

DISCUSSION

Creating the conditions for robust early language development for all—Part 1: Evidence-informed child language surveillance in the early years

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Abstract

Background: The emergence of language in the early years is a major developmental accomplishment that underpins learning, enables social interaction and, later, is an indicator of well-being. Learning language is an effortless process for most, but can be challenging for others. There is a need to act early. First, because there are several social, environmental and family factors known to influence how language develops during the critical early years. Second, there is a robust association between a child's socio-economic circumstances and language outcomes. Put simply, children living in less advantaged circumstance have poorer language outcomes, which are apparent very early and persist across the lifespan. Third, children with demonstrated weaknesses in language learning in early childhood have poorer educational, employment, mental health and quality-of-life outcomes across the lifespan. Acting early to counter these impacts is important; however, there are several well-documented challenges in accurately identifying in the early years children who are at later risk of developmental language disorder (DLD) and to deliver prevention and intervention programmes to scale. This is critical because many services do not currently reach those who need them most; as many as 50% of children in need may not be receiving support.

Aim: To determine whether an improved surveillance system, based on best evidence, could be developed for the early years.

Methods & Procedures: We summarised findings from longitudinal, population or community studies that: (1) adopted bioecological models, (2) repeatedly measured language (including the early years) and (3) adopted similar methodologies, to identify factors that influence language outcomes.

Main contribution: The evidence confirmed that language development is not always stable but is characterized by distinct trajectories and each has distin-

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guishing social, environmental features. Children in the change or fluctuating groups tend to live in less advantageous circumstances that may not always support and enable language development. Risk factors tend to cluster and accumulate across the early years and beyond, thereby markedly increasing the likelihood of poorer language outcomes later in life.

Conclusions & Implications: In this the first of two papers, designed to be read together, we integrate research on the social determinants of child language and propose they be embedded into surveillance models. This has the potential to reach more children and those living in disadvantaged circumstances. In the accompanying paper we combine this information with evidence-informed early prevention/intervention approaches and propose the design and implementation of an early language public health framework.

KEYWORDS

child language, early years, surveillance

What this paper adds

What is already known on the subject

- There are several well-documented challenges in accurately identifying in the early years children who are at later risk of DLD and reaching those most in need of language support.

What this study adds to existing knowledge

- A combination of child, family and environmental determinants, collectively and cumulatively, play out over time and dramatically increase the risk of later language problems, in particular those children living in disadvantaged circumstances. We propose an improved surveillance system that incorporates these determinants be developed and that this be part of a whole of system approach to child language in the early years.

What are the potential or actual clinical implications of this work?

- Clinicians intuitively act to prioritize children with multiple features or risks; however, they can only do so for those who present or are identified to be at risk. Given many children with language problems are not being reached by many early language services, it is reasonable to ask if this knowledge can be integrated to improve reach. Or is a different surveillance model required?

INTRODUCTION

Development in the early years is both highly robust and highly vulnerable. ... What happens during the first months and years of life matters a lot, not because this period of development provides an indelible blueprint for adult well-being, but because it sets either

a sturdy or fragile stage for what follows. (Shonkoff & Phillips, 2000)

In the first few years of life there are rapid and remarkable developmental accomplishments which lay the foundations for health, well-being and development across the life course. This paper concerns the 'early years', defined here as birth to 4 years. In the words of Shonkoff and

Phillips (2000), what happens in the early years ‘matters a lot’ because an array of child, family and environmental factors influence and shape not only early development but also life-long outcomes resulting in significant disparities in health and well-being. Recognizing this, Marmot et al. (2010) identified ‘giving every child the best start in life’ as one the six key objectives to improving health and well-being.

Amongst the child’s many early developmental accomplishments is the ability to learn language, which is arguably the most distinguishing evolutionary feature of humans (Mountford, et al., 2022). Language development supports and sets the pace for learning, both informal and formal, and is fundamental to relationships and social interactions. Language is an important indicator of well-being across the life course, playing an important role in developing human capability and an individual’s life chances (Law et al., 2017a). Of all the socio-economic inequalities in child health and development, none is larger than those related to language (Bradshaw, 2011; Lynch et al., 2010; Nicholson et al., 2012). More than two decades of research has unequivocally demonstrated that weaknesses in language learning in the pre-school years increases the risk of poorer outcomes later in adolescence and early adulthood, namely, educational attainment, employment, mental health and general well-being (Beitchman, et al., 1986; Tomblin, et al., 1997; Young, et al., 2002). The biological underpinnings of language remain poorly understood as is the understanding of how biological factors might interact with early life factors.

For most children, the acquisition of language is an effortless process, however others can experience problems learning language. There has long been an imperative to act early to identify those children at risk and to intervene to prevent the deleterious life-long consequences associated with early language problems. However, there are well-documented challenges in the early years concerning: (1) the accurate identification, in the early years, of those children at risk of developmental language disorder (DLD) later in childhood; and (2) knowing how best to deliver prevention and intervention programmes at scale to reach those most in need. It is these challenges that we focus on in this and the accompanying paper (McKean & Reilly, 2023).

Persuasive evidence from longitudinal, population or community studies could help address these challenges, and three particular learnings underpin our thinking in this paper and the model we outline in the accompanying paper. First, that there is fluctuation in language development in the early years. Second, that there are distinct characteristics associated with different trajectories or language groups and it has become abundantly clear that children in change or fluctuating groups tend

to live in less advantageous circumstances predisposing them to influences that may not support and enable language development. Third, the risks in the early years accumulate, and as they do, so does the magnitude of the risk or poorer language outcomes across the life-course. In the first paper, we appraise these critical findings before proposing, in the accompanying paper, how this knowledge might be applied to better identify and support children in the early years who are at risk of later DLD.

This paper is organized into four parts. Part 1 is a brief overview of some key issues relevant to the study of child language and the criteria and terminology used to describe children with language learning difficulties. Part 2 outlines the key concepts that underpin recent thinking about child language in a social context, beginning with a description of Bronfenbrenner’s bioecological model. Of the many life-course frameworks, we selected this because of the holistic approach to child development across multiple domains and, importantly, its relevance to the early years and to language development (Wang et al., 2021). Part 3 documents the overwhelming evidence to support DLD being defined and understood as a public health problem. Part 4 summarizes and links new research explaining how language fluctuates and how early life factors cluster together and accumulate to characterize early aberrant language trajectories placing children at risk for future DLD. In both this and the accompanying paper (McKean & Reilly, 2023) we primarily focus on findings from large-scale, longitudinal studies that have adopted similar methodological approaches, noting that whilst there is burgeoning information about child language from large-scale population studies, there remains a paucity of information about the emergence of language in the early years. We conclude with a rationale of why we need to do things differently, how these new learnings might be integrated and how these underpin the proposed conceptual model are outlined in McKean and Reilly (2023). This model moves beyond screening at time points in the early years to an approach that addresses the inequities in child language development (Halfon, et al., 2014; Molloy et al., 2021; Pearce, et al., 2019).

