviews examined the impact of physical exercise on achievement or on physical health, the general wellbeing measures were missing. Thus none of the studies included in these reviews were included in the current systematic review, which required both an academic and a wellbeing measure. A few of the systematic reviews that focused on encouraging physical activity also incorporated components of promoting healthy eating and improving mental wellbeing but failed to include academic achievement as a measure and therefore none of the studies from these reviews were included in this current review. It is likely that the balance of systematic reviews aligned to each of the four domains is a reflection of the number of programs and suggests that there are many more programs that mental wellbeing, compared to the other domains.

Likewise, most reviews considered interventions within the school context (88%), with few reviews focusing on out-of-school (6%) or preschool (6%) settings. One of the delimitations of the current review excluded programs that were out-of-school hours or in preschool settings, so no studies from these systematic reviews were eligible for inclusion in the current analysis.

Accordingly, this systematic review conducted an investigation into the effectiveness of interventions, including universal wellbeing mental health promotion programs, in schools for children and young people. In order to provide empirical evidence, the focus only involved interventions that report impact on academic achievement (e.g., standardized test scores). While an initial search of literature on school wellbeing research found several relevant recent reviews (e.g., Corcoran 2018), most reviews

on this topic did not report on outcomes for academic achievement. This suggests that while there are considerable amounts of research linking aspects of student wellbeing to cognitive and non-cognitive outcomes, there is little definitive evidence available. Moreover, a preliminary search of ERIC and Google found that the few previous systematic reviews found were narrow in scope and did not assess the broad range of school-based interventions that support wellbeing, including physical activity, healthy eating, mental health, and preventing tobacco use and harm from alcohol. All these aspects are considered important in a holistic approach to wellbeing promotion, supporting the need for this systematic review.

1.5 Student wellbeing programs in schools

Before undertaking the systematic search for studies, a general review of the literature on school-based wellbeing promotion in Australia is presented in order to set the scene. For all of the frameworks and programs presented here, almost none are the focus of the studies selected and included in this systematic review. It serves to demonstrate the gap that exists – that while there is significant activity in the wellbeing intervention space, there is a lack of high-quality evidence of impact. By doing so, it provides an overview of the type of evidence available on health and wellbeing interventions and the elements of effective implementation that comprise them.

Mental health promotion

In Australia, there has been a strong focus over several decades to systemically promote wellbeing in schools, understanding the important link between health and education. Research continues to illustrate the need for infusing student social-emotional wellbeing programs into the curriculum to promote their mental health and optimise learning outcomes (DECS, 2010; Dobia et al., 2020).

At the broadest level, these programs typically take the form of 'frameworks' and 'initiatives', however very little evidence exists to attest their effectiveness. For example, the ['Australian Student Wellbeing Framework'](#) supports schools to offer students a robust foundation to reach their learning goals and life aspirations. Examples of other home-grown frameworks implemented in Australian schools include [Positive Schools](#), [School-Wide Positive Behaviour](#), [Restorative Practices](#), [National Framework for Protecting Australia's Children](#) and the [Framework for Improving Student Outcomes \(FISO\)](#), as well as international frameworks such as the [Collaborative for Academic, Social and Emotional Learning](#) (CASEL, 2020) [Health Promoting Schools](#), developed by the World Health Organisation (WHO, 2006) and [Positive Psychology](#) (PERMA), developed by Martin Seligman.

Table 3 presents a selection of the evidence supporting whole-school wellbeing interventions in Australia, reinforcing the critical importance of systemic implementation that integrates wellbeing practices into school ethos in order to generalise learning beyond the classroom and into the day to day life of the school (Chatterjee Singh & Duraipappah (2020).

The national whole-school mental health initiative currently being implemented in Australia (called [Be You](#)) commenced in late 2018, built on its predecessors: MindMatters (started in 2000), KidsMatter Primary (2007) and KidsMatter Early Childhood (2010). While a process and impact evaluation of Be You is not yet available, the previous initiatives have some evidence of impact, as Table 2 also summarises, however none of these studies met the inclusion criteria for this review, mainly due to study design. As such, the information collated here acknowledges that while there may have been effective wellbeing initiatives in Australia, most studies do not have a controlled trial design, which is typically a key criteria for inclusion in high-quality systematic reviews.

Table 3. Examples of evidence of impact of whole-school wellbeing interventions (excluded)

Author year	Title	Key findings
Gregory 2016	The promise of restorative practices (PR) to transform teacher-student relationships and achieve equity in school discipline	High RP-implementing teachers had more positive relationships with their diverse students and were perceived by them as more respectful compared with low RP implementers. RP factors significantly explained 17% of the between-teacher variance in teacher respect.
Horner 2009	A randomized, wait-list controlled effectiveness trial assessing school-wide positive behavior support in elementary schools	Findings suggest that training and technical assistance were functionally related to improved implementation of universal-level SWPBS practices. SWPBS Schools were perceived as safer environments and were tentatively associated with increased 3rd-grade reading performance.
Langford 2015	The WHO Health Promoting Schools framework: A Cochrane systematic review & meta-analysis	67 studies were included with health interventions and only a few of these had academic/attendance outcomes. The review mainly found positive average intervention effects (generally small) for: body mass index (BMI), physical activity, physical fitness, fruit/veg intake, tobacco use, and being bullied.
Kern 2015	A multidimensional approach to measuring wellbeing in students: Application of PERMA framework	Positive emotion has been found to be associated with outcomes such as life satisfaction, hope, gratitude, school engagement, physical vitality and activity.
Askell-Williams 2013	Quality of implementation of a school mental health initiative and changes over time in students' social and emotional competencies (KidsMatter Primary)	Statistically significant relationships between high-implementing schools and improved student social and emotional competencies (SEC). HLM analysis of change over time showed statistically significant relationships, with small practical effect sizes ($r = 0.1$ to 0.15). In average- and high-implementing schools, there were 7.8% and 13.1% shifts in children moving from low or average SEC, to high SEC, respectively.
Dix 2010	KidsMatter for Students with a Disability: Evaluation Report	Significant positive improvements in mental health and wellbeing was reported for students with a disability, attributed to the impact of the initiative. The impact of KidsMatter Primary on the provision of SEL: The effect size for this change was of small practical significance for teachers of students with a disability. Parents and teachers reported an increase in mentally healthy behaviours.
Dix 2012	Implementation quality of whole-school mental health promotion and students' academic performance. (KidsMatter Primary)	High-implementing schools had improved learning outcomes for students, equivalent to 6 months more schooling by Year 7, controlling for SES background. Compared with the low-implementing schools, Year 3 students in high-implementing schools were 2.6 months ahead in academic achievement, rising to 4.4 months ahead at Year 5, and to 6.2 months ahead by Year 7 – small effect of 0.26 ($p < .05$).
Dix 2013	KidsMatter and Young Children with Disability: Evaluation Report	There was a significant improvement in staff-child closeness but children with disability were less likely to share as close a relationship with ECEC staff, compared to children without disability. The quality of whole-site mental health promotion made a difference for parents of a child with disability. Children's mental health difficulties significantly reduced over time ($p=0.004$) – controlling for developmental ageing.
Slee 2012	KidsMatter Early Childhood Evaluation Report	On the services' ability to address children's social-emotional needs, there were practically significant increases in staff's ratings in both High and Low Implementing services, equivalent respectively to medium and small effect sizes. The change in parents' ratings across the time of the pilot showed a small significant effect in both the Low and High Implementing services.
Slee 2012	KidsMatter Early Childhood in Services with High Proportions of Aboriginal and Torres Strait Islander Children	In relation to the extent of engagement and usability of KMEC, services with a high proportion of Aboriginal and Torres Strait Islander children generally endorsed KMEC. Respondents also highlighted factors that constrained uptake including the KMEC resources (e.g., lack of an Indigenous content).
Slee 2009	The KidsMatter Evaluation: Final Report	There were positive changes to schools, teachers, parents/caregivers, and children associated with KM over the two year trial. For students with mental health difficulties, medium to large effects for reductions in emotional symptoms, conduct problems, peer problems and hyperactivity, in addition to a small effect for improvements in prosocial behaviour.
ACER 2010	MindMatters Evaluation	Evidence of awareness and reach was the main focus of the national report.
ACER 2016	Evaluation of the redeveloped model of MindMatters	The engagement, implementation and embedding of the redeveloped MindMatters Framework in schools is a gradual process, one that is individual to each school and is influenced by their needs and capacity at the time.
ACER 2021	Be You Evaluation Report (in progress)	Cross-sectional evaluation comparing the student mental health & academic outcomes, family engagement, and educator MH knowledge, confidence, and skills in low vs high implementing schools.

Wellbeing programs in Australia

Guided by online professional learning for educators, the Be You framework provides an umbrella that encourages schools and early learning services to seek out, identify and implement existing social-emotional learning programs and interventions (e.g., BounceBack) to support and promote student wellbeing specific to their needs and context. Accordingly, schools may be implementing multiple interventions within a broader framework of whole-school wellbeing promotion, in addition to embedding their local jurisdictions' wellbeing improvement framework as part of 'business as usual'.

Moreover, according to a national programs directory (beyou.edu.au/resources/programs-directory) Australian schools and early learning services can access over 200 school-based wellbeing programs. The [Addendum](#) presents a full list of programs (as at August 2020) in alphabetic order with an indication of who it's for and in which setting. A quick appraisal of the evidence provided for each program shows that over half (56%) had 'low' quality evidence, where only an underlying theoretical framework was identified but no study had been undertaken or published. One-fifth of programs (22%) were rated as having a 'medium' quality evidence-base, by referencing some related research. Only 23% of programs gave concrete evidence of their impact in the form of published studies or reports (first author and date provided).

Clearly there are many good wellbeing programs and interventions available for schools to implement, as evidenced by the programs directory (see the [Addendum](#)) and a sample of the whole-school wellbeing frameworks (see Table 3 above). However, there are very few studies that have been published on any of these programs and frameworks that adopt an experimental or quasi-experimental research design favoured in high-quality systematic reviews. Of the 200 plus programs listed, only two (*You Can Do it!* and *Tribes*) had sufficient quality of evidence to be included in this current systematic review. This systematic review, therefore, presents the best evidence of program impact, not necessarily the best program. In other words, wellbeing programs have been selected for inclusion in this systematic review because they met selection criteria that minimises reporting bias, not because it was an exceptional program. It is important to understand this difference when interpreting the results and outcomes of this systematic review.

2 Method

2.1 Protocol and registration

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement checklist (Moher et al., 2009) was used to inform the content of this review. PRISMA is an evidence-based set of standards for reporting in systematic reviews and meta-analyses. It consists of a checklist of items and a four phase flow diagram (CONSORT), presented in Appendix 1. One of the aims of the PRISMA statement is to assist authors of systematic reviews to improve the clarity and transparency of their reporting by following a checklist of recommended items (Moher et al., 2009). It also assists readers of systematic reviews by facilitating standardised, consistent, and complete reporting of studies (Liberati et al., 2009). As part of the PRISMA recommendations, the systematic review protocol (Dix et al., 2020) was registered on 28 April 2020 with PROSPERO [CRD42020176599].

2.2 Eligibility

Participants: Samples needed to consist of students in mainstream schools between 5 and 18 years of age. This includes children with learning difficulties or disabilities.

Interventions: To be eligible for inclusion, an intervention needed to be a framework or program used in school, including whole-school universal or targeted approaches, for promoting student mental-health and wellbeing. It could be delivered by the classroom teacher or a program specialist. Interventions could directly involve students, or indirectly involve students via teacher professional development. Interventions could be incursions or excursion that occurred during school time. The interventions were not specific to health or attainment. Interventions focused on students in mainstream schools with a disability or additional learning need were included. However, we did not include search terms solely relating to disability or disorders. Interventions that were solely family, out-of-school hours, preschool, clinical, or pharmacologically based were excluded from the review. Interventions that were system-level (e.g., Charter schools) were also excluded.

Comparison groups: The comparison groups in experimental and quasi-experimental studies typically included wait-list control groups or treatment-as-usual groups. Studies with a pre-post or longitudinal design that did not have a control group were excluded.

Outcomes: The primary outcome for included studies was student academic achievement (e.g., numeracy, literacy, GPA). All included studies reported at least one standardised achievement-related outcome. Studies that only reported wellbeing outcomes and not academic outcomes, were excluded from the review. The secondary outcomes for included studies, were selected mental health and wellbeing-related outcomes (e.g. physical, resilience, SEL skills, self-esteem, self-regulation). The tools and instruments employed to measure the wellbeing outcomes were grouped around the four 'strategic imperatives' (see Figure 2) and aligned to Hattie's (2017) influences on student achievement. Mental health and wellbeing were measured using valid and reliable approaches (e.g., validated scales, screening instruments, behavioural checklists) in the school or family setting. Self-reported outcomes were prioritised over teacher or parent reports. Follow-up measurements was not a required criterion for inclusion and was not extracted.

Study design and publication: Studies were included if they were either randomised controlled trials (RCTs), non-randomised controlled trials, or quasi-experimental pre-post designs. This was performed in order to report on the quantitative research currently available. Established criteria was used to assess the quality of the study design and resulting evidence which are appropriate to the design of

the study (JBI, 2013). All studies needed to be published between January 2004 to January 2020 in the English language and in peer-reviewed journals, commissioned reports, or approved Masters or Doctoral theses.

2.3 Search strategy

The electronic databases A+ Education, ERIC, Education Research Complete, British Education Index, PsycInfo and Scopus (limited to the 'Social Sciences' Subject Area) were searched for studies using a comprehensive set of keywords and Subject Heading terms, presented in Appendix 2. Trial registries and grey literature sources were also searched. Additional articles were obtained through a hand search strategy which included scanning the reference lists of key articles and related systematic reviews (see Table 2). The grey literature in Google Scholar was also searched for published papers.

The following simplified PICO concepts formed the basis of the search strategy, but also included the other terms presented in Appendix 2: [Children and young people] AND [Wellbeing, resilience, mental health] AND [program, prevention, training] AND [Trial, experimental, control group] AND [Academic achievement, literacy, numeracy]. The Intervention concept included 'problem' terms aligned to the strategic imperatives in Figure 2 (above) in order to be as broad and inclusive as possible. The search strategy was adapted to the search features of each selected database. The use of subject terms ensured a targeted search and avoided the need to consider all equivalent spellings, words and phrases. A detailed search statement for the ERIC database that draws on the key terms is presented in Appendix 2. This statement was adapted for each database, attempting to match statements as closely as possible, accommodating the varying content and features particular to each database.

2.4 Study selection and search results

A total of 4850 studies were identified by the search strategy. Once duplicates were removed (n = 497), the titles and abstracts of 4353 studies were screened for relevance by the authors who then excluded non-relevant titles (n = 3805). The full texts of the remaining studies (n = 548) were then reviewed. Authors were provided with a set of inclusion and exclusion criteria against which to assess each study and met regularly to ensure common understanding and to discuss studies that were unclear or required a consensus when there was disagreement. Two authors then independently critically appraised the full texts to determine final eligibility. A third author was involved to resolve any discrepancy for inclusion. A breakdown of the reasons for exclusion during the screening and eligibility process is detailed in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA: Moher et al., 2009) flow diagram in Appendix 1.

2.5 Data extraction

Data were extracted by authors for 75 included articles based on the Cochrane Review Group's Data Extraction Template for Included Studies (2016, Version 1.8) for experimental and quasi-experimental studies. These extraction sheets were converted into a Microsoft Excel table, one row for each outcome extracted, which included standard sections for reporting study characteristics and outcome measures. This involved reading each paper several times and completing a row in the extraction table with data entered under standard column headings including the name of the first author, year of the publication, groups, sample attributes, intervention, and outcomes. Each article had data extracted for at least two outcomes – one academic and one wellbeing-related. Data were extracted purely for the purpose of obtaining information about each study rather than tailoring the process to only extract data relevant for subsequent reporting. This best-practice procedure was performed in order to ensure

that no information was missed (Cochrane Review Group, 2016). If data were not available in numerical format (two studies), it was estimated from figures using WebPlotDigitizer (2018). The main author reviewed and finalised the extracted data. From the 75 included studies, 432 outcomes were extracted (126 Academic and 306 Wellbeing outcomes).

2.6 Assessing risk of bias

Following GRADE protocol (Guyatt et al., 2011), pairs of authors independently assessed the risk of bias of each included study. Any disagreements were discussed between the two authors and another author gave final judgment if no consensus could be reached. Trials were assessed using Cochrane's tool for assessing risk of bias in randomised trials (Higgins et al., 2011). The tool includes the following domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. We rated each domain for risk of bias as Low, Unclear, or High risk. Funnel plots were used to visually explore publication bias, which arises from the likelihood that studies reporting relatively large treatment effects tend to be published over studies that report modest or trivial treatment effects, potentially impacting conclusions drawn.

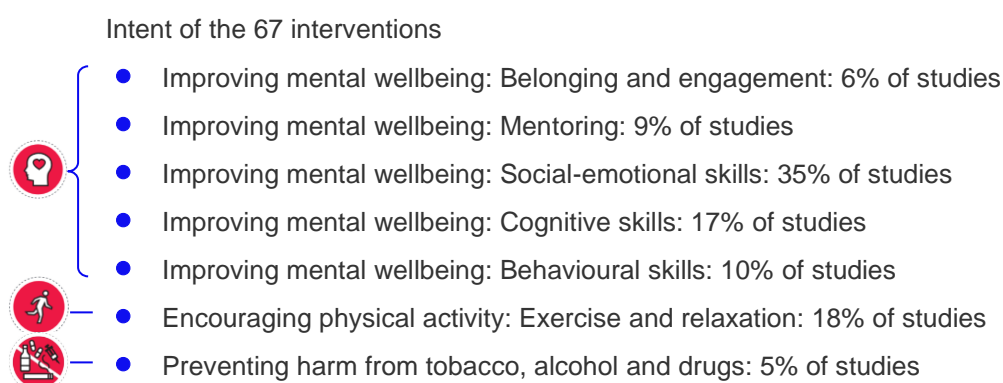
2.7 Data analysis

The effect size estimate used was the adjusted standardized difference between means of the intervention and the comparison group: Hedges's g (1988). Multiple studies did not contain information that allowed for the direct extraction of the effect size estimate. Various statistics reported in these studies were converted to Cohen's d and Hedges's g using the Comprehensive Meta-Analysis (CMA) Version 3.0 program (Borenstein, Hedges, Higgins & Rothstein, 2014). Where data was missing, authors were contacted to obtain the relevant information if it was not possible to calculate the effect size from available information. All treatment-comparison contrasts using independent participant groups were included in our analysis. Effect directions were defined in relation to the meaning of each outcome category measured. Accordingly, outcomes that were desirable to increase (e.g., social-emotional skills or academic achievement) had a positive effect direction when increased, while outcomes that were desirable to decrease (e.g., anxiety or alcohol abuse) were reversed to a positive effect direction when decreased. For studies reporting more than one academic or wellbeing outcome (nearly all), effects of the specific outcomes were averaged to obtain a single wellbeing or academic estimate for the given study using the CMA program. The random effects model was used to allow heterogeneity of effect sizes reported across different studies and provide a more conservative estimate of effect size by including study-level sampling error (Lipsey & Wilson, 2001). The random effects model incorporates the assumption that the different studies are estimating different but related treatment effects (Higgins & Green, 2011). Statistical tests were two-tailed and an alpha level of < 0.05 was used to indicate statistical significance. In order to evaluate the heterogeneity, Cochran's Q test and I^2 were applied. The heterogeneity among studies was categorised into three groups of less than 25% (low), 25% - 75% (moderate), and more than 75% (high).

