NHS Health Scotland

Rapid Evidence Review:
Reducing the attainment gap – the role of health and wellbeing interventions in schools.

Dr Jane White

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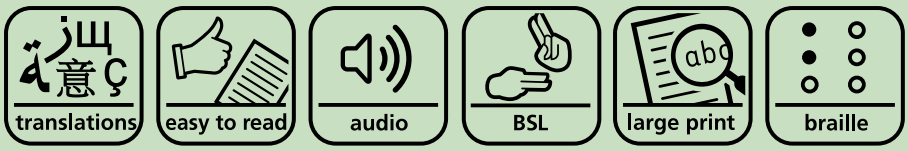

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Introduction

The purpose of this review is to examine the effectiveness of health and wellbeing interventions in a school setting to potentially reduce inequalities in educational outcomes. It begins by giving a brief description of the inequalities in educational outcomes in Scotland along with the political context for this paper. The next section focuses on social and emotional wellbeing interventions and the links with educational and wellbeing outcomes. The following section looks at interventions that promote healthy lifestyles and their potential impact on wellbeing and attainment. The final section discusses the findings of the previous sections. The method used to identify papers for this review is detailed in Appendix 1. The review was restricted to research conducted in the United Kingdom (UK) and Ireland to ensure that findings were as relevant to the Scottish education system as possible. As children who have higher social and emotional wellbeing tend to do better in school,[1] studies that reported wellbeing outcomes were included.

The review is intended as a source of information for people working in primary and secondary education, providing an overview of the supporting evidence for specific health and wellbeing programmes. NHS Health Scotland does not endorse the use of any programme over another. Decisions to use a particular programme should take into account the effectiveness of the programme and the local delivery context. Local considerations may include cost, need, resources and workforce implications (including ongoing training and supervision).

Key messages

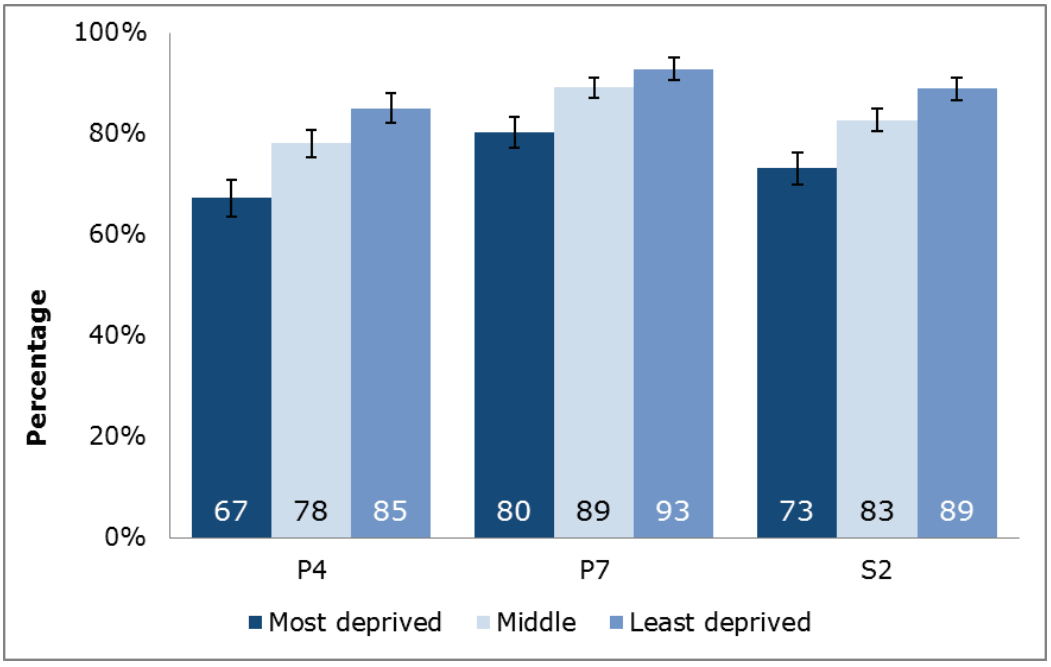
- Consistent international review-level evidence suggests that universal social and emotional learning programmes can have positive impacts on wellbeing and educational outcomes. However, findings from studies conducted in the UK and Ireland were mixed.
- The quality of implementation of social and emotional learning programmes was important for positive outcomes. Programmes that fit the needs and context of the class or school and are easy to carry out are more likely to be implemented well.
- Few studies conducted in the UK and Ireland reported the effect on children and young people from different socio-economic or ethnic backgrounds.

- Offering healthy, nutritious lunches at school tended to have beneficial effects on educational outcomes.
- There was inconsistent evidence that breakfast clubs, where children were provided with a nutritious breakfast at school, have an impact on educational outcomes.
- A number of promising approaches merit further examination.

1. Background

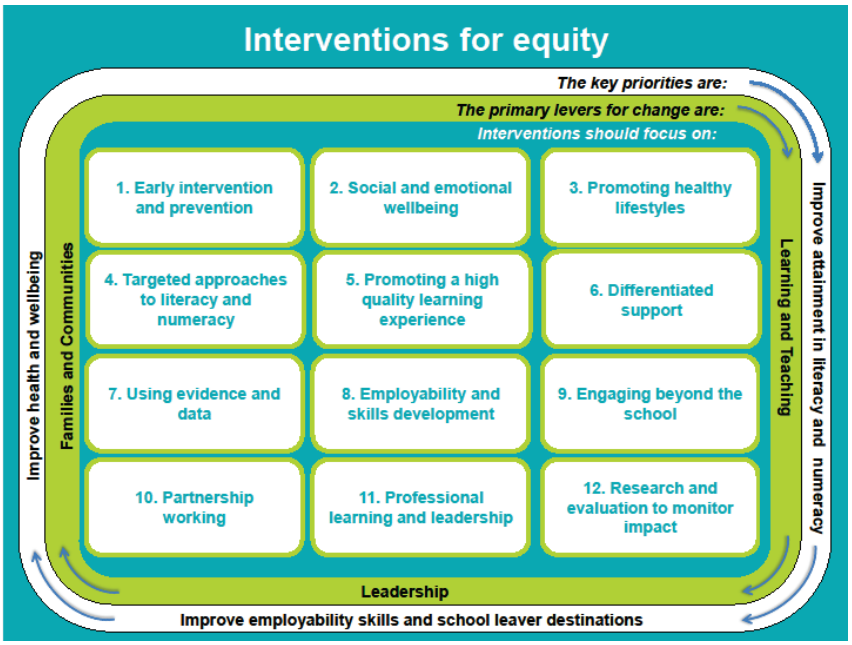
In general, children from poorer families have poorer educational outcomes compared to those from more affluent families.[2] [3] [4] While these associations are not unique to the UK, differences in Scotland are marked, starting before children begin school and persisting throughout.[3] For example, in the latest Scottish Survey of Literacy and Numeracy, the proportion of Primary 4 children who were assessed as doing well or very well in reading ranged from 67% in the most deprived areas to 85% in the least deprived areas.[5] (Figure 1). Similar patterns were seen for writing, listening and talking[5] and numeracy[6].

Figure 1: Proportion of pupils performing well or very well in reading by stage and deprivation category[5]



The Scottish Attainment Challenge aims to achieve equity in educational outcomes, with a particular focus on closing the poverty-related attainment gap. The Scottish Government has committed £750 million over the course of the current parliament (2016–2021) to close the poverty-related attainment gap for pupils from the most deprived areas. This includes £120 million of Pupil Equity Funding which benefits every council area in Scotland and is allocated directly to schools.[7] Allocations are based on the number of pupils from P1 to S3 who are eligible and registered for free school meals (see Appendix 2), with schools receiving around £1,200 per pupil.[8] Education Scotland has developed a framework of 'Interventions for equity' to help guide the decisions of school leaders (Figure 2).[9] In order to support the development of evidence-informed programmes within this framework, NHS Health Scotland was asked to identify and review health and wellbeing interventions in a school setting that could contribute to reducing inequalities in educational outcomes.