KEY ISSUES RELEVANT TO THE STUDY OF CHILD LANGUAGE

Changes to methodological approaches used to study child language

Before the 1980–90s the bulk of clinical and research knowledge regarding child language development used to inform practice and policy originated from the study of individual or series of cases, groups of children with

distinct language profiles or clinical cohorts of children identified because they exhibited difficulty learning language. However, the past few decades have seen substantial changes in the field of child language driven by evidence emerging from longitudinal, large-scale representative samples of children (Beitchman, et al., 1986; Tomblin, et al., 1997) and the establishment of the first child language-focused cohorts (Norbury et al., 2016a, 2016b; Tomblin, et al., 1997). Longitudinal, large-scale representative study designs have allowed researchers to examine child language in populations for the first time. Many of these studies have tracked language development in a social context, that is, they concurrently measured aspects of the child's family and environment including socio-economic circumstances (Law et al., 2022). In addition, they have measured other domains of child development including academic and social-emotional development, and the outcomes of participants into adolescence and early adulthood. The focus in this paper is on evidence from large-scale longitudinal studies.

Changes to the criteria and terminology used to describe child language disorders

The terminology researchers and clinicians use to describe children who have difficulty learning language has also undergone change since the first recorded mention in 1822 (for a detailed description, see Leonard, 1998; McKean et al., 2018; Reilly et al., 2014). The more recent and substantial changes have relevance to this paper. Reilly et al. (2014) questioned the validity of continuing to use the label specific language impairment (SLI). This term had been coined and embedded in practice before the availability of information from large-scale longitudinal cohorts. Using data from several longitudinal studies, Reilly et al. demonstrated that there was no empirical evidence to support the continued use of the diagnostic criteria and terminology of SLI and limited evidence that it provided real benefits for children and their families. In a population of school-aged children, Norbury et al. (2016b) demonstrated that there were no differences in the severity of the language deficit, social, emotional and behavioural problems, or educational attainment when comparing children with average and low-average non-verbal IQ scores, yet non-verbal IQ had previously been a key exclusionary criterion. At the same time Bishop (2014) noted the proliferation of terminology in use and the problems this created for research, clinical practice and children with DLD and their families. Bishop et al. (2016, 2017) led a major initiative to reach consensus to change the terminology used to describe children who experienced difficulty learning language resulting in the use of the preferred term DLD (Bishop et al., 2016,

2017). The traditional exclusionary criteria, used previously to describe language problems, were replaced with a threefold distinction between differentiating conditions, risk factors and co-occurring conditions. An important consideration in the change was that the diagnosis be ascribed to children with persisting language problems that lead to functional impairments (Bishop et al., 2017; McKean et al., 2022). This consideration emphasizes that whilst functional limitations may be apparent in some children very early, for others the limitations may take longer to emerge and may vary and depend on the environment in which the child is communicating. There is, however, consensus across many (but not all) countries, that the term language disorder (LD) is recommended when it is known to be associated with a differentiating condition and DLD when there is no differentiating condition (Bishop et al., 2017). This change, Bishop et al. highlighted, creates some discontinuity with interpreting the prior literature.

Why are the changes to terminology important? Clearly, demonstrating the lack of empirical evidence for the use of the term SLI was important, however the CATALISE consensus process (Bishop et al., 2016, 2017) also highlighted the challenges in the early years given the lack of certainty about which children will go on to have later DLD. This is because a key characteristic in the early years is the fluctuation observed both in early typical language development and in the trajectories of those with language vulnerability. This variability in developmental language trajectories has been observed across several cohorts and results in less certainty about whether the problem may persist into childhood and beyond (Bavin et al., 2008; Bornstein et al., 2016; Reilly et al., 2017; Ukoumunne et al., 2012; Zambrana et al., 2014).

The prevalence of DLD

The variability in the prevalence of DLDs is affected by how DLDs are determined and the research population used to derive the estimates. Prevalence estimates of child language disorder also vary considerably according to the age at which language is measured and which measure(s) is used. In school-aged children, using similar criteria, prevalence estimates tend to be within a narrower band of 5–8% which equates to around two in every 30 children in a school entry classroom (Norbury et al., 2016b; Tomblin et al., 1997). Longitudinal population studies have tended to adopt broader criteria to define language ability and used briefer measures and prevalence estimates therefore tend to be higher, with some studies reporting 14–20% of 4–7-year-olds to have problems (McKean et al., 2015; Reilly et al., 2010). However, the early years are the most problematic—how should we refer to or label children

who have problems learning language in the early years when we are not sure if the problems will persist? Perhaps this is not an ideal time and prevalence rates should be determined later in childhood when language is more stable, although as Sansavini et al. (2021) highlighted there is currently no specific guidance.

This introduction gives some insight into the conundrum the early years present for child language researchers, clinicians, and early childcare health and education professionals. Recently, Eadie et al. (2022) wrote about this issue, highlighting a range of challenges that introduce further uncertainty about the early years, including which language domains should be measured, what are the best reporting and observational methods to use to measure language ability, when they should be measured and what cut points or boundaries should be used to determine language criteria (Eadie et al., 2022). Unsurprisingly, these challenges present a myriad of reasons for not recommending that screening be adopted to detect early child language problems; the currently available tools and methods do not meet rigorous, internationally accepted screening criteria (Nelson et al., 2006; Wallace et al., 2015; Wilson et al., 2022).

KEY CONCEPTS: CHILD LANGUAGE IN A SOCIAL CONTEXT

Viewing child language in the early years through a life-course development lens

Life-course models typically comprise five main periods commencing in utero, continuing through infancy, childhood and adolescence, and culminating in adulthood. The first three periods are considered critical because they lay the foundations for optimal future health and development. There are several life-course models or frameworks and each views health as a developmental process that is particularly sensitive in the early years to the dynamic interactions that occur between children and their environments (Halfon et al., 2014). The social determinants of health, that is, where a child lives, learns and plays, have a major impact on a child's well-being, development and quality of life. Multiple individual, family, community and system factors, interacting dynamically across the early years, determine outcomes across the life course. Lynch and Davey Smith (2005) describe the life-course approach as one that 'recognizes the importance of time, and timing, in understanding casual links between exposures and outcomes within an individual life course across generations and on population disease trends'. COVID-19 has highlighted health and socio-economic inequalities even further with the impact being felt disproportionately by

some of the most vulnerable in the community and these effects will be felt into the future.

Along with many other child health researchers (Pearce et al., 2019) we favour Bronfenbrenner's bioecological model (Figure 1) to explain how these multiple and complex factors interact to influence child language development in the early years. In Bronfenbrenner's model the child is surrounded by several ecosystems. At the heart of the model is the first ecosystem, the microsystem, which represents the child's most intimate and immediate environment in the early years. This is the environment in which the child lives and is cared for, in which the earliest child-carer relationships are formed. In the model the microsystem captures characteristics of the family and the environment that influence and shape the child's development including parental educational levels and mental and physical health, available resources and parent responsiveness. Given how close they are to the child they are known as proximal factors. As Figure 1 shows, the child is also surrounded by and enmeshed in several other ecosystems. Typically described as distal factors, because they are further from the child, these ecosystems represent multiple layers of influence that interact and play out over time (Bronfenbrenner, 2005). Together or individually, they can protect, buffer or expose children to factors that can increase or decrease developmental vulnerability. The multiplicity of factors, dimensions and levels in the model are not static but interact dynamically across the life course. The model does not explicitly reflect the child's biological endowment that may predispose how they respond to influences and whether environmental factors (particularly in the preschool years) might influence gene expression (epigenetics).