3 Results

3.1 Interventions, moderators and outcomes

Of the 75 articles included, Adler 2016 reported three studies and Gibbons 2006 reported two studies, giving a total of 78 studies for inclusion in the meta-analyses. In line with other meta-analyses of this kind (e.g., Blank et al., 2009; Goldberg et al., 2019) the 67 wellbeing-related interventions considered in the 78 studies were categorised into seven emergent intervention types aligned to the overarching framework guiding this systematic review (see Figure 2 above). This grouping of interventions by type, provided a manageable structure that underpinned the meta-analyses presented in this report, that without, would have been unwieldy (Blank et al., 2009).



Types of wellbeing-related interventions

Belonging and engagement: These programs focus on the extent to which students feel included, respected, accepted, and encouraged by others in school. Research has shown that a positive relationship to school community can shape a student's emotional, behavioural, and cognitive engagement with schooling, and influence academic outcomes (Hattie, 2017).

Mentoring: A mentoring approach is often defined as a formal relationship in which an experienced person (the mentor) assists another in developing specific skills and knowledge that will enhance the less-experienced person's (the mentee) growth. In his meta-analysis of factors influencing student academic achievement, Hattie (2017) reported that mentoring had a very small positive effect.

Social-emotional skills: According to Hattie (2017), social skills programs are school-based curricula designed to teach students to "appropriately interact and communicate effectively with their peers and teachers and develops respect for self and respect for others". Hattie reported that social skills programs generally had a positive influence on student academic achievement.

Cognitive skills: Cognitive programs are generally founded on the notion that cognitive deficits are a learned behaviour rather than inherent trait, and that they can be unlearned or replaced in a nurturing environment. The general aim of many cognitive programs is to learn and develop practical self-help strategies that replace unhelpful thoughts, feelings, and behaviours. Cognitive behavioural therapy interventions have been reported to be mildly effective in reducing depression and moderately effective in reducing anxiety symptoms (Mychailyszyn et al., 2012). Hattie (2017) found that cognitive behaviour programs had a small influence on student academic performance.

Behavioural skills: Such programs are designed to modify student behaviour in the classroom by developing prosocial skills and reduce problem behaviours like aggression. Hattie (2017) found that behavioural programs had a moderate influence on student achievement. Blank et al. (2009) found

that curriculum interventions to promote prosocial behaviours and skills had a positive effect on preventing internalising symptoms of anxiety and depression.

Exercise and relaxation: In an educational context, Hattie (2017) broadly described exercise and relaxation programs as those involving physical activity and relaxation exercises, usually aimed to reduce stress levels or maintain focus on tasks. He found that such programs had a small effect on student academic achievement.

Preventing harm from tobacco, alcohol and drugs: Positive peer influences, focused on reducing risky behavior such as drug and alcohol abuse, were found by Hattie (2017) to have a moderate effect on student academic outcomes.

Types of moderators

In order to investigate the sensitivity of interventions under various conditions, six moderators were also considered. The moderator analyses included research design, school setting, intervention mode, duration, grouping and approach.

Research design: Studies were categorised as a randomised control trial (RCT: 51% of studies) or a quasi-experimental design (QE: 49% of studies).

Setting: Studies were categorised into the following levels of schooling: Primary school (44% of studies), Middle school (20%), Secondary school (25%), Combined K-12 (7%), and Other (4%). For studies that included students across two settings, the study was aligned to the main cohort.

Mode: Studies were categorised depending on whether students were directly involved in the program (Direct: 51% of studies), or indirectly (e.g., their teacher received professional development to deliver the program) (Indirect: 49%). For example, Mohoney et al. (2020) advocate as part of a systemic schoolwide approach to social-emotional learning, “strengthening adult SEL competencies and capacity” (p.3). Hattie (2017) found that teacher professional development courses or interventions that aimed to enhance the beliefs, actions, or knowledge to indirectly improve student outcomes, had a small effect. While there is general agreement that indirect delivery is less expensive than direct delivery (e.g., Boyle, 2009), no systematic reviews were found that specifically compared the effectiveness of direct versus indirect delivery modes of wellbeing interventions in schools.

Duration: There was substantial diversity amongst the interventions in terms of the frequency of sessions, the how long sessions went for, and the overall duration of the program. For example, one intervention was a once-off one hour session, while other programs were embedded over years throughout the curriculum, making it difficult to derive a meaningful measure of program intensity. Adopting the cleanest approach, studies were categorised into short (31%), moderate (40%) and long (29%) duration. Short programs were one school Term (3 months) or less, moderate programs were up to one year’s duration, and long programs were defined as more than one year.

Grouping: There was also diversity in how the interventions involved students. While 23% of interventions were categorised as individual or one-to-one, 56% were classroom based, usually delivered by the teacher to the whole classroom. There were also interventions that involved non-classroom groups of students, often based on a group characteristic such as gender or special needs. These groups were defined as small: with 10 or fewer students (5% of studies); medium: with between 11 to 20 students (11% of studies); and large: groups with more than 20 students (5% of studies).

Approach: Lastly, we considered the nature of interventions with regard to their universal or targeted approach. Three-quarters of studies (75%) were categorised as using a targeted approach to support students at risk of academic failure. Targeted approaches were also used in 5% of studies with a

focus on counteracting disadvantage (identified as students from low socio-economic backgrounds in this report), and in 4% of studies focused on students with special needs. The remaining 16% of interventions used a universal approach.

Types of outcomes

Outcome measures used to assess student wellbeing were diverse and needed to be categorised in order to facilitate the comparison of studies (Zubrick et al., 2000; Svane, Evans & Carter, 2019). Accordingly, the 126 academic outcomes (our primary outcome) and 306 wellbeing-related outcomes (our secondary outcome) that were extracted, were broadly categorised into five major domains, in line with previous systematic reviews and research (e.g., Payton et al., 2008; Sklad et al., 2012; Mahoney et al., 2020).

- Academic achievement (100% of studies): this category included all measurements of general academic performance, for example GPA, standardised literacy or numeracy tests. A separate sub-analysis was also done comparing numeracy, literacy and general academic outcomes.
- Social-emotional adjustment (25% of studies): this category included measurements of social or emotional skills, and attitudes toward self and others, connectedness, relationships, mindfulness.
- Cognitive adjustment (27% of studies): this category included learning engagement, resiliency, cognitive-regulation, executive function, decision making, autonomy, self-efficacy.
- Behavioural adjustment (28% of studies): this category included prosocial behaviour, conduct problems, inattention, victimisation, aggression, suspension, risky behaviour (e.g., substance abuse).
- Internalising symptoms (20% of studies): this category included outcomes related to reducing mental health difficulties, anxiety, depression, dysfunctional attitudes, psychological wellbeing.

The results in this chapter present the meta-analyses of each of these five outcomes organised by the seven types of intervention, followed by the academic sub-analyses and an exploration of the moderators on academic and wellbeing outcomes more broadly.

3.2 Characteristics of the included studies

The characteristics of the included studies are presented in Appendix 3. Of the 78 studies, 41 were randomised control trials and 37 were quasi-experimental with pre-post design but no random allocation. Most studies were carried out in the United States (51 studies) and the United Kingdom (5 studies). Spain and Turkey each had three studies, while the Democratic Republic of the Congo, Israel and Italy each had two studies. One study was included from Australia, Bhutan, Brazil, India, Mexico, Northern Ireland, Peru, Singapore, Sweden, and Tanzania. The number of participants in each study ranged from 1 school with 15 students in the United Kingdom (Roughan 2011) through to 694 schools with 694,153 students in Peru (Adler 2016). In total, the meta-analyses undertaken were based on 411,535 students.

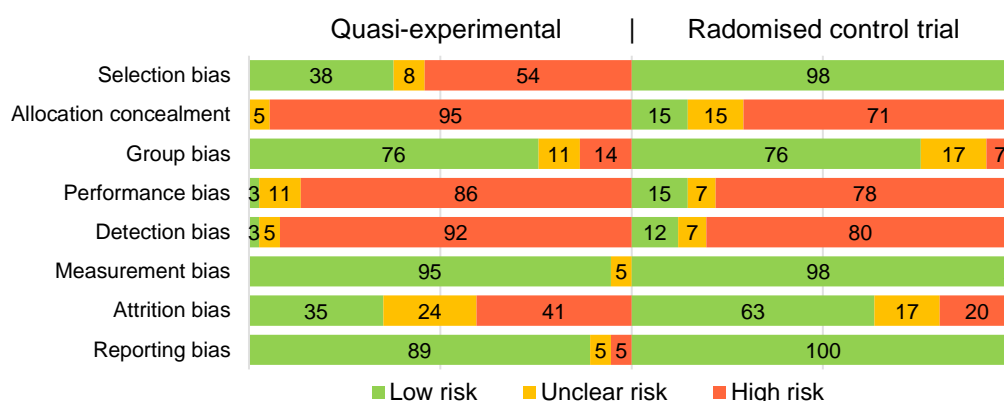
All 78 studies included dependent measures of academic performance (N = 320,505: 126 outcomes), 38 studies included dependent measures of social-emotional adjustment (N = 34,750: 77 outcomes), 39 studies included measures of behavioural adjustment (N = 51,321: 87 outcomes), 47 studies included measures of cognitive adjustment (N = 37,404: 82 outcomes), and 31 studies included measures of internalising symptoms (N = 288,061: 60 outcomes).

Study participants ranged from all-girl samples (Seaton 2010, Gatz 2019) to 91% boys (Lopata 2019), with the total sample being 52% boys overall. Students were as young as 5 years of age through to 26 years old and included all schooling grade-levels: 3 studies in junior primary, 38 studies in primary school, 21 studies in middle school, and 28 studies in secondary school.

3.3 Quality of the evidence base

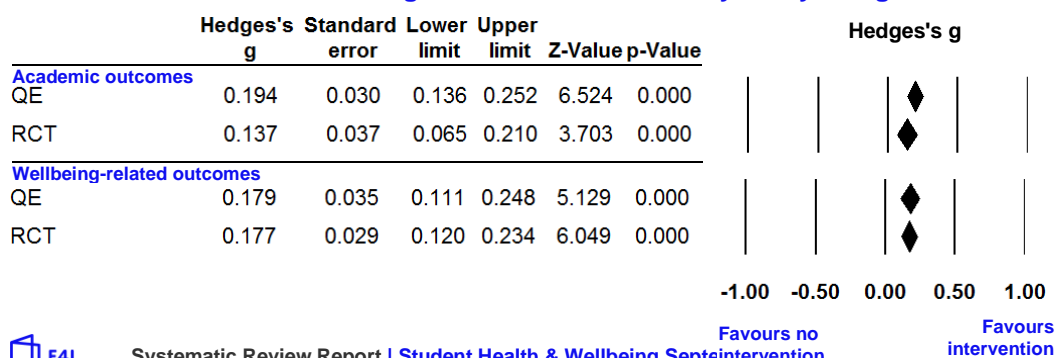
Full details of the risk of bias assessment for the experimental and quasi-experimental studies are provided in Appendix 4. All studies had at least one domain at high risk of bias. Among the 41 randomised controlled trials, the main issues were a high risk of bias due to lack of blinding of participants and study personnel and lack of blinding of outcome assessment. Information about random sequence generation and allocation concealment was unclear for most trials. Funnel plots were used to visually explore publication bias, presented Figure 20 and Figure 21 in Appendix 4 for the academic and wellbeing outcomes respectively. A summary of the proportion of trials that were at low, unclear, and high bias for each domain is shown in Figure 3.

Figure 3. Risk of bias item presented as percentages across all 75 included studies



Keeping in mind that, overall, the quasi-experimental studies carried a greater risk of bias (55% on average) compared to the RCTs (43%), Figure 4 shows the random effects meta-analysis of the academic and wellbeing outcomes moderated by study design. It shows for student **academic achievement**, quasi-experimental designs reported greater effect ($k = 37$; $g = 0.19$; 95%CI 0.14 to 0.25; $z = 6.52$; $p < 0.001$) than RCTs ($k = 38$; $g = 0.14$; 95%CI 0.06 to 0.21; $z = 3.70$; $p < 0.001$). There was no difference in the reports on overall **wellbeing-related outcomes**, based on the study being quasi-experimental ($k = 37$; $g = 0.18$; 95%CI 0.11 to 0.25; $z = 5.13$; $p < 0.001$) or RCT ($k = 38$; $g = 0.18$; 95%CI 0.12 to 0.23; $z = 6.05$; $p < 0.001$). This suggests that in the context of school-based wellbeing programs, the assessment of academic outcomes may be more sensitive to study design than the assessment of wellbeing outcomes.

Figure 4. Random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes moderated by study design



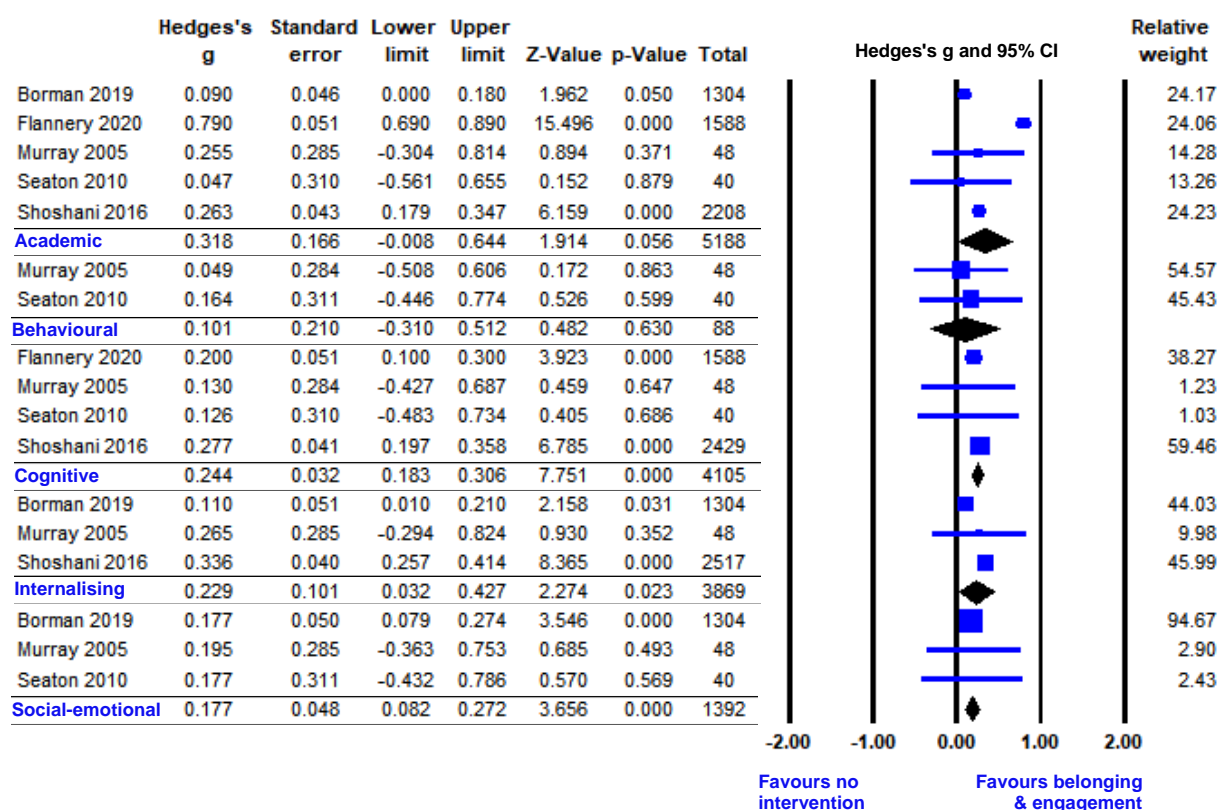
3.4 Findings

While numerous meta-analyses have been conducted to review the effectiveness of school-based mental wellbeing interventions at the universal level (delivered to all students irrespective of perceived need) and targeted level (delivered to 'at risk' individuals) (Mackenzie & William, 2018), the results overall have been mixed. The following section adds to this literature by presenting the results of the random effects meta-analyses of the effectiveness of the seven types of wellbeing interventions on academic achievement and the four wellbeing outcomes of social-emotional adjustment, behavioural adjustment, cognitive adjustment and internalising symptoms.

Improving mental wellbeing: Belonging and engagement

Supporting a sense of belonging and engagement in school was examined in five studies. The nature of these interventions were diverse. They ranged from a student writing task to reduce worries and increase the feeling of belonging at school (Borman 2019), through to positive psychology-based classroom-level interventions (Shoshani 2016; Flannery 2020) and a program aimed at strengthening engagement through building student-teacher relationships (Murray 2005). One intervention was directly delivered to students and four interventions were delivered through the classroom teacher. Figure 5 shows the random effects meta-analysis of the belonging and engagement interventions by comparing control and treatment groups.