Figure 2: Interventions for equity framework[9]



2. Social and emotional wellbeing

Healthy social and emotional development in childhood and adolescence has been shown to be positively associated with better educational outcomes and greater wellbeing.[4] Children and young people from disadvantaged backgrounds are at increased risk of poor social and emotional wellbeing.[3] [10] It is not, however, inevitable. Social and emotional learning programmes in schools have the potential to help build resilience and promote wellbeing. In general, the aim is to contribute to the development of five inter-related social and emotional competencies: self-awareness, self-management, social awareness, relationship skills and responsible decision making.[4] [10] [11]

The following section starts by bringing together international review-level evidence about the general effectiveness of school-based social and emotional learning programmes. This is followed by a review of individual programmes that have been implemented and evaluated in the UK and Ireland. The focus in this review is universal programmes that are delivered to the general school population rather than on interventions that are targeted at children who are displaying early symptoms or diagnosed with a social, emotional or behavioural problem. The individual programmes are listed alphabetically.

2.1 International review-level evidence

There is consistent evidence from five systematic reviews and one umbrella review, reported in seven papers, that universal social and emotional learning programmes can have a positive effect on a range of outcomes in children and young people including improved social and emotional skills,[4] [10] [11] [12] [13] [14] [15] enhanced academic achievement[4] [12] [13] [14] and reduction in mental health difficulties.[11] [12] [13] [14] Positive effects were maintained when followed up 12 months after completing the programme[11] but longer term follow-up was scarce so less is known about longer-term effectiveness.[14] Significant* improvements in academic achievement were only detected when school staff were involved in delivery of the programme.[4] [13] Although the impact on education attainment was calculated to be small to moderate in statistical terms,[4] [13] this equated to an 11 percentile gain in one review,[4] which for individual pupils would be important.[4] [13]

* Throughout this paper the term ‘significant’ is used in the sense of statistical significance.

In general, there is review-level evidence that the effects of social and emotional learning programmes are more effective for children who are at greater risk of developing problems compared to the general school population.[11 13] However, there was a lack of studies that had evaluated the potential differential impact of the programmes on children with different backgrounds.[4 10 11 13 15] Durlak et al found that only about a third of studies that met the review's inclusion criteria (n=213) contained any information about effects on children with different ethnic or socio-economic backgrounds.[4]

Programmes were found to be more likely to be effective if they followed four key principles[4 10]

- Sequenced – a connected and coordinated set of activities to achieve skill development objective.
- Active – use of dynamic, varied forms of learning that are engaging and allow students to practise and learn new skills in real-world situations.
- Focused – has at least one component devoted to developing personal or social skills.
- Explicit – based on a theoretical model of social and emotional learning and targets specific social and emotional learning rather than positive development in general.

The quality of implementation was also important for positive outcomes.[4] Programmes that are easy to carry out and fit the needs and context of the class or school are more likely to be implemented well.[13] Classroom teachers are more likely to deliver a programme's content as the developers intend, if they were given appropriate training, resources such as standardised manuals and lesson plans, and ongoing support.[10]

2.2 Individual programmes

FRIENDS

FRIENDS* is an anxiety prevention and early intervention programme, developed in Australia, which consists of three developmentally tailored variants: Fun FRIENDS (4–7 years), FRIENDS for Life (8–11 years), and My FRIENDS Youth (12–15 years).[16] The 10-week programme can be delivered universally to whole classes or in small groups of

* FRIENDS: **F**eelings, **R**elax, **I** can try! (to do my best), **E**ncourage (explore solutions and coping plans), **N**urture (reward yourself), **D**on't forget (to practice) – be brave!, **S**tay happy[17 20]

children who are thought to be at increased risk of developing problems.[17] This review identified one systematic review of the effectiveness of FRIENDS as a universal prevention programme.[17] In addition, three research studies, reported in five papers[18] [19] [20] [21] [22] conducted in either the UK or Ireland were found; one study conducted in Ireland was included in the systematic review.

There is review-level evidence that, compared to a non-intervention comparison group, the FRIENDS programme had a significant positive effect on self-report measures of anxiety for children who completed a programme. Only five studies met the authors' inclusion criteria; three involved the programme developer and were conducted in the home country of the developer.[12] [17] The relative lack of independent evaluation outside of the programme's home country suggests that the findings of this review should be treated with a degree of caution, as the transferability to a Scottish context is uncertain.

The systematic review included programmes that had been delivered by trained classroom teachers and/or psychologists. However, it is possible that the effectiveness of the FRIENDS programme may differ depending on who is facilitating the programme. A randomised controlled trial in Ireland found that, compared to usual school provision, the FRIENDS programme delivered by trained teachers to primary school-aged children had no significant impact on overall anxiety levels, even though improvements in self-reported self-concept, coping efficacy and school connectedness were reported.[22] In contrast, Rodgers and Dunsmuir found that secondary school children in the intervention group had significantly lower self-reported anxiety scores compared to young people in the non-intervention comparison group.[21] This programme was facilitated by a staff member from the Irish National Behaviour Support Service. However, other factors are likely to have contributed to the differing outcomes. For example, the children in the two studies were at different life stages. The first study involved primary school-aged children, whereas children in the second trial were in their first year of secondary schooling.

Stallard et al compared the effectiveness of the programme delivered universally to children in Year 4 or 5* by either trained health professionals or a trained member of school staff.[19] [20] Participating schools in southwest England were randomly allocated to health-led FRIENDS, school-led FRIENDS or usual school provision. Even though self-reported anxiety levels reduced in all three groups, the health-led FRIENDS programme

* Equivalent to Primary 5 or 6 in Scotland.

was found to be significantly more effective than teacher-led or usual provision in reducing children's self-reported anxiety levels measured 12 months after completion of the programme. However, even though the children reported feeling better, teachers and parents did not report any differences.[20] As children's ethnicity and socio-economic circumstances were not recorded,[18] this study did not examine the differential impact on children from different backgrounds. The schools were said to be representative of the UK in terms of academic performance but had a lower proportion of children eligible for free school meals.[18]

A number of features of this study may have influenced the finding that the health-led programme was more effective. Firstly, the number of trained facilitators delivering each arm was different. The health-led programme was led by two trained facilitators supported by the classroom teacher, whereas the school-led programme was implemented by one trained teacher or member of school staff supported by two facilitators.[20] Secondly, it is possible that having the classroom teacher present in the health-led programme helped to embed the learning. It is not reported whether the school-led programme involved the classroom teacher. Thirdly, the quality of the implementation of the health-led and teacher-led programme differed. Health-led facilitators delivered all the core and home tasks of the programme, whereas only 60% of the school-led implementers managed to do so. Finally, members of school staff attended fewer of the supervision sessions, held every two weeks, to discuss and review the progress of the programme and reinforce class and behaviour management skills.[20]

Lessons for Living

Designed for primary school children, Lessons for Living is a universal programme developed and evaluated in Scotland. It aims to reduce anxiety by helping children, aged nine to ten years, to develop positive coping skills over a series of 10 lessons delivered in place of routine Personal, Social and Health Education (PSHE) lessons. In a small randomised controlled trial, Collins et al examined if the intervention was effective overall as well as whether it mattered who delivered the course.[23] After taking part in the Lessons for Living programme, children reported significantly lower levels of anxiety. This improvement was maintained when children were followed up six months later. Children in non-intervention groups did not report any change. No differences in effectiveness were found between teacher-led and school psychologist-led intervention groups.[23]

The primary schools in the study had lower levels of children eligible for free school meals than the Scottish average,[23] so the generalisability to other contexts is not known. In addition, this study did not examine whether the programme was more or less effective in different population groups (e.g. boys or girls, children from a white or from a black and minority ethnic (BME) background or free schools meals eligibility status). However, the potential promise of this approach suggests that further independent research is needed to establish whether the positive outcomes can be replicated in larger populations living in diverse contexts.

