Reading skills, outcomes and interventions: A review of the evidence

Essex Year of Reading 2022-23

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The Education Policy Institute is an independent, impartial and evidence-based research institute that promotes high quality education outcomes, regardless of social background. We achieve this through data-led analysis, innovative research and high-profile events.

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About the Essex Education Task Force

The Essex Education Task Force was established by Essex County Council in April 2021 as an independent body. At the heart of its work across Essex lie Renewal, Equality and Ambition.

The two key aims are:

- To minimise the impact of the pandemic on all children and young people as quickly as possible, with a three to five-year overview of phases of regeneration.
- To capture and promote current innovation and best practice across the education system in Essex.

An initial budget of £1.5 million has already been invested in supporting the work of pre-school and early years settings, schools, further education, governors and the voluntary sector. A major investment has focused on launching the Essex Year of Reading 2022-23. This report from EPI is the third in a series of commissioned reports (a) to identify 'the learning gaps' the Task Force needs to address, and (b) to evaluate the impact of the Task Force's work over the next three years.

Roy Blatchford CBE, Chair, Essex Education Task Force

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Executive summary

Relationship between reading and longer-term outcomes

- Children and young people's reading ability is an important predictor of longer-term outcomes. The studies reviewed found significant associations between reading ability and educational attainment, social and emotional skills, physical and mental health, occupational success, and employment earnings.
- It's also clear that attitudes towards reading and frequency of reading are associated with concurrent reading abilities and long-term outcomes – providing insight into additional reasons why reading skills are important.

Approaches to teaching reading

- Reading ability is thought to be the product of word reading and language comprehension skills. As such, reading skills can be measured based on the components of word reading skills (for example, word reading efficiency) and/or language comprehension skills (for example, vocabulary and grammar).
- In England, there is an emphasis on 'systematic synthetic phonics' instruction – a mode of learning to read that emphasises the links between letters and sounds. In other high-income countries where English is the dominant language, methods also include 'whole language' or balanced (i.e. mixed phonics and whole language) approaches.
- Phonics instruction has powerful effects on children's early word reading skills. However, the effects are far smaller at follow up (mean follow-up time for the studies looked at was 11.2 months).
- In the absence of a large-scale, randomised control trial with an active and passive control group, it is unclear whether systematic synthetic phonics instruction is *more* effective than other approaches to teaching reading.

Policy recommendations

- The government and/or local authorities should **commission research exploring approaches to reading instruction used in schools in addition to synthetic phonics instruction** to help policymakers and educators better understand which approaches to reading instruction are most effective.
- The government and/or local authorities could **consider a randomised control trial with a systematic synthetic phonics instruction as the intervention group, and an appropriate active and passive control group,** to better understand whether phonics instruction is *more* effective than other approaches.
- In general, **evaluations of interventions with longer follow-up periods are required** to, first, build the evidence base on the long-term effects of interventions, and second, to consider how we can best extend the long-term effects of interventions that target word reading and language comprehension skills.
- Schools should **monitor pupils' progress for diminishing effects of decoding or language comprehension interventions**.

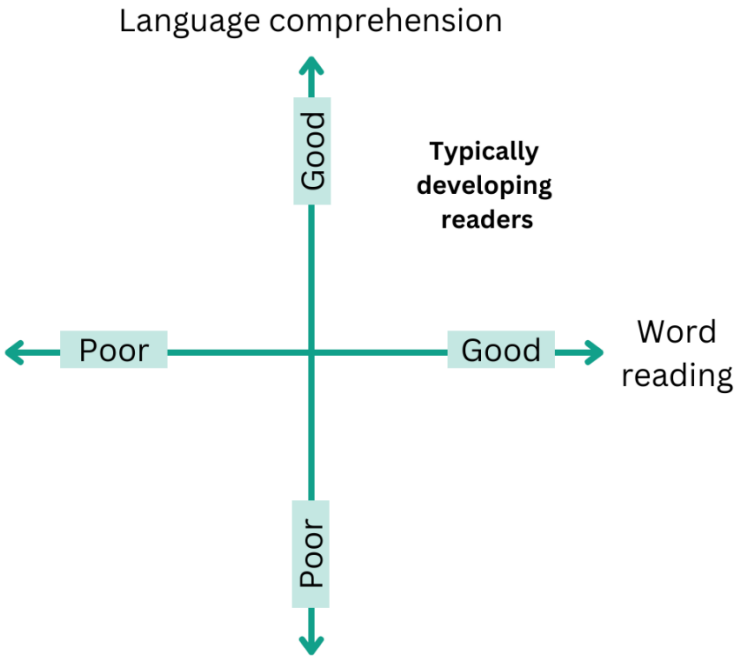
- More **research is required into how we can best support the development of reading skills in vulnerable pupils**. Tutoring and cooperative learning appear as promising instructional methods for vulnerable children. However, the specific interventions and combinations of interventions that are effective, as well as the components of reading comprehension these interventions should be targeting, remains unclear for certain at-risk groups of learners. The government should first fund more **efficacy trials that consider the complexities of recruitment and retention of samples of vulnerable children to better understand whether models from typically developing readers apply and the barriers to successful intervention for these groups.**

Introduction

Background

Reading comprehension – what we would refer to colloquially as 'reading' – requires the combination of word reading skills and understanding text; this is also referred to as the 'simple view of reading' in the literature.[1] The development of word-reading skills likely rests on an interplay between sight recognition and alphabetic decoding; sight recognition makes use of the visual features of print whilst alphabetic decoding requires converting and manipulating letters into sounds.[2] Understanding text is supported by the development of language comprehension skills (e.g., vocabulary, grammar, and syntax).[3] As depicted in Figure 1, **the development of word reading *and* language comprehension skills serve as important pillars of sound reading comprehension skills.**

Figure 1. The simple view of reading which emphasises the importance of both word reading *and* language comprehension skills.



