



CoLab EVIDENCE REPORT

Risk and protective factors in early childhood: An ecological perspective



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ABOUT COLAB:

CoLab brings together families, clinicians, educators, policy makers, other practitioners and researchers to provide evidence to improve service delivery and community capacity to meet the needs of children, families and communities who are experiencing vulnerability. Our vision is that young children in Australia develop, learn and thrive so they can build a better future for themselves and their communities. CoLab has three priorities, including: providing better support to families experiencing adversity; advocating for place-based approaches to improve the ways that families, services and communities work together, and; advancing the economic understanding of early childhood, with a focus on where the best early investments can be made. CoLab was launched in 2017 through a partnership between Telethon Kids and the Minderoo Foundation, made possible by Minderoo's founding commitment to ensure every Australian child gets the best possible start in life.





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HIGHLIGHTS

- An **ecological perspective** of **early childhood development** underscores the **critical impact** of a range of **environmental contexts** on **young children's outcomes**. 
- The multiple environments in which a child develops includes: the **prenatal environment**, the **family environment**, **Early Childhood Education and Care (ECEC) settings**, **neighbourhoods** and **communities**, as well as **cultural and political systems**.
- Characteristics of each these environments can **shape different aspects of a child's development**, by **increasing his/her risk experiencing poor developmental outcomes** or, alternatively, by **helping build protection from the impact of adversity**. 
- The **potential for risk and protective factors to influence early childhood development** should be considered within the context of **child-environment interactions** and the ongoing reciprocal relationship between the individual and his/her immediate environment.
- **Positive and negative experiences** can also accumulate throughout the life-span, with resulting implications for children's **individual developmental trajectories**.
- **Public health initiatives** can target resources towards enhancing protective factors and mitigating risk factors at a child, family, and community level, to **improve developmental outcomes in early childhood**.

Risk and protective factors in early childhood: An ecological perspective



Introduction

Early childhood development occurs within the context of multiple environments, with a vast range of factors in these environments exerting influence on different aspects of a child's development. This Evidence Report discusses the potential for the characteristics of these environments to increase the risk of a young child experiencing poor developmental outcomes or, alternatively, to enable protection from the impact of adversity. An Ecological Framework of Child Development is outlined, and the key factors influencing development in a child's immediate contexts are summarised, including: the prenatal environment, the family and home environment, and early childhood education and care. This Evidence Report then considers the influence of broader contexts on early childhood development including: neighbourhoods and communities, cultural and political systems, and process of development over time. Finally, we summarise the Ecological Approach to early childhood interventions.

An ecological framework of child development

As proposed by Bronfenbrenner ^[1], the ecological perspective is concerned with the characteristics of the multiple environments in which a child develops, and how these shape different aspects of his/her development ^[2]. Characteristics that increase the probability that a problem will be formed, maintained or exacerbated are called risk factors; characteristics that appear to moderate and/or minimise the impact of risk are called protective factors ^[2]. Research shows that some children develop along 'normal' trajectories despite the presence of risk factors; this capacity to achieve developmental milestones and avoid disorder in the context of adversity is called resilience ^[3]. An Ecological Framework comprises five layers of interrelated environments, called systems. Risk and protective factors exist across each of these layers ^[1]:



- **Microsystems** - patterns of interactions between the developing child and the physical, social and psychological elements of his/her environment. These interactions, called proximal processes, have more impact on development than the broader systems in which they occur. For example, caregiver-child interactions.
- **Mesosystems** - the links between two or more settings in which the child is directly involved (i.e. between two or more microsystems). For example, caregiver involvement with the child's preschool.
- **Exosystems** - relationships between two or more settings, where one does not directly involve the child but indirectly influences him/her. For example, the impact of a caregiver's work conditions, such as shift work or leave arrangements, on the child.
- **Macrosystems** - broader patterns in the child's environments that are reflective of culture. For example, legislation regarding the provision of free/subsidised childcare.
- **Chronosystems** - account for changes to the child and his/her environment over time. For example, a child transitioning from preschool to Year 1.

Child-environment interaction

Characteristics of the child such as age, sex, personality and temperament, mental and physical health and special needs status can interact with factors in the environment to influence outcomes ^[6]. For instance, genetic variations in how the body responds to stress mean that some children are more sensitive to their environments, whether those environments are supportive or adverse. Additionally, the body's ability to produce certain hormones can impact a child's ability to initiate and sustain social interactions, affecting attachment and social behaviour. Further, functional differences in the brain's reward circuit impact on a child's motivation and emotional regulation, affecting things like optimism and perseverance ^[9]. Individual variations in biology will also impact the development of resilience through their influence on personality and temperament ^[7].