Mindfulness

Mindfulness-based interventions in a school setting have been proposed as a way to help children manage their stress, thus improving wellbeing and learning outcomes. Two systematic reviews[24] [25] were identified that have examined international literature exploring mindfulness-based interventions delivered in a school setting to children of a range of school ages. Overall, significant effects were found for cognitive outcomes[24] [25] and resilience and stress measures.[24] However, effects on academic and behavioural outcomes were found to be small and not significant.[25] The quality of the included studies was low to moderate[25] and follow-up was relatively short-term.[24] Only three studies conducted in the UK or Ireland were included in the reviews, so the generalisability of the findings to a Scottish context is uncertain.

Paws b.

Paws b. is a mindfulness programme developed in the UK and designed to be delivered by trained teachers as part of the PSHE curriculum to children aged 7–11. Two small controlled trials[26] [27] that examined its effectiveness were found. Results of the trials were inconsistent. One study found that teacher-rated outcomes such as reasoning, self-reflection and self-awareness improved significantly for children who had completed the Paws b. programme compared to those who had received usual school provision. However, parents did not report the same positive improvements. No changes in emotional wellbeing or positive affect were detected.[27] Furthermore, Thomas and Atkinson found that Paws b. had different effects in two different cohorts of children in the same study. In the first group, children's teacher-reported attention behaviours improved

significantly after taking part in the Paws b. programme. In contrast, in the waiting list control cohort, who took part in the Paws b. programme six to eight weeks later, teacher-rated attention behaviours significantly reduced afterwards. This deterioration was not maintained at follow-up six weeks later.[26] While the mindfulness programme was taught to both cohorts by the same trained teacher, the waiting list control cohort had a change of classroom teacher part way through the study. This meant that the attention behaviour measure was not completed by the same teacher before and after the programme. In addition, at the same time as Paws b. was introduced, the children were adjusting to a new classroom teacher.[26]

PATHS

Promoting Alternative Thinking Strategies (PATHS) is an American-developed universal social and emotional learning classroom-based programme for children aged four to 11 years. It is designed to be taught by classroom teachers on a weekly basis with daily activities to help embed learning. Research in America has demonstrated positive effects but evidence from European studies has been more inconsistent.[28] [29] Three cluster randomised controlled trials conducted in the UK or Ireland, reported in five papers,[28] [29] [30] [31] [32] were identified for this current review.

Overall, there is limited evidence from research conducted in the UK or Ireland that, compared to schools' routine social and emotional learning activities, the PATHS programme had benefits for children taking part. No significant effects favouring the PATHS programme were found for primary outcome measures immediately or in the longer term.[28] [29] [30] [31] [32] Nonetheless, positive benefits for secondary outcomes such as teacher-rated social competence,[28] [29] [32] aggressive behaviour and learning behaviours[28] were reported. In addition, more frequent classroom observations of pro-social behaviours in the PATHS group were described.[31] However, one trial found that routine school provision was significantly more effective for improving peer relationships and emotional symptoms.[29] [32] Furthermore, Ross et al found that positive classroom behaviours such as rule compliance and engagement were more common in the non-intervention comparison classes.[31]

For children who were assessed at baseline as being at risk of developing social or emotional problems, PATHS was found to have a significant positive impact on pro-social

behaviour and emotional symptoms.[28] [29] [30] However, usual school provision was found to be significantly more effective than PATHS in improving cooperation and reducing conduct problems in this population.[29] PATHS was found to be equally effective for children of different ages. White children appeared to benefit more than non-white children, although differences were not significant.[28] Berry et al found no differences between the impacts on children eligible for free school meals compared to their more affluent peers.[28]

Overall, there was little evidence that taking part in PATHS had a significant impact on educational outcomes. In the general school population, no effect on attainment at Key Stage 2* was detected.[28] [32] However, for pupils eligible for free schools meals, one study found a small non-significant positive impact on English exam scores at Key Stage 2. Maths exam scores did not show the same improvement.[32]

The quality of implementation of the PATHS programme in these studies is likely to be an important factor in its effectiveness.[4] One evaluation found that, although individual lessons were delivered reliably, the frequency at which they were provided was considerably less than suggested by the developers.[29] [32] On average, teachers were able to deliver about 50% of the lessons in a given year.[29] In addition, the non-intervention comparison schools were asked to continue with their 'usual' social and emotional learning activities. If routine provision included aspects similar to elements of the PATHS programme, the effects are likely to be more difficult to detect. Changes to social and emotional learning activities in individual schools during evaluations add another confounding factor. Only one study reported surveying the participating schools to ask about their routine provision at baseline and again at follow-up. The authors found that non-intervention comparison schools had significantly increased their social and emotional learning activities during the course of the study.[29]

Roots of Empathy

Roots of Empathy is a universal classroom-based social and emotional programme, developed in Canada, for primary school-aged children. It aims to develop self-awareness and self-management of emotions leading to positive relationships skills. Nine themes are delivered by a trained facilitator throughout the school year. Each theme consists of three

* National exams sat by pupils in England at the end of Year 6.

sessions: a family visit when a mother and baby visit the classroom, with a preparatory session a week before and a follow-up session a week after. The baby is considered to be the teacher.[33] Two evaluations conducted in Scotland were identified for this review.[33 34]

Children who took part in the programme demonstrated significant improvements in measures of the extent that they felt the same feelings as others (emotional empathy), whereas children in the non-intervention comparison group either showed no improvement[34] or had deteriorated[33]. Reported effects on measures of the extent children understood why other people feel the way they do (cognitive empathy) were inconsistent. MacDonald et al reported improvements in the children taking part and detected a deterioration in the non-intervention comparison group of children.[33] In contrast, Wrigley et al detected no change in either group.[34]

Both studies found that teacher-rated pro-social behaviours of children who had taken part in the Roots of Empathy programme increased more than for children in the comparison groups. Younger children tended to benefit more than older pupils and the impact on pro-social behaviours was greater for boys than girls.[33 34] In addition, a greater effect was detected in schools located in areas of high deprivation.[33] Only MacDonald et al measured wellbeing outcomes specifically. The scores of both intervention and non-intervention groups decreased over time and no significant differences between the groups were found.[33] Neither study reported any differences in effect between children of different ethnic backgrounds.

R time

R time is a whole-school approach, developed in the UK, which aims to promote positive relationships for learning through short activities (10–15 minutes) delivered weekly over 30 weeks. Each activity aims to develop cooperative working, peer relationships and improve interaction skills.[35] One quasi-experimental trial was identified for this review. Pupils aged four to 14 years were recruited from 21 schools, including a school for children with severe learning difficulties, within a city in southwest England. After being involved with R time, children were statistically significantly more likely to speak about their feelings and report enjoyment of school. There was no evidence that experience of bullying had changed. Teachers felt that children were more cooperative with each other in the classroom.[35]

These findings should be interpreted with a degree of caution for a number of reasons. Firstly, the study report did not discuss the validity and reliability of the outcome measure which was developed by one of the authors. Secondly, although R time is reportedly intended to be implemented over 30 weeks, the time period between the teacher training in January and the post-intervention measures in June–July is less than this. Thus, it is probable that the intervention was not delivered as the developers had intended. Finally, despite the stated research aim to examine the effectiveness of the programme among 'children of different ages, abilities and socio-economic areas' (page 44), no separate analysis is reported.

Social and Emotional Aspects of Learning programme

The Social and Emotional Aspects of Learning programme (SEAL) was a national whole-school approach to promote social and emotional skills in English primary and secondary schools. Implemented in 2005, it was a framework for improvement rather than a structured prescriptive package; schools were encouraged to tailor their approach to their own context.[36] Evaluation of the SEAL programme implemented in secondary schools detected no significant impacts on pupils' social and emotional skills, pro-social behaviour, general mental health difficulties or behavioural problems in either the general population of pupils or those assessed at baseline as being at increased risk of problems.[36 37]

UK Resilience Programme

The UK Resilience Programme was the UK version of the American-developed Penn Resiliency Programme. It was implemented in mainstream secondary schools in three local authorities in England in 2007. In a controlled trial, reported in two papers,[38 39] the impact of taking part in the programme was evaluated. Results were mixed. Immediately after the programme, a small significant improvement in depression scores was detected in Year 7* pupils taking part in the programme compared to the non-intervention comparison group. However, this improvement was not maintained at follow-up.[38 39] No significant improvements in anxiety or social and emotional behaviour scores were detected.[38]

* Equivalent to Secondary 1 in Scotland.

