



EARLY
INTERVENTION
FOUNDATION

TEACHING, PEDAGOGY AND PRACTICE IN EARLY YEARS CHILDCARE: AN EVIDENCE REVIEW

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Contents

Foreword	5
Summary	7
Context for the review	7
Methodology	8
Headline findings	8
Findings on language and literacy outcomes	9
Findings on numeracy or mathematics outcomes.....	10
Findings on other cognitive outcomes	10
Findings on socio-emotional outcomes	10
Findings on physical outcomes	11
Recommendations for future research	11
Abbreviations	13
1. Introduction	15
1.1 Background to the review	15
1.2 English policy context	15
1.3 Theories of child development and their relationship to policies and practice	17
1.4 The evidence suggests that process quality has an impact on children’s outcomes	19
2. Methodology: systematic rapid evidence assessment	25
2.1 Research aims, objectives and questions of the REA.....	25
2.2 REA inclusion/exclusion criteria and overview of search results	26
3. Overview of key findings	27
3.1 Overview of the included studies.....	27
3.2 Overview of the teaching, pedagogy and practices covered	27
3.3 Overview of children’s outcomes.....	30
4. Impact of early years practices on language and literacy outcomes	32
4.1 Headline findings	32
4.2 Summary of evidence	32
5. Impact of early years practices on numeracy or mathematics outcomes	35
5.1 Headline findings	35
5.2 Summary of evidence	35

6. Impact of early years practices on other cognitive outcomes.....	38
6.1 Headline findings	38
6.1 Summary of evidence	38
7. Impact of early years practices on socio-emotional outcomes	41
7.1 Headline findings	41
7.2 Summary of evidence	41
8. Impact of early years practices on physical outcomes.....	44
8.1 Headline findings	44
8.2 Summary of evidence	44
9. Discussion	46
9.1 Strengths and limitations	46
9.2 Future research needed to strengthen the evidence base	47
References.....	49

Foreword

The early years of a child's life is a period of rapid and profound change. The potential of early childhood education and care (ECEC) to support child development, in particular that of children from a disadvantaged background, has long been recognised. In the UK, the Effective Pre-School, Primary and Secondary Education project (EPPSE) provides some indication that high-quality ECEC is associated with long-term improvements in outcomes, with particularly strong long-run effects for children with parents who have lower levels of qualifications.¹

The body of research into ECEC is broad and deep, drawing on multiple academic fields and philosophical schools of thought, and using a wide range of research methods. While an obvious strength, this richness and diversity can make the evidence base difficult to access, and challenging, especially for non-experts, to discern the strength of the evidence that underpins various claims. With this in mind we set out to produce a clear and accessible overview of the literature on effective pedagogy and practice, focusing on studies with high-quality empirical evidence of impact.

We believe this report is the first of its kind, and we have reviewed over 100 studies from the last 10 years which have used rigorous methods to assess impact. The majority of these studies come from the US, focus on children over the age of 3, and do not analyse the differential impact on disadvantaged groups or long-term impacts. This limits the generalisability of these findings to the UK and their applicability to the government's agenda on improving social mobility by reducing the social gradient of educational outcomes, and we make specific recommendations on research to address this.

However, our aim is to go beyond this and make recommendations which influence policy and practice directly, although the limitations of the evidence base makes this challenging. This is principally because most studies do not test specific pedagogical practices in isolation, and so do not allow us to easily identify the 'active ingredients' which make them work, limiting our ability to say with certainty what specific pedagogical practices have been shown to work. Nevertheless, this report adds to our knowledge of the wider literature on early years and child development, allowing us to make recommendations about the areas which show promise in terms of supporting the development of children from disadvantaged backgrounds.

Disadvantaged children underperform educationally partly because on average they experience more risk factors, including poor parenting and home learning environments which impede their cognitive development. If the intention is that ECEC is to at least partially compensate for this, then in our view there are important principles to bear in mind:

- **Interventions which seek to address multiple causes of educational underperformance for disadvantaged children may have a better chance of success.** EIF concludes in the forthcoming report on early childhood competencies² that two-generation models of ECEC, supporting both parent and child, are a promising way of improving outcomes for disadvantaged

1 A compendium of reports, abstracts, briefs and papers can be found at <http://www.ucl.ac.uk/ioe/research/featured-research/effective-pre-school-primary-secondary-education-project/publications>

2 Key competencies in early cognitive development: Objects, people, numbers and words (forthcoming).

children, as they address multiple risk factors. Although the impact on parents and parenting behaviours has not been extensively evaluated to date, two-generation models that combine support for parents with enriching childcare for children seem well placed to enhance development. Such models provide stimulating and high-quality ECEC for children, and help parents to better engage with children's development. Head Start is a prominent example of a two-generational model. Our review shows that there are high-quality studies that evaluated Head Start, suggesting that **a broad and holistic approach which combines delivery by well-qualified individuals with active screening and monitoring of children's progress can improve long-term outcomes for disadvantaged children.**

- **The calibre of ECEC professionals likely matters.** The skills of early years professionals are usually considered an element of structural quality, and so outside the scope of our review, but higher pre-service qualifications and in-service training have been found to be associated with the provision of higher-quality and stimulating ECEC activities (OECD, 2018). While further evaluation is needed of the relative benefits of using graduates or teachers to deliver ECEC and of the optimal level and type of in-service training in the UK context, **there is reason to think that a greater focus on the skills of professionals could be a mechanism to deliver improvements in outcomes for disadvantaged children.**

Our review offers a significant contribution to the field of what works in early years pedagogy and practice. Based on our findings we are able to make specific recommendations about what research is needed to significantly improve the evidence base in the UK. In this foreword, we also make recommendations about the ECEC workforce which draw from our knowledge beyond the review, but we feel if properly evaluated could make a significant contribution to the evidence on what works to improve educational outcomes for those born into disadvantaged circumstances.

Tom McBride and Julie Bélanger

August 2018

Summary

Context for the review

The Early Intervention Foundation (EIF) is conducting a new programme of work, exploring the impact of early years childcare and education on children's outcomes. This new work focusses particularly on children at risk of falling behind their peers, in terms of key developmental milestones, at an early age. As part of this programme of work, the EIF has partnered with RAND Europe to produce a review of teaching and practice in childcare settings. The purpose of the review is to identify those areas of early years childcare practice that are well evidenced and where the main evidence gaps are, providing an accessible overview of the research in the field for policy-makers and practitioners. Given the scale of investment in early childhood education and care in England, the amount of time that children spend in childcare and the government's ambition to use childcare to improve social mobility, it is vital to understand what practitioners can do to maximise outcomes for children.

There is good evidence to suggest that attending high-quality childcare can improve many different outcomes: the benefits of quality early education and childcare range from ensuring children's healthy cognitive, behavioural, social and physical development and laying the foundation for later outcomes (see Sylva et al., 2014; Melhuish et al., 2015), to wider economic benefits in the short and long term (see Naudeau et al., 2010). But unpacking what quality early education and childcare is and what its specific impacts are (in which context and for whom) is no easy task.

The field of child development can appear complex and fragmented, with a wide range of theories continually being revised. How these theories translate into direct practice varies considerably as approaches have developed. There is also a wide range of research and evaluative techniques deployed in this area, and no consistent view across the sector on what counts as good-quality evidence. This can make it particularly challenging for those who are not well versed in the literature to engage with it and distinguish evidence on what works from theory.

Process quality factors refer to children's daily experiences and the interactions between early education staff, children and parents, such as pedagogical quality, cognitive stimulation, emotional care and support. Despite the recognition of the importance of process quality to outcomes of early childcare and the proliferation of multiple schools of thought as to how children learn and the best ways to support this, strong empirical evidence to support policy initiatives is lacking. While there is a rich body of observational literature that captures the characteristics of best practice, the strength of conclusions we can draw is limited by the representativeness of the samples often used and lack of strong counterfactuals or comparison groups, and that self-report or practitioners' perceptions are often used as measures of effective pedagogy. This review fills an important gap in the current literature as it offers a first attempt at using systematic methods to identify those interventions that have been robustly tested and to also identify areas in the literature where significant evidence gaps remain.

Methodology

RAND Europe conducted a rapid evidence assessment (REA) of the evidence on effective early years practice that improves early education outcomes. The review focused on studies that used high-quality experimental and quasi-experimental designs that directly examined the effectiveness of practices or programmes on a range of child outcomes including language and literacy, numeracy, other cognitive outcomes (such as cognitive flexibility, attention, problem-solving skills, motivation, creativity), socio-emotional, and physical outcomes. The review also identified and included relevant systematic reviews and meta-analyses. For each high-level group of outcomes, we present the types of interventions evaluated, the specific outcomes assessed, the level of impact observed, as well as notable gaps in the evidence reviewed.

A systematic search of the literature identified over 7,000 articles. Following a rigorous selection process, 108 studies were retained for detailed review, reflecting the impact of 83 specific programmes or practices. As well as noting basic information about these studies, including their methodology, and the practice/programme/intervention in question, we examined the studies to understand at what level the intervention was implemented (that is, whether the intervention involved changes at the teacher, setting or curriculum level), whether the intervention was beneficial for children, and if so, how long effects lasted, and whether interventions benefited all children equally, or if certain groups of children benefited more than others.

Headline findings

The high-quality studies included in this review (systematic reviews, meta-analyses or counterfactual studies) **provide robust evidence on the effectiveness of programmes or interventions** in terms of improvements to children's outcomes in early years childcare.

Overall, the studies reported favourable outcomes for children who were attending the examined programmes, across the domains of language and literacy, mathematics, cognitive, socio-emotional and physical outcomes.

However, **the literature reviewed did not allow for a more fine-grained assessment of the specific pedagogical practices** that work for improving outcomes. This is in part a result of the design of existing studies and in part a result of the lack of details about the programmes in the publications reviewed. In particular, many studies lacked detailed descriptions of the programmes they were examining, lacked controlled comparisons of the different components of the programmes, or lacked measures of fidelity of implementation of the programmes. This makes it difficult to draw firm conclusions about whether there are particular aspects of programmes that are more effective for children and to assess whether programmes adhered to these prescriptions or whether they lacked fidelity to the intended programme.

While our report highlights specific programmes that have been shown to 'work' at improving specific outcomes, **the majority of the studies reviewed were conducted in the US**, with a very small number carried out in Europe and elsewhere. This severely limits the potential generalisability of the existing findings to contexts such as England. Furthermore, **there was also a lack of evidence on the replicability and generalisability of the programmes**, with the exception of Head Start, a programme of the United States Department of Health and Human Services that uses a holistic approach to education and aims to improve the school

readiness of children from low-income families. Head Start was the focus of several studies conducted in the US. Additionally, most studies focused on children aged 3 years and over, meaning that the evidence of what works for younger children is limited.

The most frequently tested outcome domain was language and literacy, with findings against this outcome being reported in around half of all the studies included. We do not know whether this reflects that there are more programmes targeted at improving this specific outcome or whether these outcomes are more readily tested or amenable to testing in the early years. Most of the studies examined more than one outcome for children; indeed, many examined a battery of outcomes, even sometimes including outcomes that did not seem directly related to the stated goal of the programmes being implemented.

There was, however, limited evidence reported on programmes that had longer-term impacts, and programmes that might benefit at-risk groups of children more. Although many programmes were targeted at disadvantaged children, few studies tested variation in the impacts for different groups of children. Therefore, it is not possible to conclude whether particular programmes or interventions might be more effective for certain groups. These represent further important gaps in the literature. Similarly, few studies compared the impacts of programmes across different groups of children, including younger children below the age of 3.

Below, we provide more details on the findings for each category of outcomes.