Child language development and socio-economic circumstances

Although, socio-economic status or circumstance are a multifaceted construct that can be measured and determined in different ways, there is no doubt that children living in disadvantaged circumstances are at greater risk of poorer health and well-being compared with their counterparts living in more advantaged environments. These disparities have been well documented in numerous longitudinal studies (e.g., Pearce et al., 2019; Rougeaux et al., 2017; Weightman et al., 2012) with strong agreement about the influence that socio-economic circumstance can wield in childhood and across the life course. In the early years, children are highly dependent upon the adults who care for them and have no control over their socio-economic circumstances and the factors in the micro- and meso-systems (Figure 1) likely to influence

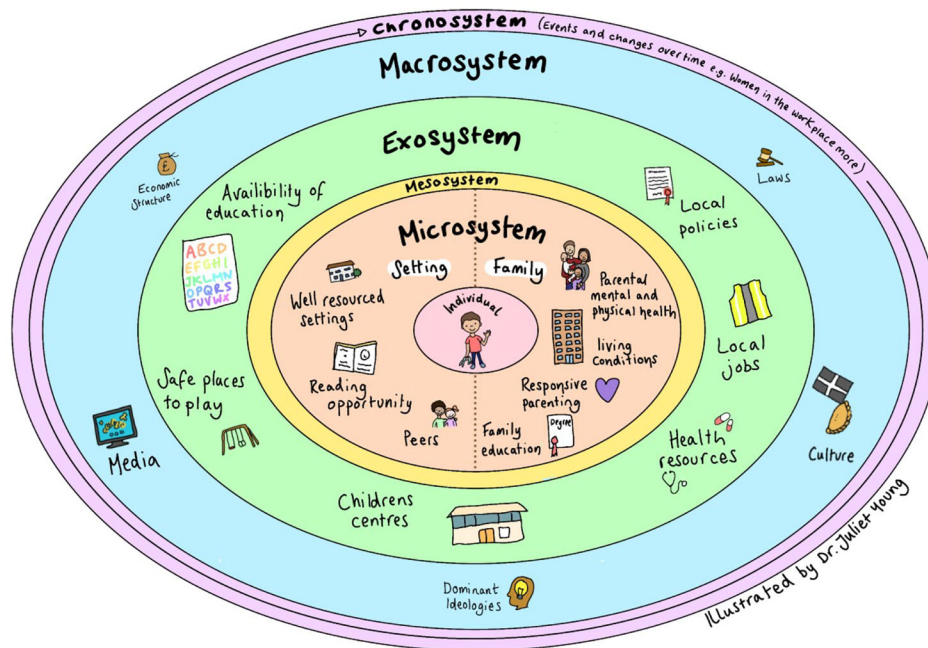


FIGURE 1 Bronfenbrenner's bioecological model adapted to illustrate the social and environmental factors that influence language development

their health and well-being (Pearce et al., 2019). A child's socio-economic circumstance is therefore determined by measuring aspects of their surroundings and that of their primary caregiver(s). These aspects might include distal measures (see the exo- and microsystem in Figure 1) such as where one lives (e.g., postcode and neighbourhood) what the family income is, and the level of the parental education. Proximal factors (see the exo- and microsystem in Figure 1) are more likely to capture what a parent does (e.g., interactive book reading; quality of parent interaction). Many studies attempt to capture both proximal and distal factors and, of course, they are not independent; family income could influence the availability of books and toys in the home and parental education levels can influence literacy levels and in turn shared book reading, for example.

Increasingly child language researchers refer to the social determinants of language development (e.g., Di Sante & Potvin, 2022; Law et al., 2019) to more accurately describe the environment and experiences and social contexts that support and shape language development in the early years (Di Sante & Potvin, 2022; Hoff et al., 2022; Pace et al., 2017). These authors, and many others, demonstrate that the quality of the child's early language environment, characterized by rich verbal interactions, is one of the most important social determinants contributing to group and individual differences in the rate and course of child language development. Further, these interactive, linguistic and conceptual dimensions of caregiver language input vary with socio-economic circumstances and interact more

broadly with other structural, material, behavioural and psychosocial factors (e.g., Rowe & Snow, 2020). In Figure 2 we have drawn on the work of Pearce et al. (2019) and others to illustrate how structural and material factors, including, socio-economic circumstances, as well as behaviour and psychosocial factors influence child language in the early years. We acknowledge that many of these factors do not act in isolation but are interrelated and the influence exerted is often multidirectional. The implications of this body of work highlight that it is essential to adopt a social determinants model to conceptualize the impact of disadvantage on child language development in the early years. We also acknowledge that biological factors influence child language outcomes, including a family history of language, literacy and learning problems. The biological factors do not exert influence in isolation but are highly likely to interact with and influence some of the social determinants.

A robust association has been established between child language and socio-economic circumstances: the association is apparent early, well before entry to formal schooling, affects multiple language domains and is pervasive, persisting across the lifespan (Di Sante & Potvin, 2022; Pace et al., 2017). Compelling data from three longitudinal studies (Millennium Cohort Study—MCS; Growing Up in Scotland—GUS; and Early Language in Victoria Study—ELVS) demonstrated on average children in the lower quintiles (i.e., living in more disadvantaged circumstances) had poorer language skills as measured by naming vocabularies (MCS and GUS) and core language scores