Improvements in English attainment were found immediately after completing the programme and these positive effects were maintained when followed up a year later. Although no gains in maths attainment were detected directly after the programme, positive impacts were found when followed up a year later. Sub-group analysis found that children who had not attained the expected target level in national exam scores, those from more disadvantaged backgrounds and those at greatest risk of developing problems seemed to gain more than other groups.[39]

Zippy's Friends

Zippy's Friends is a universal programme, available internationally, which aims to develop the coping and social skills of children aged five to seven years. The course is delivered over 24 weeks by classroom teachers who have been trained.[23] [40] Zippy's Friends was implemented in Ireland as one element of support offered to schools designated as disadvantaged in the context of Delivering Equality of Opportunity in Schools policy.[41] Three papers reporting outcomes from a mixed-method cluster randomised controlled trial, which examined the immediate and longer-term impact, were identified for this review.[40] [41] [42]

Compared to a non-intervention comparison group, children who undertook the programme demonstrated significant improvements in teacher-reported self-awareness, self-regulation, motivation and social skills immediately after the programme. This improvement was maintained when followed up 12 months later. However, no significant impact on teacher-reported empathy, emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems or pro-social behaviour were detected.[41] The quantitative outcome measures were supplemented by participatory workshops with a sub-sample of children (n=161). Children who had taken part in the programme were more likely to suggest active coping strategies, such as problem solving or support seeking, during a draw and write activity and were more able to articulate their feelings compared to children in the non-intervention comparison classes.[42] No information is given about potential differential impacts on children from different socio-economic backgrounds or ethnic communities.

3. Promoting healthy lifestyles

3.1 Diet and nutrition

Poor diet and nutrition has been linked with poorer academic, social and emotional development in children and young people.[43] Diets deficient in essential vitamins and minerals such as iron and vitamin B may affect an individual's ability to concentrate and pay attention in the classroom. In addition, a poor diet may leave children and young people more susceptible to illness, reducing time in the classroom through absenteeism.[44] This review identified two systematic reviews that examined UK and international literature about the impacts a) on educational outcomes of interventions that aim to change children's diet and nutrition[45] and b) of food growing activities in school.[46] Five studies, reported in eight papers, of research conducted in the UK were also found.

3.1.1 Diet and nutrition interventions

The identified review was an update of a review which was published earlier than the inclusion criteria for this current paper. In general, the authors concurred with the original review's conclusions that there was insufficient evidence to detect an effect of diet and nutrition change on educational outcomes for school-aged children and young people living in developed countries.[45] However, their findings about breakfast clubs are discussed in section 3.1.3. Only one study conducted in the UK was included in the updated review, which evaluated the impact of offering free school meals in two pilot areas in England.[47] This study is discussed separately in section 3.1.4.

3.1.2 Food growing

There is review-level evidence from studies conducted in the UK and USA that food growing activities in school can have a positive effect on educational outcomes. Nelson et al found strong evidence that attainment in science improved.[46] However, effects on language and maths attainment were more mixed. Food growing appeared to help the language skills of pupils who had English as a second language. Qualitative evidence suggested that pupils' wellbeing has been enhanced through the development of social skills, positive peer relationships and a sense of belonging.[46] The majority of studies looked at food growing in primary schools, so it is not known whether these outcomes

would be replicated in secondary-age pupils. In general, there were limited studies conducted in the UK or Ireland included in this review, so it is uncertain whether these findings are transferable to a Scottish context.

3.1.3 Breakfast clubs

Breakfast clubs provide children and young people with a nutritious breakfast at school. It has been suggested that eating a healthy breakfast at school will help improve pupil concentration and behaviour, reduce illness-related absenteeism and improve punctuality.[45] Educational outcomes are believed to benefit from a better learning environment (e.g. less disruptive classroom behaviour) and more teacher contact (e.g. less absenteeism through illness).[48] At review level, there is mixed evidence that breakfast clubs have an impact on educational outcomes. Overall, a small positive effect has been reported. However, it was not possible to determine whether benefits were attributable to the consumption of a nutritious breakfast or the social dimension of breakfast clubs.[45] Furthermore, the generalisability of these findings to a Scottish context is unclear as the majority of the studies were conducted outside the UK and Ireland.

Four reports of two research studies conducted in the UK were identified for this current review.[48] [49] [50] [51] Both examined the universal free provision of breakfast at primary school. Results were inconsistent. The Welsh Government's primary school free breakfast initiative was evaluated in a cluster randomised controlled trial.[49] [50] [51] Eating breakfast, the number of healthy breakfast food items consumed, the healthfulness of the diet (portions of fruit and vegetables and amount of sweets and crisps) throughout the day was found to be significantly positively associated with educational performance at Key Stage 2.[51] Children who attended schools offering free breakfast were more likely to eat healthy breakfast items and consumed less sweets and crisps throughout the day. Children who were eligible for free school meals were significantly more likely to eat unhealthy foods at breakfast or skip breakfast altogether. While there was no overall effect of offering free breakfast on the number of children who skipped breakfast, breakfast skipping reduced in children who were eligible for free school meals.[50] However, no significant differences in educational outcomes were detected for pupils who attended schools offering free breakfasts compared to those who were pupils at non-intervention schools.[49] [51]

On the other hand, a cluster randomised controlled trial of the 'Magic Breakfast' initiative in England found that in schools where Year 2* and Year 6† pupils were offered a free breakfast prior to school starting, there was a significant positive impact on national Key Stage 1 exam‡ scores in maths, reading and writing. Compared to pupils in non-intervention comparison schools, the effect was estimated to be the equivalent of two months progress in maths and writing and slightly less than two months in reading. Although positive impacts on Key Stage 2 exam results were observed, these were not significant. However, while positive effects were demonstrated overall, those who were eligible for free school meals seemed to benefit less than those who were not.[48]

The findings from these two studies should be interpreted with a degree of caution. Both studies suffered from a considerable amount of contamination between intervention and non-intervention groups. For example, in the 'Magic Breakfast' study, about 40% of the comparison group schools who responded to the follow-up survey had adopted some form of breakfast club and about 90% had provided or encouraged breakfast for Year 6 pupils in the week before the Key Stage 2 exams. In addition, some of the intervention schools implemented breakfast clubs in ways that differed from the intended intervention of free, universal provision of breakfast prior to school, by for example introducing a small charge for some or all of the pupils or by restricting the number of places available.[48] In addition, the Welsh study relied on pupils recalling what they had eaten over the previous day; the time period included two breakfasts.[50] Although the questionnaire was reported to have reasonable reliability and validity, it is possible that children altered their answers to fit with healthy eating guidelines. Also, it is not known whether the breakfast described reflected a typical day.

3.1.4 School meals

School meals are one way that differences in diet between children from more or less affluent backgrounds can be potentially addressed. Three studies conducted in the UK, reported in four papers, looked at the effects of introducing healthier school meals on educational outcomes.[43 44 47 52]

* Equivalent of Primary 3 in Scotland.
† Equivalent of Primary 7 in Scotland.
‡ National exams sat by pupils in England at the end of Year 2.