Findings on language and literacy outcomes

The largest number of studies fell into this category: 53 studies and seven systematic reviews or meta-analyses were identified in the review as reporting on language and literacy outcomes. Studies examined a wide range of language and literacy outcomes, including general language and literacy performance, oral language, listening, reading, vocabulary and writing. The headline findings from these studies include:

- The studies examined 42 programmes implemented at different levels, although the programme most commonly evaluated was Head Start, which is based in the US.
- Many but not all of the programmes targeted children's language and literacy outcomes.
- The studies mostly examined children aged over 3 years and living in the US.
- The majority of studies found that programmes had a favourable and moderate impact on language and literacy outcomes, although it is unclear if impacts are maintained in the longer term.
- However, findings on Head Start suggest that it has positive impacts on general literacy, reading, vocabulary and writing skills, some of which last several years.
- It was not possible to ascertain if certain programmes may work better for at-risk children because of the small number of studies that examined this, although Head Start may improve the reading ability of children who do not speak the majority language.
- Although many studies included in this REA reported on language and literacy outcomes, overall the evidence is insufficiently detailed to determine if impacts may differ between children from different backgrounds and whether impacts are maintained in the longer term. The most robust findings are for Head Start, which may not be generalisable to a UK context.

Findings on numeracy or mathematics outcomes

A sizable number of studies examined numeracy or mathematics outcomes: the review identified 21 studies and two meta-analyses that examined these types of outcomes. The headline findings from these studies include:

- The studies examined 17 programmes, the majority of which were implemented at multiple levels. Early Learning in Mathematics and Building Blocks were the most commonly studied programmes.
- Programmes ranged from those aimed at improving numeracy or mathematics outcomes to those targeting a broader range of developmental outcomes.
- Most of the studies examined children who were at least 3 years old and living in the US.
- The meta-analyses and the majority of studies found that programmes had a positive impact on numeracy or mathematics outcomes and promising longer-term effects.
- There are initial promising findings on programmes that may offer greater benefits to children at risk, but more research should be done to confirm this.

Findings on other cognitive outcomes

The review found 20 studies measuring cognitive outcomes other than language, literacy and mathematics. Outcomes related to cognitive ability or flexibility, which includes measures on scientific creativity and originality, problem-solving ability, attention and science knowledge were represented in this group. The headline findings from these studies include:

- Of the 13 programmes examined, Head Start programmes were the most common. The majority of the programmes were implemented at the curriculum and teacher level.
- The majority of the programmes focused on language, mathematics and socio-emotional development rather than other cognitive outcomes.
- The majority of studies examined children aged over 3 years and living in the US, though two studies included younger children.
- The majority of programmes were found to have positive impacts for children, though five studies found no impact. The gains in learning engagement, attention and executive function children experienced after attending Head Start REDI (Research-Based, Developmentally Informed) were maintained in primary school.
- There is limited evidence on which to draw conclusions about which programmes may be most beneficial to children at risk, though a small number of Head Start studies suggest that this programme may be particularly beneficial for some subgroups of children.
- Many of the studies reviewed suffered from some methodological limitations (such as imbalance between comparison groups or systematic attrition problems) which may affect the interpretation of findings.

Findings on socio-emotional outcomes

The review identified 35 studies and four systematic reviews or meta-analyses reporting on children's socio-emotional outcomes. The headline findings from these studies include:

- Twenty-five different programmes were included in the review. Almost one-third of the studies investigated programmes related to Head Start. The

majority of programmes were implemented at the curriculum and setting or teacher level.

- Many programmes targeted children’s socio-emotional outcomes, although a number of programmes focused on language and literacy, and mathematics.
- Most of the studies examined children who were at least 3 years old and living in the US.
- Studies generally found that programmes had a positive and moderate impact for children. There is limited evidence on whether effects are maintained, although Head Start and related programmes show promise.
- There is insufficient evidence to determine which programmes may work better for children at risk.
- It is not possible to ascertain if the positive impacts seen for programmes are genuine or reflects publication bias.

Findings on physical outcomes

Fewer studies fell in this general category: Only seven studies and one meta-analysis were identified in this review as reporting on physical outcomes. The headline findings from these studies include:

- The studies examined five programmes implemented at different levels. Three studies examined programmes related to Head Start, and the meta-analysis focused on the TEACCH (Treatment and Education of Autistic and Related Communication Handicapped Children) intervention programme.
- About half the programmes studied aimed at improving children’s physical outcomes.
- Almost all studies included children aged at least 3 years and living in the US.
- Most programmes except Active Play demonstrated small to moderate positive effects on children’s physical outcomes.
- There is very limited evidence on which programmes may work better for children at risk.
- The overall body of evidence on programmes that impact children’s physical outcomes is small, and more research needs to be done on what programmes might be effective and for which groups of children.

Recommendations for future research

The volume of articles identified by the initial search illustrates the scale and breadth of the research conducted in this area – and underscores the challenge faced with distilling clear recommendations. As mentioned above, this review suggests that many programmes and interventions have shown favourable outcomes for children across many domains. However, the literature reviewed does not allow for a more fine-grained assessment of the *specific* pedagogical practices that work for improving outcomes. Further, a number of limitations in the literature highlighted above suggest a great need for future research to inform policy and practice. Specifically, this review suggests the following important gaps.

More rigorous research into the effectiveness of programmes in England is needed. Knowing that a programme or practice has been shown to be effective is a good starting point. But given that the majority of the studies reviewed were conducted in the US, this severely limits the generalisability of the existing findings to England. There is increasing consensus in the prevention and implementation science field on the challenges of importing programmes developed overseas,

specifically: the need to carefully consider the fit with the local context; to make appropriate adaptations while maintaining fidelity with the core elements of the original programme; and, to rigorously evaluate to see if findings are replicated (Durlack et al., 2008; Ferrer-Wreder et al., 2012; Wang et al., 2005).

Future research should provide sufficient details on implementation.

Disentangling the core aspects of early childhood provision and process quality that are involved in promoting equity in developmental opportunities should be a priority in future research. This is only possible if researchers are able to assess in more detail the variation across programmes and how they were implemented.

More research is needed for children below the age of 3, and children at risk.

There is relatively little research that examines the specific impact of interventions and programmes on children below the age of 3 years and on at-risk groups of children. The relative scarcity of studies investigating these areas means that policy-makers and practitioners are not able to focus their attention on children at greatest risk of falling behind their peers in terms of key developmental milestones. In particular, further evidence on the impact of specific practices for children under the age of 3 would be very relevant to help maximise the impact of government's disadvantaged 2-year-old free childcare offer.

A greater focus is needed on assessing the possible sustained impacts of programmes. Notwithstanding the logistical difficulties in conducting longitudinal studies with children across age groups and settings, future studies should prioritise conducting more follow-up measurements with children over longer periods of time. Without such evidence, policy-makers and practitioners are not able to focus their attention on programmes with the longest impacts.

There is an opportunity to develop research focusing on key areas of early years teaching and practice. There are a range of pedagogical practices and principles – such as scaffolding and child-centred learning – which are widely accepted as being part of effective early years education. However, we found few studies that considered the impact of these practices in isolation. Given the increased focus in the UK in recent years on piloting and trialling interventions in the early years, there is an opportunity to design, pilot and evaluate interventions that build practitioners' skills in these areas in order to assess whether it is possible to codify and improve practice and if such a change leads to improvements in children's outcomes.

Work should be done to disentangle the common elements across the most effective interventions. As noted, the studies identified through this review provide few examples where individual elements of programmes have been tested for effectiveness in isolation. However, it would be possible to take a more forensic look at the content of interventions, going beyond the peer-reviewed literature and to systematically identify common processes and practices deployed by the most effective programmes.

Abbreviations

AAC	Augmentative and Alternative Communication
ABRACADABRA	A Balanced Reading Approach for Children Designed to Achieve Best Results for All.
ABS	Abstract
AOL	Academic Oral Language
CAP	Community Action Project
CDSR	The Cochrane Database of Systematic Reviews
CENTRAL	Cochrane Central Register of Controlled Trials
CL	Cooperative Learning
COMP	Classroom Organization and Management Program
DfE	Department for Education
EAL	English as an additional language
ECCE	Early childhood care and education
ECE	Early childhood education
ECEC	Early Childhood Education and Care
ECHOS	Early Childhood Hands-On Science
EEF	Education Endowment Foundation
EF	Executive Function
EIF	Early Intervention Foundation
ELM	Early Learning in Mathematics
EMT	Enhanced Milieu Teaching
EPIC	European Platform for Investing in Children
EPPE	Effective Provision of Pre-School Education
EPPSE	Effective Pre-school, Primary and Secondary Education
ERIC	Educational Resources Information Center
ESL	English as a second language
EYFS	Early Years Foundation Stage
FCR–STEM	Foundations for Success – Science, Technology, Engineering and Maths
FSCT	Figural Scientific Creativity Test
GCSE	The General Certificate of Secondary Education
Head Start CARES	Head Start Classroom-based Approaches and Resources for Emotion and Social skill Promotion
Head Start REDI	Head Start Research-Based, Developmentally Informed
Head Start REDI-C	Head Start Research-Based, Developmentally Informed Classroom
ISCED	The International Standard Classification of Education
INSIGHTS	INSIGHTS Into Children’s Temperament (INSIGHTS)

IY-TCM	Incredible Years Teacher Classroom Management
K-PAVE	Kindergarten PAVED for Success programme
LEAP	Language Education Activities for Preschoolers
LELP	Literacy Express Preschool Curriculum
MFAS–CCSC	Maths Formative Assessment System – Common Core State Standards
NELI	Nuffield Early Language Intervention
NHT	Number Heads Together
NSB	Number Sense Brief
OWL	Opening the World of Learning
PATHS	Promoting Alternative Thinking Strategies
PBL	Problem Based Learning
PBS	Public Broadcasting Service
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RAILS	Reading and Integrated Literacy Strategies
RCT	Randomised control trial
REA	Rapid evidence assessment
SAT	Stanford Achievement Test
SEAL	Social and emotional aspects of learning
SEL	Social and emotional learning
SEN	Special educational needs
SES	Socioeconomic status
SESAT	Stanford Early School Achievement Test
TEACHH	Treatment and Education of Autistic and Related Communication Handicapped Children
TEMA	Test of Early Mathematical Ability
TPS	Tulsa Public Schools
TRIAD	Technology-enhanced, Research-based, Instruction, Assessment, and professional Development
TRIAD-FT	TRIAD-Follow Through
TRIAD-NFT	TRIAD-Non-Follow Through
WJ-III-NU	Woodcock-Johnson III/Normative Update
WOW	World of Words

1. Introduction

1.1 Background to the review

This report is part of a programme of work by the Early Intervention Foundation (EIF) exploring the impact of early years childcare and education on children's outcomes, particularly those children at risk of falling behind their peers in terms of key developmental milestones from an early age. EIF has partnered with RAND Europe to produce a review of teaching and practice in childcare settings. The purpose of the review is to: provide an accessible overview of the research in the field for policy-makers and practitioners; identify those areas of early years childcare practice that are well evidenced in terms of effectiveness; and identify where the main evidence gaps remain. A better understanding of the early years evidence landscape is one way to start to improve the quality of childcare and ultimately lead to improved outcomes for children.

There is good evidence to suggest that attending high-quality childcare can improve a range of outcomes for children. There is a long history of thought and research into how children learn and how best to support their development both in the home and in formal childcare settings. Competing debates and theories have led to a wide diversity in practice, both in the UK and internationally. However, it is often challenging to isolate *what elements of childcare practice* are particularly effective and for whom, which means that it is hard to make specific recommendations about what activity most improves outcomes. These challenges stem in part from the breadth of research and the multiple research fields spanned as well as from the difficulties in conducting robust empirical research that isolates specific aspects of practice.

This report fills an important gap in the current literature as it represents a first attempt to apply systematic methods to identify what targeted practices or interventions have been robustly tested in recent years and where the evidence for intervention is strongest.

1.2 English policy context

In England, publicly funded early education and childcare is intended to achieve the dual goals of supporting parents in work³ and improving educational outcomes.⁴ There is a well-evidenced case that attending high-quality formal childcare can lead to widespread improvements in child outcomes – ensuring children's healthy cognitive, behavioural, social and physical development and laying the foundation for later outcomes (see Sylva et al., 2014; Melhuish et al., 2015), as well as delivering economic benefits in the short and long term (see Karoly et al., 2005; Naudeau et al., 2010).