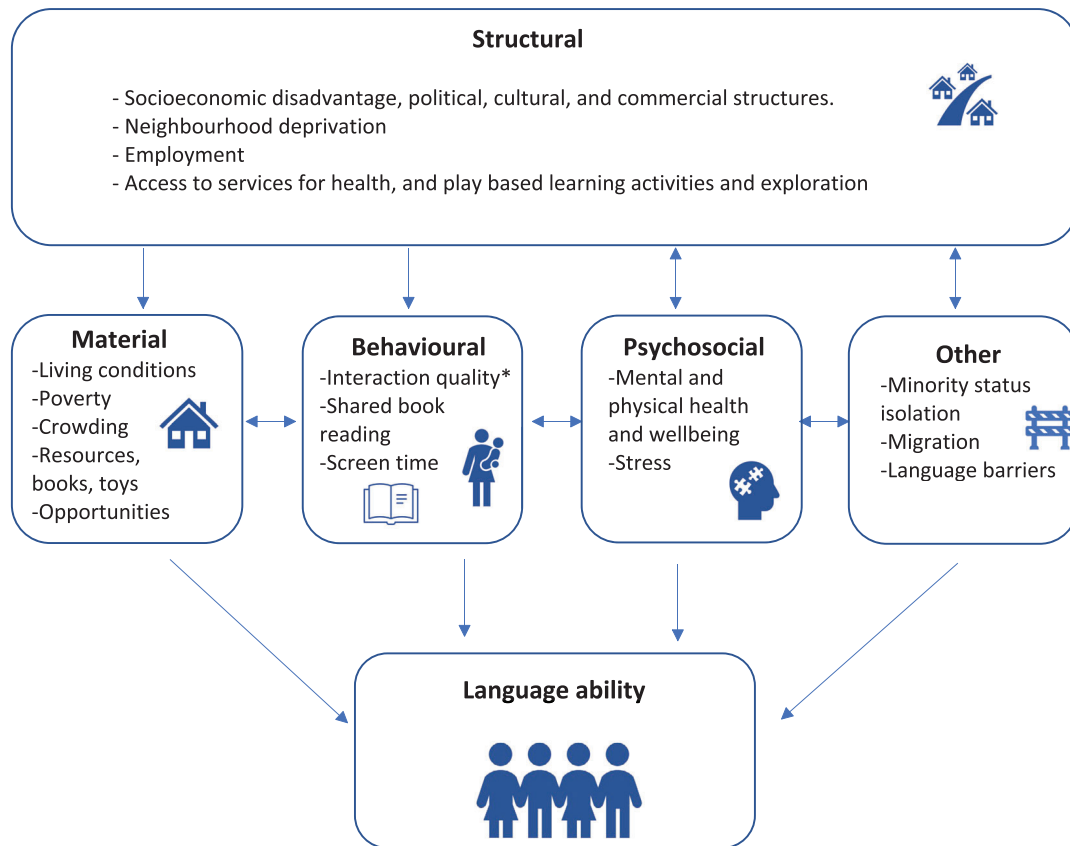


FIGURE 2 Structural, material, behavioural and psychosocial factors that interact to influence child language outcomes in the early years

Sources: The model is adapted from Pearce et al. (2019) and Diderichsen et al. (2001).

(ELVS) (Law et al., 2017b; Reilly et al., 2014). In a European collaborative using data from three cohort studies, mother's education levels were found to significantly affect early child language skills with a common gradient across the three countries (Germany, the Netherlands and England) (Wareham et al., 2021). Both high and low language performance have been observed in research studies across the socio-economic spectrum; however, the social gradient remains strong; average language skills in children growing up in more advantaged circumstances are higher than the average language abilities of those living in more disadvantaged circumstances (Di Sante & Potvin, 2022; Law et al., 2019; Wareham et al., 2021). In Box 1 we summarize key findings from longitudinal studies regarding the social gradient.

Whilst the cause of DLD is unknown, there remains no doubt that greater socio-economic disadvantage, whilst complex and multifaceted, contributes to poorer language outcomes. As highlighted in Box 1, the 'stage' (as described by Shonkoff & Phillips, 2000) can be very 'fragile' for some children who, by circumstance of birth, find them-

selves in less advantaged circumstances. The result may be long-lasting impacts felt across the life course.

VIEWING DEVELOPMENTAL LANGUAGE DISORDER AS A PUBLIC HEALTH PROBLEM

Over the last decade Law et al. (2017b) have compiled evidence to support DLD meeting the criteria for and being considered a public health problem, namely:

- DLD places a large burden on society.
- DLD is unfairly distributed.

There is evidence that upstream preventative strategies might reduce the burden of DLD if public health approaches were taken.

In Table 1 we expand on Law's earlier evidence providing a detailed summary of the evidence demonstrating that DLD more than meets these criteria. Despite child

BOX 1. The social gradient for child language development: evidence from longitudinal population studies

- Children living in less advantaged circumstances with limited family resources (e.g., low socio-economic status (SES), low income, low maternal education) have poorer language outcomes (Di Sante & Potvin, 2022; Houweling et al., 2022; Law et al., 2019; Reilly et al., 2010; Ribeiro et al., 2020; Wareham et al., 2021).
- Differences in average language performance are pronounced in the lower socio-economic quintiles; however, slight gains in social and economic resourcing, such as moving from quintile 1 to 2, also are associated with gains in language performance (Di Sante & Potvin, 2022; Law et al., 2017a).
- The distribution of language scores narrows with increasing socio-economic circumstances across time (Reilly et al., 2014; Snowling et al., 2016).
- Improving or resolving language trajectories is associated with more advantaged circumstances and persistent trajectories with less advantaged circumstances (Snowling et al., 2016; Ukoumunne et al., 2012).
- The vocabulary knowledge gap widens over time (Taylor et al., 2013, 2022; Sullivan et al., 2022).
- The variation in the rate of children's language progress is partially explained by social determinants in the child's home environment such as the number of books in the home, television viewing and the frequency of being read to (Law et al., 2019; McKean et al., 2015).

language being a core competency at the heart of the development of human capability, it has become increasingly clear that every child is not getting the same start in life: the burden is unfairly distributed. A major challenge is to understand what possibilities there are to alter children's early language pathways and the timing of doing so. Targeting the early years is not in doubt given that the highest return on investment is in the early years because 'it builds the base that makes later returns possible' (Conti & Heckman, 2012). However, before we can achieve this for children at risk of later DLD it is critical we understand how best to identify children at risk and what resources should be allocated to whom and when. We acknowledge

that this cannot necessarily be achieved in isolation but part of initiatives to shape the economics of Health for All (WHO Council on Economics for All 2021) which has an ambition to build 'healthy societies that are just, inclusive, equitable and sustainable'.

The terminology used in life-course development and public health models is grounded in epidemiology. Public health models fundamentally aim to prevent or reduce illness or problems by identifying risks and then targeting policies, prevention and intervention programmes at the known risks. Many of the risks known to influence healthy development and well-being (Figures 1 and 2), extend well beyond the domains of health into other agencies and services such as education and local government. In this and the accompanying paper, we use the term *public health* and its framework recognizing that the approach encompasses a broad range of services and systems, including health, that are involved in the promotion of healthy development and well-being. The terminology we adopt in both papers also refers to early life *factors* that influence language development rather than viewing these factors as risks per se. Whilst some may argue this is 'splitting hairs', we think it is important, as the way individual factors play out for families can be multifaceted and variable. Taking bilingualism as an example, in some epidemiological studies, being from a non-English-speaking family has been characterized as a 'risk'. That is, it is used as a proxy for other demographic factors such as being from an immigrant family with perhaps fewer resources and limited social support. However, bilingualism per se is not a risk, instead it is a cognitive and social advantage (Peña et al., 2022). Bilingualism is an important factor to be explored and considered in epidemiological models. In a perfect world having language measures in multiple languages and with detailed language exposure would be the ideal and should be lobbied for in future research. However, including and characterizing bilingualism as a relevant early life factor, rather than excluding this group from research completely is, in our view, currently the best available course. In isolation, any single factor is not likely to negatively influence a child's language development, a point that we now explore further in the following section.