The effect of offering healthier menu choices along with changes to the dining room environment was examined in a clustered randomised controlled trial conducted in six primary[52] and 12 secondary schools.[43] A sample of pupils from Years 4, 5, 7 and 9* were observed systematically in the post-lunch period prior to the changes being brought in and 12 weeks afterwards. On-task behaviours, where pupils were engaged in the activity in ways that might be expected by teachers or other adults, and off-task behaviours, when behaviour was disengaged or disruptive were noted.[43]

Overall, prior to changes to the menu and dining room arrangements, high levels of on-task and low numbers of off-task behaviours were observed in both primary school and secondary school pupils. For primary school pupils, there was no significant evidence that the changes had made a difference to classroom behaviours.[52] However, secondary pupils appeared to demonstrate significantly more on-task behaviours and less off-task behaviours afterwards.[43] It is not known whether these observed benefits continued in the longer term and if improved behaviours were associated with better educational outcomes. In addition, primary schools were responsible for selecting participating classes and secondary schools were asked to randomly select pupils to take part. The representativeness of their selections is not known.

Celebrity chef Jamie Oliver's 'Feed Me Better' campaign sought to change the school meal menus in one local authority area in order to provide more nutritious choices. In a natural experiment, the educational outcomes at Key Stage 2 of pupils attending schools who had changed their menu were compared with pupils in schools in neighbouring areas. Having healthier school meals on offer had positive effects on Key Stage 2 exam results and the authorised absence rate† was reduced. However, the effects for children who were eligible for free school meals was considerably less than their more affluent peers. Qualitative evidence suggested that there was more resistance to menu changes among more disadvantaged pupils and parents.[44]

Since the Jamie Oliver campaign and the data collection period of the study discussed above, new nutritional standards for school meals have been introduced, so the transferability of these findings to the current Scottish context is limited. Nonetheless, more recently, an evaluation examining the potential impact of offering free school meals to all

* Equivalent to Secondary 3 in Scotland.
† Taken a proxy for illness affecting school attendance.

primary school pupils in two pilot areas in England found positive effects of eating a nutritious lunch at school on attainment. There was a significant increase in pupils from the pilot areas achieving the expected level in English and maths at Key Stage 2 compared to similar pupils in the comparison areas. It was estimated that gains were equivalent to two months' progress.[47] In contrast to the Jamie Oliver campaign, pupils who had been eligible for free school meals at baseline made slightly more progress than those who were not eligible. Overall, no significant difference in absenteeism was observed between pilot and comparison schools, which suggests that attainment gains may be a result of something other than increased teacher contact time.[47]

3.2 Physical activity

Being physically active during childhood and adolescence has been linked positively with educational outcomes.[53] Less is known about specific interventions that might impact on attainment. This review identified one systematic review which examined international literature about the link between physical education, taught as part of the compulsory school curriculum, and academic achievement. The authors concluded that physical education classes can have a positive impact on educational achievement if they are integrated with other learning activities.[53] However, methodological weaknesses of this review such as poor reporting of the search strategy used to identify studies and lack of quality assessment of primary studies suggest that these findings should be treated with caution. It is not possible to tell whether any of the included studies were conducted in the UK or Ireland, so the transferability to a Scottish context is not known. In addition to the systematic review, five research studies conducted in the UK were found, which looked at the links between specific physical activity programmes and education and/or wellbeing outcomes.

3.2.1 Multi-component interventions

The effectiveness of two different interventions to improve the physical activity and wellbeing of secondary school children was examined in a cluster randomised controlled trial.[54] One intervention paired Year 7 children with Year 9 peer mentors. During six meetings at weekly intervals, the peer mentors supported the younger children to set physical activity goals and offered encouragement to help them to achieve them. In the second intervention, Year 7 children were able to collect and interpret information about

their own daily physical activity through Geographical Information Systems (GIS) technology. In six weekly geography lessons participants were encouraged to think about environmental factors that might influence their activity levels. A third group of participants were offered a combination of the two interventions. Wellbeing and physical activity outcomes were measured before the programmes started and again, in the main, six weeks after they finished and compared with a comparison group that continued with routine school activities. No evidence that either intervention alone or in combination had a significant impact on physical activity level or wellbeing was found.[54] The potential differential impact on children from different backgrounds was not assessed.

Commando Joe's

Commando Joe's is a year-long military style physical activity programme which provides physical activity sessions and mentoring facilitated by ex-military personnel. Instructors monitor late attendance at the school gate and motivate late-comers when necessary. The programme also provides English and maths booster classes.[55] In a controlled trial undertaken in seven primary schools and five secondary schools situated in deprived areas in England, after three months of taking part, the English and maths scores of pupils taking part had significantly improved compared to those in the non-intervention comparison schools. However, these improvements were not maintained when followed up 12 months later despite continued delivery of the programme. Beneficial effects on pro-social behaviours and conduct problems were also reported.[55] The authors suggest that the positive influence of the ex-military instructor contributed to the short-term improvements in English and maths scores; the possible effect of the booster lessons are not mentioned. Even though Commando Joe's is branded as a physical activity programme, changes in activity levels were not reported. Sub-group analysis of differential impact for children eligible for free school meals or from different ethnic backgrounds is not described.

3.2.2 Single component interventions

Dance

Two studies explored the effect of dance in school settings on physiological and psychological outcomes. The first examined the effect of providing electronic dance mat systems to secondary schools in a controlled trial. Physical activity levels and psychological wellbeing were measured in 11–13 year old pupils prior to the dance mats being introduced into schools and again 12 months later. Compared to pupils in comparison schools, pupils in schools with dance mats reported improvements in psychological wellbeing as well as anthropometric measures such as body mass index (BMI). However, no evidence of an impact on moderate to vigorous physical activity was detected. Perhaps surprisingly, there was a significant reduction in the amount of light physical activity undertaken and an increase in length of sedentary time in those with access to the dance mats compared to the non-intervention comparison group.[56]

It is difficult to draw any firm conclusions from this study for a number of reasons. Firstly, only five of the schools where the dance systems were introduced agreed to take part in the evaluation. It is not known how representative these were of the local authority area. Secondly, there were significant differences at baseline between the schools where the dance mats were introduced and the comparison schools. The comparison schools were larger, located in less deprived areas and had a lower proportion of pupils eligible for free school meals. Finally, the dance mat systems were introduced into schools in a variety of ways from incorporation into regular physical education classes to intermittent use when space was available.

The second study evaluated the impact of ‘Dance-4-Your-Life’, a contemporary dance programme for female adolescents at secondary schools, on physiological and psychological outcomes. No significant differences in physical activity or wellbeing outcomes were detected when measured prior to and after completion of the programme. Self-esteem was reported to have increased significantly but it is possible that this may be a result of being chosen to take part in a research study rather than an effect of the dance programme.[57] No information is given in this published report about the socio-economic or ethnic demographics of pupils attending the schools taking part, so it is difficult to generalise the findings to other contexts.

Move4Words

Move4Words is a whole-class 12-week physical action programme designed for children aged seven to 13 years. Daily activities focus on the mindful control of visual, motor and auditory skills. Children follow videos of child actors demonstrating the actions; as the programme progresses activities become more complex. Evaluated in a controlled trial, eight intervention primary schools were matched to comparison schools taking into account final year performance averaged over the previous three years, Year 6 numbers, and the proportion of pupils eligible for free school meals and special educational needs. After taking part in the programme, the percentage of children who had achieved or exceeded the expected level in English and maths at Key Stage 2 had significantly increased compared to the previous three years. In the non-intervention comparison schools, the proportion had also increased but this was not significant. Qualitative feedback suggested that teachers had noticed improvements in learning-related behaviour in the classroom.[58]

In a separate element of the evaluation, the individual performance of pupils in five classes in three schools (Year 3 – Year 5) was followed from the age of seven years until one year after taking part in the programme. Progress in reading, writing and maths was significantly faster after taking part in the programme; children who had been underachieving the most seemed to progress the fastest.[58] However, the numbers of underachievers was relatively small so may not be representative. No information is given about the potential differential impact on children who were from different ethnic or socio-economic backgrounds. This evaluation was led by the developer of the programme which may have increased the likelihood of positive outcomes than would be found if independently evaluated.[12] However, the potential promise of this approach suggests that further independent research is needed to establish whether the positive outcomes can be replicated in larger populations living in diverse contexts.