Government investment in early years childcare has increased significantly in recent years, and is expected to reach around £6 billion by 2019/20 (DfE, 2017, p. 11). In September 2013 the government-funded 2-year-old free entitlement was introduced, which provides 15 hours of free care for children from the most disadvantaged households, and is specifically intended to improve educational

3 See: <https://www.gov.uk/government/publications/childcare-bill-policy-statement>

4 See: <https://www.gov.uk/government/news/number-of-2-year-olds-eligible-for-free-childcare-to-double>

outcomes for children who are most likely to fall behind educationally from an early age. Combined with the 15 hours of childcare at age 3-4 that all children are entitled to and the 30 hours of funded childcare offered to in-work households from 2017/18,⁵ families are increasingly afforded the opportunity to place their children in formal childcare for longer periods of time.

The quality of funded early year's childcare provision in England is regulated through inspection against the standards set out by the government in the Early Years Foundation Stage (EYFS) Framework. Ofsted reports on the quality and standards of provision against the EYFS. In addition to specifying staff-to-pupil ratios, minimum staff qualification levels and safeguarding requirements for settings, the EYFS sets out seven key areas/domains that all educational activities must involve. These include:

- communication and language
- physical development
- personal, social and emotional development
- literacy
- mathematics
- understanding the world
- expressive arts and design.

The EYFS requires that the seven areas of learning are delivered through 'planned, purposeful play, with a balance of adult-led and child-initiated activities' (DfE 2017, p. 9). However, the EYFS provides no specific requirement that practitioners use a particular approach to teaching in support of children's development.

In 2017 the Department for Education's (DfE) social mobility action plan *Unlocking Talent, Fulfilling Potential* set out the government's commitment to improving social mobility by reducing the early years 'word gap'. The focus on early language exposure derives from the work of Hart and Risley (1995), who observed that American toddlers growing up in low-income households heard approximately 1,500 fewer words per hour compared to children growing up in professional families. Hart and Risley hypothesised that this early language gap partly contributed to income-related differences that were apparent in later school achievement.

Hart and Risley's (1995) observations have since been replicated in several UK and non-UK studies, using larger and more representative samples.⁶ A recent work, using data from the Millennium Cohort Study (Finnegan et al., 2015) observed that while social disadvantage predicted children's academic performance, one of the most important factors in reaching the expected levels in English and maths at age 7 was children's language skills at age 5. While such studies do not conclusively demonstrate the causal link between early language exposure and the observed socio-economic gradient in early language skills and later academic achievement, they do highlight the fact that early language difficulties are a good early predictor of later problems as children develop (Law et al., 2017).

Among the activity to reduce social inequality in early educational outcomes, the DfE has set out its ambition to improve both access to and take-up of the government-funded childcare offers among disadvantaged pupils, as well as

5 Eligibility for the 30-hours offer extends to in-work (or those on parental leave, sick leave or annual leave) and where the household earns at least the national minimum wage or living wage for the equivalent of 16 hours per week.

6 See for instance, Kelly et al., 2011; Pace et al., 2017; studies cited in Law et. al., 2017.

through improving the quality of early years provision by spreading best practice. Given the scale of investment, the amount of time that children spend in childcare and the government's ambition to use childcare to improve social mobility, it is vital to understand what it is that practitioners can do to have the biggest impact to maximise outcomes for children.

1.3 Theories of child development and their relationship to policies and practice

In this section we provide a brief overview of some of the original theories of child development to illustrate the wide range of theoretical bases that led to the development of current theories and practices. The field of child development can appear quite fragmented, with a wide range of competing and/or complementary theories continually being revised. Theories are often rooted in profoundly different scientific and epistemological perspectives (Woodhead, 2006) and most focus on explaining change in different sub-sets of domains of development. The first explicit theories of child development were inspired by the work of earlier philosophers such as John Locke (empiricism, or the idea of a 'tabula rasa'), Jean-Jacques Rousseau (nativism, or the idea that humans develop naturally in positive ways as long as society doesn't interfere), and Darwin (ethology, or the evolutionary value of behaviour). These 18th- and 19th-century thinkers paved the way for the pioneers of child psychology and the main theories that have dominated the 20th-century discourse, particularly in the western world, about how children learn and how they are best supported to learn. Box 1.1 presents an overview of some of the earlier prominent theories that have helped shape the development of more recent theories and have influenced the discourse around early education and care and directly informed a range of curricula and pedagogies in the early years. The theories in the box are presented roughly chronologically, with behaviourism appearing at the beginning of the 20th century and Mahler's theory being developed during the second half of the 20th century.

BOX 1.1 PROMINENT EARLY THEORIES OF CHILD DEVELOPMENT

Watson: behaviourism

The focus of behaviourism is the study of observable behaviour and it posits that all behaviours are learned through interactions with the environment through mechanisms such as classical or operant conditioning (learning theory). All behaviour (and thus all learning) is the result of a chain of stimulus-response. Watson's original work has been furthered by numerous forms of behaviourist approaches in past decades (such as Skinner, Hull, Tolman). Concepts such as positive and negative reinforcements and positive and negative punishment are associated with this theory.

Piaget: genetic epistemology and constructivism

Genetic epistemology refers to the view that cognitive development is a result of both biological maturation and active interaction with the environment. Piaget proposed a universal 4-stage theory of child cognitive development (from birth to adolescence) to account for how a child constructs a mental model of the world. He claimed that children's thought processes were qualitatively very different from those of adults. Although there have been many criticisms of Piaget's theory, his work has fuelled a generation of researchers and his influence on the field of education has been enormous (for example, 'discovery learning', 'student-centred learning' and 'readiness to learn' are all rooted in Piaget's concepts).

Vygotsky: sociocultural theory

Vygotsky's theory in contrast to Piaget's, steers away from a 'staged' and 'universal' view of development and rather conceptualises development as a continuous and deeply cultural process. His theory focuses on the importance of language and social interactions in cognitive development. Thus, cognitive development is thought to be embedded in the social and cultural context. Concepts such as 'guided learning', 'zone of proximal development', 'scaffolding' and 'co-construction of knowledge' are very much inspired by Vygotsky's ideas.

Bandura: social learning theory

Bandura's theory follows the behaviourist ideas of classical and operant conditioning, but added mediating processes and observational learning to the equation. His research popularised the idea that children observe people (models) behaving around them and then encode and imitate these behaviours. In social learning theory, the mediating processes are related to four types of cognitive processes: attention, retention reproduction and motivation. The later social cognitive theory stems from this initial account.

Freud: psychosexual theory

Freud developed a psychodynamic theory which posits that experience during each stage influences development through five stages from birth to adulthood and using concepts such as drive, conflict and fixation. Freud stressed the importance of the first five years of life to the formation of adult personality.

Erikson: psychosocial theory

This psychodynamic theory influenced by Freud conceptualises psychosocial development into eight stages from infancy into adulthood which are characterised with a crisis that must be resolved before continuing to the next stage of personality development. The crises are distinctly social in nature and involve developing a sense of trust in others and of identity in society.

Bowlby: attachment theory

Bowlby and his contemporaries have written about the importance of adults' behaviour in responding sensitively and appropriately to a child's needs to develop healthy attachment relationships which will influence their subsequent development. The work of researchers such as Ainsworth, Schaffer and Emerson fall within this field. They have developed concepts such as 'patterns of attachment' and 'stages of attachment'.

Mahler: separation-individuation theory

Mahler's three-stage theory was heavily inspired by Freud's theory and focused on the first three years of life resulting in separation and individuation. Through these stages, a child goes through a mental separation from the parent or caregiver and develops a sense of self-concept.

Sources: Shute & Slee, 2015; Thomas, 2004

How these theories translate into direct practice varies considerably as approaches have developed over time in response to a number of factors. In their recent review of pedagogy in childhood education and care in England, the OECD provides a very useful, though non-exhaustive, summary of some of the main practices adopted in childcare settings which stem from these main theoretical perspectives (Wall et al., 2015). Table 1.1 lists a selection of the main pedagogical approaches identified in the OECD report.

TABLE 1.1 KEY PEDAGOGICAL APPROACHES IN ECEC CONTEXTS

Key pedagogical approaches	Main features
Child-centred	Adults provide a stimulating yet open-ended environment for children to play within.
Constructivist/Interactive	Views learning as an active exchange between the child and environment that progresses in 'stages', with adults and peers providing important stimulus in learning.
Didactic pedagogy/Direct instruction	Classic method of learning with mainly teacher-initiated activities including repetition.
Play-based	Guided play opportunities are offered to children.
Scaffolding	Teachers support children with tasks that are just beyond their capability. While the child is learning something the practitioner will provide the child with guidance. As the child learns the skill and their ability grows, the amount of support is lessened until the child can do the new skill on their own.
Socio-pedagogic	Emphasis on dialogue between adults and children, as well as creative activities with discussions and time for practitioners to reflect.
Sustained shared thinking	Two individuals work together (children together, or adults and children) in an intellectual way to perform activities such as solving a problem or clarifying a concept – both parties must contribute to the thinking and develop and extend it.
Teacher-directed	Teacher initiated, programmed learning approach.

Source: Adapted from Wall et al., 2015, table 5.1 (pp. 46–47)

As many have noted, it is typically a combination of well-known theories that underpins or informs practice within national childcare systems (see Wall et al., 2015). For instance, the OECD (2015) notes that in England, the EYFS and supporting guidance used to inform practice emphasise a play-based approach, with individualised learning and integrated activities that derive in part from *child-centred* and *constructivist* perspectives (Siraj-Blatchford and Nah, 2014, as cited in Wall et al., 2015). Practices of *sustained shared thinking* and *adult-led activities* draw parallels with Vygotsky's *socio-cultural constructivism* (Siraj-Blatchford and Manni, 2008, as cited in Wall et al., 2015). And, the concept of scaffolding, which is widely used in England, is underpinned by the work of Vygotsky and Piaget (OECD, 2015). As we have seen above in our discussion of the EYFS in the UK, national curriculums and frameworks for practice are not always rooted in any one school of thought or pedagogical discipline. What happens within individual childcare settings will be influenced by a range of factors, which may or may not be explicitly rooted in the theories discussed.

1.4 The evidence suggests that process quality has an impact on children's outcomes

The quality of early years childcare is typically described with *structural* and *process* quality factors. Structural quality factors can be thought of as factors that are further from children's learning processes, and include aspects such as group size, staff-child ratio and staff training. Process quality factors are comparatively

closer to children’s learning processes, and refer to children’s daily experiences and the interactions between early education staff, children and parents, such as pedagogical quality, cognitive stimulation, emotional care and support (see Hamre, 2014; Layzer and Goodson, 2006; Pianta et al., 2005).

As the factor more proximal to children’s experiences in early childhood and care settings, process quality is considered to be most responsible for children’s outcomes (Melhuish et al., 2015; von Suchodoletz et al., n.d.). There are a wide range of reports and studies into effective practice that have had significant impact in England in informing the debate and practice in the early years. Chapter 4 reviews an important subset of the recent empirical literature that met the quality standards for this systematic review. In addition, a number of important studies and reports, some using smaller-scale observational methodologies or other mixed methods and cross-country comparisons were not included as part of the systematic review, but are worth examining here as they have contributed significantly to informing practice in past decades (see box 1.2 for a brief description of some of the observation scales used in these studies).

BOX 1.2 OBSERVATION SCALES FOR PROCESS QUALITY

Environment rating scales

Environmental rating scales (such as the Early Childhood Environment Rating Scale – ECERS-R and ECERS-E; Infant Toddler Environment Rating Scale – ITERS-R; Sustained Shared Thinking and Emotional Well-being Scale – SSTEWS) have been developed over the past decades to provide validated comparable measures of quality across settings (Sylva et al., 2011; Harms et al., 2005; Harms et al., 2006; Siraj et al., 2015). These are based on intensive observation, capturing aspects of both the physical environment and pedagogical, social and emotional interactions in settings. Several of the studies described in section 1.4.1 used one or more of these scales as their measure of process quality.