Adapted from 'The simple view of reading'.[4 5]

The average reading ability of children and young people in England exceeds that of their international peers. There are many ways that the reading abilities of children can be benchmarked internationally. Directed by the International Association for the Evaluation of Educational Achievement (IEA), the Progress in International Reading Literacy Study (PIRLS) is an international comparative study aimed at assessing the reading ability of children, roughly aged 9-10 or Year 5 in England, across various countries. The latest data collected in 2016 indicated that England had an average score of 559, above the international median score of 539.[6] Similarly, the Programme for International Student Assessment (PISA), organised by the Organisation for Economic Co-operation and Development (OECD), benchmarks 15-year olds' performance on a

reading assessment across a variety of countries. Again, according to the latest data from 2018, pupils in England had a mean score of 505 – above the OECD average for reading of 487.[7]

Despite England's comparatively high score, major inequalities remain. According to the government's own data, in 2022, over one in five children left primary school without meeting the expected standard in reading.[8] Only 38 per cent of pupils with Special Education Needs (SEN) status met the expected standard in reading. Moreover, the disadvantage gap, or gap in attainment between disadvantaged children and their more affluent peers, at Key Stage 2 is the widest it has been since 2012.[9] COVID-19 has introduced challenges related to learning loss; EPI research has suggested that primary school children were 0.8 months and secondary school pupils were 2.4 months behind in reading compared to a cohort in a typical pre-pandemic year.[10]

Policy context

The cost of illiteracy to the UK economy has been estimated to be as high as £80 billion a year, in part due to lost earnings and increased welfare spending.[11] In the latest academic year 2021/22, 75 per cent of children left primary school having met the expected standard in reading. **In Essex, 74 per cent of pupils met the expected standard in reading, comparable to the national average** (see Table 1). Compared to areas with similar demographic profiles,[12] the proportion of pupils who meet the expected standard is middling (see Table 2).

Pre-pandemic data shows significant variation within Essex in the disadvantage gap – the gap in months of attainment between disadvantaged learners and their more affluent peers – particularly at later stages of education (see Table 3).

Relatedly, disparities in learning loss related to the pandemic and school closures were observed at a regional level. London saw the smallest learning loss in primary and secondary reading whereas the North East, North West and Yorkshire and the Humber saw larger learning losses.[13] **The East of England saw 0.5 months of learning loss in primary and 2.2 months in secondary.**

Table 1. The percentage of pupils meeting standards in reading at the end of KS2 for local authorities in the East of England in 2021/22

Location	Percentage of pupils meeting the expected standard in reading	Percentage of pupils not achieved expected standard in reading
Bedford	70	26
Cambridgeshire	75	20
Central Bedfordshire	72	24
Essex	**74**	**21**
Hertfordshire	78	18
Luton	77	21
Norfolk	70	26
Peterborough	69	26
Southend-on-Sea	73	22
Suffolk	72	23
Thurrock	75	21
England	**75**	**21**

Source: Explore education statistics: KS2 attainment

Table 2. The percentage of pupils meeting standards in reading at the end of KS2 in Essex and selected comparators in 2021/22

Location	Percentage of pupils meeting the expected standard in reading	Percentage of pupils not achieved expected standard in reading
Bury	77	20
Cumbria	75	21
Stockport	77	19
Dudley	70	25
Telford and Wrekin	75	21
Essex	**74**	**21**
Hertfordshire	78	18
Southend-on-Sea	73	22
England	**75**	**21**

Source: Explore education statistics: KS2 attainment & comparators selected from Education Policy Institute report[14]

Table 3. Disadvantage gap in months by Essex Parliamentary Constituency in 2018/19

Location	Early Years	Key Stage 2	Key Stage 4
Basildon and Billericay	4.3	9.1	21.6
Braintree	4.9	9.9	18.6
Brentwood and Ongar	4.6	6.8	17.8
Castle Point	4.5	9.5	19.7
Chelmsford	4.9	11.6	19.6
Clacton	5.6	14.6	24
Colchester	4.1	11.3	13.7
Epping Forest	4.4	10.5	14.7
Harlow	3.3	9	23.2
Harwich and North Essex	3.8	9.1	19.7
Maldon	4.5	11.1	20.6
Rayleigh and Wickford	4.8	7.8	18.3
Rochford and Southend East	3.2	10.2	21
Saffron Walden	4.5	11.1	17.4
South Basildon and East Thurrock	4	8.6	24
Southend West	4.6	7.6	19.2
Thurrock	4	7.1	17.1
Witham	6	10.8	18.1
Essex average	**4.5**	**10.1**	**19.6**
National average	**4.6**	**9.3**	**18.1**

Source: Education Policy Institute (2022)[15]

To curb regional differences, the Johnson government pursued a 'Levelling Up' agenda, aimed at addressing geographic inequalities in a range of policy areas. For schools, the white paper, Opportunity for All, set out ambitious targets to meet by 2030:

- 90 per cent of pupils should leave primary school meeting the expected standard in reading, writing, and maths
- The GCSE average grade in English language and in maths will increase from 4.5 to 5[16]

To achieve these goals, a series of reforms were announced including standardising the minimum school week to 32.5 hours, additional teacher training opportunities, and further opportunities for tutoring. The government has estimated that for the 2030 cohort, improvements in standards of reading, writing and maths in KS2 may be worth £31.1-59.6bn for the wider economy.[17]

In Essex, as part of its pandemic recovery programme, the Education Task Force launched a series of interventions in 2022 with the aim of ensuring that every Essex child leaves school able to read at their age level or better. These include a 'whole community approach' involving programmes targeted at vulnerable groups of learners, including looked after children, those in alternative provision, and those with literacy difficulties, as well as wider programmes focused on raising early achievement in literacy, building reading fluency and comprehension, and encouraging reading for enjoyment targeted at teachers, children in different key stages, parents and local services which support children and their families.