An important aspect of child-environment interactions is also how environmental experiences can have a dramatic physiological impact on the developing brain. Between birth and school-age, neural connections in the brain are either weakened or reinforced depending on a child's interactions with his/her immediate environment ^[8]. Exposure to adverse environments triggers the release of stress hormones to which prolonged exposure suppresses brain function, and causes long-term changes in the brain regions responsible for behavioural control and emotional well-being ^[8-10]. The immune system also responds to environmental stress by producing inflammation, with prolonged inflammation linked to increased morbidity and mortality ^[5, 8, 10]. Prolonged exposure to adversity causes structural changes to the brain; for example, decreased volume of the cerebellum, which is involved in emotional processing and fear conditioning ^[9]. Ultimately, the developing child is engaged in an ongoing reciprocal relationship with his/her immediate environment, where the unique characteristics of the child influence how these environments respond (e.g. through caregiving practices) and with these environments having a psychological and physiological impact on the developing child ^[6, 11].



Immediate environments

In the early years of life, a child's immediate environments have the most significant influence on his/her development. These include: the prenatal environment, the family and home environment, and the child's experience of early childhood education and care outside of the home. The prenatal environment. In the prenatal environment, key risk factors implicated in child development include maternal substance abuse, nutritional behaviour, and mental and physical health ^[13, 14]. Specifically, alcohol use in pregnancy contributes to the risk of birth defects and Fetal Alcohol Syndrome (FAS) ^[15, 16], while exposure to tobacco smoke is associated with lower IQ, poorer memory and attention, delayed motor development, and behavioural and mental health problems ^[17-22]. Inadequate maternal nutrition can result in low birthweight which is associated with adverse health and developmental outcomes ^[8, 23-25]. Conversely, maternal obesity is associated with increased problems at birth such as prematurity and birth defects, and

children of obese mothers are more likely to be overweight themselves [26–28]. Prenatal exposure to a high fat diet affects hormonal regulation and brain development potentially contributing to increased psychosocial problems found in the children of obese mothers [27, 29]. Furthermore, fetal exposure to environmental toxins such as lead, mercury, or pesticides adversely affects neurological development impairing cognitive and psychomotor abilities [17]. Prenatal maternal distress (anxiety/depression) also adversely impacts on a range of child developmental outcomes, such as attention regulation, cognitive and motor abilities, fearful temperament, behavioural and emotional problems, impulsivity, and mental health issues [22, 23, 30].



The family and home environment

- **Secure attachment and parenting:** The fundamental protective factor in the early years of life is the establishment of secure attachment with the primary caregiver [1, 14]. Secure attachment is a pattern of interactions between the child and the caregiver which demonstrates a sense of emotional and physical security. Specifically, secure attachment develops when a caregiver provides prompt and appropriate responses to the child [8, 31]. However, maternal anxiety/depression, as well as prolonged absences due to incarceration, physical illness/injury or military deployment, may disrupt the development of secure attachment by impairing the quantity and quality of caregiver-child interactions [8, 9, 23, 31–33]. Moreover, recent research demonstrates that the influence of maternal mental health can have a lasting effect, and is associated with their children's risk of emotional and behavioural difficulties in early adolescence [34]. Neglect, abuse, and harsh or inconsistent parenting style increase the burden of environmental stress on the developing child [9, 13, 32]. Alternatively, a parenting style characterised by positive reinforcement, displays of warmth and affection and consistent disciplinary strategies, is associated with fewer behavioural problems, and better academic

achievement [8, 35]. Research shows that establishing just one stable, supportive, and caring relationship with an adult significantly enhances a child's capacity to thrive amidst adversity [5].

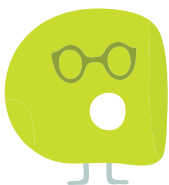
- **Family socio-economic disadvantage:** Children from disadvantaged households are more likely to have poorer developmental trajectories, with outcomes becoming progressively worse as socio-economic status (SES) decreases [8, 13, 21]. Poverty is a multifaceted experience which involves the inability to satisfy material needs, as well as the deprivation of social support systems [31]. Disadvantage does not directly cause poorer developmental outcomes, rather it creates material, psychological and social conditions which translate poverty into everyday

experiences [4, 17]. The child's experience of family poverty can result in chronic stress, which adversely affects the developing brain, as previously discussed, as well as limiting caregiver's ability to provide supportive carer-child interactions, thus results in decreased opportunities to learn [8, 23]. Poverty has a cascading effect on development where early disadvantage sets in motion a compounding series of negative life experiences [32]; as such, early SES disparities seem to widen over the life course [33, 34]. For example, children from high SES backgrounds with low school-readiness can improve over the first few years of school, while children from low SES backgrounds do not show the same developmental mobility [35]. Within the family and home environment, protective factors include parental investment in the child, and the provision of resources for children such as space, toys, reading materials, and access to media which promote explorative play, benefitting cognitive, language and socioemotional development [22].