1.4.1 Main studies funded by the Department for Education that have informed policies and practice in the early years

This section provides a brief overview of some of the main studies commissioned by the Department for Education (DfE) over the past couple of decades which have been part of the policy and practice discourse on process quality in the early years.

Study of Pedagogical Effectiveness in Early Learning (SPEEL)

An early study on effective pedagogy helped shape the policies and guidance surrounding practice in the early years in England. From 2000 to 2001, the government undertook the SPEEL project to identify practitioner’s perceptions and understanding of effective pedagogy to develop a framework on what good practice looks like in the early years to serve as guidance to the profession (Moyle et al., 2002). The study was based on 1) a literature review; 2) consultations with stakeholders; and 3) interviews, questionnaires and video observations and reflective dialogue in 27 high-quality settings (quality was determined by Ofsted ratings and consultations with local authorities). The resulting Framework for Effective Pedagogy in Early Years contained specific statements on what pedagogical practice looks like, such as using scaffolding, modelling behaviours, promoting child-initiated activities, and communicating with children at a level consistent with their development level (ibid.).

Effective Pre-school, Primary and Secondary Education (EPPSE) and related studies

The Effective Pre-school, Primary and Secondary Education (EPPSE) longitudinal study, funded by the DfE, has followed a cohort of approximately 3,000 children born in England in the 1990s over time. Numerous papers and studies have explored the outcomes associated with this cohort.⁷ A series of 12 qualitative case studies conducted as part of this study, during the Effective Provision of Pre-School Education phase (EPPE) as well as two case studies from the earlier Researching Effective Pedagogy in the Early Years (REPEY) study, examined the characteristics of pre-school centres with ‘good to excellent’ child outcomes (that is, if children had made more progress than expected on average based on their individual or home characteristics) (Siraj-Blatchford et al., 2003). Case study centres were thus selected retrospectively on the basis of child outcome data and further data collection methods included naturalistic observations of staff, systematic focal observations of children and interviews.

This research provides some evidence that the centres most effective at boosting children’s outcomes had staff that: engaged in more adult-child verbal interaction, and in particular, used ‘sustained shared thinking’⁸ in interactions with children; had a greater understanding of curriculum and pedagogy; had better knowledge of how children learn; supported children to resolve conflicts; and helped parents to support children’s learning at home. Follow-up phases of the research examined the relationship between attending pre-school and students’ dispositions and on their developmental, wellbeing and educational outcomes at different stages, until age 16 (see Sylva et al., 2014). This later research suggests a sustained relationship between attendance, quality and duration of preschool on students’ outcomes later in life.

Nevertheless, the difficulty with isolating key aspects or factors that have the strongest impact is widely recognised. Instead it is generally accepted that it is the *interaction* between structural quality factors and process quality factors that impacts on children’s outcomes (see Pianta et al., 2005; Vandell et al., 2010).

Study of Early Education and Development (SEED): Good Practice in Early Education

SEED is a longitudinal programme of research that examines the impact of early childhood education on children’s longer-term outcomes in England. As part of this wider programme of research, 16 case studies of ‘good’ or ‘excellent’ quality early years provision were conducted (Callanan et al., 2017). Quality of provision was established with the observational measures described above and interviews were conducted with setting staff, parents and local authority staff. In terms of practice, interview data suggested that high-quality settings thought to be those that tailored practice to the needs of the child, capitalised on children’s interests, differentiated for the child’s stage of development and had a clear vision of what they wanted to achieve for the children in their care. This was reinforced by having a skilled and trained workforce and having an open and reflective culture in which good practice was shared.

⁷ A compendium of reports, abstracts, briefs and papers can be found at <http://www.ucl.ac.uk/ioe/research/featured-research/effective-pre-school-primary-secondary-education-project/publications>

⁸ ‘Sustained shared thinking’ occurs when two or more individuals work together in an intellectual way to solve a problem, clarify a concept, evaluate an activity or extend a narrative.

1.4.2 International comparative studies provide conclusions consistent with those from England in terms of process quality

This section provides a short overview of some of the main international studies that provide relevant recommendations with regards to process quality in the early years.

OECD Engaging young children: Lessons from research about quality in early childhood education and care

The OECD recently published a study into quality in early childhood education and care, focusing on the relationship between structural and process quality (OECD, 2018). This report includes both a cross-national literature review examining the relations between structural indicators such as child–staff ratios, and process quality in early year’s settings, with a meta-analysis of studies looking at the relationship between quality and child learning/development. On process quality, the OECD report concludes that process quality is the primary driver of improvements in development outcomes for children. The report finds evidence that high-quality staff–child interactions account for individual differences in children’s behavioural, social-emotional and academic outcomes. However, the review itself does not provide any detail on what effective practice looks like and bases its conclusions on the observational scales of quality documented in the literature.

OECD early childhood education and care pedagogy review – England

The OECD review for England describes pedagogical approaches, how they are monitored, and how policies can affect practices in England with particular comparisons with Japan, France, Denmark and New Zealand (Wall et al., 2015). The study incorporates the results from: 1) a target literature review of evaluations of pedagogical approaches (Anders, 2015); 2) analysis of OECD survey data on countries’ monitoring of quality; and 3) a short qualitative survey on pedagogy responded to by government officials in 21 countries.

The OECD review confirms that few countries typically adopt a single prescriptive pedagogical approach. In each of the five case study countries, such as England, a broad curriculum is outlined while settings are encouraged to employ different approaches and practices flexibly.

The literature review suggests a mixed picture in terms of efficacy of particular programmes or approaches. For example, there was some evidence that the Montessori approach had greater gains in reading and maths; however, effectiveness was conditional on how well the approach was implemented. Alternative educational programmes, such as Steiner, were found to be no more effective than mainstream programmes. The review points to a lack of replication studies examining a programme in different contexts and points to the importance of fidelity of implementation.

On pedagogical effectiveness, the OECD review concluded that staff–child interactions characterised by sustained shared thinking were ‘vital’ in stimulating early learning and that pedagogy should be child-centred, developmentally appropriate, and with an emphasis on play-based learning. On play, the OECD report argued that when effectively structured, it can be highly effective at improving development, but that free play was often less effective. On the other hand, the report argues that overly teacher-led practice could have negative effects on things like children’s motivation to learn. Techniques, such as scaffolding, where teachers support children with tasks that are just beyond their capability, tend to show greater positive effects on development compared to children placed in mainly teacher-directed or exclusive child-centred environments.

Early Childhood Education and Care in Europe (CARE) report on effective approach to curriculum and pedagogy

From 2014 to 2016, the European Union funded a collaborative project across 11 countries and involving multiple interdisciplinary partners with the overarching goal of examining the benefits of early childhood education and care in Europe (CARE).⁹ As part of this project, a report pulled together evidence across European countries on effective approaches to curriculum and pedagogy (Sylva et al., 2016). This evidence was gathered with a survey in 11 countries, secondary data analysis from existing data in five countries, and video observations of practice in seven countries.

Findings from the surveys and interviews suggest a growing consensus that there is a need for a balanced curriculum, combining socio-emotional and intellectual development, and that the intellectual stretch of provision should become more challenging as children develop and approach school entry. Nonetheless, the findings suggest that there continue to be tensions regarding the importance and role of play, creativity and child-initiated activities in early years curriculum and pedagogy.

1.4.3 Evidence on the differential effectiveness of practice for children at risk of falling behind their peers is mixed

There is some evidence that attending early years education or childcare can help mitigate the gap in children's outcomes associated with socio-economic disadvantage (Melhuish et al., 2015). For instance, the EPPSE study found that attending high-quality pre-school was an important influence on the English and mathematics GCSE attainment of children whose parents had low educational qualifications (Sylva et al., 2014). Yet recent meta-analyses¹⁰ of process quality did not find that process quality was more beneficial for children from disadvantaged backgrounds, compared to children from higher socio-economic backgrounds (Keys et al., 2013; von Suchodoletz et al., n.d.).

1.4.4 Using systematic methods to identify areas of practice that are supported by rigorous evidence

Despite the recognition of process quality's potential importance to early childcare outcomes and the proliferation of multiple schools of thought as to how children learn and the best ways to support this, strong empirical evidence of effectiveness to support new developments and policy initiatives is lacking. Many of the studies summarised above are limited by the lack of strong counterfactuals or comparison groups and often use self-report or practitioners' perceptions as measures of effective pedagogy. In particular, there is a need to better understand *why* certain practices work and for whom.

An important reason for why it's difficult to draw firm conclusions is that for much of the available evidence, children taking part in the research and selected to receive the interventions may be systematically different from the children not receiving the intervention in unobservable ways. In addition, there is little evidence on whether the effects of certain practices or interventions are replicated in the same or different circumstances (Wall et al., 2015). These factors limit policy-makers' ability to translate research findings into evidence-based policy.¹¹ This review offers a first attempt at using systematic methods to identify those areas

⁹ See project website: <http://ecec-care.org/resources/about-care/>

¹⁰ A meta-analysis is a study that uses statistical methods to combine the findings from multiple studies, in order to provide overarching evidence and conclusions about a body of research.

¹¹ It is, however, notable that compared to other countries, England has a best practice guidance booklet (the Practice Guidance for the Early Years Foundation Stage) which was developed based on locally conducted research (Wall et al., 2015).

of process quality that are well evidenced and where there remain significant evidence gaps.

The next chapter provides a brief overview of the methodology used in this rapid evidence assessment (REA). Chapters 3 to 7 present the headline findings and the summary, strengths and limitations of the evidence on the impact of early years practices, programmes and interventions on children's language and literacy, mathematics, cognitive, socio-emotional and physical outcomes respectively. The detailed findings are presented by different sub-categories of the respective outcome, if sufficient evidence is available. Findings from some existing systematic reviews and meta-analyses are presented in boxes. Chapter 8 provides a summary of the evidence and discusses evidence gaps and implications for policy and practice.

Annex A provides a detailed account of the methodology used in this REA. Annex B provides brief descriptions of all included practices, programmes and interventions. The detailed findings and strengths and limitations of the evidence for each outcome are presented in annexes C–G respectively.¹²

12 The annexes to this report have been published separately. Available at: www.eif.org.uk/publication/teaching-pedagogy-and-practice-in-early-years-childcare-an-evidence-review

2. Methodology: systematic rapid evidence assessment

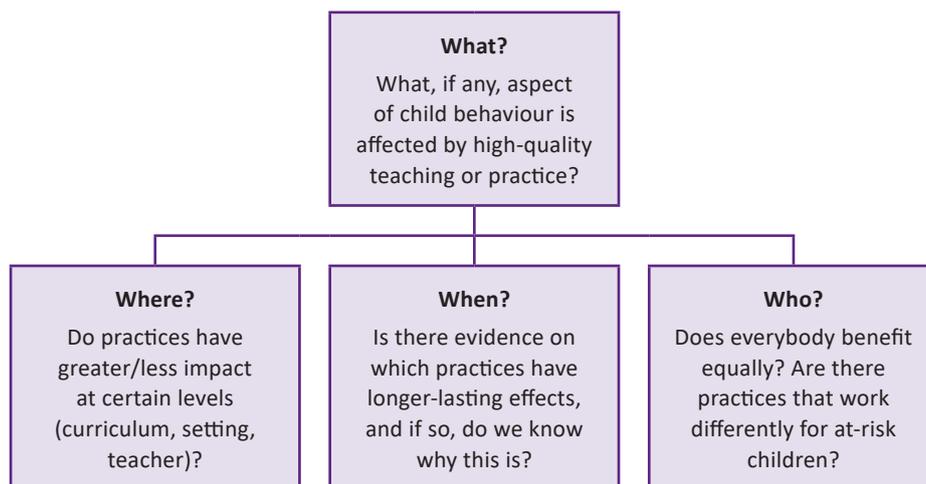
To gather and synthesise the evidence on effective early years practice that improves early education outcomes, we undertook a rapid evidence assessment (REA). REAs provide a systematic assessment of what is known about an issue, but the scope of the search and quality assessment are restricted compared to a more exhaustive systematic review. This is usually achieved by formally constraining the types of research to be sourced for the REA, for example on the basis of where the research was published, in which language it was conducted and during which time period it took place.