Purpose and structure of this review

Children who cannot read effectively are likely to face significant challenges. We know that early reading skills predict later reading skills. [18] [19] For example, children who are poor readers at age 8 were almost 20 times more likely to be poor readers at age 11 (odds ratio = 19.69).[20] Evidence from England also suggests that prior attainment in early literacy skills, as measured by the Year 1 phonics check, is highly correlated with reading performance on the Progress in International Reading Literacy Study (PIRLS).[21] As children grow older, disparities between proficient and poor readers may grow larger.[22]

Therefore, understanding the relationship between reading and later outcomes and the evidence on interventions that strengthen reading skills remains of utmost importance to the sector and policymakers alike. Section 1 of this review examines the evidence on the effect of reading on children and young people's long term educational, occupational and health outcomes. Section 2 examines the evidence on the effectiveness of approaches used to enhance reading skills. A critical discussion of the quality of the evidence is weaved into both sections. In sum, this literature review aims to review the evidence on **why reading matters**, explore **what it is about reading that matters** for children and young people's outcomes and **shine a light on what the literature has to say about aspects of Essex's Year of Reading programme.**

Methodology

Research questions

Our literature review was guided by a series of research questions:

- What does the literature say about the relationship between reading ability and outcomes in childhood, adolescence and adulthood?
- What elements of reading ability have a positive impact on children's outcomes and is there evidence to suggest that schools should be pursuing one type of reading proficiency over others?
- What do existing systematic reviews conclude about the effectiveness of approaches used in England and other countries of interest to teaching reading?
- What do existing systematic reviews conclude about the most effective approaches to supporting particular groups of learners in developing their reading ability, including pupils in different key stages, those with specific learning difficulties related to reading, pupils from disadvantaged backgrounds, and those with English as an additional language?

Search strategy

To answer these research questions, we searched the following databases to find relevant literature related to the topic of reading:

- PSYCHinfo
- Education Resources Information Centre (ERIC)
- Google Scholar

We also searched the grey literature (e.g. papers published by key voluntary or community organisations, funding organisations, and government papers) so that we could review studies that may not have been indexed on search engines. Exclusively conducting a search of the academic literature is no longer considered best practice due to increased risk of publication bias.[23] We drew on the primary search terms based on what appeared to be used most frequently when measuring reading ability in relation to other outcomes. We searched for a variety of secondary search terms to find information on outcome variables, interventions, and populations. Table 4 shows the search strings. We used the 'AND' and 'OR' Boolean operators to combine the primary and secondary search terms.

Table 4. Search terms for identification of studies

Category	Search term
Primary search terms AND	"reading" OR "reading ability" OR "reading difficulty" OR "literacy"
Outcome terms	"economic" OR "cost" OR "attainment" OR "mental health" OR "wellbeing" OR "well-being" OR "internalising" or "externalising" OR "life-expectancy" OR "life expectancy" OR "health outcomes" OR "employment" OR "lifetime"

OR	OR “Socio-economic status” OR “SES” or “Socioeconomic”
Elements of reading terms OR	“phonics” OR “synthetic systematic phonics” OR “motivation” OR “engagement” OR “enjoyment” OR “frequency”
Population terms	“Early-Years” OR “Early Years” OR “Young children”

Inclusion and exclusion criteria

We reviewed relevant literature published in the last ten years (2012 – 2022) to provide conclusions and recommendations using the most up-to-date literature. The inclusion and exclusion criteria adopted in the current search are outlined in Table 5.

Table 5. Inclusion and exclusion criteria for the literature review

Inclusion criteria	Exclusion criteria
Published since 2012	Published before 2012
Published in English	Published in languages other than English
Evidence is from high-income countries	Evidence is from middle- or low-income countries

All potentially relevant articles from the first thirty results were selected based on their title and abstract relating to the primary and secondary research questions. If full texts of these studies were accessible, we reviewed them, and papers cited in their literature reviews for relevance. We “snowballed” seminal articles and the reviews mentioned in the literature by searching the reference lists in these publications to find studies that the search engines may have missed. The evidence reviewed in this literature review was largely quantitative (including RCTs, quasi-experimental studies, correlational studies) and seldom qualitative (other reviews).

Limitations of the current review

A strength of this literature review is the fact the methodology used to identify relevant papers has been made clear and transparent. This review was never intended to be a full systematic review, but several differences warrant discussion. Firstly, the studies included in the review are of varying quality and methodological rigour as no study was excluded based on any pre-defined standard of ‘good’ evidence. Whilst there is some discussion on the quality of the evidence, caution is therefore urged as findings of any individual paper should be considered in light of the methodology used. Our strict inclusion criteria that any study had to published in the last 10 years was intentional and typical in reviews so that the latest policy and practices are reflected upon. However, this may mean that seminal papers that may be of interest to readers were not covered.

Results

Section 1: The importance of reading

Primary research question

- What does the literature say about the relationship between reading ability and outcomes in childhood and adolescence (educational attainment, social and emotional development, mental health and wellbeing), and adulthood (employment, earnings, mental health and wellbeing, self-reported general health)?

Secondary research question

- What elements of reading (e.g. reading skills such as comprehension and fluency v reading behaviour, including motivation to read, reading enjoyment and reading volume) have a positive impact on children's outcomes?