THE CHILD'S ECOSYSTEM AND LANGUAGE DEVELOPMENT IN THE EARLY YEARS

Fluctuation

The development of language in the early years is characterized by 'periods of swift growth and a relatively consistent sequence' (Eadie et al., 2022). Individual

TABLE 1 Criteria for determining a public health problem: The evidence for DLD

Criteria for a public health problem	DLD evidence summary	Evidence source(s)
Prevalence of the condition	5–8% of school-aged children with higher rates reported to be as high as 14–20% in population-based studies	Tomblin et al. (1997); Reilly et al. (2014); Norbury et al. (2016b)
Significance has increased	The significant shift from blue-collar manual employment to white-collar roles in which oral and written communication are highly desirable and mean young people with a communication disability are more vulnerable	Rubén (2000); Law et al. (2013); Reilly et al. (2014)
Consequences are significant and pervasive	<p>The impact is felt across the life course on learning, socio-emotional development, employment, community engagement, social and civic life. Children with DLD are:</p> <ul style="list-style-type: none"> • Six times more likely to have reading disabilities and significant spelling problems and four times more likely to struggle with mathematics • A total of 12 times more likely to face all three of these difficulties combined • Declining parent-reported QoL more likely between 4 and 9 years • Girls are three times more likely to experience sexual abuse • Boys are four times more likely to engage in delinquent behaviour <p>Youth with DLD:</p> <ul style="list-style-type: none"> • In a 12-month period, 71% of those sentenced in the UK Youth Justice System had speech, language and communication needs <p>Adults with DLD:</p> <ul style="list-style-type: none"> • Six times more likely to experience clinical levels of anxiety • Three times more likely to have clinical depression • Twice as likely to go over a year without employment than other adults 	Young et al. (2002); Brownlie et al. (2004); Conti-Ramsden and Botting (2008); Law et al. (2009); Levickis et al. (2018); Cronin et al. (2020); Cronin and Addo (2021); UK Government Publishing Service (2021); Hoff et al. (2022); Eadie et al. (2022)
Burden unfairly distributed	The social gradient is evident: <ul style="list-style-type: none"> • The prevalence of DLD increases as disadvantages increase • Children living with disadvantage are three times more likely to have low language 	Locke et al. (2002); Reilly et al. (2014); Law et al. (2015, 2017a; 2022); Brushe et al. (2021); Taylor et al. (2022)
Increased healthcare and education costs across childhood	Increased healthcare costs notable in early in childhood through to early teens. Under- and over-servicing evident	Cronin et al. (2017); Le et al. (2022)
Inequitable access (Boxes 4 and 5)	Underrepresentation of children with LD in services is driven by the geographical location of services, minority status, gender and socio-economic status Financial constraints (e.g., high out-of-pocket expenses). Mismatch between service location and child vulnerability and socio-economic disadvantage	Bercow (2008, 2018); Skeat et al. (2014); Morgan et al. (2016); McGregor (2020)
Evidence that early prevention/intervention can substantially reduce the burden	There is evidence that early prevention/intervention can substantially reduce the burden. In the accompanying paper (Table 1), illustrative examples of primary and secondary preventative intervention studies for children aged 0–5 years are displayed	Markussen-Brown et al. (2017); Greenwood et al. (2019); Heidlage (2019); Levickis et al. (2022); Justice and Cabell (2022); Law and Charlton (2022); see McKean and Reilly (2023: tab. 1) for illustrative examples and sources

Note: DLD, developmental language disorder; LD, language disorder; QoL, quality of life.

variation in the rate of progress is also a feature, with fluctuating language profiles evident across the early years in children with typical early development and also in those with vulnerabilities (Bavin et al., 2008; Eadie et al., 2014, 2022; Poll & Miller, 2013; Zambrana et al., 2014). The aim of this section is to summarize the body of knowledge concerning language trajectories, focusing on what is known about their nature and characteristics in the early years and beyond. This includes a review of the child, family and environmental factors associated with language trajectories as a prelude to discussing new research about early life risk factors, specifically how they cluster together and accumulate, thereby increasing the risk of poor, later language outcomes. In summarizing this body of research, we highlight how this knowledge might inform surveillance models in the early years, which underpins the accompanying paper (McKean & Reilly, 2023).

There are several reports describing child language trajectories; however, many originate from clinical samples of selected or predetermined populations which are not necessarily representative of the population or the community (Bishop & Edmundson, 1987; Bornstein et al., 2016). Whilst birth cohorts are the ideal samples in which to map language trajectories, few contain repeated or detailed measures of child language. Other valuable cohorts commence later in childhood (e.g., Norbury et al., 2016b; Tomblin et al., 1997) with no measures in the early years and there are few studies that bridge the early years through childhood to early adolescence. Perhaps unsurprisingly, the measures used, the methodological approaches taken and the sample sizes vary, making it difficult to draw comparisons and in some circumstances methodological shortcomings were identified (McKean et al., 2017, 2022).

For these reasons we have deliberately limited our review to longitudinal population or community cohorts, or those that draw a sample from the former, primarily because they are more likely to be representative of the population from which they are drawn. Further, the studies are characterized by several common features:

- Prospective and repeated measurement of language or language domains over a range of ages including at least one measure in early years (0–4 years).
- Measurement of a broad range of factors likely to predict outcomes of interest as well as factors associated with individual trajectories.
- The application of longitudinal trajectory latent class analyses to identify different subgroups of children. Latent class analysis is based on the idea that individual subgroups or classes can be explained by patterns that differentiate them from each other. The methodological advantages include a reduction in measurement error in

subgroup analyses and avoidance of high Type 1 error rate (Lanza & Rhoades, 2013; Määttä et al., 2012; McKean et al., 2017).

The characteristics of child language trajectories

We identified eight reports from five cohorts originating in four countries (Norway, Finland, UK and Australia) that met the above criteria. The key characteristics of each study are summarized in Table 2, including sample size, country of origin, age(s) at which language was measured and details of the number of language trajectories identified. Whilst variation is evident, there are many similarities which we summarize below along with the characteristics and distinguishing features of the trajectories.

Typically developing trajectory

Each study described a group of children whose language was consistently within the normal range.

Distinguishing feature(s)

More likely to be associated with well resourced, developmentally enabled home environments and with more highly educated mothers.

Fluctuating trajectory(ies)

Fluctuating or change categories (albeit with different descriptors) were common across studies and more pronounced in the early years. Notably, some children continued to move between language trajectories (impaired and non-impaired later) later in childhood, after the commencement of formal schooling (McKean et al., 2017; Zubrick et al., 2015).

Distinguishing feature(s)

Improving and decreasing trajectories were identified. Improving trajectory(ies) were more likely to be associated with environmental factors including greater disadvantage, being from a non-English-speaking background (NESB), and having fewer books in the home; higher levels of maternal vocabulary and education (Ukoumunne et al., 2012). Decreasing trajectory(ies) were more likely to be associated with biological factors such as being male, having lower birth weight, increased socioemotional problems and growing up in families with lower literacy and educational levels (McKean et al., 2015, 2017; Snowling et al., 2016).



TABLE 2 Summary characteristics of studies using latent class analyses to determine language trajectories commencing in the early years

Source	Country	Sample size	Ages of language measured (years)	Number of classes
Zambrana et al. (2014)	Norway	10,587	3 and 5	Four classes: (1) typical; (2) late onset; (3) transient; and (4) persistent
Ukoumunne et al. (2012); Määttä et al. (2012)	Australia	1607	1, 2, 3 and 4	Five classes: (1) typical; (2) precocious late; (3) impaired early; (4) impaired late; and (5) precocious early
Määttä et al. (2012)	Finland	271	12, 15, 18, 21 months and 4.7 years	Six classes: (1) average; (2) above average; (3) average with fluctuating social skills; (4) below average with symbolic difficulties; (5) expressive difficulties; and (6) broad difficulties
Snowling et al. (2016)	England	220	3.9, 5.08 and 8.01	Three classes ^a : (1) resolved; (2) persistent; and (3) emerging
McKean et al. (2015, 2017)	Australia	1290	4, 5 and 7 4, 5, 7 and 11	Three classes: (1) stable; (2) low increasing; and (3) low decreasing
Zubrick et al. (2015); Christensen et al. (2017)	Australia	4000 2792	8 and 9	Six classes: (1) stable middle high; (2) stable low; (3) improving; (4) declining; (5) fluctuating low; and (6) fluctuating middle high

Note: ^aA predetermined group of children with typical language was recruited as a comparison.