2.1 Research aims, objectives and questions of the REA

The primary aims of this review are to 1) synthesise the available evidence on how early years practice, focusing on process quality rather than structural quality, can improve early educational outcomes; 2) assess the strength of the evidence; and 3) identify the main evidence gaps in the literature. The objective of the review was to provide a concise and accessible summary of the available evidence that would be useful to policy-makers, decision makers and practitioners.

To achieve these aims and objectives, the research team used the following framework for interpreting and comparing different types of evidence through a hierarchical set of research questions, outlined in figure 2.1 below. The staged approach allowed us to first identify early years practices that are associated with early educational outcomes, before examining at what level changes in practices have the most impact; when impacts are observed; and whether these practices work for all children, or specifically those who are at greatest risk of falling behind.

FIGURE 2.1 RESEARCH QUESTIONS



2.2 REA inclusion/exclusion criteria and overview of search results

To focus on the available rigorous evidence on how early years practice can improve early educational outcomes, the research team searched six academic databases and libraries (CENTRAL, Campbell Collaboration, ERIC, PsycINFO, Scopus and Web of Science). The initial criteria for including studies (inclusion/exclusion criteria) were:

- any articles published between January 2008 and January 2018 (inclusive)
- on a practice, programme or intervention, carried out by early education teachers and taking place in an early years setting
- including children aged up to 6 years old.

Subsequent criteria assessed the studies on their *quality* and *research design*; systematic reviews and empirical studies that used a randomised experimental design with large sample sizes¹³ were included.

The research team initially identified 7,006 potentially relevant studies through database searches. After screening and reviewing the studies against the inclusion/exclusion criteria, 108 studies were selected for review in more detail (data extraction). As well as noting basic information about the studies and the practice/programme/intervention in question, we examined the studies to understand:

- at what level the intervention was implemented
- whether the intervention was beneficial for children
- and if so, how long effects lasted
- whether interventions benefited all children equally, or if certain groups of children experienced more benefits than others.

In interpreting the findings in this report, it is important to consider a number of limitations to the REA approach we have taken for this review. Included studies that met our quality inclusion/exclusion criteria constrained the scope of the study by excluding qualitative and observational evidence on process quality, as well as experimental studies that used small sample sizes. Further evidence of effective teaching is likely to be identified in the wider literature that was not considered for this REA. Additionally, due to the large number of search results, we did not search grey and unpublished literature or use reference snowballing to identify further literature. This means that the findings in this REA may be subject to publication bias, as there is a known tendency for ‘positive’ findings on the effectiveness of interventions to be overrepresented in published academic articles (Petticrew and Roberts, 2008).

A detailed account of the methodology employed for this review is presented in annex A of the report.¹⁴

¹³ Studies including at least 50 participants in each arm.

¹⁴ The annexes to this report have been published separately. Available at: www.eif.org.uk/publication/teaching-pedagogy-and-practice-in-early-years-childcare-an-evidence-review

3. Overview of key findings

The high-quality studies included in this review (systematic reviews, meta-analyses or counterfactual studies) provide robust evidence on what programmes or interventions may ‘work’ for improving children’s outcomes in early years childcare. However, the literature reviewed does not allow for a more fine-grained assessment of the *specific* pedagogical practices that work for improving outcomes. Further, this review suggests that very few robust studies test specific *schools of thought* that have informed many early years policies to date (see chapter 1 and table 1.1). This chapter thus provides the key messages from the review and highlights some of the programmes and interventions showing positive impacts.

3.1 Overview of the included studies

The 108 studies included in the REA included 12 systematic reviews or meta-analyses as well as 96 individual studies. To be included in the REA, individual studies had to use a methodology with a counterfactual and have a sample size of at least 50 each in the treatment and control groups. Studies ranged from just meeting this cut-off point, to including thousands and even tens of thousands of participants. Most studies only included participants aged over 3 years and were conducted in the US, with a small number carried out in Europe and elsewhere in the world (see chapter 9 for limitations of the empirical literature reviewed in this REA). Table 3.1 provides an overview of the included studies.

3.2 Overview of the teaching, pedagogy and practices covered

This REA includes studies examining 83 programmes or interventions. Rather than focusing on specific teaching practices, most interventions were broader programmes, including a range of activities, resources and sessions. Where details of programmes were reported by studies, they appeared to vary widely in terms of length, frequency and intensity of programme. Furthermore, programmes typically operated at multiple ‘levels’ within the organisation, for instance they combined changes to both the curriculum level (that is, specific elements of course content) the teacher level (that is, training provided to practitioners) and setting level (that is, changes to practice and ethos across the whole institution).

The limited information provided with regards to the specific characteristics of the programmes or on the fidelity of implementation in the studies made categorising programmes into types of practices challenging and drawing conclusions on the effectiveness of specific practices practically impossible. One meta-analysis (Wang et al., 2016) did report that interventions focusing on a single content area, lasting at least 120 minutes each week, and involving one-on-one interactions with children, tended to have larger effects.

TABLE 3.1 OVERVIEW OF THE INCLUDED STUDIES

		Language and literacy	Numeracy or mathematics	Other cognitive	Socio-emotional	Physical	Total
Total number of...	Primary studies	53	21	20	35	7	136
	Systematic reviews or meta-analyses	7	2	-	4	1	14
Geographical location	US	46	18	13	29	6	112
	Europe	5	1	4	5	1	16
	Other	2	2	3	1	0	8
Primary studies that reported positive programme effects for at least one measured outcome		45	16	15	31	6	113
Primary studies that included...	Children aged at least 3	47	18	17	30	5	117
	Children aged under 3	1	0	1	2	1	5
	Both	4	3	1	3	1	12
Primary studies that examined differences across...	Gender	8	2	5	5	2	22
	Socio-economic background	6	2	-	4	-	12
	Children with SEN	3	4	2	2	1	12
	Children whose home language is different than the majority language	8	2	2	2	1	15

Note: The totals in the last column do not add up to the total number of studies included in the REA because some studies included outcomes in more than one domain.

There were limited studies considering the same programmes or approaches in the same context (Wall et al., 2015), so there is a lack of evidence on the replicability and generalisability of the programmes. The main exception was Head Start (and variations including Head Start Research-Based, Developmentally Informed, or REDI), which was the focus of 13 studies conducted in the US. Other programmes that were examined by a small number of studies include: Aprender a Convivir, Building Blocks, K-PAVE, the OWL programme, Ready to Learn, the Recognition and Response model, the Social-Emotional Prevention Program, Second Step and Success for All. Box 3.1 below provides further details on some of these programmes.

BOX 3.1 PROGRAMMES EXAMINED BY MULTIPLE STUDIES IN THE REA

Head Start is a programme of the United States Department of Health and Human Services that uses a holistic approach to education and aims to improve the school readiness of children from low-income families. It emphasises the cognitive, social and emotional development of children as well as parental involvement. The Head Start programme comprises comprehensive and high-quality services, including early education and development; parental involvement; and medical, dental, mental health, and nutritional programs as well as other social services.

Aprender a Convivir (learning to live together) is a preventative intervention programme in Spain that aims to improve children's social skills and competence, so that they are able to face and resolve conflict situations from an early age. The programme also aims to improve the classroom and general school climate and to present children's risk behaviours. It consists of four content 'blocks': 1) rules and their compliance; 2) feelings and emotions; 3) communication skills; and 4) support and cooperation. The sessions include both group (such as games, songs, role-play) and individual activities (such as colouring, puzzles) and a token economy is used to reward children for accomplishing goals.

Building Blocks is a programme that aims to improve mathematics attainment through the embedding of mathematical learning into children's everyday activities and includes activities ranging from mathematics-specific activities to story time. Teachers guide children in relating their informal mathematics knowledge to more formal mathematical concepts – for instance, through probing children to identify how they solved problems or tasks.

Kindergarten PAVEd for Success (K-PAVE) is a programme that aims to improve the vocabulary learning of children. It consists of 240 target words that are introduced over 24 weeks. Each week, the target words are explicitly taught to children and then reinforced through repeated exposure, for instance in storybook reading, small group activities and classroom discussion.

The **OWL (Opening the World of Learning)** curriculum focused on improving children's early language and literacy skills. It also includes a social skills component, in which teachers would discuss socio-emotional issues with children and integrate emotion-related vocabulary into discussions.

The **Ready to Learn** initiative addresses the development of three early literacy skills: recognition of letter names, identification of letter sounds, and understanding of story and print concepts. The Ready to Learn Media Supplement additionally incorporates digital video, online games and hands-on activities.

In the **Recognition and Response** model, teachers use standardised language and literacy assessments to identify low-performing children (recognition), then provide small-group lessons to these children using a curriculum focused on improving these skills (response).

The **Social-Emotional Prevention Program** is a curriculum used in Romania that aims to improve children's social and emotional competencies and reduce behavioural problems. The curriculum comprises 37 classroom activities across five modules that target children's emotion recognition, emotion regulation, as well as problem-solving, compliance with roles, and prosocial behaviour such as sharing, cooperation and turn-taking.

The **Second Step Early Learning** programme aims to improve children's early social-emotional skills and executive functioning. The programme comprises 28 weekly themes and includes daily activities, daily 'Brain Builder' games and theme-related songs. Teachers are also given strategies to reinforce children's skills and manage behaviour. The Second Step Preschool/Kindergarten Kit aims to address children's behavioural problems in preschool. It includes 25 lesson cards focusing on empathy, emotion management and problem-solving, as well as posters, puppets, music and tokens that can be used as reinforcements.

Success for All is a programme that aims to ensure that all children will learn to read well in the elementary grades. It employs a structured curriculum that focuses on phonics for beginning readers and comprehension for all pupils, and emphasise cooperative learning, frequent assessments and tutoring for children who need extra help.¹⁵

Source: RAND Europe

Finally, there was some, although limited, evidence reported on programmes which had longer-term impacts, and programmes which might benefit at-risk groups of children more. For example, one systematic review on the best strategies for teaching English literacy to immigrant children, including in kindergarten, found positive effects, with collaborative reading studies having the largest effect (Adesope et al., 2011) – although it is not clear how long these effects persisted. Moreover, although many programmes were targeted at disadvantaged children, few studies tested variation in the impacts for different groups of children.

The Early Learning in Mathematics and the Road to Mathematics programmes have shown promising effects on children with poorer initial mathematics skills. Building Blocks and Head Start may have greater benefits for children from a lower socio-economic background and dual-language learners, respectively, than for other children. Also, the gains in learning engagement, attention and executive function that children experienced after attending Head Start REDI were shown to be maintained in primary school. However, more research would be needed to substantiate these findings more widely and across other contexts.

3.3 Overview of children's outcomes

Due to the challenges encountered for reporting on the overall effectiveness of specific types of practices, this report is organised around the types of outcomes that were shown to be impacted by the programme evaluated. Outcomes were categorised into the following overarching categories: 1) language and early literacy; 2) numeracy and mathematics; 3) other cognitive outcomes¹⁶; 4) socio-emotional outcomes¹⁷; and 5) physical outcomes. Most of the studies examined more than one outcome for children; indeed, many examined a battery of outcomes, even sometimes including outcomes that did not seem directly related to the programmes being implemented. The majority of studies focused on language and literacy outcomes; in contrast, fewer studies examined the other outcomes. We do not know

15 Although the REA only included evaluations of Success for All that have been conducted outside the UK, it should be noted that the Education Endowment Foundation has also funded an evaluation of the programme on 1,767 children in Reception in the UK (Miller et al., 2017).

16 Outcomes of cognitive ability or flexibility, which includes measures on scientific creativity and originality, problem-solving ability, attention and science knowledge, were represented in this group.

17 These included social skills outcomes, emotional skills, socio-emotional outcomes and behavioural outcomes.

whether this reflects that there are more programmes targeted at improving this specific outcome domain or whether language and literature outcomes are more readily tested or amenable to testing in the early years.