The literature covered in this review includes studies of the effects of reading ability and reading behaviour. The relationship between attitudes towards reading, reading behaviour and reading ability are well documented. [24 25 26] Secondly, **the relationship between these factors may well be reciprocal where children with greater word reading and reading comprehension ability read more, and greater print exposure leads to greater reading skills**. [27 28 29]

Educational attainment

Childhood reading ability is a significant predictor of educational attainment, and particularly secondary school completion and educational qualifications.[30 31] Using the National Child Development Study, Richie & Bates (2013) demonstrated that reading skills at age 7 were a significant, albeit small, predictor of the age at which the cohort member left full-time education. [32] This effect occurred even after controlling for a range of socio-demographic variables including childhood SES, a measure of intelligence (IQ) at age 11, and academic motivation at age 16. In addition, reading attitudes and behaviour has also been positively associated with later attainment. Cross sectional, longitudinal and meta-analytic evidence suggests that attitudes towards reading and motivations for reading are both associated with reading achievement. [33 34 35] Further, reading frequency at age 10 has also been associated with later vocabulary at age 16 and even up to age 42. [36, 37] Further, In sum, **early reading ability, behaviour and motivation appears to exert long term positive effects on educational attainment**.

Social and emotional development

Reading skills likely also serve a role in social and emotional development [38, 39] For example, Lin et al. (2013) analysed a large sample of over 9000 children in the US and found that reading ability at age 8 predicted teacher reported task management, self-control, and interpersonal skills at age 11. [40] Furthermore, evidence from Finland suggests that poorer fluency and comprehension skills

predicted bullying perpetration, both from age 12 to age 13 and age 13 to age 15.[41] The same authors also found that in a large nationally representative sample of over 17000 Finnish students, self-reported reading difficulties were also associated with being victims of bullying.[42] In addition, a review of the literature by BOP Consulting suggested that reading for enjoyment and self-development has been correlated with a greater sense of emotional intelligence, empathy, and understanding of other cultures. In sum, **correlational studies lend support to the idea that reading ability and reading behaviour is associated with a range of social and emotional skills**.

Mental health and wellbeing

Reading difficulties may pose a risk factor for the mental health of adolescents. Meta-analytic evidence suggests there are significant differences between typical and poor readers on measures of internalising problems, or 'inwardly focused' emotional problems, (*d*=.41); this effect was larger for measures of anxiety (*d*=. 41) than depression (*d*=.23). [43] Heterogeneity analysis, which provides insight on the consistency between studies included in a meta-analysis, suggested that the results were more consistent for internalising and anxiety measures than for depression. It is important to note that whilst most studies in the meta-analysis found an effect of childhood reading ability and later mental health, not all studies have found this specific relationship. For example, John, Stott & Richards (2021) found that in the British 1946 birth cohort study, reading difficulty at age 11 was associated with higher mental health symptoms in adolescence (age 13 and 15), but this did not persist into adulthood (ages 35 up to 69).[44] There is also a relationship between reading behaviour and mental health, whereby regular readers for pleasure reported lower feelings of stress and higher levels of self-esteem than non-readers. [45] The National Literacy Trust's analysis of its own data suggested that when reading ability is considered alongside other affective reading variables (e.g. attitudes towards reading), reading ability was no longer a significant predictor of mental wellbeing; they argue that this highlights the importance of not considering the effects of ability and the affective side of reading in silos. [46] Lastly, higher book ownership, which was correlated with literacy engagement, was also associated with higher mental wellbeing scores.[47] Overall, **these findings highlight an important period in adolescence when reading ability and reading behaviour may influence mental health and wellbeing.**

General health outcomes

There were a limited number of studies that investigated the relationship between literacy skills (defined as reading *and* writing) and general health outcomes. In a nationally representative sample of British adolescents, reading behaviour at age 11 was associated with a range of health-related behaviour at age 14, including increased level of fruit consumption, decreased odds of cigarette and alcohol use, but also lower levels of physical activity. [48] In adults, a literature review by the National Literacy Trust found that literacy rates were associated with life expectancy.[49] Their analysis indicated evidence of a post-code lottery, with geographic overlap in literacy and life expectancy levels. Boys who grew up in areas of low literacy rates were projected to have a life expectancy 26.1 years shorter than boys who lived in areas of high literacy rates. The gap for girls was also stark at 20.9 years. They argued the mechanism in which literacy effects life expectancy is largely through socioeconomic factors (e.g., being unemployed and earning a lower income). Low reading comprehension skills may also present a challenge for accessing medical help and

understanding medical information; two in five working age adults in England were unable to understand commonly used health material. [50] In essence, **there was limited but consistent evidence that literacy skills and reading behaviour was related to general health outcomes**.

Occupational success and employment earnings

There was some evidence that suggested that early reading ability was a small, but significant, predictor of later income, occupational status, and socioeconomic status (SES). For example, cohort studies have found childhood reading ability is associated with higher earnings in adulthood. [51] [52] [53] This effect however would reduce in size and sometimes became not statistically significant when control variables (e.g., highest attained qualification) were included in the model, suggesting labour market returns from early reading ability may be largely generated through facilitating additional higher study. Additionally, Ritchie and Bates (2013) demonstrated in a large representative sample from the UK, reading ability at age 7 had a small but significant effect on attained SES at age 42.[54] Using the National Child Development Study, attained SES reflected a latent variable made up of three measures: occupational status, housing tenure and the log of the cohort member's gross income. This effect occurred independent of childhood SES at age 7, intelligence (IQ) at age 11, academic motivation at age 16 and the age at which the cohort member left full-time education. Lastly, Smart et al. (2017) found that children with reading difficulties at age 7 were three times more likely to be in a low status job at age 23, although there were no statistically significant differences in unemployment rates. [55] Overall, **there was some evidence that reading ability was associated with adult occupational success and income**.