Figure 5. Forest plot for interventions that promote belonging and engagement in school and learning



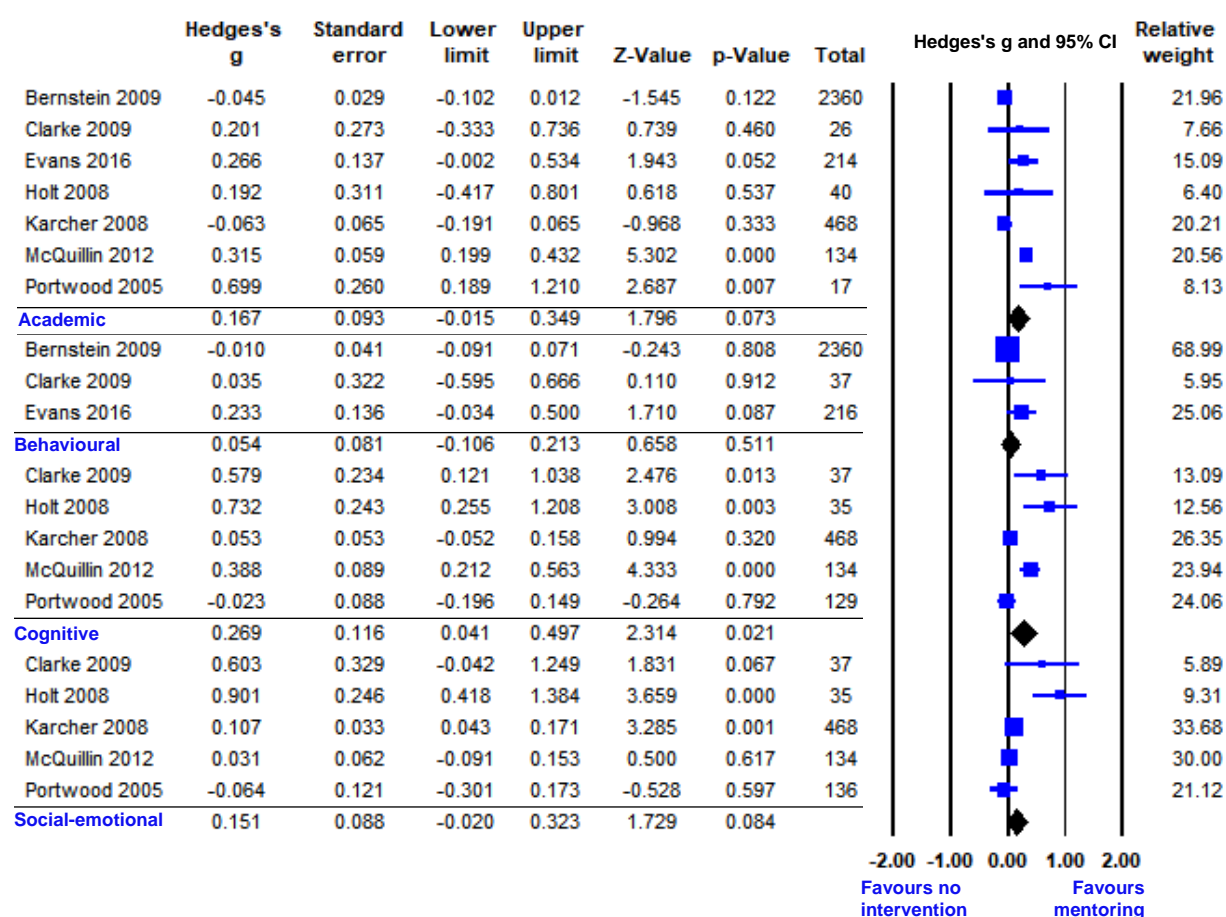
As Figure 5 shows, the effect of interventions on student **academic achievement** was marginally greater than the comparison conditions ($k = 5$; $g = 0.32$; 95%CI -0.01 to 0.64; $z = 1.91$; $p = 0.056$). The effect of interventions on **behavioural adjustment** favoured the treatment group ($k = 2$; $g = 0.10$; 95%CI -0.31 to 0.51; $z = 0.48$; $p = 0.630$), but not significantly. However, the effect of interventions on **cognitive adjustment** favoured the treatment group to a small extent ($k = 4$; $g = 0.24$; 95%CI 0.18 to 0.31; $z = 7.75$; $p < 0.001$) and the effect of interventions on **internalising symptoms** also significantly

favoured the treatment group ($k = 3$; $g = 0.23$ 95%CI 0.03 to 0.43; $z = 2.27$; $p = 0.023$). Lastly, the effect of interventions on student **social-emotional adjustment** was more effective than the comparison conditions ($k = 3$; $g = 0.18$; 95%CI 0.08 to 0.27; $z = 3.66$; $p < 0.001$). Overall, there was substantial variability in the extracted data (high heterogeneity) within academic outcomes ($Q(4) = 112.68$, $p < 0.001$; $I^2 = 96\%$) and within wellbeing outcomes ($Q(4) = 25.93$, $p < 0.001$; $I^2 = 85\%$) supporting the need for a random effects approach.

Improving mental wellbeing: Mentoring

Promoting student wellbeing and connection to school through mentoring initiatives was examined in seven studies. This direct and more targeted approach, usually involving middle-school students identified at risk of poor academic outcomes, dropping out of school or delinquency concerns. Mentoring was usually provided by an adult (e.g., school counsellor) in a group or individual context. For example, one group-based mentoring program (Portwood 2005) aimed to improve values, attitudes and behaviours in regard to substance abuse and school, and to improve school connectedness and effect positive changes in attitudes toward self, adults, and the future. Figure 6 shows the random effects meta-analysis of the belonging and engagement interventions by comparing control and treatment groups.

Figure 6. Forest plot for interventions that promote wellbeing through mentoring



As Figure 6 presents, there was no significant effect of mentoring on student **academic achievement** compared to treatment as usual ($k = 7$; $g = 0.17$; 95%CI -0.02 to 0.35; $z = 1.80$; $p = 0.073$). Likewise, there was no impact of the mentoring interventions on **behavioural adjustment** ($k = 3$; $g = 0.05$; 95%CI -0.11 to 0.21; $z = 0.66$; $p = 0.511$). There was a small significant effect of mentoring on

cognitive adjustment favouring the treatment group ($k = 5$; $g = 0.15$; 95%CI 0.04 to 0.50; $z = 2.31$; $p = 0.021$), but no impact on **social-emotional adjustment** ($k = 5$; $g = 0.10$; 95%CI -0.02 to 0.32; $z = 1.73$; $p = 0.084$). Overall, there was high heterogeneity within academic outcomes ($Q(6) = 41.94$, $p < 0.001$; $I^2 = 86\%$), and within wellbeing outcomes ($Q(6) = 33.61$, $p < 0.001$; $I^2 = 82\%$), supporting the need for a random effects approach.

Improving mental wellbeing: Social-emotional skills

Promoting student social-emotional skills was the most common type of intervention, involving 24 of our included studies. This group of interventions included indirect programs like Friendly Schools (Adler 2016), Second Step (Benson 2017, Espelage 2016, Low 2019), Student Success Skills (Bowers 2015, Brigman 2007, Campbell 2005), and You Can Do It! (Ashdown 2012), as well as direct delivery software programs like Happy 8-16 Emotional Education (Filella 2016, Filella 2018, Ros-Morente 2018). Figure 7 shows the random effects meta-analysis of interventions aimed at primarily developing students' social-emotional skills by comparing control and treatment groups.

Figure 7 shows that the positive effect of social-emotional interventions on student **academic achievement** was greater than the comparison conditions ($k = 24$; $g = 0.16$; 95%CI 0.09 to 0.23; $z = 4.20$; $p < 0.001$). The effect of interventions on **behavioural adjustment** favoured the treatment group ($k = 14$; $g = 0.25$; 95%CI 0.15 to 0.35; $z = 5.10$; $p < 0.001$). The effect of interventions on **cognitive adjustment** favoured the treatment group to a small extent ($k = 11$; $g = 0.21$; 95%CI 0.09 to 0.33; $z = 3.50$; $p < 0.001$). The effect of interventions on **internalising symptoms** also favoured the treatment group ($k = 10$; $g = 0.25$; 95%CI 0.09 to 0.42; $z = 3.00$; $p = 0.003$). Lastly, the effect of interventions on student **social-emotional adjustment** was marginally greater than the comparison conditions ($k = 15$; $g = 0.18$; 95%CI 0.10 to 0.25; $z = 4.70$; $p < 0.001$). Overall, there was high heterogeneity within academic outcomes ($Q(23) = 300.36$, $p < 0.001$; $I^2 = 92\%$) and within wellbeing outcomes ($Q(23) = 906.47$, $p < 0.001$; $I^2 = 97\%$) supporting the need for a random effects approach.

Improving mental wellbeing: Cognitive skills

Promoting student cognitive skills involved 13 of our included studies. This group of interventions were focused on building metacognitive awareness, resiliency, self-regulation skills and reducing text anxiety. It included indirect programs like Tribes (Hanson 2011), as well as direct delivery programs like FRIENDS (Cooley-Strickland 2011, Skryabina 2016). Figure 8 shows the random effects meta-analyses of interventions aimed primarily at developing students' cognitive regulation skills by comparing control and treatment groups.

Figure 8 shows that the effect of cognitive interventions on student **academic achievement** was marginally more effective than the comparison conditions ($k = 13$; $g = 0.11$; 95%CI 0.00 to 0.23; $z = 2.00$; $p = 0.045$), as was the effect on **internalising symptoms**, which also favoured the treatment group ($k = 8$; $g = 0.11$; 95%CI 0.03 to 0.19; $z = 2.79$; $p = 0.005$). There was no significant effect of the interventions on **behavioural adjustment** ($k = 4$; $g = 0.03$; 95%CI -0.03 to 0.09; $z = 0.92$; $p = 0.360$), **cognitive adjustment** ($k = 9$; $g = 0.09$; 95%CI -0.03 to 0.21; $z = 1.47$; $p = 0.142$), or on student **social-emotional adjustment** ($k = 3$; $g = 0.16$; 95%CI -0.01 to 0.33; $z = 1.85$; $p = 0.064$). Overall, there was high heterogeneity within academic outcomes ($Q(12) = 76.70$, $p < 0.001$; $I^2 = 84\%$) and moderate heterogeneity within wellbeing outcomes ($Q(12) = 30.74$, $p = 0.002$; $I^2 = 61\%$) supporting the need for a random effects approach.

Figure 7. Forest plot for interventions that foster the development of social-emotional skills

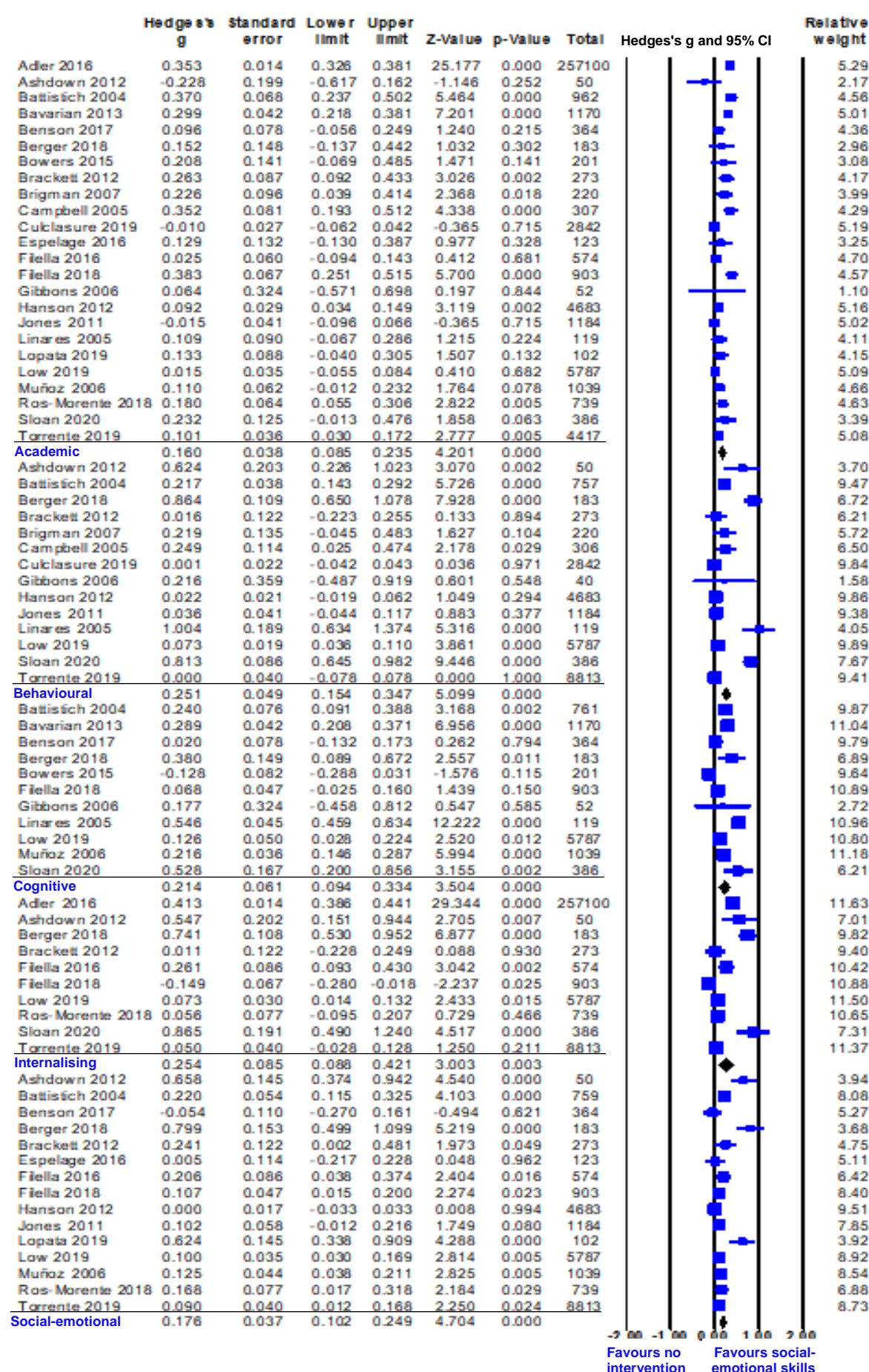
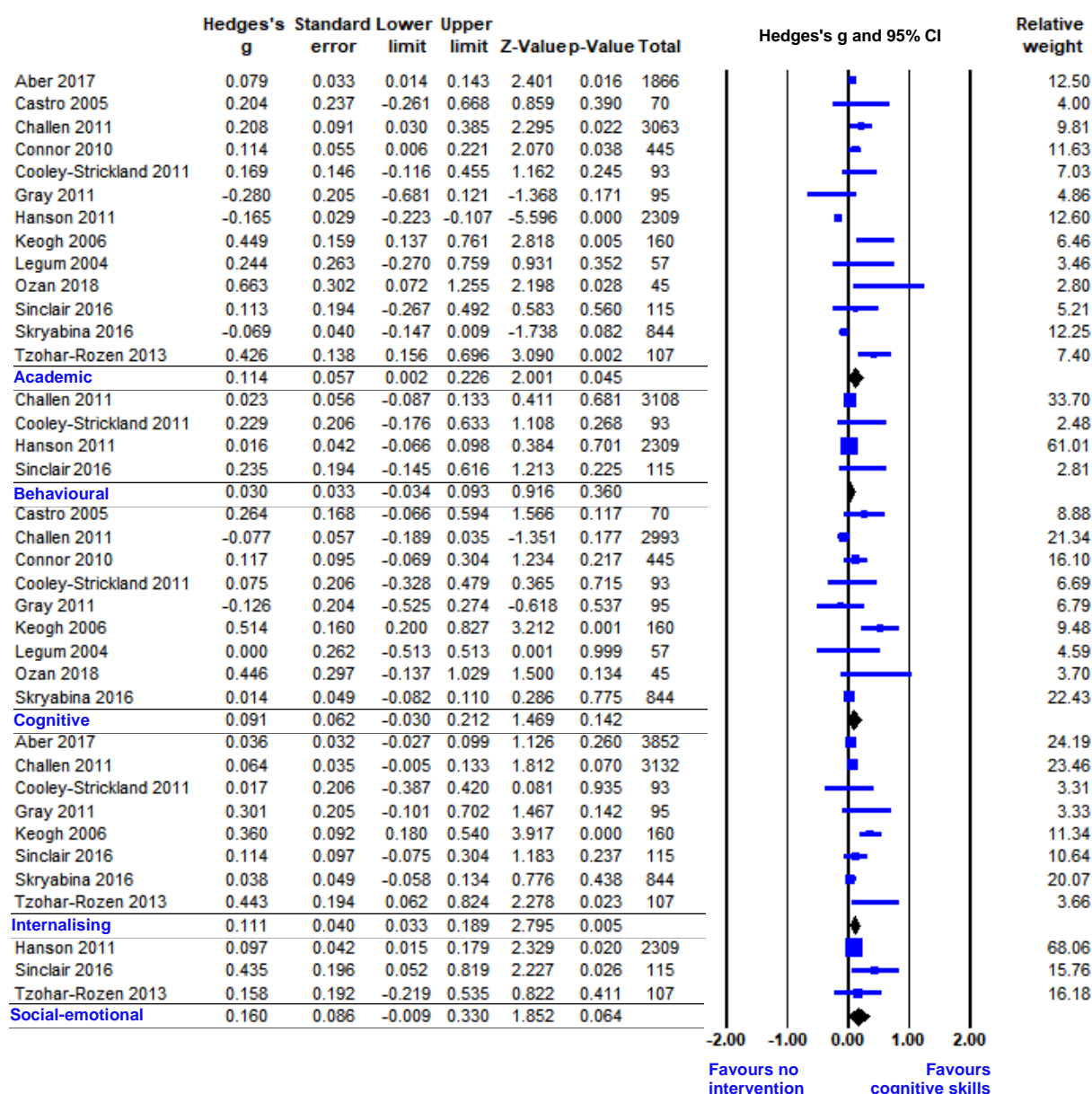


Figure 8. Forest plot of academic and wellbeing outcomes for interventions that promote wellbeing by teaching of cognitive skills



Improving mental wellbeing: Behavioural skills

Promoting students' behaviour skills involved 8 of our included studies. There are behavioural skills programs that directly target at-risk youth and can typically be part of an Individualised Education Plan (Caprara 2014, Cho 2005, Roughan 2011). There are other class-wide behavioural skills programs that indirect target younger students by capacity-building the teacher to establish good behaviours that promote positive classroom culture, like the Incredible Years Teacher Classroom Management program (Chuang 2020, Reinke 2018). Figure 9 shows the random effects meta-analysis of interventions aimed primarily at developing students' behavioural skills by comparing control and treatment groups.