Persistently low trajectory

Described in each study except for the report by Ukoumunne et al. (2012).

Distinguishing feature(s)

Children in persistently low trajectories were more likely to be male, to have had low language comprehension (earlier), to have more severe and pervasive language problems, to have a family history of delayed language or late talking and to be living in socially disadvantaged circumstances (e.g., Snowling et al., 2016; Zambrana et al., 2014).

Late emerging group

Language problems did not become evident until after the commencement of formal schooling.

Distinguishing feature(s)

More likely to be associated with familial risk factors (Snowling et al., 2016; Zambrana et al., 2014).

The latent class analyses demonstrate that whilst language is stable for many children in the early years, it is not a universal characteristic. Distinct language trajectories have been identified across the early years into the late childhood. Attempts to identify children at risk of later LD may therefore be successful at identifying children in stable low trajectories but highly likely to miss those in fluctuating or change trajectories, as well as those with

late onset trajectories. This is of concern to early child language services given that children with low language at 4 years are more likely to have persistent and pervasive problems with language learning and are less likely to close the gap between them and their peers (McKean et al., 2015; 2017; Norbury et al., 2016a). McKean et al. (2015) and Snowling et al. (2016, 2017) reported that most of the children in the low decreasing trajectory had dropped by more than 2 SD below the mean by outcome at 11 years. There is also growing evidence suggesting that the risk profiles associated with different trajectories vary, although disadvantaged circumstances appear to exert influence across both the fluctuating and low trajectories.

Child, family and environmental influences on language trajectories

The Life Course framework and Bronfenbrenner's bioecological model highlight the complex and multifaceted factors that can influence language trajectories. Undoubtedly, understanding these better will inform the identification of children at risk of developing DLD in the early years as well as determine the best approaches to support language learning and tailor these to the needs of individual or groups of children.

McKean et al. (2015, 2022) documented the individual differences in language trajectories of children aged 4–7 years, creating three groups (child, family and environment) of early life factors from a total of 22. The least mutable factors were those that cannot be modified such

as the child's family history of language difficulties, the upstream or societal determinants that were linked to broader government policy, disadvantage, and the physical and economic environment (Figure 1, Bronfenbrenner's ecosystem). Factors that might be considered mutable included the downstream societal determinants related to an individual's health related knowledge, beliefs and behaviours. Examples include the frequency of shared book reading, the number of books in the home, etc. Together the 22 early life factors explained 67% of the variability in language growth between 4 and 7 years. Mutable early life factors, that is, potentially changeable via intervention, explained a total of 23% of the variance in the slope between 4 and 7 years, including factors in the child's home learning environment, such as number of books in the home, frequency of shared book reading, television viewing and pro-social scores.

For most children, the presence of a single risk factor or even a small number of intermittent risks, in the early years may not result in adverse developmental consequences. However, it has become clear in several other child health domains that the presence of multiple risks and how the risks cluster and accumulate has been found to be associated with a range of poorer child outcomes including mental health, obesity and cardiovascular disease (Gobel & Cohrdes2021; Hakala et al., 2021). Recently published research concerning risk factors and how they might group together and accumulate over time across the early years to influence language trajectories has advanced knowledge. Using the criteria outlined earlier we identified four reports from two Australian cohorts (briefly described in Boxes 2 and 3 and Table 3) that examined whether the number and clustering of risk factors predicted later language outcomes (Christensen et al., 2017; Eadie et al., 2022; Taylor et al., 2022). Each study was designed to be broadly representative of the population and community and the selection of risk factors for the analyses was guided by Bronfenbrenner's bioecological model. Table 3 outlines the main characteristics of the samples for the two cohorts along with specific information about the language domains measured, the measures used and the age at which language was measured. The early life factors included in each study are listed, and the similarities between these highlighted by the shading.

Christensen et al. (2017) and Taylor et al. (2022) identified six latent classes whereas Eadie et al. (2022) identified four classes as shown in Tables 4 and 5. Common to the studies is the existence of a *developmentally enabled* group comprising the largest number of children and the lowest likelihood of risk(s). Children with vulnerable profiles were also common, although they were described and grouped differently across the studies. A feature of the vulnerable groups was socio-economic disadvantage

BOX 2. Characteristics of the Early Language in Victoria Study (ELVS) (Reilly et al., 2018)

- Aim: To address specific knowledge gaps regarding language development across the early years and a broad range of child, family and environmental factors that might predict language outcomes.
- Design: A prospective, longitudinal community study of participants growing up in Melbourne, Australia.
- Participants: 1907 children and their families recruited at age 8–10 months and subsequently tracked through to adolescence and into early adulthood.
- Measures: Information about language and developmental domains was obtained via multi-source informants, direct assessment and linkage to nationally acquired academic achievement data and national health service utilization. Information about service costs and service utilization and health related quality of life was also collected.
- Further information about the cohort can be obtained via the cohort profile and the Melbourne Children's Life Course website (Reilly et al., 2018; <https://lifecourse.melbournechildrens.com/cohorts/> accessed on 23 January 2023)

and less-than-optimal home learning environments. Eadie et al. calculated the risk of having low language at age 7 for each of the four classes. Children in the vulnerable group, that is, where the child's language development was characterized by low use of early gesture and poor expressive vocabulary development combined with a less-than-optimal home learning environment, were 13.7 times more likely to have low language at 7 years.

In further analyses, using the same cohort but different approaches, Christensen et al. (2017) and Taylor et al. (2022) took a slightly different approach and calculated the number of risks associated with each group or class. The *overwhelmed group* had an increased likelihood of all risk factors except for being from a NESB. This group had the highest number of families from an indigenous background, the highest number of mothers with low education and mothers were more likely to be unemployed and have mental health distress. Further, the families lived with greater socio-economic disadvantage, were more likely to have four or more siblings and less likely to read with the



TABLE 3 Characteristics of the samples for the Early Language in Victoria Study (ELVS) and the Longitudinal Study of Australian Children (LSAC).