Critical discussion

There are several limitations of the literature exploring the effect of reading ability on long-term outcomes. Whilst correlational studies provide initial insight into understanding the relationship between reading skills and other outcomes, the scarcity of experimental studies in domains outside of educational attainment means causality is challenging to claim. For example, these associative studies cannot reveal whether reading difficulty *causes* social and emotional issues, social and emotional issues *cause* reading difficulty, or whether there is a reciprocal relationship between reading difficulties and social and emotional issues. Adding to the complexity, the relationship between reading and behavioural difficulties may be spurious and caused by a third, unaccounted-for variable that may cause both reading and behavioural difficulties whilst the two may have no causal direct effect on each other. The role of an underlying shared genetic factor or environmental factor (e.g., disadvantage, the home learning environment, neglect, or abuse) may instead cause both reading and behavioural difficulties.

The strongest of causal inferences require several conditions to be met, including random assignment, use of a matched control group to rule out alternative explanations, and consideration of baseline pre-intervention scores to assess gains in score. Intervention studies, using Randomised Control Trial (RCT) designs, are needed to resolve issues surrounding uncertainty on causality. To our best knowledge, such large scale RCT studies that have tracked the impact of childhood reading interventions on some of the outcome domains (e.g., on adult health and earnings data) do not exist.

In the studies reviewed, whilst most studies had a standardised measure of reading ability, measures of adult outcome variables (e.g., income) were self-reported, which may vary in its quality. Currently, the Education Endowment Foundation (EEF) supports linkage of data from interventions to national assessments on the National Pupil Database. However, finding effects onto domains outside of education will likely require governmental initiatives that aim to link education, health, and occupational data, and even then, may not show up as causally related. It seems likely that studies will continue to use observational, non-experimental methods and rely on self-reported measures for adult outcomes limiting our understanding of causality.

In the absence of experimental data, researchers have employed longitudinal designs to test temporal sequencing and/or careful consideration of control variables to elucidate causality. However, even when studies control for a rich array of potential confounders - e.g. prior attainment in reading ability - the validity of any conclusions derived from these studies rests on statistical techniques that *support* causal claims but cannot *confirm* them.

In sum, we see the importance of reading demonstrated by a series of studies on the relationship between reading ability and education attainment, social and emotional skills, physical and mental health, occupational success, and employment earnings. It is also clear attitudes towards reading and frequency of reading have effects on reading scores and subsequent outcomes - also shining light on why reading is important.

Section 2: Interventions and their effectiveness

Primary research question

- What do existing systematic reviews conclude about the effectiveness of approaches used in England and other countries of interest to teaching reading? Is there evidence that schools should be pursuing one type of reading proficiency over others?

Secondary research question

- What do existing evidence reviews say about the most effective approaches to supporting particular groups of learners in developing their reading ability, including pupils in different key stages, those with specific learning difficulties, pupils from disadvantaged backgrounds, and those with English as an additional language?

Effectiveness of approaches to teaching reading

Approaches to teaching reading in countries where English is the dominant language can be considered across three dimensions:[56] [57]

- **Phonics**
  - The **phonics** approach, sometimes referred to as a bottom-up approach, encourages children to learn the sounds (phonemes) associated with each letter or group of letters (graphemes). Phonics programmes are considered ***systematic*** when they teach the letter-sound correspondence in an ordered, structured sequence. In ***synthetic*** phonics, children are taught how to segment words into sounds and later combine and blend (*synthesise*) sounds together. Importantly, in synthetic phonics children do not begin by establishing sight vocabulary and are encouraged to pronounce words for themselves. This contrasts with ***analytic*** phonics in which whole words are presented, pronounced by the teacher first and then the child's attention is drawn to the sound(s) given by each letter or group of letters. In England, the government places an emphasis on a **systematic synthetic phonics** instruction.
- **Whole language**
  - The **whole language** approach encourages children to learn words on sight recognition and to be immersed in literacy through 'real' books read with or by adults. Unlike phonics instruction which has explicit instruction on letter-sound connections, children are thought to be deduce the relationship between letters and sounds naturally without formal instruction. The focus of this approach is to increase understanding of the meaning of words; children are expected to use context to understand unfamiliar words. This is also referred to as a 'top down' approach. Proponents of this approach have also argued that the English language

has irregular words in which the phonics approach can lead to inaccurate pronunciation – e.g. 'done' or 'yacht'.

- **Balanced instruction**
  - The **balanced instruction** approach to reading draws on the strengths of phonics teaching and whole language approaches. The approach attempts to carefully balance teaching based on the use of whole texts to understand print while also teaching about the letter-sound link.

England has a long history of using phonics instruction; since the turn of the century, significant events include the publication of the Rose Report that argued for the expansion of phonics instruction and the introduction of the Phonics Screening Check in 2012.[a] In 2013, the national curriculum made explicit mention of the importance of systematic phonics instruction during the first two years of formal schooling.[58] Additionally, the Department for Education (DfE) published 'The reading framework: Teaching the foundations of literacy' which places great emphasis on learning to word read through systematic synthetic phonics whilst comprehension should "be developed through their listening and speaking".[59] Once children become more adept at decoding and can read through sight recognition, they are "free to think about the meaning of what they read" and can "develop their understanding of language through their reading".[60] DfE is not overly prescriptive regarding which systematic synthetic phonics programme must be used and promotes several programmes on its website, but nonetheless state-maintained primary schools are expected to follow a systematic synthetic phonics.[61]

The use of phonics instruction is supported by several meta-analyses and systematic reviews of the international evidence that suggest this approach can be effective for improving early reading skills, especially for children with reading difficulties.[62] [63] [64] For example, McArthur et al. (2018) found that phonics training for poor readers had significant effects on reading accuracy and reading fluency.[65] Additionally, there was some evidence that phonics training improved reading comprehension, although the authors urged caution on over-interpreting the findings as some of the studies reviewed were of low quality. Research has also found that whilst phonics interventions had significant effects at the end of the intervention period, the effect size decreased at follow up.[66] The loss at follow up was greatest for phonics and fluency interventions in contrast to phonemic awareness – defined as interventions targeting awareness of the sounds that compose words – and comprehension interventions which saw larger effect sizes at follow up. There is also some quasi-experimental evidence that the staggard expansion of phonics instruction in England specifically had initial effects on attainment, particularly for children at greater risk of experiencing difficulties in reading, although this was not statistically significant by the end of primary school.[67] In sum, **whilst phonics instruction appears effective, long-term effects may diminish with the passage of time.**