Overall, the studies reported favourable outcomes for children who were attending the examined programmes, across the outcome domains. This may reflect that well-regulated programmes (such as Head Start) have generally positive effects for participants (see Buysse et al., 2014).¹⁸ Specifically, the evidence on Head Start suggests that it has positive impacts on general literacy, reading, vocabulary and writing skills, some of which last several years – and the evidence also suggests positive findings for children who do not speak the majority language.

18 However, it should be noted that many studies reported positive findings, raising questions about the possibility of a publication bias (Petticrew and Roberts, 2008). As the REA did not examine unpublished or grey literature, it was not possible to assess the extent to which findings might be subject to this potential publication bias.

4. Impact of early years practices on language and literacy outcomes

4.1 Headline findings

- Fifty-three studies and seven systematic reviews or meta-analyses were identified in the REA as reporting on language and literacy outcomes.
- The studies examined a range of programmes implemented at different levels, although the most common programme was Head Start.
- The majority of the fifty-three studies included specifically targeted children's language and literacy outcomes. However, for some this was not specified as a specific goal of the intervention.
- The studies mostly examined children aged over 3 years and living in the US.
- The majority of studies found that programmes had a favourable and moderate impact on language and literacy outcomes, although it is unclear if impacts are maintained in the longer term.
- However, findings on Head Start suggest that it has positive impacts on general literacy, reading, vocabulary and writing skills, some of which last several years.
- It was not possible to ascertain if certain programmes may work better for at-risk children because of the small number of studies that examined this, although Head Start may improve the reading ability of children who do not speak the majority language.
- Although many studies included in this REA reported on language and literacy outcomes, overall the evidence is insufficiently detailed to determine if impacts may differ between children from different backgrounds and whether impacts are maintained in the longer term. The most robust findings are for Head Start, which may not be generalisable to a UK context.

4.2 Summary of evidence

There were 53 studies and seven systematic reviews or meta-analyses identified in the REA as reporting on language and literacy outcomes.

The studies examined a wide range of language and literacy outcomes, including general language and literacy performance, oral language, listening, reading, vocabulary and writing. Many studies assessed a battery of language, literacy and other outcomes (as opposed to just one outcome).

The studies examined a range of programmes implemented at different levels, although the most common programme was Head Start.

Altogether the studies examined 42 different programmes or interventions. The Head Start programme and related programmes, implemented in the US (such as Head Start REDI, Head Start REDI-C) was the most common programme among the studies (n=7) (see box 3.1 for a description of this programme). Two studies examined the Kindergarten PAVED for Success (K-PAVE) programme in the US. A further two studies, also conducted in the US, each investigated the Ready to Learn initiative and the Ready to Learn media supplement. Two studies examined the Opening the World of Learning (OWL) programme. Two studies reported early and interim findings from the study on the Success for All Model of School

Reform in the US. Another two studies, also conducted in the US, assessed the Recognition and Response model. There were also three studies conducted in the US that examined the Building Blocks programme (see box 3.1 for a description of this programme). The remaining articles examined different programmes. The majority of programmes studied examined programmes that made changes at the curriculum level, as well as at the setting and teacher level. However, not all studies provided information on the duration and frequency of the intervention.

Many but not all of the programmes targeted children’s language and literacy outcomes.

Many of the programmes investigated targeted general or specific language and literacy outcomes. For instance, the K-PAVE programme was designed to improve children’s vocabulary outcomes. However, there were some programmes that had more general learning (such as the Opportunity Project) and development (such as Head Start REDI, the integrated comprehensive academic skills-focused curriculum, storytelling and story-acting practice) or school readiness goals (Ready to Learn initiative). In addition, three studies investigated the Building Blocks programme, which aimed to improve children’s mathematics attainment.

The studies mostly examined children aged over 3 years and living in the US.

There was a wide range in the number of children participating in these studies, from 113 (Goldstein et al., 2017) to over 30,000 (Konstantopoulos et al., 2016). Most programmes targeted children aged over 3 years; one study examined children aged under 3 (Landry et al., 2014) and three studies included both age groups (Bakken et al., 2017; Bernhard et al., 2008; Lonigan et al., 2015.). The majority of studies were conducted in the US (n=46). One study each was conducted in the UK, Denmark, France, Portugal, the Netherlands, Canada and India.

The majority of studies found that programmes had a favourable and moderate impact on language and literacy outcomes, although it is unclear if impacts are maintained in the longer term.

Across the outcomes being examined, the majority were found to be favourably impacted by the programmes in question (110 outcomes out of 153). This is true for general language and literacy, oral language, reading and writing. In contrast, for listening and vocabulary outcomes, only just over half of the assessed outcomes were favourably impacted by the programmes. The studies that reported effect sizes largely found medium effects. For reading and vocabulary outcomes, the evidence on whether impacts were sustained in the longer term was mixed.

The generally positive findings for the programmes being examined mean that it is difficult to disentangle if particular aspects of programmes are more effective than others, and may reflect a broader publication bias. Only a small number of studies reported outcomes for different subgroups of children. The lack of exploration between subgroups is a major gap in the research evidence and impedes the ability of policy-makers and practitioners to target interventions at children at greatest risk of falling behind (although see box 4.1 for systematic reviews on language outcomes for second- or dual-language learners).

However, findings on Head Start suggest that it has positive impacts on general literacy, reading, vocabulary and writing skills, some of which last several years.

Seven studies examined the impact of the Head Start programme and its variants on several language and literacy outcomes. These studies found that participating in Head Start classrooms had a positive impact on children’s general literacy skills (Bierman et al., 2008; Zhai et al., 2011), oral comprehension and reading skills (Puma et al., 2010; Zhai et al., 2011), and vocabulary skills (Bloom et al., 2014; Puma et al., 2010). The effects on children’s general literacy (Zhai et al., 2011), oral

language (Puma et al., 2010) and vocabulary skills (Bloom et al., 2014; Puma et al., 2010) appear to last several years, even into primary school.

It was not possible to ascertain if certain programmes may work better for at-risk children because of the small number of studies that examined this, although Head Start may improve the reading ability of children who do not speak the majority language.

Only a small number of studies reported outcomes for different subgroups of children. The lack of exploration between subgroups is a major gap in the research evidence and impedes the ability of policy-makers and practitioners to target interventions at children at greatest risk of falling behind. However, two studies (Puma et al., 2010; Zhai et al., 2011) and a systematic review (Buisse et al., 2014) show that Head Start may be a promising intervention for improving the reading ability of children who do not speak the majority language (see box 4.1 for systematic reviews on language outcomes for second- or dual-language learners).

The evidence is not detailed enough to determine if impacts may differ between children from different backgrounds and whether impacts are maintained in the longer term.

Although many studies included in this REA reported on language and literacy outcomes, overall the variety of the programmes studied (in terms of length, frequency and intensity of programme) and the lack of clear and complete descriptions of these programmes means it is difficult to draw conclusions about whether there are particular aspects of programmes that are more effective for children's language and literacy outcomes. There is also insufficient evidence to determine if impacts may differ between children from different backgrounds and whether impacts are maintained in the longer term. The most robust findings are for Head Start, which may not be generalisable to a UK context.

The results for each language and literacy category, and the strengths and limitations of the evidence, are presented in more detail in annex C.¹⁹

BOX 4.1 FINDINGS FROM SYSTEMATIC REVIEWS ON LANGUAGE AND LITERACY OUTCOMES OF DUAL- AND SECOND-LANGUAGE LEARNERS

Buisse et al. (2014) conducted a systematic review of 25 studies on the effects of early care and education practices on the developmental outcomes of dual-language learners aged 5 and under. The authors found some evidence that widely available and well-regulated programmes, such as Head Start, had a positive impact on improving the language and literacy skills of dual-language learners. However, based on the research available it was not possible to distinguish between the separate contributing effects of language instruction and type of intervention.

Adesope et al. (2011) conducted a systematic review of 20 studies on the best strategies for teaching English literacy to immigrant children (kindergarten to grade 6). There were four groups of strategies: collaborative reading, systematic phonics instruction and guided reading, multimedia assisted reading, and structured or diary writing. Except for multimedia assisted reading, the other intervention types had positive and statistically significant effects on children's reading and writing, with collaborative reading studies having the largest effect.

Source: RAND Europe

¹⁹ The annexes to this report have been published separately. Available at: www.eif.org.uk/publication/teaching-pedagogy-and-practice-in-early-years-childcare-an-evidence-review

5. Impact of early years practices on numeracy or mathematics outcomes

5.1 Headline findings

- The REA identified 21 studies and two meta-analyses that examined numeracy or mathematics outcomes of children.
- The studies examined a range of programmes, the majority of which were implemented at multiple levels. Early Learning in Mathematics and Building Blocks were the most commonly studied programmes.
- Programmes ranged from those aimed at improving numeracy or mathematics outcomes to those targeting a broader range of developmental outcomes.
- Most of the studies examined children who were at least 3 years old and living in the US.
- The meta-analyses and the majority of studies found that programmes had a positive impact on numeracy or mathematics outcomes and promising longer-term effects.
- There are initial promising findings on programmes that may offer greater benefits to children at risk, but more research should be done to confirm this.

5.2 Summary of evidence

The REA identified 21 studies and two meta-analyses that examined numeracy or mathematics outcomes of children.

We identified 21 papers through this REA that examined numeracy or mathematics outcomes. In addition, we included two meta-analyses: one on the impact of early mathematics programmes in prekindergarten and kindergarten, and one on the Tools of the Mind curriculum (see box 5.1).

The studies examined a range of programmes, the majority of which were implemented at multiple levels. Early Learning in Mathematics and Building Blocks were the most commonly studied programmes.

The 21 studies examined 17 different programmes or interventions. Of the included studies, three examined the impact of Early Learning in Mathematics, and two studies examined Building Blocks (see box 3.1 for a description of this programme). The remaining studies focused on different programmes.

Fourteen of the 21 studies examined programmes that were implemented at more than one level, either at both the curriculum and teacher levels (n=8), the curriculum and setting levels (n=5), or at all three levels (n=3).

Programmes ranged from those aimed at improving numeracy or mathematics outcomes to those targeting a broader range of developmental outcomes.

Many of these programmes were targeted at children's numeracy or mathematics outcomes, including counting, number recognition, mathematical ability, simple arithmetic and problem-solving. Such programmes include Building Blocks (Clements et al., 2008; 2011a; 2011b), Big Math for Little Kids (Lewis Presser et al., 2015) and Early Learning in Mathematics (Doabler et al., 2016b). Other programmes aimed to improve children's outcomes in a range of domains,

including language and socio-emotional outcomes. For instance, the Opportunity Project, an intervention aiming to provide a stimulating environment and support for learning and development, targeted improvements in language development, attitudes towards school and relationships, in addition to mathematical knowledge (Bakken et al., 2017). Other programmes such as Head Start REDI did not focus on children's mathematical skills, but instead aimed to improve children's social-emotional competencies and their literacy skills (Sasser et al., 2017).

Most of the studies examined children who were at least 3 years old and living in the US.

The number of participants in these studies ranged from around 270 (Clements and Sarama, 2008) to nearly 30,000 children (Konstantopoulos et al., 2016). In most studies, the target age of children was 3 or more years; none of the studies examined children aged under 3, while three studies focused on children of both age groups (Dillon et al., 2017; Bakken et al., 2017; Lonigan et al., 2015). All but three studies were conducted in the US. The remaining studies were conducted in the Netherlands, India and Paraguay (one study each).

The meta-analyses and the majority of studies found that programmes had a positive impact on numeracy or mathematics outcomes and promising longer-term effects.

One meta-analysis found that early mathematics programmes in prekindergarten and kindergarten, such as Building Blocks and Early Learning in Mathematics, had a positive effect on children's outcomes (Wang et al., 2016). Another meta-analysis on the Tools of the Mind curriculum, aimed at improving children's self-regulation and academic skills, also found that it had a favourable impact on children's mathematics skills (Baron et al., 2017) (see box 5.1 below).