	ELVS (Eadie et al., 2022)	LSAC(Christensen et al., 2017; Taylor et al., 2022)
In-scope sample (<i>n</i>)	1208	4983
Age at outcome (years)	7	8–9
Language measures and age measured	Clinical Evaluation of Language Fundamentals (CELF—P2 and P4, respectively); 4, 5 and 7 years	Adapted from the Peabody Picture Vocabulary Test—III (PPVT); 4, 6 and 8 years:
Risk factors	17 child, maternal and family factors as follows: <i>Child</i>	16 child, maternal and family factors as follows: <i>Child</i>
	<ul style="list-style-type: none"> • Low birth weight • Temperament high shyness • Temperament low sociability • Emotional and behavioural difficulties • Poor prosocial skills • Low gesture use • Low non-verbal cognition • Low expressive vocabulary • Male gender 	<ul style="list-style-type: none"> • Low birth weight • Temperament low in persistence • Temperament high reactivity • Indigeneity • low school readiness
	<i>Maternal</i>	<i>Maternal</i>
	<ul style="list-style-type: none"> • Low education • Mental health symptoms • Non-English speaking • Low parent responsivity • Low vocabulary • Low number of books in the home 	<ul style="list-style-type: none"> • Low education • Mental Health symptoms • Mother non-English speaking • Low parental consistency • Teenage mother • Unemployment
	<i>Family</i>	<i>Family</i>
	<ul style="list-style-type: none"> • Socio-economic disadvantage • Family history speech and language problems 	<ul style="list-style-type: none"> • High neighbourhood disadvantage • Four or more siblings • Low family income • Healthcare card • Child not read to in last week

Note: CELF-4, Clinical Evaluation of Language Fundamentals, Fourth edition; CELF-P2, Clinical Evaluation of Language Fundamentals Preschool, Second Edition; PPVT-III, Adapted Peabody Picture Vocabulary Test—III.

children. On average children in this group were exposed to 6.1 risks.

Taylor et al. then fitted growth models to the six groups, and these are illustrated in Table 6 (Christensen et al., 2017; Taylor et al., 2022). The language measure was the Peabody Picture Vocabulary Test (PPVT) receptive vocabulary scores which were obtained at four time points defined as median ages 50, 57, 82 and 105 months. In Table 6 the PPVT point scores are provided for baseline (median age = 50 months) and outcome measures (105 months), as illustrated in columns 4 and 5. The authors converted scores at baseline and outcome (see columns 3 and 6) to difference in months scores to ease interpretation.

Compared with the reference group, the *developmentally enabled group*, all five groups lagged on receptive vocabulary, ranging from a lag of 5.8 to 26.3 months (see column 3). The delay was marked for the *overwhelmed* and *resource-poor NESB* classes where the gap was 18.9 and

26.3 months, respectively. Column 6 illustrates the difference scores at follow-up 4 years later (105 months). The delay in receptive vocabulary persisted and the difference in months ranged from 4.7 to 13.1 months. Three groups, the *working poor*, *developmental delay* and *low human capital* groups, demonstrated no to limited growth over this period, whereas the *resource-poor NESB* group more than halved the delay from 26.3 to 10.4 months. The children in the *overwhelmed group* had the greatest delay (13.1 months) although they did close the gap by approximately 6 months.

Taking a different approach, Eadie et al. (2022) quantified the association between the number of early life risk factors and low language outcomes in later childhood using the same sample and participants reported in the latent class analysis earlier. Of the 966 children, 87 (8.7%) presented with low language at 7 years and 50% of these children had six or more risks. Of the children with

BOX 3. Characteristics of the Longitudinal Study of Australian Children (LSAC) (also referred to as the Growing Up in Australia Study)

- Aim: The broad aim of the study was to find out how well Australian children were doing on several key developmental outcomes and to understand pathway markers, early indicators or constellations of behaviours that are related to different child outcomes. In addition, seven broad research questions and a number of other specific questions were developed.^a
- Design: A prospective, longitudinal, multiple cohort cross-sequential study of children growing up across Australia.
- Participants: Two cohorts were recruited in 2004 of approximately 5000 children in each. Cohort 1, aged 0–1 years and cohort 2, 4–5 years, were subsequently tracked every 2 years until they reached the ages of 6–7 and 1–12 years, respectively.
- Measures: Multiple aspects of the individual child, family, community and society were obtained for each individual and their family including child language.
- Several reports are available on the study's website including detailed information about the study design, measurement and research reports (<https://growingupinaustralia.gov.au>)
- ^aFor further detail about the LSAC's aims, see <https://growingupinaustralia.gov.au/sites/default/files/discussionpaper1.pdf> (accessed on 23 January 2023)

typical language, 36.6% had two or fewer risks. As illustrated in Table 7, the risk of having low language at 7 years was 17 times more likely for children with six or more risk factors when compared with the reference group (i.e., those with two or fewer risks). The stark gradient between the number of risks (column 1) and the likelihood of low language at 7 years (the risk ratios in column 4) can be seen in Table 7.

BRINGING IT TOGETHER: SUMMARY OF KEY FINDINGS AND IMPLICATIONS

Of the many important learnings about language development in the early years, the most recent information

about the way in which language develops (trajectories) and the circumstances that favour or influence optimal language development, are considered major advances. This is because they have the potential to change the way in which we identify children in the early years who are at risk of later DLD and reshape our approach to primary and secondary preventative interventions in the early years. The first learning concerned fluctuation, a phenomenon recognised and written about for many years but not demonstrated in longitudinal, population or community studies until more recently. Fluctuation partly explains why the sensitivity and specificity of screening children at risk of DLD is unacceptable in the early years; screening at a single time point will misidentify children in the fluctuating or change categories. The second learning was in understanding that different groups or trajectories could be characterized and differentiated by specific features. This results in an improved understanding of the factors that influence and enable (and those that do not) language development in the early years. It is abundantly clear that children in the developmentally enabled groups live in circumstances that are more likely to favour their development and also protect them from developmental constraints if, and when, they appear (Taylor et al., 2022). In contrast, a substantial number of children in the change or fluctuating groups tended to live in less advantageous circumstances and these groups are characterized by factors or influences that cluster together and thereby distinguish one group from another, although socio-economic disadvantage was common to all but the enabled group. Taylor et al. described the way in which the influencing factors group or cluster together as being like a wolf pack, 'like wolves risk factors hunt in packs [...]' (Taylor et al., 2022). The third learning concerned the accumulation of risks; as the number of risks increase or accumulate, so does the likelihood of a poorer language outcome. Whilst many clinicians may act intuitively to prioritize children with multiple features or risks, this research demonstrates how a combination of child, family and environmental determinants, collectively and cumulatively play out over time and dramatically increased the risk of later language problems.

There are several implications arising from this important body of research concerning children at risk of later DLD:

- Current early identification and detection systems have a reasonable chance of identifying children in the stable low trajectory but not those in the fluctuating or change trajectories.
- Risks accumulate:
 - Surveillance based on one or two factors known to influence child language is not sufficient in identifying children at risk of developing DLD.

TABLE 4 Latent class models from the Early Language in Victoria Study (ELVS) illustrating four classes, class size, risk ratio, characteristics and defining features

ELVS (Eadie et al., 2022)			
Classes/groups	Group size (%)	Risk ratio ^a	Characteristics and defining features
1. Developmentally enabled	56.2%	1.0	Supportive home learning environment
2. Vulnerable	31.2%	13.7	Vulnerable: Child development and home learning environment <i>Defining feature(s):</i> low use of early gesture, vocabulary and non-verbal cognition
3. Socially disadvantaged circumstances	7.4%	8.5	Socio-economic disadvantage combined with a vulnerable home learning environment <i>Defining feature:</i> Greatest socio-economic disadvantage
4. Maternal mental health	5.2%	5.9	Maternal mental health problems combined with vulnerable child socio-economic adjustment <i>Defining feature:</i> Higher rates of maternal mental health problems

Note: ^aRisk ratio: the risk of having low language at age 7 years for each class.