It is important to note that within the phonics literature, the question of whether analytic or synthetic phonics is more effective is contentious.[68] [69] The EEF noted that whilst synthetic approaches had larger effect sizes than analytic approaches, analytic phonics had been studied in

[a] The Phonics Screening Check (PCS) is an assessment taken at the end of Year 1. It consists of 20 words and 20 pseudo-words that children are asked to read aloud to their teacher who assesses whether the child is decoding and pronouncing words correctly.

far fewer studies - potentially hindering the security (likely replicability) of this finding. Additionally, Castles, Rastle and Nation (2018) argued that the evidence base supported systematic phonics instruction but was not sufficiently strong enough to suggest that synthetic phonics was superior to analytic phonics.[70] Ideally, **singular studies alone** (e.g., the Clackmannanshire study where sample sizes across the three conditions ranged from only 78 to 117 children at the start of a 7-year study and of note has been previously cited in DfE's reading framework) **ought not to be used to guide national policies on which approach should be implemented.** Large-scale replications with close attention paid to statistical power (which would also enable meaningful study of sub-group differences) are ideally required to determine which implementation of phonics (e.g., synthetic or analytic phonics) is most effective.

The landmark pieces of research that have been cited in support of phonics instruction and earlier seminal work, such as the National Reading Panel report in the USA and the Rose Report in the UK, have been met with criticism. For example, Wyse & Bradberry (2020) argue that countries that opt for whole language approaches have fared better on PISA reading achievement than countries that have opted for phonics instruction. However, their methodology for associating approaches to reading instruction with PISA achievement has come under scrutiny. [71] Key points of disagreement also include the categorisation of interventions as 'phonics', 'whole language' and 'balanced' approaches, whether interventions should even attempt to isolate each component of reading, and whether current provision in school actually separates them and teaches phonics in isolation.

Torgerson et al. (2019) note that whilst the evidence supports phonics instructions, this does not justify a 'phonics only' approach.[72] **It is currently unclear to what extent, if any, such a dichotomy exists where practice reflects a 'phonics only' approach.** It is unlikely that reading instruction through phonics occurs in the absence of *any* other opportunities designed to support reading comprehension skills. Previous research investigating practice in schools has attracted criticism for convenience sampling method and representativeness of its sample.[73] [74] [75] **Exploring practices that are used simultaneously and in addition to the synthetic phonics instruction in a nationally representative sample may be an avenue for future research.** Nonetheless, for this reason, concerns about whether improvements in performance in international comparisons can be *strictly* attributable to phonics instruction in the absence of *any* other instructional method used in conjunction within schools are justified.

As with all meta-analyses, they are only as good as the criteria used for inclusion and quality of the studies that are analysed. One of Bowers (2020) critique of the evidence base used to justify the proliferation of phonics instruction (namely the National Reading Panel) in the USA revolves around the fact that researchers making different analysis decisions (e.g., only including studies of the highest methodological rigour) can change the average effect size. This becomes an issue if effect sizes become smaller or not statistically significant when 'research' is supposedly driving policy decision making. Part of this issue may reflect strict word counts set by academic journals which limit the information that can be presented - although academic journals do now increasingly offer spaces for supplementary materials where additional analysis can be placed. Part of this issue can also be fixed with being transparent about decision making, sharing data and pre-registering analysis plans with justification. Greater use of sensitivity analysis to declare how

different research decisions can impact results may be useful – e.g. see Rodge et al. (2019) for an example of using sensitivity analysis. [76] Even still, categorising the final average effect size as small, medium, and large and consequently 'meaningful' is a clear source of contention. Therefore, **consistency in interpreting effect sizes by researchers within the reading intervention literature is needed.**

Whether phonics instruction is *more* effective than alternative methods is also controversial. Bowers (2020) argues that the control conditions are often poorly defined and will either include a mixture of non-systematic phonics, but still phonics, instruction or no phonics instruction at all. Such use of controls could speak to the effectiveness of systematic phonics over other types of phonics instruction or no phonics instruction but would not speak to whether phonics instruction is *more* effective than other approaches. **Ideally, the strongest of causal inferences would require sufficiently powered randomised control trials that considers baseline scores and compares a phonics intervention (e.g. systematic synthetic phonics approach) to an active control group (e.g. a different reading instruction approach) and appropriate passive control group.** This research design would be better positioned to answer the question of which approach is *more* effective.

The EEF cancelled the evaluation of the efficacy trial of the Read, Write Inc Phonics Programme, a popular phonics instruction programme used in over 8000 schools for young children,[77] due to COVID-19-related challenges of recruitment and cancellation of national testing.[78] **The government could consider re-running a large scale phonics RCT in the wake of the pandemic with an appropriate active and passive control group.** One of the programmes from the government list of 'validated' systematic synthetic phonics programmes could be used as the intervention phonics programme.[79] Although RCTs in education typically now contain an intervention and a passive control group, in the absence of an active control group it is difficult to ascertain whether the cause of intervention effects is unique to the intervention over and beyond the introduction of new resources and additional training. Put simply, it provides limited information about the components of the intervention that may be the *most* effective.

A 'good' active control group would equate the introduction of new resources and additional training experienced during the intervention period. As such, the active control group would need to be closely matched on engagement and challenge so that improvements are not driven through motivational differences between the groups. Whilst there will still be some departures from the 'gold standard of evidence', as schools or children may not be truly blind to the condition they have been allocated to, some researchers have argued that the only way to equate the effect of expectations between the groups is to measure and statistically control for those expectations.