Figure 9. Forest plot for interventions that build wellbeing through the development of behavioural skills

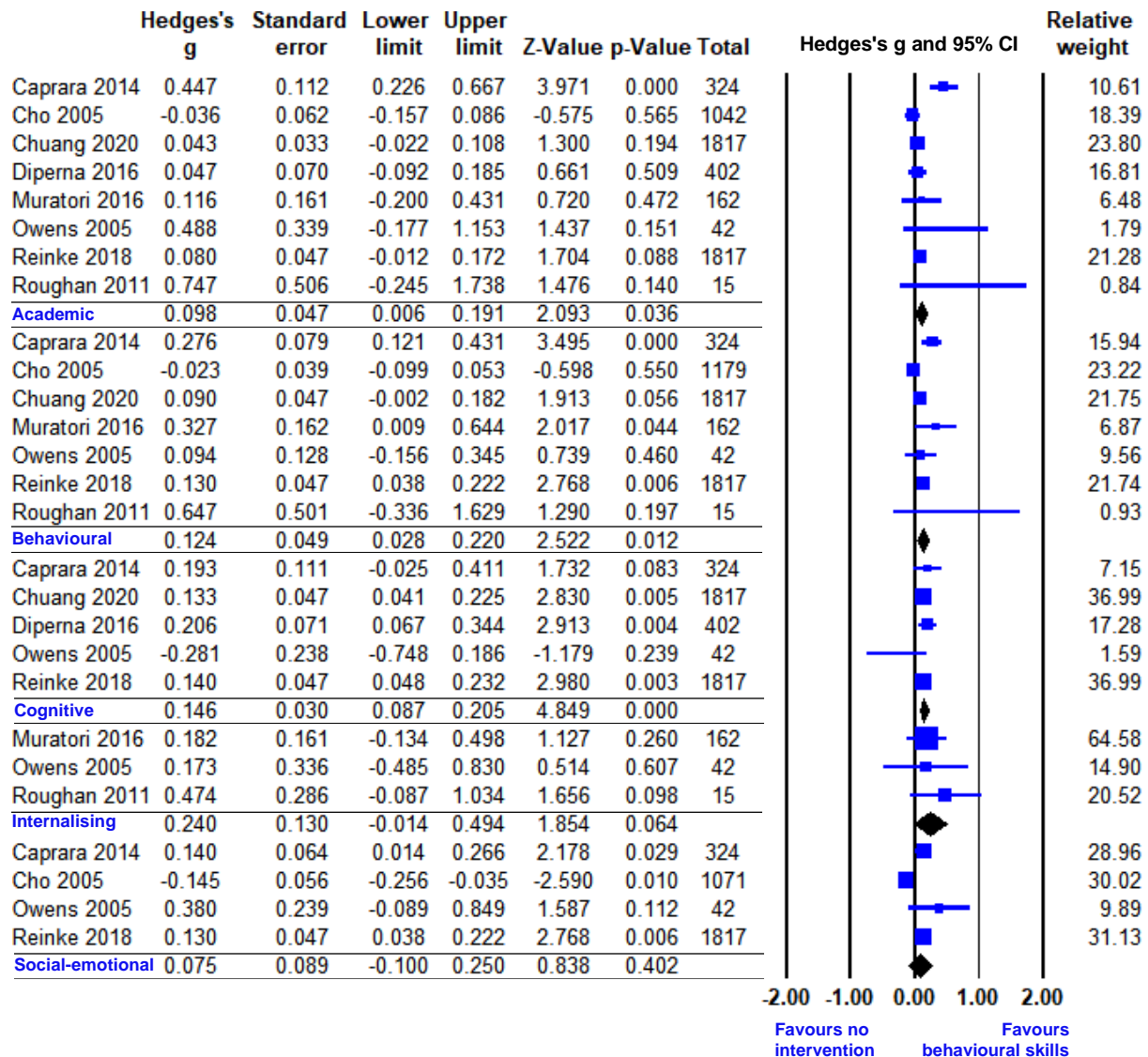


Figure 9 shows that the effect of behavioural interventions on student **academic achievement** had a small positive effect compared to the comparison conditions ($k = 8$; $g = 0.10$; 95%CI 0.01 to 0.19; $z = 2.09$; $p = 0.036$). The effect of interventions on **behavioural adjustment** favoured the treatment group ($k = 7$; $g = 0.12$; 95%CI 0.03 to 0.22; $z = 2.52$; $p = 0.012$). The behavioural interventions were found to have a small positive effect on **cognitive adjustment** ($k = 5$; $g = 0.15$; 95%CI 0.09 to 0.20; $z = 4.85$; $p < 0.001$), and on **internalising symptoms** ($k = 3$; $g = 0.24$; 95%CI -0.01 to 0.49; $z = 1.85$; $p = 0.064$). We found no effect of behavioural skills interventions on promoting student **social-emotional adjustment** ($k = 4$; $g = 0.07$; 95%CI -0.10 to 0.25; $z = 0.84$; $p = 0.402$). Overall, there was moderate heterogeneity within academic outcomes ($Q(7) = 18.22$, $p < 0.001$; $I^2 = 82\%$) and high heterogeneity within wellbeing outcomes ($Q(7) = 38.67$, $p = 0.002$; $I^2 = 61\%$) supporting the need for a random effects approach.

Encouraging physical activity, exercise and relaxation

Encouraging physical activity, exercise and relaxation involved 14 of our included studies. This diverse group of directly delivered programs included activities like Zumba (Marino 2010) and aerobic fitness (Gatz 2019, Bakir 2017, Çalik 2018, Kall 2015), Massage (Gonçalves 2017), Yoga (Hagins 2016), and

deep-breathing (Khng 2017, Wendt 2015), as well as an Equine program (Stebbins 2012). Figure 10 shows the random effects meta-analysis of interventions aimed primarily at encouraging physical activity, exercise and relaxation by comparing control and treatment groups.

Figure 10. Forest plot for interventions that encourage physical activity, exercise and relaxation

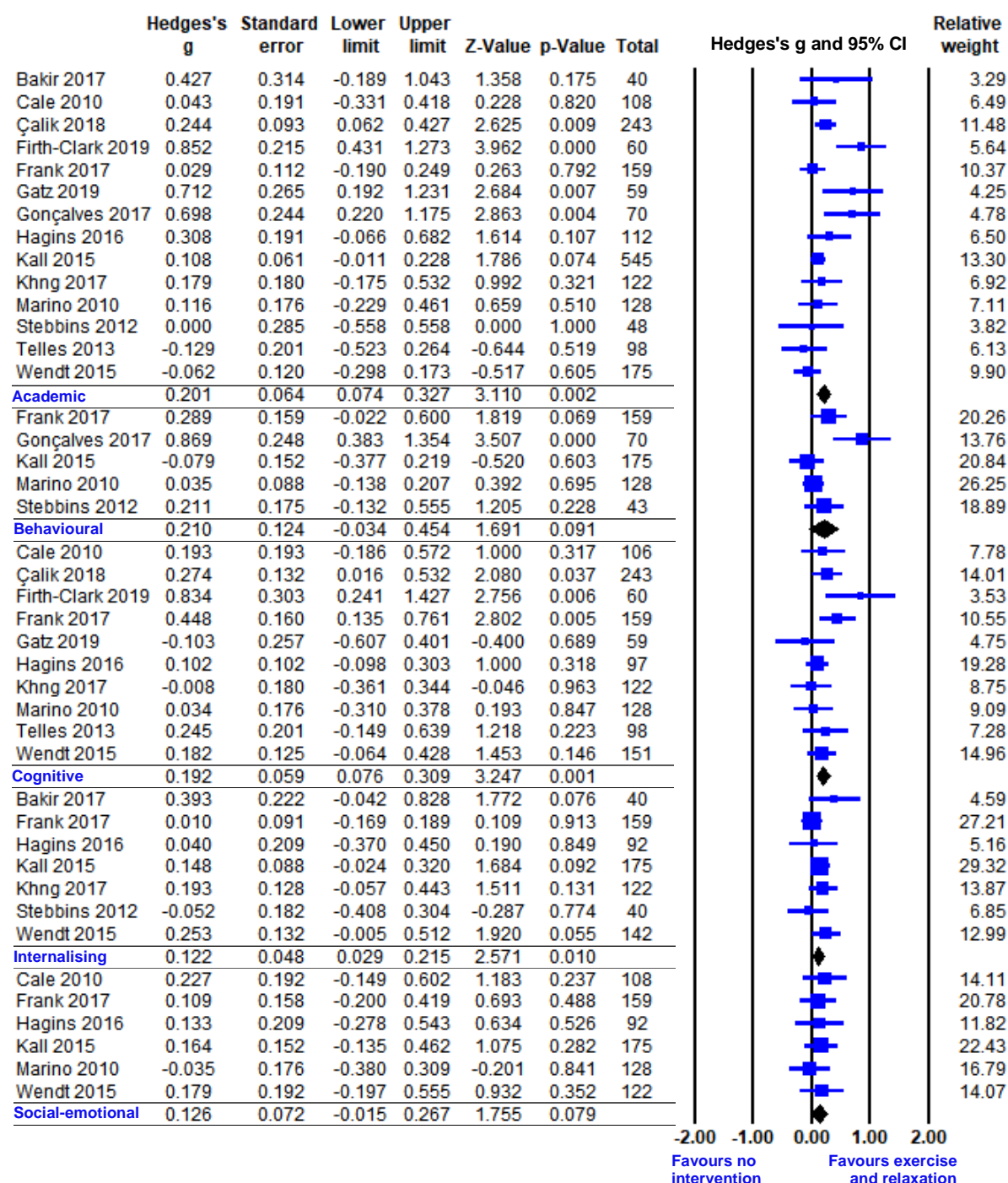


Figure 10 indicates that physical-health interventions on student **academic achievement** was more effective than the comparison conditions ($k = 14$; $g = 0.20$; 95%CI 0.07 to 0.33; $z = 3.11$; $p = 0.002$). The effect of interventions on **behavioural adjustment** also favoured the treatment group ($k = 5$; $g = 0.21$; 95%CI -0.03 to 0.45; $z = 1.69$; $p = 0.091$) but was not significant due to the smaller number of included studies. Likewise for student **social-emotional adjustment** ($k = 6$; $g = 0.13$; 95%CI -0.01 to 0.27; $z = 1.75$; $p = 0.079$). The effect of interventions on **cognitive adjustment** favoured the treatment

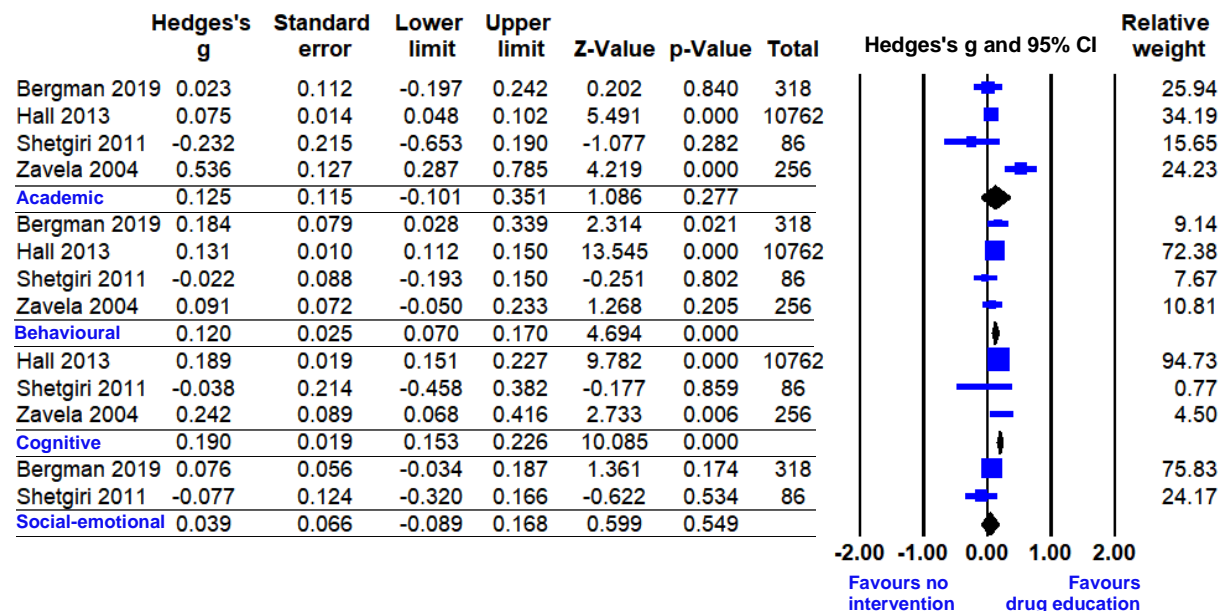
group to a small extent ($k = 10$; $g = 0.19$; 95%CI 0.08 to 0.31; $z = 3.25$; $p = 0.001$). The effect of interventions on **internalising symptoms** also marginally favoured the treatment group ($k = 7$; $g = 0.12$; 95%CI 0.03 to 0.22; $z = 2.57$; $p = 0.010$). Overall, there was moderate heterogeneity within academic outcomes ($Q(13) = 30.00$, $p < 0.005$; $I^2 = 57\%$) and moderate heterogeneity within wellbeing outcomes ($Q(13) = 21.77$, $p = 0.059$; $I^2 = 40\%$).

Preventing harm from tobacco, alcohol and drugs

The fewest number of studies included in the review regarded interventions that focused on preventing harm from tobacco, alcohol and drugs. The four programs focused on building supportive family influence (Bergman 2019, Zavela 2004) or peer influence (Hall 2013, Shetgiri 2011). Figure 11 shows the random effects meta-analysis of interventions aimed primarily at raising awareness about the adverse effects of tobacco, alcohol and drugs by comparing control and treatment groups.

Figure 11 suggests that there was no significant effect of tobacco, alcohol and drug education interventions on student **academic achievement** relative to the comparison conditions ($k = 4$; $g = 0.13$; 95%CI -0.10 to 0.35; $z = 1.09$; $p = 0.277$), or on student **social-emotional adjustment** ($k = 2$; $g = 0.04$; 95%CI -0.09 to 0.17; $z = 0.60$; $p = 0.549$). There were small positive effects of the interventions on **behavioural adjustment** ($k = 4$; $g = 0.12$; 95%CI 0.07 to 0.17; $z = 4.69$; $p < 0.001$) and **cognitive adjustment** ($k = 3$; $g = 0.19$; 95%CI 0.15 to 0.23; $z = 10.08$; $p < 0.001$). Overall, there was high heterogeneity within academic outcomes ($Q(3) = 15.36$, $p < 0.002$; $I^2 = 80\%$) and moderate heterogeneity within wellbeing outcomes ($Q(3) = 7.52$, $p = 0.057$; $I^2 = 60\%$) supporting the need for a random effects approach.

Figure 11. Forest plot for interventions that aim to prevent harm from tobacco, alcohol and drugs



3.5 Effects on numeracy and literacy

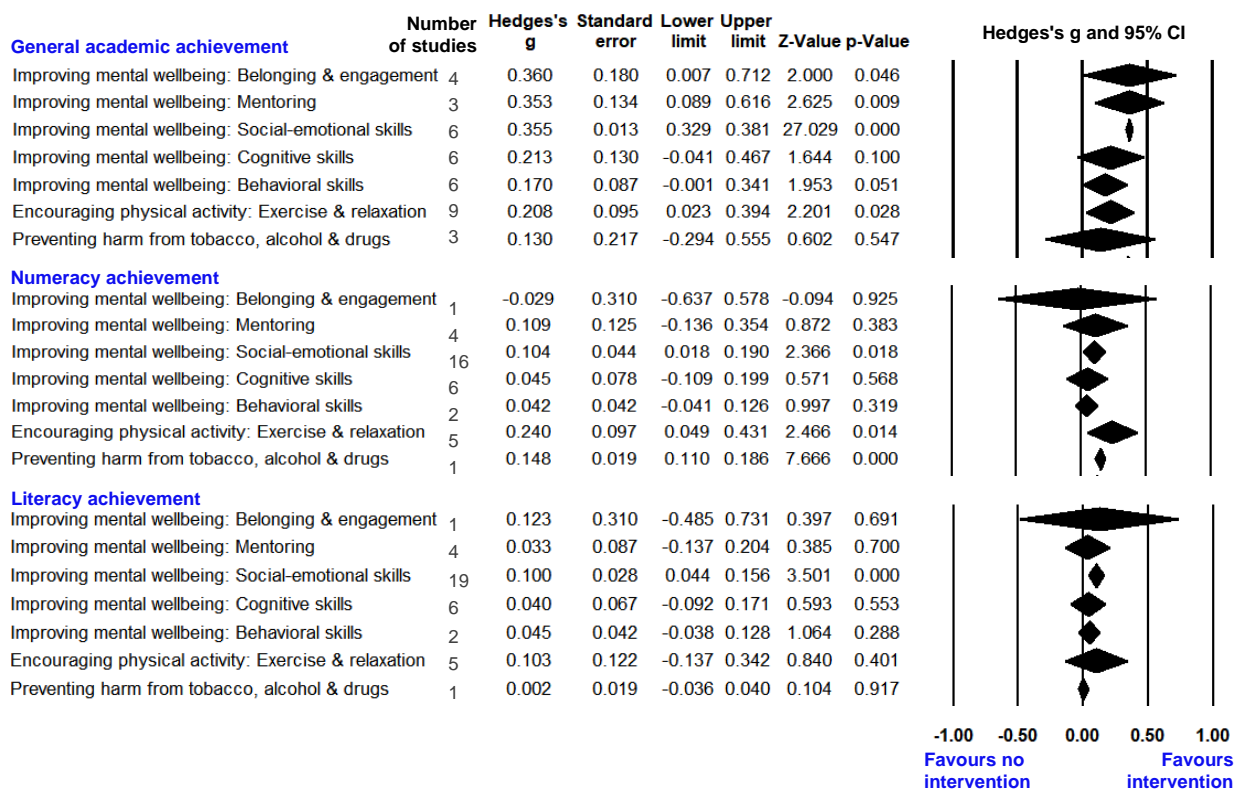
Differences in the effectiveness of wellbeing interventions on specific domains of academic achievement were also considered. As Appendix 3 shows, for many of the included studies there were multiple assessments of academic achievement. These typically took the form of standardised mathematics test, English tests, or the reporting of GPA (Grade Point Average). Assessments related to the mathematics curriculum were categorised as numeracy and those related to reading, writing

and language were categorised as literacy. All other assessments (GPA, one science) were categorised under general achievement.

Figure 12 presents a breakdown of numeracy, literacy and general achievement by the seven types of intervention. It suggests that interventions that promoted belonging and engagement, used mentoring, or developed social-emotional skills had greatest impact on general academic achievement ($g = 0.35$ - 0.36 , $p < 0.05$), equivalent to four months gain. Encouraging physical activity, exercise and relaxation was most effective at supporting numeracy achievement ($g = 0.24$, $p = 0.01$), equivalent to three months gain. Literacy achievement was marginally supported by a number of intervention types, but only significantly so for interventions that developed social-emotional skills ($g = 0.10$, $p < 0.01$), equivalent to two months learning gain.