TABLE 5 Latent class models from the Longitudinal Study of Australian Children (LSAC) showing the class, group size, number of risks and the characteristics and distinguishing features

LSAC (Christensen et al., 2017; Taylor et al., 2022)			
Classes/groups	Group size (%)	Risk # ^a	Characteristics and distinguishing features
1. Developmentally enabled	46%	1.0	Low likelihood for each risk factor. <i>No risk for (1) teenage motherhood, (2) four or more siblings and (3) not being read to</i>
2. Working poor	20%	2.8	Increased likelihood of socio-economic disadvantage. Child more likely to exhibit low school readiness, mothers with low maternal education and have four or more siblings <i>Decreased likelihood of high child reactivity and maternal mental health distress</i>
3. Overwhelmed	10%	6.1	Increased likelihood of all risk factors. Highest likelihood of indigenous status, low maternal education, maternal unemployment, four or more siblings and disadvantage <i>Unlikely to have mothers from NESB</i>
4. Child developmental delay	9%	3.8	Combination of child factors: higher proportions of children with low school readiness, low temperamental persistence and reactive temperament <i>Less likely to have four or more siblings, low income and healthcare cards</i>
5. Low human capital	8%	3.8	Highest proportion of families in the lowest income quintile and with healthcare card usage. Higher proportion of teenage mothers and mothers with lower maternal education. Maternal unemployment relatively high compared with populations average <i>The proportion of children with low school readiness comparable with general population</i>
6. Resource-poor NESB	7%	4.7	98% likelihood of NESB. Increased likelihood of mothers with psychological distress, low parenting consistency, four or more siblings, low income, high healthcare card use, neighbourhood disadvantage and not reading to the child <i>No increase in likelihood for indigenous status, child reactive temperament or teenage motherhood</i>

Notes: NESB, non-English-speaking background.

^aRisk #, exposure to risk(s) at age 4 years.

TABLE 6 Baseline receptive vocabulary scores for each class as well as the difference from the reference group (Class 1). Vocabulary scores almost 4 years later are shown along with the difference from the reference group (Taylor et al., 2022)

Classes/groups	Risks # ^a	Receptive vocabulary (Peabody Picture Vocabulary Test—PPVT)			
		Scores (months)			
		Difference score	Baseline score at 50 months	Outcome score at 105 months	Difference score
1. Developmentally enabled	1		64.4 (64.2, 64.6)	79.8 (79.7, 80.0)	
2. Working poor	2.8	-5.8	62.8 (62.4, 63.2)	78.2 (77.8, 78.5)	-5.9
3. Overwhelmed	6.1	-18.9	59.1 (58.5, 59.7)	76.1 (75.6, 76.7)	-13.1
4. Child developmental delay	3.8	-9.6	61.7 (61.0, 62.4)	77.8 (77.3, 78.4)	-7.2
5. Low human capital	3.8	-6.1	52.0 (56.3, 57.7)	78.5 (78.0, 79.0)	-4.7
6. Resource-poor NESB	4.7	-26.3	62.7 (62.1, 63.3)	76.9 (76.4, 77.5)	-10.4

Notes: NESB, non-English-speaking background.

Risk #, exposure to risk(s) at age 4 years.

TABLE 7 Association between early risk factors and low language outcomes at age 7 years in the Early Language in Victoria Study (ELVS) (adapted from Eadie et al., 2022).

Risks (n)	Participants (n)	Low language, n (9%)	Risk ratio
0-2	328	5 (1.5)	1.0 (reference)
3	180	9 (5.0)	3.28*
4	162	13 (8.0)	5.36**
5	135	15 (12.5)	7.29***
6+	161	42 (26.1)	17.11***
Total	966	84 (8.7)	

Note: * $p = 0.03$; ** $p = 0.001$; *** $p < 0.001$.

- A focus on children with four or more risk factors is more likely to accurately identify children at risk.
- Risks cluster: Groups of risks distinguish trajectories from each other providing useful information that can be used to identify children at risk and improve the ability to target and implement the best prevention and intervention practices.
- The majority of influences can be readily measured and are easily observed or reported by parents and other health and early education professionals.

However, all risk models and tools require further development and evaluation before widespread clinical and public health adoption and application, and as such, are a priority for future research. Given the current state of the science we recommend that clinicians consider whether, and how many, identified risk exposures a child experiences to inform holistic clinical decision-making (Table 7).

This must not be a tick box exercise with a definitive cut point or score but should be used to help a practitioner tip the balance one way or another regarding whether and how to act when they have concerns about a child's language development.

In the accompanying paper we consider how best to use this knowledge to identify children in the early years who are at risk of later DLD and promote robust language development for all children (McKean & Reilly, 2023). Importantly, we ask if this can be done within existing systems and services? Many speech and Language therapy services were established in line with a traditional biomedical model, one that focuses on individuals presenting for help for discrete problems. Whilst there have been many changes to this model and way of delivering services research demonstrates that there is over and under servicing in child speech and language services in the UK, the USA and Australia suggesting we may be failing to reach



as many as 40–50% of children with language problems (McGregor, 2020, Norbury et al., 2016a; Skeat et al., 2014). Further, children living in disadvantaged circumstances, the populations we most wish to reach, are less likely to seek and receive help and disparities have been identified concerning race/ethnicity, health insurance type, co-occurring diagnoses and disorder type.

Families living in disadvantaged circumstances are likely to be involved with multiple parts of the health, education systems and the social support systems. There may be limited understanding amongst these professionals as to how many of these factors can influence a child's language development. There is also evidence that COVID has exacerbated access to services (RCSLT, 2022), almost certainly disproportionately impacting those living in disadvantaged circumstances with the potential for long term consequences. If existing services and systems cannot be readily adapted to use this evidence, then it behoves us to consider what alternatives there might be and we consider this in more detail in the accompanying paper. A current opportunity in Australia, is the government's commitment to developing an Early Years Strategy in recognition of the importance of the early years for children's development and continued success across the life course. Many are advocating for universal childcare to be embedded in the strategy with the potential to reshape the current workforce and provide a framework to work with families in the child's early years and support child development.

We expand on a range of opportunities and ways in which agencies, areas and local governments might instigate a different approach to promoting language development in the early years in the accompanying paper. In doing so we acknowledge and highlight existing initiatives that have already or are taking steps to address some these issues, including those that involve cross agency collaboration. The approach(s) adopted will almost certainly vary within and between countries to meet local needs however the aim, to universally support children's language development, will remain consistent.

Three important principles underpin the design of the next steps described in the accompanying paper:

- Adopt a dynamic, life-course development approach to support children's language development across the early years. The approach(s) should be driven by the child's ecosystem and incorporate the life course into existing complex system models rather than the traditional biomedical models.
- Underpin surveillance with knowledge about language trajectories in the early years and the influence that risks, groups of risks and cumulative risks have on language development.

- Ensure child language services are not hard to reach for those who need them most. Those living in disadvantaged circumstances are underserved by current models of provision.

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Not applicable.

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