Two challenges remain. Firstly, the selection of which instruction should be used to form the control groups. Morris et al. (2012) used four categories, leaving only approximately 68-73 participants in each of the four groups but the study provides a springboard for understanding what active control groups may look like.[80] Any future re-runs of a phonics trial must carefully consider what a passive, 'business-as-usual', control group may look like given that all state-maintained primary schools are now expected to follow a systematic synthetic phonics programme.[81] Secondly, the practicalities of conducting research in education using such strict experimental criteria must also be considered. For example, any new study would need to

consider how to rule out the potential role of beliefs and expectations on outcomes. Further, not all interventions are restricted to just one approach of instruction and the meticulous unpacking of components may result in too small of a meaningful effect size.[82] Consideration must also be given to study how to best incentive and support schools in implementing interventions. In the EEF 'Fresh Start' phonics trial, 35 per cent of schools in the intervention group chose not to deliver the programme.[83] Barriers to implementation included limited staff capacity and lack of comprehensive training material. Nonetheless, such designs may help us better understand the role of each component of reading and the *most* effective method of instruction.

It is also important to note that the academic literature has recently come under scrutiny over questionable research practises (e.g., selectively reporting only statistically significant outcomes but not all outcome measures) and publication bias (e.g. where non-significant or contrary findings are less likely to get published). This is pertinent as publication bias has been noted in *some* meta-analysis of the reading intervention literature.[84] For stronger robustness, any new trails should be pre-registered to help prevent biases in analytic decision making. The EEF currently publishes study protocols and analytic plans of its evaluations, which are updated as required, and the academic literature is making better use of pre-registrating analysis plans and journals have started to publish some papers (i.e., registered reports) regardless of the 'flashiness' of the findings to curb questionable research practises and publication bias. This will hopefully help increase the security of the findings.

If policy makers are serious about using robust evidence-based policy making, then all aspects of any proposed system should be evidence based – including making clear what does not work. In sum, phonics instruction appears to be a valuable method of teaching children to read but may benefit from being subject to an up-to-date, large scale RCT with an appropriate active and passive control group to confirm its effectiveness.

Should schools pursue one type of reading proficiency over another?

The question on whether schools should pursue one type of reading proficiency over others, cannot be answered without considering the child's stage of development. As mentioned in the introduction, reading comprehension is largely thought to be the product of word reading (decoding) skills *and* language comprehension skills.[85] Importantly, these skills are intertwined and neither alone are sufficient in the 'Simple View of Reading'.[86] Whilst word reading (decoding) and language comprehension skills remain important, as children become older the relative contributions of decoding and language comprehension skills to reading comprehension change. **Early on, for typically developing readers, reading comprehension is constrained by variation in decoding skills but as children get older and master their decoding skills, language comprehension becomes more important for reading comprehension skills**[87] [88] This changing role is reflected in the English national curriculum where children in year 3 become encouraged to apply their growing knowledge of morphological language skills.[89] However, the evidence base for any precise and optimal timing of which specific year aspects of language (e.g. morphology) should be introduced is unclear. Reading fluency, which can refer to the degree of automaticity of decoding skills, is developed as children become proficient decoders and accumulate print knowledge through reading experience.[90] However, **for children with poor decoding skills**, **their decoding skills may act as a barrier for the development of reading**

skills and so interventions targeting decoding (e.g. linking letters to sound) may be more appropriate; for children who can read but not understand what they are reading, a focus on supporting language comprehension skills is imperative.[91 92]

As reviewed above, systematic reviews and meta-analyses suggest phonics instruction as important for children's reading ability, although long-term effectiveness diminishes with time.[93, 94, 95, 96] There is also some evidence that parents can support the development of language comprehension skills, such as through shared book reading activities, long before formal instruction in school. [97 98] Whilst some language interventions have been found to improve language skills, findings from meta-analyses on transfer effects to reading are mixed. [99 100 101 102] Conclusions of meta-analyses may differ as a result of different inclusion criteria. For example, Silverman et al. (2020)'s meta-analysis only analysed language interventions in the USA for children in kindergarten (age 3) to grade 5 (age 11) whereas Rogde et al. (2019) meta-analysis considered interventions up to secondary school. Furthermore, significant effect sizes were seen on custom made, researcher-developed outcome measures but not on standardised outcome measures.[103] In terms of observing effects on reading comprehension at follow up, Silverman et al. (2020) argued that significant effects can be found; however, this was based on only two studies. Rodge et al. (2019) also noted few studies have reported follow-up effects on reading comprehension skills, with inconsistent findings. Some researchers have opted for re-administering the post-intervention test, but this may be time-consuming and costly. Alternatively, some researchers have collected data from national assessments to act as the long term, follow up measure. Nonetheless, **it is important that more interventions are also designed with longer follow up assessments to build the evidence base.**

Despite the longitudinal evidence detailing the contributions of decoding skills and language comprehension on reading comprehension, when subject to an RCT design, interventions have not always been successful for long-term reading comprehension outcomes. Several reasons may explain why interventions fail to produce effects at follow up. This may highlight gaps in our understanding of developing interventions and subjecting them to RCTs (e.g., lack of statistical power associated with small sample sizes and attrition at follow up, too limited of a time frame during which the intervention occurred, inappropriate measures, fidelity and/or implementation issues etc.) or may suggest that relying on early intervention is not enough and that remediating reading comprehension difficulties requires on-going intervention.