Overall, there was high heterogeneity within general academic achievement ($Q(37) = 232.91$, $p < 0.001$; $I^2 = 85\%$), high heterogeneity within numeracy achievement ($Q(35) = 155.22$, $p < 0.001$; $I^2 = 78\%$), and moderate heterogeneity within literacy achievement ($Q(38) = 105.07$, $p < 0.001$; $I^2 = 65\%$).

Figure 12. Forest plot of general, numeracy and literacy academic outcomes by the seven type of intervention



3.6 Effects of intervention characteristics

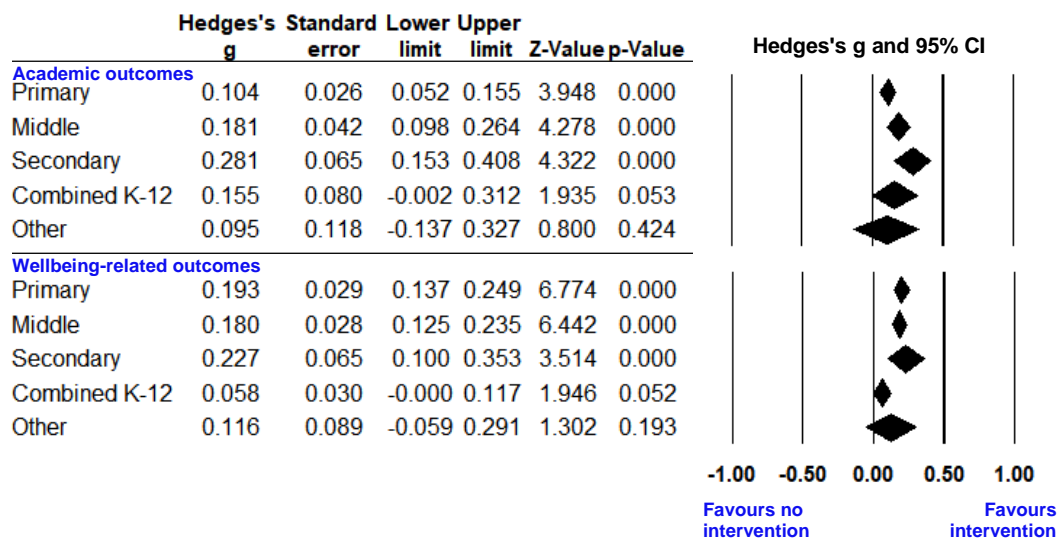
The sensitivity of academic and wellbeing outcomes moderated under the intervention conditions of the school setting, intervention mode, intervention duration, student grouping, and whether it was a universal or targeted approach was explored.

School setting

Moderator analysis was also performed by school setting. Studies were categorised into five groups that aligned with participant's grade level. These resulting groups were - Primary, Middle, Secondary,

Combined K-12 and Other (included Special schools). Figure 13 shows the random effects meta-analysis of the academic and wellbeing outcomes moderated by setting type, comparing control and treatment groups. The impact of interventions in the Secondary group on student **academic achievement** ($k = 19$; $g = 0.28$; 95%CI 0.15 to 0.41; $z = 4.32$; $p < 0.001$) had a larger effect compared to lower grade levels: Middle ($k = 15$; $g = 0.18$; 95%CI 0.10 to 0.26; $z = 4.28$; $p < 0.001$), and Primary ($k = 33$; $g = 0.10$; 95%CI 0.05 to 0.16; $z = 3.94$; $p < 0.001$). Combined K-12 ($k = 6$; $g = 0.16$; 95%CI 0.00 to 0.31; $z = 1.94$; $p = 0.053$) and Other school settings, which included Special schools ($k = 3$; $g = 0.09$; 95%CI -0.14 to 0.33; $z = 0.08$; $p = 0.42$), were not significantly different between the control and intervention comparison conditions.

Figure 13. Random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes moderated by setting



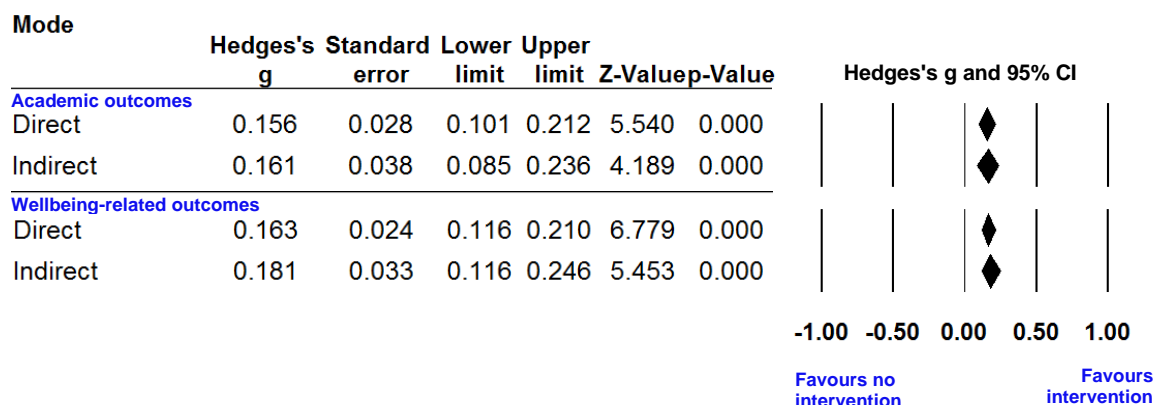
Similarly, the impact of interventions in Secondary school settings on **wellbeing-related outcomes** ($k = 19$; $g = 0.23$; 95%CI 0.10 to 0.35; $z = 3.51$; $p < 0.001$) was marginally larger than Middle ($k = 15$; $g = 0.18$; 95%CI 0.13 to 0.23; $z = 6.44$; $p < 0.001$) and Primary ($k = 33$; $g = 0.19$; 95%CI 0.14 to 0.25; $z = 6.78$; $p < 0.001$) settings. The effect of interventions targeting students in Combined K-12 ($k = 6$; $g = 0.06$; 95%CI 0.00 to 0.12; $z = 1.95$; $p = 0.052$) and Other settings ($k = 3$; $g = 0.12$; 95%CI -0.06 to 0.29; $z = 1.30$; $p = 0.193$) did not show a significant difference between comparison groups. This suggests that interventions targeting students in Secondary school settings were more effective and improving student academic and wellbeing outcomes than interventions targeting Primary, Middle, Combined or Other schooling contexts.

Intervention mode

Studies were categorised into two modes of implementation, depending on whether students were directly involved in the program, or indirectly (e.g., a teacher development program designed to improve classroom climate, supported by resources for students). Figure 14 shows the random effects meta-analysis of the academic and wellbeing outcomes moderated by implementation mode of delivery by comparing control and treatment groups. The impact of indirect interventions on student **academic achievement** ($k = 37$; $g = 0.16$; 95%CI 0.09 to 0.24; $z = 4.19$; $p < 0.001$) had a similar effect to direct delivery ($k = 38$; $g = 0.16$; 95%CI 0.10 to 0.21; $z = 5.5$; $p < 0.001$) when compared to the comparison conditions. However, the impact of indirect interventions on **wellbeing-related outcomes** ($k = 37$; $g = 0.18$; 95%CI 0.17 to 0.20; $z = 27.19$; $p < 0.001$) were marginally larger than the directly delivered interventions ($k = 38$; $g = 0.13$; 95%CI 0.12 to 0.15; $z = 14.39$; $p < 0.001$) when compared to the comparison conditions. This suggests that in the context of school-based wellbeing programs, indirect delivery by the trained classroom teacher supported by program resources for

students, was marginally more effective for wellbeing outcomes than direct exposure, often delivered by an external professional.

Figure 14. Random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes moderated by delivery mode

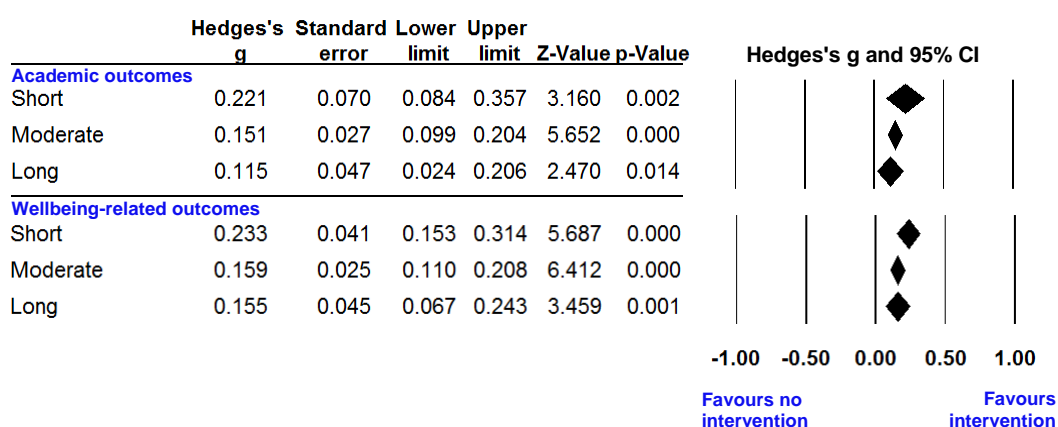


Program duration

While there was substantial diversity amongst the interventions, studies were categorised as being of short, moderate, or long duration depending on whether they ran for three months or less, up to one year, or more than one year in duration. Figure 15 shows the random effects meta-analysis on academic and wellbeing outcomes moderated by intervention duration by comparing control and treatment groups. The impact of short interventions on student **academic achievement** ($k = 23$; $g = 0.22$; 95%CI 0.08 to 0.36; $z = 3.16$; $p = 0.002$) had a larger effect over both the interventions of moderate ($k = 30$; $g = 0.15$; 95%CI 0.10 to 0.20; $z = 5.65$; $p < 0.001$) and long duration ($k = 22$; $g = 0.11$; 95%CI 0.02 to 0.21; $z = 2.47$; $p = 0.014$) when compared to the comparison conditions.

Similarly, the impact of short interventions on **wellbeing-related outcomes** ($k = 23$; $g = 0.23$; 95%CI 0.15 to 0.31; $z = 5.69$; $p < 0.001$) were larger than the moderate ($k = 30$; $g = 0.16$; 95%CI 0.11 to 0.21; $z = 6.41$; $p < 0.001$) and long interventions ($k = 22$; $g = 0.16$; 95%CI 0.07 to 0.24; $z = 3.46$; $p < 0.001$) when compared to the comparison conditions. This suggests that short wellbeing programs of up to one school term had a greater impact on student academic and wellbeing outcomes than longer duration programs.

Figure 15. Random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes moderated by intervention duration

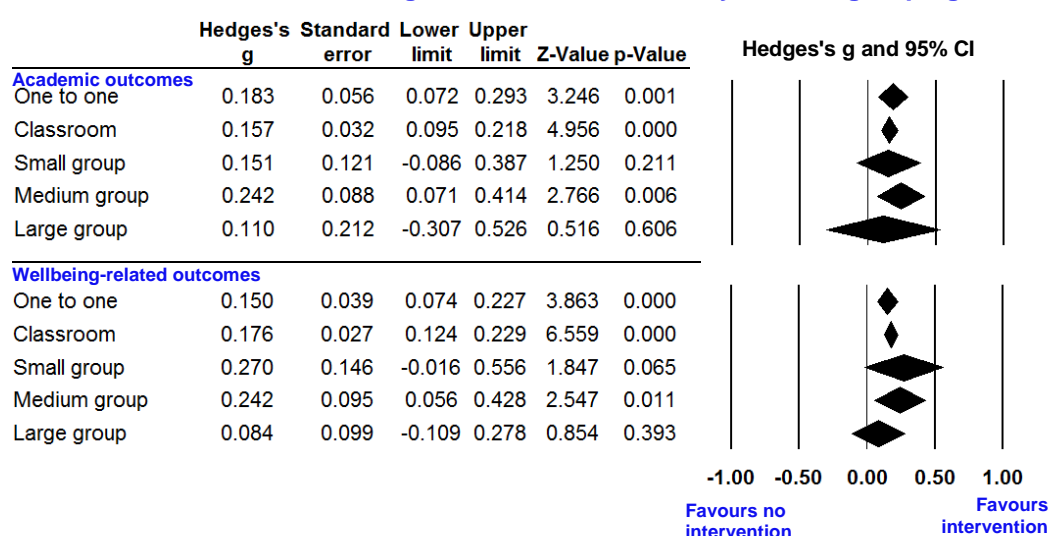


Grouping size

How the interventions involved students was highly varied across studies, ranging from individual programs to whole-school activities done through the curriculum at the classroom level. There were also interventions that involved selective groups of students. These groups were defined as small (10 or fewer students), medium (11 to 20 students), and large (more than 20 students). Figure 16 shows the random effects meta-analysis of the academic and wellbeing outcomes moderated by grouping, comparing control and treatment groups.

The impact on student **academic achievement** of interventions involving medium-sized groups of students ($k = 8$; $g = 0.24$; 95%CI 0.07 to 0.41; $z = 2.77$; $p = 0.01$), outperformed other grouping combinations, when compared to the comparison conditions. For improved **wellbeing-related outcomes**, small groupings were more effective, but not significantly so ($k = 4$; $g = 0.27$; 95%CI -0.02 to 0.56; $z = 1.85$; $p = 0.065$), closely followed by medium groupings ($k = 8$; $g = 0.24$; 95%CI 0.06 to 0.43; $z = 2.55$; $p = 0.011$), which were significantly different in their impact when compared to the comparison conditions. This suggests that in the context of school-based wellbeing programs, grouping size does make a difference. Interventions that are delivered in groups of between 11 and 20 students, appear to be more effective for improving academic and wellbeing outcomes than smaller or larger group sizes.

Figure 16. Random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes moderated by student grouping



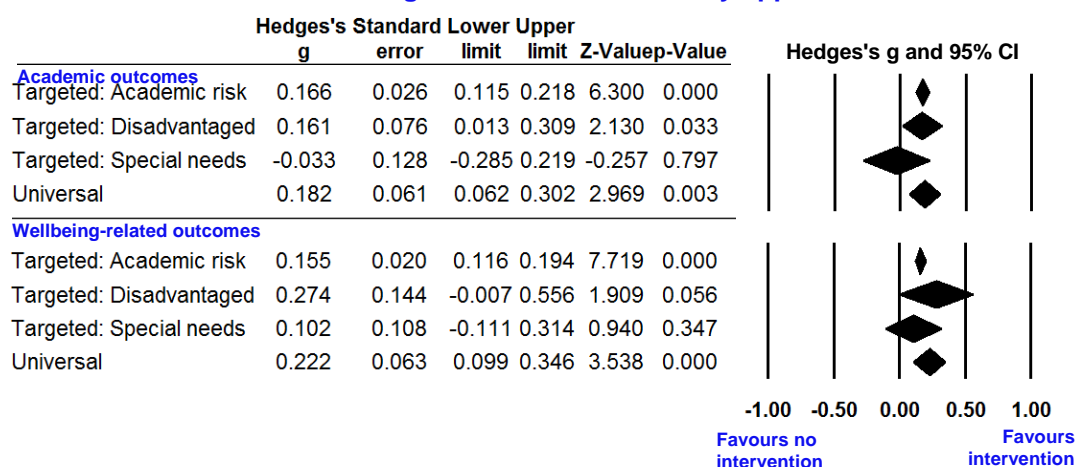
Universal or targeted approach

Lastly, whether an intervention was designed as a universal or targeted approach was investigated. Studies were categorised as Universal, Targeted: Academic risk, Targeted: Disadvantaged and Targeted: Special needs. Figure 17 shows the random effects meta-analysis of the academic and wellbeing outcomes moderated by approach, comparing control and treatment groups.

The impact on student **academic achievement** of interventions using a universal approach ($k = 12$; $g = 0.18$; 95%CI 0.06 to 0.30; $z = 3.00$; $p = 0.003$), were more effective than the targeted approaches, when compared to the comparison conditions. Although not significant, a targeted approach for improving **wellbeing-related outcomes** in disadvantaged students ($k = 4$; $g = 0.27$; 95%CI -0.01 to 0.56; $z = 1.91$; $p = 0.056$) was more effective than other approaches when compared to the comparison conditions. However, a significant effect was found for the universal approach ($k = 12$; $g = 0.22$; 95%CI 0.10 to 0.35; $z = 3.54$; $p < 0.001$). This suggests that in the context of school-based

wellbeing programs, universal approaches that include all students are more effective than targeted approaches in improving wellbeing and academic outcomes.

Figure 17. Random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes moderated by approach



Emerging examples of effective wellbeing interventions

The large number of studies included in the meta-analyses, afforded the opportunity to explore the moderating effect of intervention characteristics on student academic and wellbeing outcomes. We found that interventions that were delivered indirectly to students by the trained classroom teacher were marginally more effective for wellbeing outcomes than direct exposure and had no difference on academic achievement. However, across the other characteristics, there were differences. We found that shorter programs of up to one school term had a greater impact on student academic and wellbeing outcomes than programs of longer duration. Interventions designed for Secondary schools appeared to have greater impact on outcomes than in other school settings, compared to the comparison conditions, as did universal interventions delivered to students in medium-sized groupings.

Based on universal interventions that were of shorter duration, delivered in Secondary schools to medium-sized groups of students, one intervention emerged – that reported in Bakir 2017. The three-armed quasi-experimental study compared the effects of a sports program and a social activities program to a 'life as usual' control group of similar students in Year 10. The programs were developed around the recognition that adolescence is an important life stage where significant mental, physiological, psychological, social, and cultural changes take place. It acknowledged the importance of relaxation time to reduce stress. This Secondary school intervention involved groups of 20 students engaged in 2 hours of physical activity (e.g., playing sports, exercising) or 2 hours of social activity (e.g., cinema, theatre, sightseeing, picnic, attending live music performance, collective games), two days a week, for 10 weeks. The impact on student **academic achievement** (GPA) of the sports intervention ($g = 0.63$), was more effective than the social activities intervention ($g = 0.24$), in comparison to the control group who led their routine lives. Likewise, students' **wellbeing-related outcomes** showed improvements compared to their peers in the control group. Those involved in the sports activities showed large increases in their mental wellbeing ($g = 0.66$) but less so in their positivity ($g = 0.25$), while those students involved in the social activities showed moderate increases in mental wellbeing ($g = 0.32$) and less so in their positivity ($g = 0.21$) compared to students in the control group. Overall, as Figure 10 above shows, the combined social and sports interventions had a moderate impact on academic achievement ($g = 0.43$) and wellbeing, equivalent to five months learning gain. Bakir 2017 concluded that mental wellbeing and positivity levels increase when students

engage in physical activity and scheduled sports programs, which is particularly important at supporting their academic outcomes during a challenging period of developmental change in their lives.