Across the outcomes being assessed in the studies, the majority were favourably impacted by the programmes being examined (23 out of 32 outcomes). This was also true for studies examining the impact of Building Blocks and Early Learning in Mathematics. No differences were found between the treatment and control groups for eight outcomes. The study of mCLASS found that children that received the intervention performed worse than the control group, and that it did not close the gap between high and low achievers (Konstantopoulos et al., 2016). The studies that reported effect sizes mostly found medium effects. Five of the seven studies that conducted follow-up assessments with children continued to find positive effects of the following programmes on children's mathematics outcomes: Building Blocks (Clements and Sarama, 2008); Head Start REDI (Sasser et al., 2017); the Opportunity Project (Bakken et al., 2017); the Road to Mathematics programme (Toll and van Luit, 2014); and TRIAD (Clements et al., 2011a).

The reviewed studies suggest that programmes that target a range of children's outcomes can be as effective as mathematics-focused programmes in improving mathematical skills.

There are initial promising findings on programmes that may offer greater benefits to children at risk, but more research should be done to confirm this.

Four studies reported outcomes for different subgroups of children. These studies show that Early Learning in Mathematics and the Road to Mathematics may have greater benefits for children with poorer initial mathematics skills. Building Blocks and Head Start may have greater benefits for children from a lower socio-economic background and dual-language learners, respectively, than for other children. However, more research would be needed to substantiate these findings.

BOX 5.1 FINDINGS FROM TWO META-ANALYSES ON NUMERACY AND MATHEMATICS OUTCOMES

Wang et al. (2016) conducted a meta-analysis of 31 studies (across 29 articles) examining the effect of early mathematics programmes in prekindergarten and kindergarten. Studies examined mathematics curriculum programmes – such as Building Blocks, Early Learning in Mathematics, Experimental Mathematics Curriculum, Pre-K Mathematics Curriculum – as well as miscellaneous maths-related activities. Overall, the interventions had a moderate to large effect size. Interventions that focused on a single content area, that lasted at least 120 minutes each week and involved one-on-one interactions with children tended to have greater effects.

In a meta-analysis of six studies, Baron et al. (2017) found that the Tools of the Mind curriculum, which aims to improve children's self-regulation and academic skills through structured make-believe play scenarios and other curricular activities, had a positive and small effect on children's mathematics skills. The effect sizes for self-regulation and literacy were positive but not statistically significant. However, the authors cautioned against drawing definitive conclusions based on the meta-analysis, due to the small number of studies included and their methodological shortcomings.

Source: RAND Europe

The results for mathematics outcomes are presented in more detail in annex D.²⁰

20 The annexes to this report have been published separately. Available at: www.eif.org.uk/publication/teaching-pedagogy-and-practice-in-early-years-childcare-an-evidence-review

6. Impact of early years practices on other cognitive outcomes

6.1 Headline findings

- The REA found 20 studies measuring cognitive outcomes other than language, literacy and mathematics. Outcome related to cognitive ability or flexibility, which includes measures on scientific creativity and originality, problem-solving ability, attention and science knowledge were represented in this group.
- Head Start programmes were the most commonly examined. The majority of the programmes were implemented at the curriculum and teacher level.
- The majority of the programmes focused on language, mathematics and socio-emotional development rather than other cognitive outcomes.
- The majority of studies examined children aged over 3 years and living in the US, although two studies included younger children.
- The majority of programmes were found to have positive impacts for children, although five studies found no impact. The gains in learning engagement, attention and executive function children experienced after attending Head Start REDI were maintained in primary school.
- There is limited evidence on which to draw conclusions about which programmes may be most beneficial to children at risk, although a small number of Head Start studies suggest that this programme may be particularly beneficial for some subgroups of children.
- Many of the studies reviewed suffered from some methodological limitations (such as imbalance between comparison groups or systematic attrition problems), which may affect the interpretation of findings.

6.1 Summary of evidence

The REA found 20 studies measuring cognitive outcomes other than language, literacy and mathematics.

In this section we report on programmes that targeted cognitive outcomes other than language and literacy or mathematics outcomes. Outcome related to cognitive ability or flexibility, which includes measures on scientific creativity and originality, problem-solving ability, attention and science knowledge were represented in this group. The REA identified 20 studies that evaluated programme effects on these outcomes.

Head Start programmes were the most commonly examined. The majority of the programmes were implemented at the curriculum and teacher level.

Studies examining 13 different programmes or interventions were reviewed. Of the included studies, three papers explored the impact of the Head Start (Puma et al., 2010; Harden et al., 2012; Zhai et al., 2011) and four papers explored effects of the Head Start REDI programme in the US (Bierman et al., 2008; Bierman et al., 2014; Nix, 2016; Sasser, 2017). The remaining studies (n=13) each focused on different programmes. The majority of the programmes studied were implemented at both the curriculum and teacher levels (n=11). The remaining were either implemented at the curriculum level only (n=5) or at the curriculum, teacher and setting levels (n=4).

The majority of the programmes focused on language, mathematics and socio-emotional development rather than other cognitive outcomes.

The majority (n=14) of the 20 interventions studied were comprehensive programmes targeting the development of a range of skills, although programmes varied widely on their primary focus. Nine programmes focused primarily on language development, five on socio-emotional competencies, and three on mathematics. The remaining three programmes focused on cognitive development.

The majority of studies examined children aged over 3 years and living in the US, although two studies included younger children.

The number of participants in the studies ranged from 144 (Siew et al., 2017) to 1,884 (Puma et al., 2010). Most of the studies (n=18) targeted children aged 3 and above. Only one study examined children aged under 3 (Harden et al., 2012) and one focused on both age groups (Dillon et al., 2017).

The studies reviewed were implemented in the US (n=13), Portugal (n=1), Germany (n=1), Romania (n=1), India (n=1), Malaysia (n=1), the UK (n=1) and one study was implemented in Zanzibar, Kenya and Uganda (n=1).

The majority of programmes were found to have positive impacts for children, although five studies found no impact. The gains in learning engagement, attention and executive function children experienced after attending Head Start REDI were maintained in primary school.

The 20 studies examined a wide range of outcomes: 12 of the studies measured programme effects on outcome related to cognitive ability or flexibility, which includes measures on scientific creativity and originality. Four papers measured problem-solving ability and attention. Science knowledge was measured in two studies.

Overall, studies reported that programmes had a favourable impact on children receiving the programmes. Twelve of the 19 studies reported small to moderate effects, while five studies reported that programmes had no impact on children (three studies found positive effects but did not report the effect size). Programmes with the largest reported effects were Head Start REDI, Lubo from Outer Space!, the Madrasa Early Childhood Development Program, the Problem Based Learning with Cooperative Learning and 'Numbered Heads Together' Programme, and the Social-Emotional Prevention Program.

Six studies examined longer-term effects in children, out of which two were on Head Start and two were on Head Start REDI. The studies found that Head Start REDI had favourable effects on children's learning engagement, attention and executive function. The effect maintained even after children reached primary school (Nix et al., 2016; Sasser, 2017). Similarly, cognitive flexibility was reassessed in the Head Start programme at the end of kindergarten and end of first years. A long-term benefit of participating in the programme was found (Zhai et al., 2011; Puma et al., 2010). Additionally, the study on the Madrasa Early Childhood Development Program also found improvements in children's cognitive ability, in the three-year period children were evaluated (Malmberg et al., 2011).

There is limited evidence on which to draw conclusions about which programmes may be most beneficial to children at risk, although a small number of Head Start studies suggest that this programme may be particularly beneficial for some subgroups of children.

Overall, there is insufficient evidence to determine which programmes might work better for children at greatest risk of falling behind due to a lack of comparison with other groups of children. However, one study found that the REDI intervention had

higher impact for children who scored low on problem-solving compare to children with high scores (Sasser et al., 2017), while another Head Start study found that dual-language learners in the programme have benefited more than other groups (Puma et al., 2010). A Head Start study exploring programme impact on children's school readiness did not find any gender differences (Zhai et al., 2011).

7. Impact of early years practices on socio-emotional outcomes

7.1 Headline findings

- The REA found 35 studies and four systematic reviews or meta-analyses reporting on children's socio-emotional outcomes.
- Almost one-third of the studies investigated programmes related to Head Start. The majority of programmes were implemented at the curriculum and setting or teacher level.
- Many programmes targeted children's socio-emotional outcomes, although a number of programmes focused on language and literacy and mathematics.
- Most of the studies examined children who were at least 3 years old and living in the US.
- Studies generally found that programmes had a positive and moderate impact for children. There is limited evidence on whether effects are maintained, although Head Start and related programmes show promise.
- There is insufficient evidence to determine which programmes may work better for children at risk.
- It is not possible to ascertain if the overwhelming positive impacts seen for programmes is genuine or reflects a publication bias.

7.2 Summary of evidence

The REA found 35 studies and four systematic reviews or meta-analyses reporting on children's socio-emotional outcomes.

We identified 35 papers through this REA that examined socio-emotional outcomes. In addition, we included one narrative review and three meta-analyses.

Almost one-third of the studies investigated programmes related to Head Start. The majority of programmes were implemented at the curriculum and setting or teacher level.

The included studies examined 25 programmes or interventions. Of the included studies, 11 papers explored the impact of the Head Start programme and its variants (such as Head Start REDI, Early Head Start) in the US. There were two papers each examining the Aprender a Convivir (learning to live together) in Spain, the Social-Emotional Prevention Program in Romania, and Second Step in the US (two versions: Second Step Early Learning and the Second Step Preschool/Kindergarten Kit) (see box 3.1 for a description of some of these programmes). The remaining articles (n=18) focused on different programmes. All the studies examined programmes or interventions that made changes at the curriculum level (the majority of programmes also implemented changes at the setting or teacher level).

Many programmes targeted children's socio-emotional outcomes, although a number of programmes focused on language and literacy and mathematics.

Many of these programmes were targeted at various aspects of children's social, emotional and behavioural outcomes. Some programmes aimed to improve children's outcomes in a range of domains, including socio-emotional outcomes.

For instance, Head Start REDI focused on both children's social-emotional competencies and their language and literacy skills. There were a small number of exceptions: the OWL curriculum primarily targeted children's early language and literacy skills (Weiland and Yoshikawa, 2013); and both the PBS KIDS Transmedia Curriculum Supplement to Support Young Children's Mathematics Learning (Llorente et al., 2015) and the mathematics curriculum examined by Dillon et al. (2017) aimed to improve children's mathematics learning.

Most of the studies examined children who were at least 3 years old and living in the US.

The number of participants in these studies ranged from 110 (Meyer and Ostrosky, 2016) to over 4,000 children (Bloom et al., 2014). The target age for most of the studies was children aged 3 and above; only two studies examined children aged under 3 (Harden et al., 2012; Landry et al., 2014) and a small number of studies focused on children of both age groups (Bakken et al., 2017; Dillon et al., 2017; Lonigan et al., 2015). The majority of the studies were conducted in the US (n=29). The remaining studies were from Spain (n=2), Romania (n=2), Germany and India (n=1 each).

Studies generally found that programmes had a positive and moderate impact for children. There is limited evidence on whether effects are maintained, although Head Start and related programmes show promise.

The 35 studies examined a wide range of outcomes, including social skills outcomes, emotional skills, socio-emotional outcomes and behavioural outcomes. Overall, across these outcome categories, studies found a favourable effect for children in the treatment condition (75 out of 90 assessed outcomes). Most of the studies that reported effect sizes reported a medium effect size. The few studies that carried out follow-up assessments with children (n=9) found that positive effects were maintained over time. In particular, studies examining Head Start and Head Start REDI found that positive effects on children's social and behaviour skills were maintained in primary school (Nix et al., 2016; Puma et al., 2010). Given the almost universally positive findings and the heterogeneity of programmes, it is not possible to determine if particular aspects of programmes might have differentiated impacts on children.

There is insufficient evidence to determine which programmes may work better for children at risk.