Alternatively, focusing solely on improving a child's reading ability without addressing the underlying, potentially causal, factors unaddressed by intervention (e.g., disadvantage, the home literacy environment, general learning difficulties, abuse, or neglect) may lead to diminishing effects of any intervention. The government has acknowledged the role of support outside the classroom in the white paper, Opportunities for All, with efforts made to expand the Supporting Families programme that intends to improve the lives of 300,000 disadvantaged families.[104] In the interim, **schools must remain vigilant and ensure that children's progress is closely monitored for diminishing effects of decoding or language comprehension interventions**.

Supporting particular groups of learners in developing their reading ability

Interventions can vary based on how they are delivered (e.g., tutoring, CPD for teachers) or by content domain (e.g., targeting certain skills such as decoding or comprehension). Our search yielded reviews that were primarily focused on instructional methods for supporting particular groups of learners rather than content domains. It is also important to note that Torgerson et al. (2019) warned **that in the content domain of phonics, even with large, randomised control trials, studies were not currently sufficiently statistically powered to study meaningful subgroup differences**.[105] With this limitation in mind, we take this opportunity to reflect on what future large scale randomised control trials may look like for learning purposes.

- Pupils in different key stages
    - This literature so far has reviewed interventions centred around primary school aged children in detail. In secondary school, programmes that use **tutoring** frameworks (one-to-one or in small groups), **cooperative learning (having children work in small, mixed ability groups), whole school approaches with an emphasis on school organisation,** and a **focus on writing instruction** were associated with positive reading outcomes. [106]
- Children with special educational needs
    - Dietrichson et al. (2021) found that for children with or at risk of academic difficulties, **two instructional methods – peer-assisted instruction and small-group instruction by adults – had robust statistically significant effects on standardised assessments of reading**. [107] They also concluded that there was little evidence that effects were larger in some content domains than others.
- Pupils from disadvantaged backgrounds
    - Dietrichson et al. (2017) conducted a systematic review and meta-analysis of interventions for children from disadvantaged backgrounds on improving standardised assessments in mathematics or reading. [108] They found that **tutoring, feedback and progress monitoring, and cooperating learning** had the largest effect sizes, but noted that the effect sizes would likely only reduce the disadvantage gap, not close it.
- English as an additional language (EAL)
    - Murphy and Unthiah (2015) conducted a systematic review of specific interventions focused on language and literacy development in children with EAL. [109] They found that for **struggling word readers, interventions aimed at decoding skills** were found to be effective. However, **for typical word readers**, as the evidence suggests that children with EAL can have typical decoding skills but lack the language (particularly vocabulary) comprehension skills, **large scale replications of RCTs focused on language comprehension may be worthwhile**. Interventions targeting teacher training and the role of parents were limited in quantity and mixed in findings. Lastly, authors found that the evidence base was largely US based and aimed at primary school pupils and so suggested a need to develop an intervention targeting early and late secondary school EAL pupils in the UK and subject it to a rigorous RCT design.

In sum, **tutoring** and **cooperative learning** appear as promising instructional methods for future interventions. In the descriptions of interventions, descriptions were sometimes vague, and

interventions sometimes targeted more than one content domain, making it difficult to isolate the unique contribution any single content domain made. The components (e.g. phonics instruction) of reading interventions may vary in intensity and length across interventions which was not always disclosed, adding to the complexity. The question of which interventions, which combinations of interventions and which components of reading interventions should target are most effective remains unclear for certain groups of learners. There is a clear **need to construct large-scale randomised control trials that considers the complexities of recruitment and retention of samples, whether models from typically developing readers apply, and the barriers to successful intervention.** There is also a **need for a greater understanding on the long-term effects of interventions** and a better **understanding of why some interventions work** better in some contexts compared to others. Lastly, **careful consideration must also be given to the out-of-school drivers of disparities in reading ability in vulnerable children**.

Conclusion

There is clear evidence that early reading comprehension skills are associated with long-term healthy development. The effects of reading skills have been observed on educational attainment, social and emotional skills, physical and mental health, occupational success, and employment earnings.

The main approach to teaching word reading in England, systematic synthetic phonics instruction, is supported by evidence on its impact on early reading skills. However, the role of language comprehension skills should not be neglected, especially as children refine their word reading skills and language comprehension becomes more important. More research is required on how we can sustain the long-term effects of word reading and language comprehension interventions.

Additionally, more research is required into how we can best support the development of these skills in groups of children at risk of poorer academic outcomes, as well as the relative importance of out-of-school drivers of reading skills. The progress in closing the disadvantage gap in education has stalled and, since the Covid-19 pandemic, this gap is now widening. [110] If policy makers are serious about addressing the growing inequalities in education outcomes, a focus on improving reading skills is imperative.

Policy recommendations

Based on our review of the literature, it is clear that:

- The government and/or local authorities should **commission research exploring approaches to reading instruction used in schools in addition to synthetic phonics instruction** to help policymakers and educators better understand which components of reading instruction are most effective.
- The government and/or local authorities could **consider a randomised control trial with a synthetic phonics instruction as the intervention group, and an appropriate active and passive control group,** to better understand whether phonics instruction is *more* effective than other approaches.
- In general, **evaluations of interventions with longer follow-up periods are required** to, first, build the evidence base on the long-term effects of interventions, and, second, to consider how we can best extend the long-term effects of interventions that target word reading and language comprehension skills.
- Schools should **monitor pupils' progress for diminishing effects of decoding or language comprehension interventions**.
- More **research is required into how we can best support the development of reading skills in vulnerable pupils**. Tutoring and cooperative learning appear as promising instructional methods for vulnerable children. However, the specific interventions and combinations of interventions that are effective, as well as the components of reading comprehension these interventions should be targeting, remains unclear for certain at-risk groups of learners. The government should first fund more **efficacy trials that consider**

the complexities of recruitment and retention of samples of vulnerable children to better understand whether models from typically developing readers apply and the barriers to successful intervention for these groups.

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