Health Promoting Schools

The WHO Health Promoting Schools framework is a whole-school approach that aims to improve the health, wellbeing and educational attainment of pupils.[59] A recent Cochrane review examined international evidence of its effectiveness. Positive impacts on physical activity, BMI, tobacco use and being bullied were found. However, it was not possible to judge the effect on educational or school-related outcomes as few studies had included

these measures; none had been conducted in the UK or Ireland.[59] Similarly, another systematic review which explored whether the Health Promoting Schools approach was effective in building resilience found only six research studies that met their inclusion criteria. Positive impacts on resilience measures were reported. In particular, perceptions of peer support, self-esteem, cooperation and sense of connectedness improved.[60] However, as none of the included studies was conducted in the UK or Ireland, the transferability to a Scottish context is not known.

4. Discussion

This paper has examined health and wellbeing interventions in a school setting that have the potential to reduce inequalities in educational outcomes. There is international review-level evidence that universal school based social and emotional learning programmes are effective in improving social and emotional wellbeing and education outcomes. However, review authors noted that the effectiveness of any given intervention varied from study to study.[12 13 15] Similarly, in this current review, the evidence from the individual programmes evaluated in the UK and Ireland was equivocal. A number of studies reported beneficial effects such as lower anxiety levels and improved concentration which have been linked to positive learning-related behaviours. Follow-up, however, was relatively short. It is possible that, in the longer term, favourable impacts on educational outcomes may have been seen. Findings from the two individual studies in this review that reported impact on educational outcomes were inconsistent. Positive gains in English and maths scores were reported a year after completing the UK Resilience programme[39] whereas no significant impacts of the PATHS programme on educational attainment were detected.[32]

There are a number of possible reasons why individual studies may not reproduce the positive results reported in systematic reviews and meta-analyses. Firstly, trials carried out in 'real world' conditions tend not to produce the same positive outcomes of studies conducted with additional resources and support provided, which may ensure that the programme is implemented as the developer intended. Contextual factors such as local organisational capacity and school ethos are also likely to influence the quality of implementation.[11 12] Few studies reported the fidelity of the programme delivery but those that did suggested the programmes that were teacher-led were not necessarily implemented fully.[20 29]

Secondly, social and emotional learning programmes that have been developed and evaluated in America dominate this field of study. For example, Durlak et al found that 87% of the studies which met the review's inclusion criteria, were undertaken in the USA.[4] The social, cultural and curricular context of the American education system is distinct from the circumstances in Scotland and the UK. Successful transfer may depend on the degree that the programme is aligned to local educational approaches and pedagogical styles.[12] Furthermore, the more robust research studies used a cluster randomised controlled trial design with randomisation at either school or class level. Comparison

groups usually received routine school provision. In the UK, this is likely to include exposure to social and emotional learning activities during, for example routine PSHE lessons. Thus, the interventions under study were compared to an active comparison which may have contained similar elements. In contrast, routine provision in the USA may have been considerably different.

Finally, it is possible that routine provision of social and emotional learning activities varied between intervention and non-intervention schools and may have changed over time. Consequently, any beneficial effects of the intervention programme are likely to be more difficult to detect. In this review, only one study reported surveying the schools to ask about their routine provision at baseline and again at follow-up and taking these potentially confounding factors into account in the analysis.[29]

Cross-sectional research has linked poor diet and lower physical activity levels in children and young people with poorer educational outcomes. Less is known about whether interventions to improve diet and physical activity can also be beneficial for educational outcomes, in part because most studies do not include education-related outcome measures. This review found inconsistent evidence that breakfast clubs could have an impact. However, having healthy nutritious meals available at lunch time seemed to have benefits for attainment.[47] Findings from the two research studies that looked at the impact of a physical activity programme on educational outcomes were inconsistent. Taking part in a Move4Words programme had reported positive impacts on English and maths at Key Stage 2,[58] whereas Commando Joe's seemed to benefit pupils initially but improvements were not maintained despite continued programme input which included literacy and numeracy booster sessions.[55]

5. Conclusion

This review has highlighted the lack of research studies, conducted in the UK and Ireland, examining health and wellbeing interventions in a school setting that report educational outcomes. Similarly, few studies reported any analysis of the differential impact on children from different ethnic or socio-economic backgrounds. Quality of the studies varied considerably. Thus, in the main, there is insufficient evidence to draw firm conclusions about which, if any, health and wellbeing interventions have the potential to impact on inequalities in educational outcomes. However, a number of approaches reported promising impacts on attainment and learning-related behaviours which may warrant further investigation.

Appendix 1: Method

Research question

What health and wellbeing interventions in a school setting work to reduce inequalities in educational outcomes (including attainment)?

Search strategy

The search strategy was developed in discussion with NHS Health Scotland's Knowledge Services:

#1. physical exercise or physical education or physical activit* or exergame* or lifestyle or life-style or 'active school' or healthy eating or nutrition or diet or breakfast club or meal* or confidence or resilience or social emotional or wellbeing or well being or well-being or meditation or yoga or mindfulness

#2. attainment or achievement or education* outcome* or academic performance or academic success or attendance or engage* or litera* or numera* or learn*

#3. school

#4. UK OR United Kingdom OR Britain OR England OR Wales OR Scotland OR Ireland

#5. #1 and #2 and #3 and #4

In order to make sure that the volume of literature identified was manageable in the time frame available for this review, the search was limited to finding the terms in the title and abstract. The focus was on studies carried out in UK and Ireland to ensure that findings from this review were transferrable to the Scottish education context. In addition, electronic database searches were limited to peer-reviewed papers published in English from 2010 onwards.

Using these search terms, the following health and education electronic databases were searched:

Medline, Embase, ASSIA, IBSS, Psych Articles, Public Health Database, PsychINFO, Psychology and Behavioral Sciences Collection, Sociological Abstracts, ERIC, British Education Index, Child Development & Adolescent Studies, Education Abstracts,

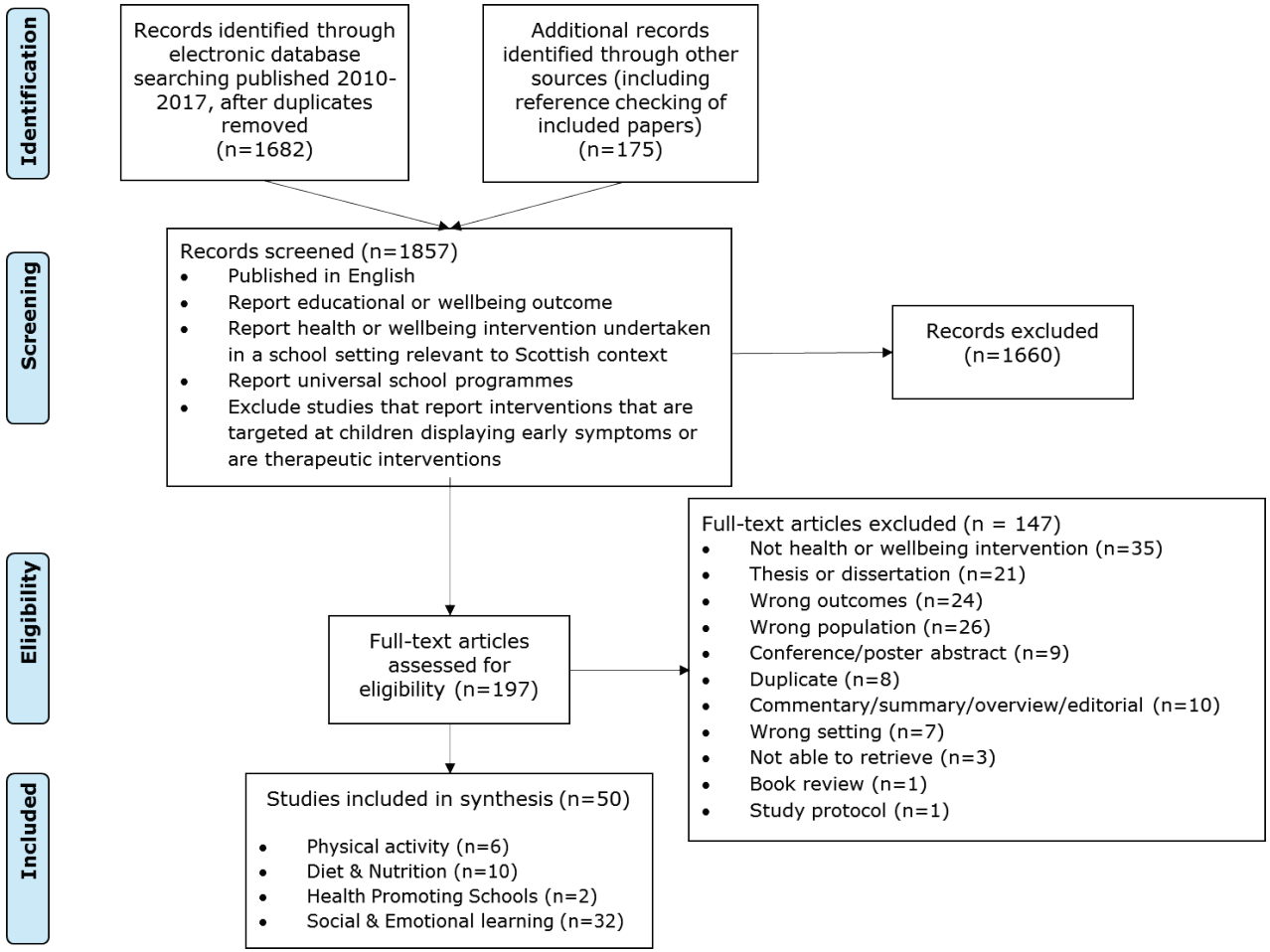
Professional Development Collection, Teacher Reference Center, Australian Education Index.