Additionally, few studies presented results on different groups of children so there is insufficient evidence to determine which programmes might work better for children at greatest risk of falling behind. However, one of the systematic reviews and one meta-analysis identified focused on the socio-emotional outcomes of interventions for children who use aided augmentative and alternative communication and children with autism, respectively (see box 6.1).

It is not possible to ascertain if the overwhelming positive impacts seen for programmes is genuine or reflects a publication bias.

Our REA found that a variety of programmes and interventions that had been implemented had positive impacts on a range of children's socio-emotional outcomes. While potentially promising, it is not possible to assess in this REA if this reflects a publication bias for positive results (Petticrew and Roberts, 2008), or whether programmes are generally effective at improving children's socio-emotional outcomes.

BOX 7.1 FINDINGS FROM SYSTEMATIC REVIEWS ON SOCIO-EMOTIONAL OUTCOMES OF NON-TYPICALLY DEVELOPING CHILDREN

Therrien et al. (2016) examined 19 studies in a narrative review of studies on the effects of interventions to promote peer interactions for children who use aided augmentative and alternative communication. The majority of studies focused on primary or secondary school-aged children; only eight participants (of 56 in total) were in preschool. All studies reported that interventions improved peer interactions for children, although the degree of impact and the quality of the evidence varied across studies.

Virues-Ortega et al. (2016) conducted a meta-analysis of 13 studies on the effect of the TEACCH intervention programme (Treatment and Education of Autistic and Related Communication Handicapped Children) on children with autism. Five studies included participants with a mean age of under 5. Overall, the meta-analysis found that TEACCH had moderate to large gains for participants' social and maladaptive behaviour, and small or negligible effects on communication, activities of daily living, and motor functioning.

Source: RAND Europe

The results for each outcome category are presented in more detail in annex F.²¹

21 The annexes to this report have been published separately. Available at: www.eif.org.uk/publication/teaching-pedagogy-and-practice-in-early-years-childcare-an-evidence-review

8. Impact of early years practices on physical outcomes

8.1 Headline findings

- Seven studies and one meta-analysis were identified in the REA as reporting on physical outcomes.
- The studies examined five programmes implemented at different levels. Three studies examined programmes related to Head Start, and the meta-analysis focused on the TEACCH intervention programme.
- About half the programmes studied aimed at improving children's physical outcomes.
- Almost all studies included children aged at least 3 years and living in the US.
- Most programmes except Active Play demonstrated small to moderate positive effects on children's physical outcomes.
- There is very limited evidence on which programmes may work better for children at risk.
- The overall body of evidence on programmes that impact children's physical outcomes is small, and more research needs to be done on what programmes might be effective and for which groups of children.

8.2 Summary of evidence

Seven studies and one meta-analysis were identified in the REA as reporting on physical outcomes.

Research on physical outcomes in the early years is limited compared to other outcome areas.

The studies examined five programmes implemented at different levels. Three studies examined programmes related to Head Start, and the meta-analysis focused on the TEACCH intervention programme.

The meta-analysis examined the effect of the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) programme. Of the included studies, three examined Early Head Start, Head Start and Head Start REDI. The remaining studies assessed Positive Action, Active Play, the Montessori Practical Life Activities programme and the Young Athletes programme. All the studies examined programmes that made changes at the curriculum level, with some also implementing setting- or teacher-level changes.

About half the programmes studied aimed at improving children's physical outcomes.

The Positive Action, Active Play and the Montessori Practical Life Activities programmes aimed to promote physical outcomes in children. Some programmes (such as Head Start, TEACCH) also targeted a range of outcomes in other domains.

Almost all studies included children aged at least 3 years and living in the US.

The majority of studies included children at aged 3 years and above. Six of the seven studies were conducted in the US; one study was conducted in the UK.

Most programmes except Active Play demonstrated small to moderate positive effects on children's physical outcomes.

The meta-analysis found that the TEACCH programme helped to improve the daily activities and motor functioning of children with autism. Across the seven studies, the nine outcomes measured were mostly positively impacted by the interventions; however, the Active Play programme was found not to improve children's physical outcomes. The studies that reported effect sizes (n=5) found small to medium effects. Very few studies conducted follow-up measurements.

There is very limited evidence on which programmes may work better for children at risk.

Almost no studies assessed how impacts might vary across different groups of children (and the two that did reported on gender effects). It was thus difficult to assess which programmes work better for different groups of children.

The overall body of evidence on programmes that impact children's physical outcomes is small, and more research needs to be done on what programmes might be effective and for which groups of children.

Our REA only found a limited number of studies reporting evidence on children's physical outcomes. It is thus too early to draw any conclusions about which programmes may be more effective and for whom.

The detailed results for physical outcomes are presented in annex G.²²

22 The annexes to this report have been published separately. Available at: www.eif.org.uk/publication/teaching-pedagogy-and-practice-in-early-years-childcare-an-evidence-review

9. Discussion

9.1 Strengths and limitations

The high-quality studies included in this REA (systematic reviews, meta-analyses or counterfactual studies) are able to provide robust evidence on what programmes or interventions ‘work’ for improving children’s outcomes in early years childcare. In particular, the REA focused on systematic reviews and meta-analyses drawing together a body of literature, as well as individual studies that implemented a robust counterfactual design with sample sizes of at least 50 in the treatment and control groups – therefore providing robust evidence on programmes and interventions. These quality criteria are aligned with existing platforms of evidenced-based practices such as the European Platform for Investing in Children (EPIC), maintained by the European Commission.²³ In order to be categorised as a ‘best practice’ on the EPIC platform, a practice must have been found to be effective in more than one population beyond the original study (in addition to meeting rigorous study design standards). The programmes and interventions that are highlighted in box 3.1 (programmes examined by multiple studies in the REA) in chapter 3 are examples of such studies. Having been replicated in more than one setting, we can have greater confidence in their potential impact in other contexts, such as the UK.

That said, the REA is constrained by its scope and a wider search to include more types of studies, different groups of search terms, as well as more databases and studies published over a longer time period and published in other languages may have produced different or more conclusive findings.

Most of the studies identified were conducted in the US and not replicated in other countries, making it difficult to assess how applicable the findings may be across cultural and other contexts. We only identified two studies conducted in the UK that met our robust inclusion criteria (Fricke et al., 2013; Foulkes et al., 2017). Additionally, most studies focused on children aged 3 years and over, meaning the evidence base for programmes and practices that might work for younger children is comparatively limited.

In addition, the heterogeneity seen in the differences between the programmes studied (in terms of length, frequency and intensity of programme) – and, in many cases, the lack of clear and complete descriptions of these programmes in the studies reporting on them – means it was difficult to draw firm conclusions about whether there are particular aspects of programmes or specific practices that are more effective for children. This also makes it difficult to assess, in particular where programmes followed a fixed curriculum or set of activities (that is, were ‘manualised’), whether programmes adhered to these prescriptions or whether they lacked fidelity.

Only a subset of the studies conducted follow-up assessments with children; of those, an even smaller number of studies continued to assess children after they

²³ This open online platform hosted by the European Commission provides a repository of practices in the fields related to child and family policies and reviews the quality of the evidence available for each practice according to a robust evaluation framework according to criteria related to ‘evidence of effectiveness’ (considering a number of study design factors, including sample size), ‘evidence of transferability’ (practice evaluated in more than one population) and ‘evidence of enduring impact’ (follow-up shows sustained impact for at least two years). More information on EPIC can be found at <http://ec.europa.eu/social/main.jsp?catId=1246&intPageId=4286&langId=en>.

entered primary school. Again, this made it difficult to draw firm conclusions about whether the generally favourable outcomes reported are maintained as children get older and as they transition into primary school, or if effects fade away. There were no studies that reported on children's outcomes beyond primary school.^{24,25} Similarly, few studies compared the impacts of programmes across different groups of children. It is thus not possible to assess which programmes might work better for children at greatest risk of falling behind.²⁶

9.2 Future research needed to strengthen the evidence base

As mentioned above, this review suggests that many programmes and interventions have shown favourable outcomes for children across many domains. However, the literature reviewed does not allow for a more fine-grained assessment of the *specific* pedagogical practices that work for improving outcomes. Moreover, the scale and breadth of the research conducted in this area underscores the challenge faced with distilling clear recommendations. Further, a number of limitations in the literature highlighted above suggest a great need for future research to inform policy and practice. Specifically, this review suggests the following important gaps.

More rigorous research into the effectiveness of programmes in England is needed.

The majority of the studies reviewed were conducted in the US, which severely limits the generalisability of the existing findings to contexts in England. There is increasing consensus in the prevention and implementation science field on the challenges of importing programmes developed overseas, specifically: the need to carefully consider the fit with the local context; to make appropriate adaptations while maintaining fidelity with the core elements of the original programme.; and, to rigorously evaluate to see if findings are replicated (Durlack et al., 2008; Ferrer-Wreder et al., 2012; Wang et al., 2005).

Future research should provide sufficient details on implementation.

Disentangling the core aspects of early childhood provision and process quality that are involved in promoting equity in developmental opportunities should be a priority in future research. This is only possible if researchers are able to assess in more detail the variation across programmes and how they were implemented. In England, the current model of evaluations conducted by the Education Endowment Foundation (EEF)²⁷ may go a long way in helping to fill this research gap. The evaluations commissioned by the EEF follow rigorous methodological procedures, provide detailed descriptions of the interventions evaluated and include detailed implementation process evaluations to monitor fidelity of implementation in the study. The EEF has recently begun funding evaluations of interventions in the early years²⁸ and, as these evaluations are published, we can expect to see the local body of evidence grow in this field.

24 Funded by the Department for Education, the longitudinal EPPSE study has followed over time a cohort of approximately 3,000 children born in England in the 1990s and is a notable exception.

25 It is worth noting that in this space again the Education Endowment Foundation (EEF) is contributing to filling this gap. For many of the evaluations they have commissioned, they will conduct follow-up analyses with national pupil outcome results as pupils progress through their school path. As they fund and publish more evaluations in the early years, this will also contribute to filling this gap in the research.

26 Again, the EEF evaluations typically report findings for pupils receiving Free School Meals premiums compared to their peers. As they fund and publish more evaluations in the early years, this will also contribute to filling this gap in the research.

27 See <https://educationendowmentfoundation.org.uk/>

28 See <https://educationendowmentfoundation.org.uk/school-themes/early-years/#projects>

More research is needed for children under 3 and those at risk.

There is relatively little research that examines the specific impact of interventions and programmes on children below the age of 3 years and on at-risk groups of children. The relative scarcity of studies investigating these areas means that policy-makers and practitioners are not able to focus their attention on children at greatest risk of falling behind their peers in terms of key developmental milestones. In particular, further evidence on the impact of specific practices for children under the age of 3 would be very relevant to help maximise the impact of government's free childcare entitlement for 2-year-old children from disadvantaged households.

A greater focus is needed on assessing the possible sustained impacts of programmes.

Notwithstanding the logistical difficulties in conducting longitudinal studies with children across age groups and settings, future studies should prioritise conducting more follow-up measurements with children over longer periods of time. Without such evidence, policy-makers and practitioners are not able to focus their attention on programmes with the longest impacts.

There is an opportunity to develop research focusing on key areas of early years teaching and practice.

There are a range of pedagogical practices and principles – such as scaffolding and child-centred learning – which are widely accepted as being part of effective early years education. However, we found few studies that considered the impact of these practices in isolation. Given the increased focus in the UK in recent years in piloting and trialling interventions in the early years, there is an opportunity to design, pilot and evaluate interventions that build practitioners' skills in these areas. This would enable the systematic assessment of whether it is possible to codify and improve practice and if such a change leads to improvements in children's outcomes.

Finally, work should be done to disentangle the common elements across the most effective interventions.

As noted, the studies identified through this review provide few examples where individual elements of programmes have been tested for effectiveness in isolation. However, it would be possible to take a more forensic look at the content of interventions, going beyond the peer-reviewed literature and to systematically identify common processes and practices deployed by the most effective programmes.

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