As a point of comparison, there were two examples of effective interventions in the Primary setting that met most of the optimal characteristics – were indirect, short duration, universal programs, but delivered at the classroom level. The Australian *You Can Do It!* program reported by Ashdown 2012, involved Reception and Grade 1 teachers trained in the program to immerse their students over a 10 week period in the social-emotional learning skills curriculum to enhance social-emotional development, wellbeing, and academic achievement. The educational program consisted of explicit, direct instruction lessons drawn from the YCDI Early Childhood Curriculum taught by their classroom teacher, three times a week, supported by a variety of additional social and emotional teaching practices. The lessons were designed to teach young children confidence, persistence, organisation and emotional resilience. The results indicated (see Figure 7) that YCDI had a positive effect on levels of social-emotional competence ($g = 0.66$) and wellbeing ($g = 0.55$), and reduction in problem behaviours ($g = 0.62$), as well as a non-significant negative difference in reading ($g = -0.23$, $p = 0.25$).

The other short duration, universal, classroom intervention, reported by Tzohar-Rozen 2013, investigated how an affective self-regulation program promotes mathematical literacy in Grade 5 students. Mathematics teachers were first trained in the intervention to deliver 10 one-hour sessions, twice weekly, for five consecutive weeks. As Figure 8 shows, students in the affective self-regulation group performed better on all aspects of the mathematical literacy tasks ($g = 0.43$) and showed a greater reduction in negative internalising emotions ($g = 0.44$) than the ‘business-as-usual’ control group.

This discussion of three studies, showcasing a sports program, a social-emotional program and a cognitive skills development program from three different countries (Turkey, Australia and Israel), gives some insight into the sheer diversity of interventions considered in this systematic review. Such diversity makes it difficult to isolate the specific set of characteristics that typify a successful intervention designed to promote both academic achievement and wellbeing outcomes.

3.7 Applicability of the evidence base

Of high importance to this systematic review was that the evidence and findings reported had to be applicable to the Australian schooling context. The review was limited to interventions delivered in school or by a school teacher with appropriate professional development. Interventions that were strictly country specific (e.g., Charter Schools in the US) were excluded from the review. To further support applicability and relevance, the review mapped the interventions onto Hattie’s (2017) framework and embedded it the *VicHealth Action Agenda Framework*. While only one Australian study was included in the meta-analyses (Ashdown 2012), the review was grounded in the current offerings of whole-school mental health promotion initiatives in Australia, as well as the plethora of wellbeing programs available to schools. The majority of studies were conducted in the US and several from the UK, with the remaining 26% coming from a diverse range of cultural backgrounds, reflecting well the multicultural diversity in Australian communities.

3.8 Gaps in the evidence base

In their review of factors facilitating and constraining the delivery of effective teacher training to promote health and wellbeing in UK schools, Shepherd et al. (2013) found that the most commonly covered topics were Every Child Matters, child protection, emotional health and antibullying, with far fewer courses reported covering healthy eating, sex and relationships, drugs, alcohol and smoking.

This imbalance in course content was reflected in our findings, with no studies related to healthy eating and only a small number of studies related to drug education included. An interactive evidence gap map accompanying the Impact Map (available [here](#)) further demonstrates the gaps. This is further reflected in the lack of robust evidence available for the 217 wellbeing-related programs presented in the Addendum, of which only 23% provided concrete evidence of their impact in the form of published studies or reports. Supported by other similar systematic reviews, there is still a need for high quality studies that investigate the effectiveness of interventions, programs and initiatives in Australian schools designed to promote student mental health and wellbeing, where wellbeing is viewed in its broadest terms across physical, psychological, and behavioural domains.

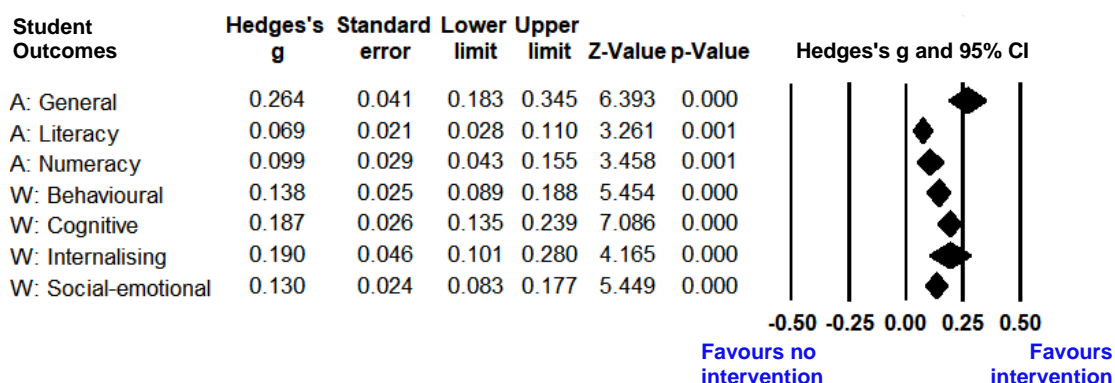
3.9 Overall evidence statement

Across the 78 studies, the effect of interventions on student **academic achievement overall** had a small positive effect compared to the comparison conditions. Wellbeing interventions that promoted school belonging and engagement had the greatest estimate of impact on academic achievement ($g = 0.31$, four months gain), while interventions that developed behavioural skills had the least impact ($g = 0.10$, two months gain) according to the studies included in the meta-analysis. In terms of contextual influences, Secondary school interventions had the greatest estimate of impact on academic achievement ($g = 0.28$, four months gain). The impact on academic achievement was also favoured by shorter interventions ($g = 0.22$, three months gain), to medium-sized groups of students ($g = 0.24$, three months gain), delivered as a universal approach ($g = 0.18$, two months gain).

The effect of interventions on student **wellbeing outcomes overall** also had a small positive effect compared to the comparison conditions. Interventions that promoted social-emotional skills had the greatest estimate of impact on wellbeing ($g = 0.22$), while interventions that developed cognitive skills had the least impact ($g = 0.09$) according to the studies included in the meta-analysis. Secondary school interventions had the greatest estimate of impact on wellbeing outcomes ($g = 0.23$), as did shorter interventions ($g = 0.22$), to small groups of students ($g = 0.27$), delivered as a targeted approach ($g = 0.27$) to disadvantaged students.

More specifically, Figure 18 compares the effects on the sub-domains of student academic achievement and wellbeing outcomes of participating in school-based wellbeing interventions compared to business-as-usual comparison groups.

Figure 18. Overall random effects meta-analysis of the adjusted standardised mean difference in student academic and wellbeing outcomes



General academic achievement was assessed in 37 studies, with a moderate positive effect ($k = 37$; $g = 0.26$; 95%CI 0.18 to 0.35; $z = 6.39$; $p < 0.001$) for students participating in a wellbeing intervention,

compared to business-as-usual. The effect is equivalent to three months of additional learning. Interventions that promoted belonging and engagement, used mentoring, or developed social-emotional skills had greatest impact on general academic achievement ($g = 0.35$ - 0.36 , $p < 0.05$, four months gain).

Literacy achievement was assessed in 38 studies, with a marginal effect ($k = 38$; $g = 0.07$; 95%CI 0.03 to 0.11; $z = 3.26$; $p = 0.001$). The effect is equivalent to one months of additional learning. Only interventions that developed social-emotional skills ($g = 0.10$, $p < 0.01$, two months gain) had an effect that was statically significant.

Numeracy achievement was assessed in 35 studies, with a small positive effect ($k = 35$; $g = 0.10$; 95%CI 0.04 to 0.16; $z = 3.46$; $p = 0.001$). The effect is equivalent to two months of additional learning. Encouraging physical activity, exercise and relaxation was most effective at supporting numeracy achievement ($g = 0.24$, $p = 0.01$, three months gain).

Social-emotional adjustment was assessed in 38 studies with a small positive effect overall ($k = 38$; $g = 0.13$; 95%CI 0.08 to 0.18; $z = 5.45$; $p < 0.001$). The greatest gains in social-emotional adjustment were found in the belonging and engagement programs as well as the social-emotional skills programs ($g = 0.18$), with no effect found in interventions focused on preventing harm from tobacco, alcohol and drugs ($g = 0.04$).

Behavioural adjustment was assessed in 39 studies, resulting in a small positive effect for students participating in a wellbeing intervention, compared to no intervention ($k = 39$; $g = 0.14$; 95%CI 0.09 to 0.20; $z = 5.45$; $p < 0.001$). Social-emotional skills had the greatest estimated impact on promoting positive behaviour ($g = 0.25$), compared to developing cognitive skills ($g = 0.03$).

Cognitive adjustment was assessed across 47 studies and resulted in a small positive effect ($k = 47$; $g = 0.19$; 95%CI 0.14 to 0.24; $z = 7.09$; $p < 0.001$). Mentoring had the greatest estimated impact on cognitive adjustment ($g = 0.27$), with the least gain in cognitive adjustment found from behavioural skills interventions ($g = 0.15$).

Lastly, **internalising symptoms** was assessed in 31 studies showing a small positive effect ($k = 31$; $g = 0.19$; 95%CI 0.10 to 0.28; $z = 4.17$; $p < 0.001$). Social-emotional skills interventions had the greatest estimated impact on internalising symptoms ($g = 0.25$) and the least impact was found for interventions that focused on developing cognitive skills ($g = 0.11$).

Table 4 summarises the finding of the meta-analyses for the primary and secondary outcomes.

Table 4. Summary of findings

Outcome	Impact g (95%CI)	Description of studies	Quality of the evidence base	Impact heterogeneity
ACADEMIC OUTCOMES				
General achievement (GPA, other)	0.26 (0.18, 0.35)	37 studies: 24 US, 2 UK, 11 other 18 RCT, 19 quasi-experimental Data from 271,053 students	High risk of bias mainly due to lack of blinding	High heterogeneity $I^2 = 85\%$ $Q = 232.91$ $p < 0.001$
Literacy achievement	0.07 (0.03, 0.11)	38 studies: 27 US, 3 UK, 7 other, 1 Australia 18 RCT, 19 quasi-experimental Data from 50,149 students	High risk of bias mainly due to lack of blinding	Moderate heterogeneity $I^2 = 65\%$ $Q = 105.07$ $p < 0.001$
Numeracy achievement	0.10 (0.04, 0.16)	35 studies: 23 US, 3 UK, 9 other 18 RCT, 17 quasi-experimental Data from 43,952 students	High risk of bias mainly due to lack of blinding	High heterogeneity $I^2 = 78\%$ $Q = 155.22$ $p < 0.001$
WELLBEING OUTCOMES				
Social-emotional adjustment	0.13 (0.08, 0.18)	38 studies: 29 US, 1 Australia 18 RCT, 20 quasi-experimental Data from 34,750 students	High risk of bias mainly due to lack of blinding	Moderate heterogeneity $I^2 = 57\%$ $Q = 86.19$ $p < 0.001$
Behavioural adjustment	0.14 (0.09, 0.19)	39 studies: 30 US, 1 Australia 18 RCT, 21 quasi-experimental Data from 51,321 students	High risk of bias mainly due to lack of blinding	Moderate heterogeneity $I^2 = 72\%$ $Q = 134.16$ $p < 0.001$
Cognitive adjustment	0.19 (0.14, 0.24)	47 studies: 35 US, 4 UK 21 RCT, 26 quasi-experimental Data from 37,404 students	High risk of bias mainly due to lack of blinding	Moderate heterogeneity $I^2 = 46\%$ $Q = 156.45$ $p < 0.001$
Internalising symptoms	0.19 (0.10, 0.28)	31 studies: 12 US, 1 Australia 15 RCT, 16 quasi-experimental Data from 288,061 students	High risk of bias mainly due to lack of blinding	High heterogeneity $I^2 = 91\%$ $Q = 349.56$ $p < 0.001$

Table 5 presents a heat map of the estimated impact of interventions on student academic and wellbeing outcomes, moderated by contextual and program characteristics. Shading of each outcome reflects the level of impact according to the statistical effect size, Hedge's g. An interactive version of the Impact Map with estimates of months learning gain and the evidence behind the results are available on the E4L website: <https://evidenceforlearning.org.au/research-and-evaluation/health-and-well-being-systematic-review/>.

Table 5. Summary of findings

Moderators	Academic overall	Numeracy	Literacy	GPA/Other	Wellbeing overall	Social-emotional	Behavioural	Cognitive	Internalising
Intervention type									
Improving mental wellbeing: Belonging & engagement	0.31	-0.03	0.12	0.36	0.21	0.18	0.10	0.24	0.23
Improving mental wellbeing: Mentoring	0.17	0.11	0.03	0.35	0.16	0.15	0.05	0.26	
Improving mental wellbeing: Social-emotional skills	0.16	0.10	0.10	0.35	0.22	0.16	0.22	0.23	0.24
Improving mental wellbeing: Cognitive skills	0.11	0.04	0.04	0.21	0.09	0.16	0.03	0.09	0.08
Improving mental wellbeing: Behavioral skills	0.10	0.04	0.05	0.17	0.12	0.06	0.11	0.14	0.20
Encouraging physical activity: Exercise & relaxation	0.20	0.24	0.10	0.21	0.18	0.13	0.23	0.21	0.13
Preventing harm from tobacco, alcohol & drugs	0.13	0.15	0.00	0.13	0.16	0.04	0.13	0.19	
School setting									
Primary	0.10	0.08	0.07	0.21	0.19	0.15	0.18	0.20	0.18
Middle	0.18	0.24	0.07	0.22	0.18	0.13	0.14	0.20	0.21
Secondary	0.28	0.24	0.24	0.28	0.23	0.13	0.02	0.20	0.19
Combined K-12	0.15	-0.01	-0.02	0.44	0.06	0.12	0.01	0.10	0.06
Other	0.09			0.09	0.12	0.19	0.13	0.03	0.06
Intervention mode									
Direct	0.16	0.09	0.03	0.26	0.16	0.14	0.16	0.19	0.15
Indirect	0.16	0.11	0.09	0.26	0.18	0.13	0.13	0.18	0.22
Program duration									
Short (< 3 months)	0.22	0.25	0.14	0.27	0.23	0.24	0.30	0.17	0.31
Moderate (< year)	0.15	0.08	0.07	0.26	0.16	0.18	0.13	0.16	0.15
Long (> year)	0.11	0.03	0.05	0.23	0.16	0.07	0.11	0.23	0.19
Grouping size									
One-on-one	0.18	0.06	0.02	0.33	0.15	0.13	0.18	0.17	0.08
Classroom	0.16	0.09	0.05	0.30	0.18	0.13	0.13	0.20	0.19
Small (<11)	0.15	0.13	0.15	0.12	0.27	0.30	0.11	0.21	0.21
Medium (11-20)	0.24	0.28	0.38	0.00	0.24	0.00	0.21	0.24	0.36
Large (>20)	0.11			0.11	0.08			0.02	0.30
Intervention approach									
Targeted: Academic risk	0.17	0.09	0.07	0.31	0.16	0.11	0.12	0.18	0.12
Targeted: Disadvantaged	0.16	0.25	0.20	0.07	0.27	0.26	0.52	0.23	0.74
Targeted: Special needs	-0.03			-0.03	0.10	0.19	0.13	-0.04	0.06
Universal	0.18	0.08	0.01	0.31	0.22	0.16	0.13	0.20	0.24

4 Implications

The current evidence suggests there are small effects of school-based wellbeing interventions that aim to enhance academic achievement, promote mental and physical wellbeing outcomes, or the prevention of mental health difficulties and harmful behaviours.

4.1 Implications for policy and practice

The large number of studies included in this systematic review afforded the opportunity to explore the moderating effect of intervention characteristics on student academic and wellbeing outcomes. In the context of school-based wellbeing programs, we found that indirect delivery by the trained classroom teacher supported by program resources for students as an enhancement to standard curriculum, may be marginally more effective and have a longer lasting impact, than directly-delivered, often targeted programs by an external professional. However, the literature recognises that a combination of a universal whole-school approach supported by targeted programs for ‘at risk’ students is optimal.

The meta-analyses using several different moderators found that shorter programs of up to one school term had a greater impact on student academic and wellbeing outcomes than programs of longer duration. Interventions designed for Secondary schools appeared to have greater impact on outcomes than in other school settings, compared to the comparison conditions, as did universal interventions delivered to students in medium-sized groupings.

However, the sheer diversity of interventions considered in this systematic review makes it difficult to isolate the specific set of characteristics that typify a successful intervention designed to promote both academic achievement and wellbeing outcomes. In short, there is no silver bullet. Nevertheless, a set of characteristics that emerged from the moderator meta-analyses suggest that effective wellbeing promotion is systemic and usually involves programs that are:

- short: delivered within a Term – thus manageable and sustainable in a crowded curriculum,
- universal program – building awareness and capacity of the whole community, reduces stigma,
- explicitly taught by the trained classroom teacher – building the teacher’s capacity first,
- delivered in regular sessions – building the student’s capacity through practice and repetition,
- delivered to groups of students – ranging from 11 students up to classroom size, and
- developmentally differentiated – recognising that wellbeing is influenced by stages in life, particularly during transition and adolescence.

4.2 Implications for research

Robust, long-term methodologies need to be pursued that ensure adequate recording of fidelity and the use of validated measures sensitive to the processes of change. Further high-quality and large-scale research is needed across Australia in order to robustly test many more programs that show promise, as well as assessing the long-term benefits for students experiencing established whole-school mental health promotion interventions. Moreover, relatively few studies of wellbeing interventions go beyond assessing wellbeing-related outcomes to include academic outcomes, even though it’s a program intention. Studies of interventions purporting to improve academic outcomes need to include robust standardised measures of academic performance to strengthen the evidence base around the relationship between health and education.

No systematic reviews were found that specifically compared the effectiveness of direct versus indirect delivery modes. There would be benefit in undertaking a further systematic review that specifically compares the effectiveness of direct-delivery (e.g., delivered by program staff) versus indirect-delivery (e.g., teacher professional development, train-the-trainer) modes of wellbeing interventions in schools.

Outcome measures used to assess student mental health and wellbeing are so diverse that comparing studies is difficult (Svane, Evans & Carter, 2019). There is a need for further research to develop clearer definitions and categories of wellbeing, design more robust interventions with clear measures of fidelity, and define valid assessment methods for interventions aimed at improving school community wellbeing and student academic outcomes.