In addition, the search terms were used in ‘Google Advanced’ search engine to find any potentially relevant reports not published in the peer-reviewed literature. Further studies and papers were identified by examining the reference lists of relevant articles identified by the search.

Selection process

The titles and abstracts were screened for potential inclusion. If studies reported a health or wellbeing intervention for school-aged children and/or young people undertaken in a school setting and reported an educational or wellbeing outcome, they were selected for further consideration. Studies were excluded if they reported therapeutic interventions or targeted populations with additional needs such as children and/or young people on the autistic spectrum. Discussion or commentary papers were not included. This screening identified 197 articles and reports for further consideration. The full text of each paper was assessed for inclusion and 50 were included in the synthesis. Of these, 14 were review-level papers and 36 were primary studies. The progress of the papers through the selection process is summarised in the PRISMA flow diagram below (Figure 3).

Figure 3: PRISMA flow diagram



Appendix 2: Eligibility criteria for free school meals[61]

Parents* can claim free school meals for their child if they are in receipt of the following:

- Income support
- Income-based Job Seekers Allowance
- Any income related element of Employment and Support Allowance
- Child Tax Credit, but not Working Tax Credit, and annual income is less than £16,105
- Both maximum Child Tax Credit and maximum Working Tax Credit and annual income is less than £6,420
- Support under Part VI of the Immigration and Asylum Act 1999
- Universal Credit

* Young people aged between 16 and 18 years in fulltime education who are in receipt of any of these benefits in their own right can claim free school meals also.

References

[1] Gutman LM and Vorhaus J. The impact of pupil behaviour and wellbeing on educational outcomes. DFE–RR253. London: Department of Education; 2012.

[2] West A. Poverty and educational achievement: Why do children from low-income families tend to do less well at school? *Benefits* 2007. 15(3) 283–97.

[3] Sosu E and Ellis S. Closing the attainment gap in Scottish education. York: Joseph Rowntree Foundation; 2014.

[4] Durlak JA, Weissberg RP, Dymnicki AB et al. The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development* 2011. 82(1) 405–32.

[5] Scottish Government. Scottish Survey of Literacy and Numeracy 2016 (Literacy) Supplementary Table. 2017. Available at: www.gov.scot/Publications/2017/05/7872/downloads Accessed 20/06/17.

[6] Scottish Government. Scottish Survey of Literacy and Numeracy 2015 (Numeracy) Tables and Charts. 2016. Available at: www.gov.scot/Publications/2016/05/2836/downloads Accessed 16/06/17.

[7] Scottish Government. The Scottish Attainment Challenge. 2017. Available at: www.gov.scot/Topics/Education/Schools/Raisingeducationalattainment Accessed 23/06/17.

[8] Scottish Government. Pupil equity fund. 2017. Available at: www.gov.scot/Topics/Education/Schools/Raisingeducationalattainment/pupilequityfund Accessed 19/06/17.

[9] Education Scotland. Interventions for Equity. 2017. Available at: www.education.gov.scot/improvement/Documents/InterventionsforEquityDiagram.pdf Accessed 23/06/17.

[10] O'Conner R, De Feyter J, Carr A et al. A review of the literature on social and emotional learning for students ages 3–8: Characteristics of effective social and emotional learning programs (Part 1 of 4). REL 2017–245. Washington, DC: US Department of Education, Institute of Education Sciences, National Centre for Education Evaluation and Regional Assistances, Regional Educational Laboratory Mid-Atlantic; 2017.

[11] Clarke AM, Morreale S, Field C et al. What works in enhancing social and emotional skills development during childhood and adolescence? A review of the evidence on the effectiveness of school-based and out-of-school programmes in the UK. Galway: World Health Organization Collaborating Centre for Health Promotion Research, National University of Ireland; 2015.

[12] Wiglesworth M, Lendrum A, Oldfield J et al. The impact of trial stage, developer involvement and international transferability on universal social and emotional learning programme outcomes: A meta-analysis. *Cambridge Journal of Education* 2016. 46(3), 347–76.

[13] Weare K and Nind M. Mental health promotion and problem prevention in schools: What does the evidence say? *Health Promotion International* 2011; 26(S1), i29–69.

[14] Sklad M, Diekstra R, De Ritter M and Ben J. Effectiveness of school-based universal social, emotional and behavioural programs: Do they enhance students' development in the area of skill, behavior and adjustment? *Psychology in the Schools* 2012; 49(9), 892–909.

[15] O'Conner R, De Feyter J, Carr A et al. A review of the literature on social and emotional learning for students ages 3–8: Outcomes for different student populations and settings (Part 4 of 4). REL 2017–248. Washington, DC: US Department of Education, Institute of Education Sciences, National Centre for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic; 2017.

[16] Friends Resilience. The Friends programs by Paula Barrett. 2017. Available at: www.friendsresilience.org Accessed 23/06/17.

[17] Higgins E and O'Sullivan S. 'What works': Systematic review of the 'FRIENDS for life' programme as a universal school-based intervention programme for the prevention of child and youth anxiety. *Educational Psychology in Practice* 2015. 31(4), 424–38.

[18] Skryabina E, Morris J, Byrne D et al. Child, teacher and parent perceptions of the FRIENDS classroom-based universal anxiety prevention programme: A qualitative study. *School Mental Health* 2016. 8, 486–98.

[19] Stallard P, Skryabina E, Taylor G et al. A cluster randomised controlled trial comparing the effectiveness and cost-effectiveness of a school-based cognitive-behavioural therapy programme (FRIENDS) in the reduction of anxiety and improvement in mood in children aged 9/10 years. *Public Health Research* 2015. 3(14).

[20] Stallard P, Skryabina E, Taylor G et al. Classroom-based cognitive behaviour therapy (FRIENDS): A cluster randomised controlled trial to prevent anxiety in children through education in schools (PACES). *Lancet Psychiatry* 2014. 1, 185–92.

[21] Rodgers A and Dunsmuir S. A controlled evaluation of the 'FRIENDS for life' emotional resiliency programme on overall anxiety levels, anxiety subtype levels and school adjustment. *Child and Adolescent Mental Health* 2015. 20(1), 13–19.

[22] Ruttledge R, Devitt E, Greene G et al. A randomised controlled trial of the FRIENDS for life emotional resilience programme delivered by teachers in Irish primary schools. *Educational & Child Psychology* 2016. 33(2), 69–89.

[23] Collins S, Woolfson LM and Durkin K. Effects on coping skills and anxiety of a universal school-based mental health intervention delivered in Scottish primary schools. *School Psychology International* 2014. 35(1), 85–100.

[24] Zenner C, Hermleben-Kurz S and Walach H. Mindfulness-based interventions in schools – a systematic review and meta-analysis. *Frontiers in Psychology* 2014. 5(603), 1–20.

[25] Maynard BR, Solis MR, Miller VL and Brendel KE. Mindfulness-based interventions for improving cognition, academic achievement, behavior, and socioemotional functioning of primary and secondary school students. Campbell Systematic Reviews 2017; 5.

[26] Thomas C and Atkinson C. Measuring the effectiveness of a mindfulness-based intervention for children's attentional functioning. *Educational & Child Psychology* 2016. 33(1), 51–64.

[27] Vickery CE and Dorjee D. Mindfulness training in primary schools decreases negative affect and increases meta-cognition in children. *Frontiers in Psychology* 2016. 6(2025), 1–13.

[28] Berry V, Axford N, Blower S et al. The effectiveness and micro-costing analysis of a universal, school-based, social-emotional learning programme in the UK: A cluster-randomised controlled trial. *School Mental Health* 2016. 8, 238–56.

[29] Humphrey N, Barlow A, Wigelsworth M et al. A cluster randomized controlled trial of the promoting alternative thinking strategies (PATHS) curriculum. *Journal of School Psychology* 2016. 58, 73–89.

[30] Little M, Berry V, Morpeth L et al. The impact of three evidence-based programmes delivered in public systems in Birmingham, UK. *International Journal of Conflict and Violence* 2012. 6(2), 260–72.

[31] Ross SM, Sheard MK, Cheung A et al. Promoting primary pupils' social-emotional learning and pro-social behaviour: Longitudinal evaluation of the Together 4 All programme in Northern Ireland. *Effective Education* 2011. 3(2), 61–81.

[32] Barlow A, Wigelsworth M, Lendrum A et al. Promoting Alternative Thinking Strategies (PATHS). Evaluation report and executive summary. London: Education Endowment Foundation; 2015.

[33] MacDonald A, McLafferty M, Bell P et al. Evaluation of the Roots of Empathy programme by North Lanarkshire Psychological Service. Watford: Action for Children; 2013.

[34] Wrigley J, Makara K and Elliot D. Evaluation of Roots of Empathy in Scotland 2014–15. Final Report for Action for Children. York: Qa Research; 2016.

[35] Hampton E, Roberts W, Hammond N and Carvalho A. Evaluating the impact of Rtime: An intervention for schools that aims to develop relationships, raise enjoyment and reduce bullying. *Educational and Child Psychology* 2010. 27(1), 35–51.

[36] Humphrey N, Lendrum A and Wigelsworth M. Social and Emotional Aspects of Learning (SEAL) programme in secondary schools: National evaluation. DFE–RR049 London: Department of Education; 2010.

[37] Wigelsworth M, Humphrey N and Lendrum A. Evaluation of a school-wide preventive intervention for adolescents: The secondary social and emotional aspects of learning (SEAL) programme. *School Mental Health* 2013. 5, 96–109.

[38] Challen AR, Machin SJ and Gillham JE. The UK Resilience programme: A school-based universal non-randomised pragmatic controlled trial. *Journal of Consulting and Clinical Psychology* 2014; 82(1), 75–89.

[39] Challen A, Noden P, West A and Machin S. UK Resilience programme evaluation: Final report. DFE–RR097 London: Department of Education; 2011.

[40] Clarke AM and Barry MM. An evaluation of the Zippy's Friends emotional wellbeing programme for primary schools in Ireland. Summary report. Galway: Health Promotion Research Centre, National University of Ireland Galway; 2010.

[41] Clarke AM, Bunting B and Barry MM. Evaluating the implementation of a school-based emotional well-being programme: A cluster randomized controlled trial of Zippy's friends for children in disadvantaged primary schools. *Health Education Research* 2014. 29(5), 786–98.

[42] Clarke AM, Sixsmith J and Barry MM. Evaluating the implementation of an emotional wellbeing programme for primary school children using participatory approaches. *Health Education Journal* 2015. 74(5), 578–93.

[43] Storey HC, Pearce C, Ashfield-Watt P et al. A randomized controlled trial of the effect of school food and dining room modifications on classroom behaviour in secondary school children. *European Journal of Clinical Nutrition* 2011. 65, 32–8.

[44] Belot M and James J. Healthy school meals and educational outcomes. *Journal of Health Economics* 2011. 30, 489–504.

[45] Levy L and Diet and Obesity Team. School Food and Attainment. Review of the Literature. London: Public Health England; 2013.

[46] Nelson J, Martin K, Nicholas J et al. Food Growing in Schools. Slough: National Foundation for Educational Research; 2011.

[47] Kitchen S, Tanner E, Brown V et al. School Meals Pilot. Impact Report. DFE–RR227 London: Department of Education; 2013.

[48] Crawford C, Edwards A, Farquharson C et al. Magic Breakfast: Evaluation report and executive summary. London: The Education Endowment Foundation; 2016.

[49] Murphy S, Moore SF, Tapper K et al. Free healthy breakfasts in primary schools: A cluster randomised controlled trial of a policy intervention in Wales, UK. *Public Health Nutrition* 2010. 14(2), 219–26.

[50] Moore GF, Murphy S, Chaplin K et al. Impacts of the primary school free breakfast initiative on socio-economic inequalities in breakfast consumption among 9–11 year-old schoolchildren in Wales. *Public Health Nutrition* 2013. 17(6), 1280–9.

[51] Littlecott HJ, Moore GF, Moore L et al. Association between breakfast consumption and educational outcomes in 9–11 year-old children. *Public Health Nutrition* 2015. 19(9), 1575–82.

[52] Golley R, Baines E, Bassett P et al. School lunch and learning behaviour in primary schools: An intervention study. *European Journal of Clinical Nutrition* 2010. 64, 1280–8.

[53] Zach S, Shoval E and Lidor R. Physical education and academic achievement – literature review 1997–2015. *Journal of Curriculum Studies* 2016. Published online, 1–19.

[54] Tymss PB, Curtis SE, Routen AC et al. Clustered randomised controlled trial of two education interventions designed to increase physical activity and well-being of secondary school students: The MOVE project. *BMJ Open* 2016. 6(e009318), 1–10.

[55] Mills HE, McNarry MA, Stratton G et al. Investigating the effectiveness on educational attainment and behaviour of Commando Joe's: A school-based, military-ethos intervention. *Archives of Exercised in Health and Disease* 2015. 5(1–2), 377–85.

[56] Azevedo LB, Burges WD, Haighton C and Adams J. The effect of dance mat exergaming systems on physical activity and health-related outcomes in secondary schools: Results from a natural experiment. *BMC Public Health* 2014; 14, 951.

[57] Connolly MK, Quin E and Redding E. Dance 4 Your Life: Exploring the health and well-being implications of a contemporary dance intervention for female adolescents. *Research in Dance Education* 2011. 53(66), 53–66.

[58] McClelland E, Pitt A and Stein J. Enhanced academic performance using a novel classroom physical activity intervention to increase awareness, attention and self control: Putting embodied cognition into practice. *Improving Schools* 2015. 18(1), 83–100.

[59] Langford R, Bonell CP, Jones HE et al. The WHO health promoting school framework for improving the health and wellbeing of students and their academic achievement. Cochrane Database of Systematic Reviews, 2014.

[60] Stewart D and Wang D. Building resilience through school-based health promotion: A systematic review. *International Journal of Mental Health Promotion* 2012. 14(4), 207–18.

[61] The Scottish Government. Free School Lunches. 2016. Available at: www.gov.scot/Topics/Education/Schools/HLivi/schoolmeals/FreeSchoolMeals Accessed 26/06/17.

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