4.3 Limitations

The systematic review was conducted according to rigorous, standard methods for evidence synthesis that involved sensitive literature searches of a range of sources, systematic screening of studies for relevance, and critical appraisal of evidence. Data extraction and critical appraisal were performed by at least two reviewers and independently checked by a third. This approach means that the systematic review presents the best evidence but not necessarily the best school-based wellbeing programs, the vast majority of which still lack high quality evidence of impact. Our choice to include academic achievement as the primary outcome precluded many studies that only assessed wellbeing outcomes.

The heterogeneous nature of the studies and the outcomes included in the meta-analyses made it challenging to summarise across the studies, requiring the need to categorise studies into seven intervention types and outcomes into four domains in order to assess and present the evidence as succinctly as possible. This is a reflection of educational research (versus medical research, for example), which tends to use a wide variety of standardised tests to assess numeracy and literacy achievement and an even wider array of validated scales and instruments to assess wellbeing outcomes (Oancea, 2005). Because this review adopted a broad perspective on health and wellbeing, it was challenging to be consistent about what could be categorised into the four wellbeing domains which emerged through a process of thematic analysis. One approach attempted to map the interventions and the wellbeing outcomes onto Hattie's 277 influences on student academic outcomes, but only with moderate success. For example, there were no clear mappings for drug education, resiliency, or wellbeing. This reflects Imrey's (2020) concern about the limitations of meta-analyses of studies with high heterogeneity, potentially yielding results that may be less interpretable and useful than initially anticipated. While these concerns do diminish the significant contribution made by the systematic review, it does serve to illustrate how high, unexplained heterogeneity may limit meta-analytic results because the diversity cannot be adequately summarised. As we have described, contributors to heterogeneity include variability in social environment and conditions, indiscernible from published results. This means that precise answers to broad meta-analytic questions about subjective issues may be difficult to ascertain when there are limitations in studies and data reported.

Although much of the evidence included in the systematic review is from English-speaking western cultures similar to Australia, studies and the resulting findings may not be wholly generalisable to the Australian context. The systematic review was restricted to studies in the English language and so there may be a potential publication bias. Further sources of publication bias arise when intervention studies showing no difference might be published less often than those that do identify a clear benefit. Moreover, all studies had at least one domain appraised as a high risk of bias, suggesting that caution needs to be exercised in interpreting these findings.

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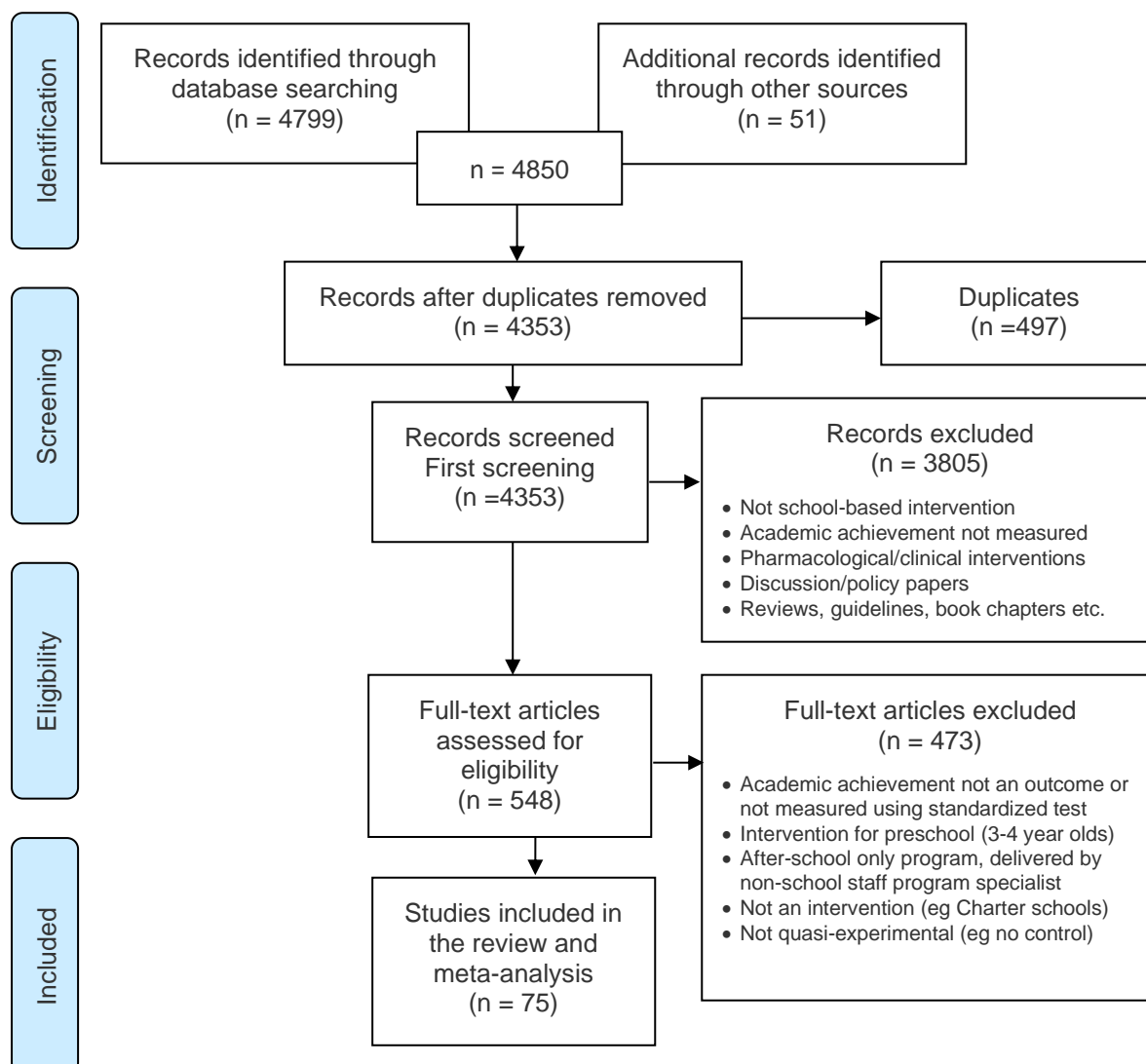
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Appendix 1: PRISMA flow diagram

Figure 19. PRISMA flow diagram showing the identification and selection of studies



Appendix 2: Search terms

Table 6. Search strategy for electronic databases

POPULATION	INTERVENTIONS		COMPARATORS Measure of effectiveness	OUTCOMES OF INTEREST
	Intervention Problems	Intervention Approaches		
School-age 5-18 years Student Children Teen Adolescence Youth Young people	Healthy eating Obesity Eating disorders Alcohol/Drinking Smoking Substance use Addiction Physical activity Sleep Fatigue Illness	Sport; Exercise; Yoga Gardening; Nature Nurture; Coping Outdoor education Health Education Music; Art; Drama Wellbeing Social and emotional learning (SEL) skills Emotional Development Social Development Mindfulness Positive psychology Positive youth development Anti-bullying Respectful relationships Anger management Stress management Emotional intelligence Cyber/internet safety School Schedules Support (groups/services) Self-regulation Whole-school; universal Health Promotion Framework; Curriculum Prevention Intervention; Initiative Program; Programme Package; Training	Impact Evaluation Control Group Randomized controlled trial (RCT) Experimental Quasi-experimental	Primary outcome Outcome Academic achievement <ul style="list-style-type: none"> literacy numeracy grades Academic Outcomes Academic Performance Academic Success Academic Persistence Educational Attainment Outcomes of Education Attendance
Schools or education levels School Education <ul style="list-style-type: none"> Elementary Primary Secondary Middle High Combined 	Mental wellbeing Mental health <ul style="list-style-type: none"> Self-harm Suicide Depression Attitudes <ul style="list-style-type: none"> Negativity Self esteem Life satisfaction Emotional <ul style="list-style-type: none"> Resilience Anxiety Stress (workload) Abuse Emotional problems Self-concept Self-control Self-regulation Social <ul style="list-style-type: none"> Bullying Social media Peer pressure Violence Aggression Anti-social behavior 			Secondary outcomes (if reported in selected study) Non-academic <ul style="list-style-type: none"> Cognitive Social Emotional Behavioral Disability
Keywords that might exclude a study Special school				Keywords that might exclude a study pharmacological clinical medical Solely home or clinic based treatments

Search statement for the ERIC database (example)

- This statement will guide the search statements for the other databases to be searched.
- Publications will limited from 2004 – 2019 (inclusive)

(SU ("Elementary School*" OR "Middle School*" OR "Secondary School*" OR "High School*" OR "Elementary Education" OR "Primary Education" OR "Secondary Education" OR Children OR Adolescents OR Preadolescents OR Youth) OR Teen* OR "Young people")

AND

((SU (Obesity OR "Eating Disorders" OR Drinking OR Sleep OR Fatigue OR Depression OR Smoking OR Abuse OR "Student Welfare" OR "Mental health" OR "Emotional Problems" OR "Emotional Disturbances" OR "Negative Attitudes" OR "Self Esteem" OR "Life Satisfaction" OR Resilience OR "Emotional Response" OR "Self Control" OR "Self Concept" OR Anxiety OR "Self Destructive Behavior" OR Suicide OR Bullying OR Victims OR "Social Media" OR "Peer Influence" OR Violence OR Aggression OR "Antisocial Behavior" OR "Drug Addiction" OR "Addictive Behavior" OR Attention) OR "Well Being" OR Wellbeing or Illness* OR "Self Harm" OR Stress)

AND

(SU ("Health Education" OR Prevention OR Dance OR Exercise OR Gardening OR Nature OR "Outdoor Education" OR Coping OR Music OR Art OR Drama OR "Emotional Development" OR "Social Development" OR "Positive Behavior" OR "School Schedules" OR Support* OR "Self Management" OR "Stress Management" OR (Internet AND Safety)) OR (Intervention* OR Program* OR Package* OR Training OR Curriculum OR Initiative* OR (Health N2 Promot*) OR Framework* OR "Physical Activit*" OR Sport* OR Yoga OR "Outdoor classroom*" OR "Outdoor Environment" OR "Natural Environment" OR Nurture OR "Social and Emotional Learning" OR "Social and Emotional Skill*" OR "Whole School" OR Universal OR Mindfulness OR "Positive Psychology" OR "Positive Education" OR "Positive Youth Development" OR "Anti Bullying" OR "Respectful Relationships" OR "Anger Management" OR "Emotional Intelligence" OR "Cyber Safety" OR "Self Regulation")))

AND

(Impact* OR "Control* Group*" OR Experimental OR "Quasi experiment*" OR Quasiexperimental OR Evaluation OR "Randomized Control*" OR "Randomised Control*" OR "Control* Trial*" OR RCT*)

AND

("Academic Achievement*" OR (Academic N2 Outcome*) OR "Academic Perform*" OR "Academic Success*" OR SU ("Academic Persistence" OR "Grades Scholastic" OR Literacy OR Numeracy OR "Grade Point Average" OR "Educational Attainment" OR Attendance OR "Outcomes of Education")

Appendix 3: Characteristics of included studies

Table 7. Characteristics of the 78 included studies (in 75 articles) grouped by intervention type

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Improving mental wellbeing: Belonging & engagement (5 studies)																		
Borman 2019	USA	RCT	High	11 schools 1304 students	not stated	51	6	M	Writing to belong	Direct	Moderate	Classroom	Targeted: Academic risk	1	3			1
Flannery 2020	USA	RCT	High	4 schools 1588 students	14	50	9	S	Freshmen Success	Indirect	Short	Classroom	Targeted: Academic risk	1		3		
Murray 2005	USA	QE	High	1 school 48 students	not stated	75	9-12	S	Teacher-Student Relationship	Indirect	Moderate	One to one	Targeted: Academic risk	1	1	1	1	1
Seaton 2010	USA	QE	High	1 school 40 students	15-17	0	9	S	Check & Connect Student Engagement Program	Indirect	Short	One to one	Targeted: Academic risk	2	2	2	2	
Shoshani 2016	Israel	QE	High	6 schools 2517 students	13.5 (0.7), 11.9-14.9	50	7-9	M	Maytiv positive psychology school program	Indirect	Moderate	Classroom	Universal	1		8		2
Improving mental wellbeing: Mentoring (7 studies)																		
Bernstein 2009	USA	RCT	High	2573 students	11.2	47	4-8	P	Student Mentoring	Direct	Moderate	One to one	Targeted: Academic risk	2			1	
Clarke 2009	USA	QE	High	1 school 39 students	not stated	44	9	S	Achievement Mentoring	Direct	Moderate	One to one	Targeted: Academic risk	2	1	2	1	
Evans 2016	USA	RCT	High	1 school 326 students	12.1 (0.9)	71	6-8	S	CHP-M: Challenging Horizons - Mentoring	Direct	Long	One to one	Targeted: Academic risk	1			1	
Holt 2008	USA	RCT	High	1 school 40 students	not stated	58	9	S	Achievement Mentoring	Direct	Short	One to one	Targeted: Academic risk	1	2	2		

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Karcher 2008	USA	RCT	High	19 schools 468 students	13.2 (2.3), 10-18	33	5-12	C	SMILE: School Based Mentoring	Direct	Moderate	One to one	Targeted: Academic risk	2	8	3		
McQuillin 2012	USA	RCT	High	1 school 134 students	not stated	53	6-7	M	School Based Mentoring	Direct	Short	One to one	Targeted: Academic risk	2	2	1		
Portwood 2005	USA	QE	High	5 school districts 170 students	not stated	48	4-12	C	Youth Friends: School Based Mentoring	Direct	Moderate	One to one	Targeted: Academic risk	1	2	4		
Improving mental wellbeing: Social-emotional skills (27 studies)																		
Adler 2016	Mexico	RCT	High	70 schools 68762 students	16.2 (1.1), 13-26	48	10-11	S	Bienestar Curriculum	Indirect	Long	Classroom	Universal	3				3
	Peru	RCT	High	694 schools 694153 students	15.4 (0.8), 11-28	47	7-11	S	Friendly Schools					3				3
	Bhutan	RCT	High	18 schools 8385 students	15.1 (2.2), 10-24	46	9-12	S	Life Skills curriculum					3				3
Ashdown 2012	Australia	RCT	High	1 school 99 students	5-6	55	P-1	P	You Can Do It!	Indirect	Short	Classroom	Targeted: Disadvantaged	2	4		2	2
Battistich 2004	USA	QE	High	6 schools 525 students	not stated	46	3-5	P	CDP: Child Development Project	Indirect	Long	Classroom	Targeted: Disadvantaged	1	2	1	4	
Bavarian 2013	USA	RCT	High	14 schools 247 teachers 1170 students	not stated	47	3-8	P	Positive Action	Indirect	Long	Classroom	Targeted: Disadvantaged	2		2		
Benson 2017	USA	QE	High	1 school 369 students	not stated	49	K-5	P	Second Step: K-5	Indirect	Short	Classroom	Targeted: Academic risk	2	1	2		
Berger 2018	Tanzania	QE	High	1 school 183 students	12.5 (0.9), 11-14	49	4-6	P	ESPS: ERS AE-Stress-Prosocal	Indirect	Moderate	Classroom	Targeted: Academic risk	1	1	1	2	2
Bowers 2015	USA	QE	High	1 school 201 students	13.2 (0.4), 12-15	51	8	M	SSS: Student Success Skills	Indirect	Short	Classroom	Targeted: Academic risk	1		3		

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Brackett 2012	USA	QE	High	3 schools 273 students	11 (1.0), 9.3-12.5	45	5-6	P	RULER	Indirect	Moderate	Classroom	Targeted: Academic risk	2	1		1	1
Brigman 2007	USA	QE	High	12 schools 220 students	not stated	46	5,6,8,9	M	SSS: Student Success Skills	Indirect	Short	Classroom	Targeted: Academic risk	2			1	
Campbell 2005	USA	QE	High	20 schools 240 students	not stated	not stated	5-6	P	SSS: Student Success Skills	Indirect	Short	Medium group	Targeted: Academic risk	2			1	
Culclasure 2019	USA	QE	High	3 schools 2362 students	not stated	51	3-10	C	PjBL: Project-Based Learning	Direct	Long	Classroom	Targeted: Academic risk	2			3	
Espelege 2016	USA	RCT	High	12 schools 123 students	11.3 (0.5), 11-12	57	6-7	M	Second Step: Student Success Through Prevention	Indirect	Long	Classroom	Targeted: Academic risk	3	4			
Filella 2016	Spain	QE	High	10 schools 574 students	10.5 (0.7)	52	5-6	P	Happy 8-12 Emotional Education	Direct	Moderate	One to one	Targeted: Academic risk	2	1			1
Filella 2018	Spain	QE	High	11 schools 903 students	12.6 (0.6)	52	1-2	S	Happy 12-16 Emotional Education	Direct	Moderate	One to one	Targeted: Academic risk	1	2	2		1
Gibbons 2006	USA	RCT	High	40 schools 2800 students	not stated	not stated	3-4	P	CHARACTERplus Way	Indirect	Long	Classroom	Targeted: Academic risk	2		2	1	
				64 schools 3500 students		not stated	4,8,11	C						2		2	1	
Hanson 2012	USA	RCT	High	50 schools 4683 students	not stated	50	4-5	P	Lessons in Character	Indirect	Long	Classroom	Targeted: Academic risk	1	3		2	
Jones 2011	USA	RCT	High	18 schools 1184 students	8.2 (0.7)	49	2-4	P	4Rs	Indirect	Long	Classroom	Targeted: Academic risk	2	1		2	
Linares 2005	USA	QE	High	2 schools 119 students	9.6 (0.4), 8.9-11.0	not stated	4-5	P	Unique Minds	Indirect	Long	Classroom	Targeted: Academic risk	2		1	1	
Lopata 2019	USA	RCT	High	35 schools 103 students	8.8 (1.4), 6-12	91	1-5	P	schoolMAX	Indirect	Short	Small group	Targeted: Academic risk	5	2			

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Low 2019	USA	RCT	High	61 school 8491 students	not stated	not stated	K-3	P	Second Step: Student Success through Prevention	Indirect	Long	Classroom	Targeted: Academic risk	2	2	1	5	1
Muñoz 2006	USA	QE	High	16 schools 1250 students	not stated	47	3-5	P	CDP: Child Development Project	Indirect	Long	Classroom	Targeted: Academic risk	1	2	3		
Ros-Morente 2018	Spain	QE	High	17 school 1477 students	10.5 (0.7), 12.6 (0.6)	52	5-6, 7-8	C	Happy 8-12-16 Emotional Education	Direct	Moderate	One to one	Targeted: Academic risk	3	2			2
Sloan 2020	Northern Ireland	QE	High	44 schools 386 students	5-6	65	R-1	P	Nurture Group	Direct	Long	Medium group	Targeted: Academic risk	2		1	4	1
Torrente 2019	Dem. Republic Congo	RCT	High	116 schools 8813 students	11.7 (1.9)	53	2-5	P	Learning in a Healing Classroom	Indirect	Long	Classroom	Universal	3	1		1	1
Improving mental wellbeing: Cognitive skills (13 studies)																		
Aber 2017	D. Rep. Congo	RCT	High	63 schools 4142 students	not stated	52	2-4	P	LRHC: Learning to Read in a Healing Classroom	Indirect	Long	Classroom	Universal	2				1
Castro 2005	USA	QE	High	1 school 70 students	not stated	63	7-8	M	Teen Leadership	Direct	Moderate	Classroom	Targeted: Academic risk	1		2		
Challen 2011	UK	QE	High	14 schools 3763 students	not stated	52	7	S	UKRP: UK Resilience Programme	Indirect	Moderate	Medium group	Targeted: Academic risk	2		1	1	2
Connor 2010	USA	RCT	High	10 school 445 students	not stated	49	1	P	ISI: Individulising student instruction	Indirect	Moderate	Classroom	Targeted: Academic risk	3		1		
Cooley- Strickland 2011	USA	QE	High	2 schools 93 students	9.4 (1.1), 8-12	52	3-5	P	FRIENDS	Direct	Moderate	Small group	Targeted: Academic risk	2		1	1	1
Gray 2011	USA	RCT	High	1 school 95 students	12.9, 12.0-13.8	49	7	M	Test Anxiety Reduction	Direct	Short	Large group	Targeted: Academic risk	1		1		1
Hanson 2011	USA	RCT	High	13 schools 2309 students	not stated	52	1-4	P	Tribes	Indirect	Long	Classroom	Targeted: Academic risk	2	1		1	

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Keogh 2006	UK	RCT	High	1 school 160 students	15.6 (0.5), 15-16	54	not stated	S	SML: Stress management intervention	Direct	Short	Small group	Targeted: Academic risk	1		1		3
Legum 2004	USA	RCT	High	1 school 57 students	not stated	not stated	6-7	M	Career Target	Direct	Short	Large group	Targeted: Academic risk	1		1		
Ozan 2018	Turkey	QE	High	1 school 45 students	not stated	49	12	S	Formative Assessment intervention	Indirect	Moderate	Classroom	Targeted: Academic risk	1		1		
Sinclair 2016	USA	RCT	High	11 classrooms 115 students	17.6 (2.0), 14-21	70	9-12	O	Think, Be, Do curriculum	Indirect	Short	Classroom	Targeted: Special needs	1	1		1	4
Skryabina 2016	UK	RCT	High	40 schools 1337 students	9-10	48	not stated	P	FRIENDS	Direct	Long	Classroom	Universal	3		2		2
Tzohar-Rozen 2013	Israel	QE	High	3 schools 107 students	10-11	54	5	P	Affective Self-Regulation in Maths program	Indirect	Short	Classroom	Universal	2	1			1
Improving mental wellbeing: Behavioral skills (8 studies)																		
Caprara 2014	Italy	QE	High	1 school 324 students	12.7 (0.51)	51	7	M	CEPIDEA: Promoting prosocial behaviour	Direct	Moderate	Classroom	Targeted: Academic risk	1	3	1	2	
Cho 2005	USA	QE	High	9 schools 1218 students	15.2 (0.9), 14-16	50	9-11	S	RY: Reconnecting Youth	Indirect	Long	Medium group	Targeted: Academic risk	1	4		7	
Chuang 2020	USA	QE	High	9 Schools 1817 students	not stated	52	K-3	P	IYTCM: Incredible Years Teacher Classroom Management	Indirect	Moderate	Classroom	Targeted: Academic risk	2		1	1	
Diperna 2016	USA	RCT	High	6 schools 402 students	7.4 (0.4)	45	2	P	SSIS-CIP: Social Skills Improvement System Classwide Intervention Program	Indirect	Short	Classroom	Targeted: Academic risk	2		2		
Muratori 2016	Italy	RCT	High	2 schools 184 students	7.6 (0.5)	43	1-2	P	Coping Power	Indirect	Moderate	Classroom	Targeted: Academic risk	1			1	1
Owens 2005	USA	QE	High	3 schools 42 students	8.5 (1.6)	71	K-6	P	YESS: Youth Experiencing Success in School	Indirect	Moderate	One to one	Targeted: Academic risk	1	2	2	7	1
Reinke 2018	USA	RCT	High	9 schools 1817 students	7.1 (1.2)	51	K-3	P	IYTCM: Incredible Years Teacher Class Management	Indirect	Moderate	Classroom	Targeted: Academic risk	1	1	1	1	

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Roughan 2011	UK	RCT	High	1 school 15 students	12.9 (0.6)	59	not stated	M	Working memory training	Direct	Short	One to one	Targeted: Academic risk	1			1	3
Encouraging physical activity: Exercise & relaxation (14 studies)																		
Bakir 2017	Turkey	QE	High	1 school 60 students	not stated	50	10	S	Sports vs Social activities	Direct	Short	Medium group	Universal	2				4
Cale 2010	USA	QE	High	1 school 108 students	14-18	50	9-12	S	ABC: Adventure-based counselling	Direct	Short	Medium group	Targeted: Academic risk	1	1	1		
Çalik 2018	Turkey	QE	High	1 school 243 students	10.9 (0.6)	51	not stated	S	IAAF Kids Athletics	Direct	Moderate	Classroom	Targeted: Academic risk	2		1		
Firth-Clark 2019	UK	RCT	High	4 schools 77 students	11-16	67	7-11	S	Sport Psychology & Biofeedback	Direct	Moderate	Medium group	Targeted: Academic risk	4		2		
Frank 2017	USA	RCT	High	1 school 159 students	not stated	52	6,9	M	TLS: Transformative Life Skills	Direct	Moderate	Classroom	Targeted: Academic risk	2	1	1	1	3
Gatz 2019	USA	QE	High	2 schools 59 students	12.5 (0.9), 11-14	0	6-8	M	Aerobic Fitness	Direct	Moderate	Large group	Targeted: Academic risk	1		1		
Gonçalves 2017	Brazil	RCT	High	1 school 105 students	7.4 (0.4), 6.5-8.1	53	2	P	Massage and Storytelling	Direct	Short	One to one	Targeted: Academic risk	2			2	
Hagins 2016	USA	RCT	High	1 school 112 students	15.3 (1.0)	52	9-11	S	Yoga	Direct	Long	Classroom	Targeted: Academic risk	1	1	4		1
Kall 2015	Sweden	QE	High	4 schools 545 students	9.9 (2.2)	52	K-6	P	Curriculum based physical activity	Direct	Moderate	Classroom	Targeted: Academic risk	2	2		2	6
Khng 2017	Singapore	RCT	High	4 schools 154 students	10.7 (0.4)	52	5	P	Deep breathing	Direct	Short	Medium group	Targeted: Academic risk	1		1		2
Marino 2010	USA	RCT	High	1 school 128 students	8.9 (0.5), 8-10	53	4	O	Zumba Gold dance	Direct	Short	Classroom	Targeted: Academic risk	1	1	1	4	
Stebbins 2012	USA	QE	High	1 school 51 students	12.6 (1.3), 9-15	88	4-10	O	Equine Assisted Activities	Direct	Moderate	One to one	Targeted: Special needs	1			3	3

DESIGN					PARTICIPANTS		SETTING		INTERVENTION					OUTCOMES				
Author (year)	Country	Design	Risk of bias	N	Age Mean (SD), range in years	% Boys	Grade	Type	Name	Mode	Duration	Grouping	Approach	Academic	Social-emotional	Cognitive	Behavioural	Internalising
Telles 2013	India	RCT	High	1 school 98 students	10.5 (1.3), 8-13	61	3-7	P	Yoga	Direct	Short	Large group	Universal	1		1		
Wendt 2015	USA	QE	High	2 schools 194 students	not stated	56	9	S	Quiet Time	Direct	Moderate	Classroom	Universal	2	1	2		2
Preventing harm from tobacco, alcohol & drugs (4 studies)																		
Bergman 2019	USA	RCT	High	4 schools 318 students	14-15	47	7-8	M	LIFT: Linking Information and Families Together	Direct	Long	One to one	Targeted: Disadvantaged	1	4		2	
Hall 2013	USA	RCT	High	40 schools 10762 students	11.3, 11-14	52	6	M	Too Good for Drugs	Direct	Moderate	Classroom	Targeted: Academic risk	2		1	4	
Shetgiri 2011	USA	QE	High	1 school 86 students	14.13	42	9	S	Reduce Violence and Substance Use intervention	Indirect	Long	Small group	Targeted: Special needs	1	3	1	6	
Zavela 2004	USA	QE	High	4 school districts 256 students	16.8 (0.6)	37	11	C	Say Yes First – To Rural Youth and Family Alcohol/Drug Prevention	Direct	Long	Classroom	Universal	1		2	3	

Appendix 4: Risk of bias assessment

Table 8. Risk of bias assessment in randomised control trials (RCT) and quasi-experimental (QE) studies

First Author (year)	Design	Selection bias Random sequence generation	Allocation concealment	Group bias Comparison groups are similar	Performance bias Blinding of participants and personnel	Detection bias Blinding of outcome assessment	Measurement bias Outcomes measured reliably	Attrition bias Incomplete outcome data	Reporting bias Selective reporting of results
Improving mental wellbeing: Belonging & engagement									
Borman 2019	RCT	Low	Low	High	Low	Low	Low	Low	Low
Flannery 2020	RCT	Low	High	Unclear	High	High	Low	Low	Low
Murray 2005	QE	Low	High	Unclear	High	High	Unclear	Unclear	Unclear
Seaton 2010	QE	Low	High	Low	Unclear	High	Low	Low	Low
Shoshani 2016	QE	Low	High	Low	Unclear	High	Low	Low	Low
Improving mental wellbeing: Mentoring									
Bernstein 2009	RCT	Low	Unclear	Low	Unclear	High	Low	High	Low
Clarke 2009	QE	High	High	Low	High	High	Low	High	Low
Evans 2016	RCT	Low	Low	Low	Low	Unclear	Low	High	Low
Holt 2008	RCT	Low	High	Low	High	High	Low	Low	Low
Karcher 2008	RCT	Low	High	Unclear	High	High	Low	Low	Low
McQuillin 2012	RCT	Low	High	Low	High	Low	Low	Low	Low
Portwood 2005	QE	High	High	Low	High	High	Low	High	Low
Improving mental wellbeing: Social-emotional skills									
Adler 2016	RCT	Low	Low	Low	Low	High	Low	Unclear	Low
Ashdown 2012	RCT	Low	Unclear	Low	Low	High	Low	High	Low
Battistich 2004	QE	High	High	Low	High	High	Low	High	Low
Bavarian 2013	RCT	Unclear	Unclear	Low	High	High	Low	Low	Low
Benson 2017	QE	High	High	High	High	High	Low	High	Low
Berger 2018	QE	Low	High	Low	High	High	Low	High	Low
Bowers 2015	QE	Unclear	High	Low	High	High	Low	High	Low
Brackett 2012	QE	Low	Unclear	Low	Low	High	Low	Unclear	Low
Brigman 2007	QE	Low	High	Low	High	High	Unclear	Unclear	High
Campbell 2005	QE	Low	High	Low	High	High	Low	Unclear	Low
Culclasure 2019	QE	High	High	Low	High	High	Low	High	High
Espelage 2016	RCT	Low	Unclear	Unclear	High	High	Low	High	Low
Filella 2016	QE	High	High	Low	High	High	Low	Unclear	Low
Filella 2018	QE	High	High	Low	High	High	Low	Low	Low
Gibbons 2006	RCT	Low	High	Low	High	High	Low	Low	Low
Hanson 2012	RCT	Low	High	Unclear	High	High	Low	Low	Low
Jones 2011	RCT	Low	High	Low	High	High	Low	Low	Low
Linares 2005	QE	High	High	High	High	High	Low	Unclear	Unclear
Lopata 2019	RCT	Low	High	Low	High	High	Low	Low	Low
Low 2019	RCT	Low	High	Unclear	High	High	Low	Unclear	Low
Muñoz 2006	QE	High	High	Unclear	High	High	Low	Unclear	Low
Ros-Morente 2018	QE	High	High	Low	Unclear	High	Low	Low	Low
Sloan 2020	QE	High	High	Low	High	High	Low	Low	Low
Torrente 2019	RCT	Low	High	Unclear	High	High	Low	Unclear	Low

First Author (year)	Design	Selection bias Random sequence generation	Allocation concealment	Group bias Comparison groups are similar	Performance bias Blinding of participants and personnel	Detection bias Blinding of outcome assessment	Measurement bias Outcomes measured reliably	Attrition bias Incomplete outcome data	Reporting bias Selective reporting of results
Improving mental wellbeing: Cognitive skills									
Aber 2017	RCT	Low	High	Low	High	High	Low	Unclear	Low
Castro 2005	QE	Low	High	Low	Low	High	Low	High	Low
Challen 2011	QE	High	High	Low	High	High	Low	High	Low
Connor 2010	RCT	Low	High	Unclear	High	High	Low	Low	Low
Cooley-Strickland 2011	QE	Low	High	Low	High	High	Low	High	Low
Gray 2011	RCT	Low	High	Low	High	High	Low	Low	Low
Hanson 2011	RCT	Low	High	Low	High	High	Low	Low	Low
Keogh 2006	RCT	Low	High	Low	High	High	Low	Low	Low
Legum 2004	RCT	Low	Unclear	Low	Unclear	Unclear	Low	Low	Low
Ozan 2018	QE	Unclear	High	Low	High	High	Low	Low	Low
Sinclair 2016	RCT	Low	High	Low	High	High	Low	Low	Low
Skryabina 2016	RCT	Low	High	Low	High	High	Low	Low	Low
Tzohar-Rozen 2013	QE	Low	High	Low	High	High	Low	Low	Low
Improving mental wellbeing: Behavioural skills									
Caprara 2014	QE	High	High	High	High	High	Low	Low	Low
Cho 2005	QE	Low	High	High	High	High	Low	Low	Low
Chuang 2020	QE	Low	High	Low	Unclear	Low	Low	High	Low
Diperna 2016	RCT	Low	Unclear	Low	Unclear	High	Low	High	Low
Muratori 2016	RCT	Low	High	Low	High	Low	Low	Unclear	Low
Owens 2005	QE	Unclear	High	Unclear	High	High	Low	High	Low
Reinke 2018	RCT	Low	High	Low	High	Unclear	Low	Low	Low
Roughan 2011	RCT	Low	High	High	High	High	Low	Low	Low
Encouraging physical activity: Exercise & relaxation									
Bakir 2017	QE	High	High	Low	High	High	Low	High	Low
Cale 2010	QE	Low	High	Low	High	High	Low	High	Low
Çalik 2018	QE	High	Unclear	Low	Unclear	Unclear	Low	High	Low
Firth-Clark 2019	RCT	Low	High	Low	High	High	Low	High	Low
Frank 2017	RCT	Low	Low	Low	High	High	Low	Low	Low
Gatz 2019	QE	High	High	Low	High	High	Low	Low	Low
Gonçalves 2017	RCT	Low	High	Low	High	Low	Low	High	Low
Hagins 2016	RCT	Low	High	High	High	High	Low	Low	Low
Kall 2015	QE	High	High	Low	High	High	Low	Unclear	Low
Khng 2017	RCT	Low	High	Low	High	High	Low	Low	Low
Marino 2010	RCT	Low	High	Low	High	High	Low	High	Low
Stebbins 2012	QE	High	High	Low	High	High	Low	Low	Low
Telles 2013	RCT	Low	High	Low	High	Low	Low	Low	Low
Wendt 2015	QE	High	High	High	High	High	Low	Unclear	Low
Preventing harm from tobacco, alcohol & drugs									
Bergman 2019	RCT	Low	High	Low	High	High	Unclear	Low	Low
Hall 2013	RCT	Low	High	Low	High	High	Low	Low	Low
Shetgiri 2011	QE	Low	High	Low	High	Unclear	Low	Low	Low
Zavela 2004	QE	High	High	Unclear	High	High	Low	Low	Low

Figure 20. Funnel plot for random effects meta-analysis of adjusted standardised difference (g) in academic achievement, based on wellbeing intervention vs no intervention

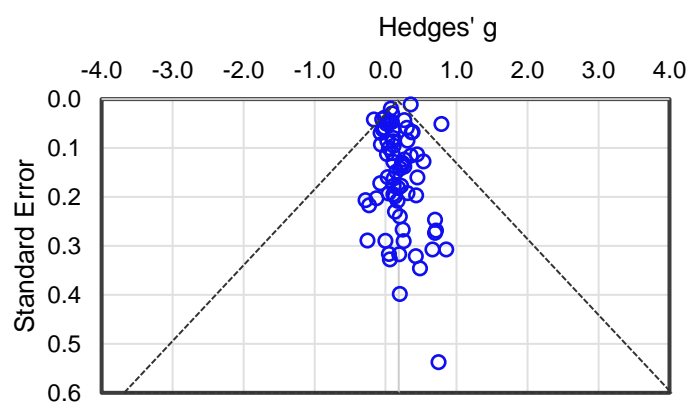
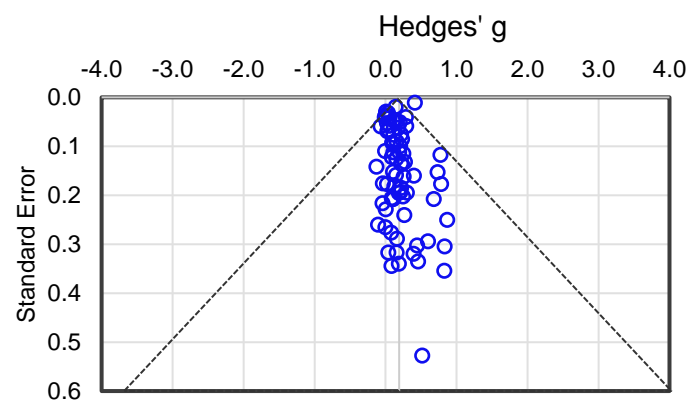


Figure 21. Funnel plot for random effects meta-analysis of adjusted standardised difference (g) in wellbeing outcomes, based on wellbeing intervention vs no intervention



Appendix 5: Summary results of meta-analysis