- **Housing:** Multiple aspects of a young child's housing situation can influence developmental trajectories, including insecure housing and overcrowding. For instance, insecure housing circumstances can result in having to frequently change accommodation, which can disrupt the development of daily routines, and inhibit engagement with community resources such as childcare [17, 41, 42]. Relatedly, frequent moving is also associated with food insecurity which is concerning given that nutritionally deficient children have more difficulty learning [8, 41, 42]. Household crowding is another characteristic of children's environments that can impact on their development. Specifically, crowding is associated with poorer cognitive, behavioural and psychomotor outcomes, and disrupts a child's ability to explore, play and engage with people and objects [17]. Subsequently, children in crowded homes spend more time unoccupied or as 'onlookers'. Crowded homes are also associated with increased family conflict, less parental monitoring and more punitive parenting practices. Furthermore, crowding can increase competition for resources such as toys, space, and food, reinforcing aggressive behaviour [17]. It is important to note that Indigenous children's housing experiences are typically inferior compared to non-Indigenous children, with: lower home ownership, high proportion living in public housing and in receipt of government assistance, and more frequent moves. Interventions to improve the housing conditions of disadvantaged children will benefit their development, independently of improving household SES [43].



- **Nutrition:** Rapid brain development occurs in the early years of life making young children particularly sensitive to the quality of their diets [25, 44]. Breastfeeding in infancy is positively associated with verbal abilities, IQ, and psychomotor development, and appears to be a protective factor against childhood mental health problems [22, 45-47]. In the early years, a healthy diet including wholegrains, vegetables, fruits and non-processed red meat is developmentally beneficial. An adequate intake of micronutrients, such as iron, vitamin B12, iodine, and omega-3 fatty acid also supports cognitive development [44].



The quality of a child's diet at one year is a significant predictor of academic performance up to 12 years old ^[44]. In particular, a child's consumption of fruit and dairy is associated with improved verbal and non-verbal cognitive abilities in later childhood. Furthermore, research confirms that having a healthy breakfast with a low glycaemic index is critical for fuelling the brain and is associated with higher cognitive functioning and improved development ^[25]. Conversely, higher consumption of sweetened beverages is negatively associated with cognitive functioning ^[44, 48].

Early childhood education and care (ECEC)

Participation in high quality ECEC is a key protective factor, associated with improved cognitive and verbal development, and better academic performance in later schooling ^[49-51]. It is thought that making cognitive gains in the early years initiates a cycle of positive learning experiences, supporting children in the transition to school ^[49, 51, 52]. While ECEC attendance has a well-

established link with positive cognitive and academic outcomes, its impact on socioemotional development is less clear ^[53]. Large-scale studies from the US and UK suggest that socioemotional problems increase the more hours per week a child spends in childcare ^[52]. Australian research indicates that children who spend more time in care have improved social competence but also more behavioural problems ^[52, 54]. However, when ECEC programs are of a high quality these potential negative effects are weakened or even eliminated ^[52, 53]. Quality in ECEC is determined by structural features such as child/carer ratios, and staff qualifications, and practice features which reflect the activities of carers. High quality



ECEC programs emphasise the interactions between carers and children which facilitate learning; that is, time spent sitting, talking and engaging with children ^[50]. Within the ECEC environment, these interactions are key proximal processes affecting a child's cognitive, emotional, social and behavioural development ^[50, 52].

Notably, research indicates that access to high-quality ECEC programs is a very effective intervention for reducing the disparities in developmental outcomes found between children from high and low SES backgrounds ^[55]. While children from disadvantaged backgrounds derive the most benefit from ECEC, they are the least likely to engage and attend. In Australia, ensuring access to quality ECEC is a key target of the Government's Closing the Gap policy; however, enrolment and attendance rates remain much lower amongst Indigenous children, as well as amongst children living in rural and remote areas ^[54, 56-58]. Furthermore, in Australia, the availability of ECEC is more restricted in low SES neighbourhoods and the quality of the available services is poorer ^[59]. Research also indicates that developmental outcomes are adversely affected when ECEC programs have a high concentration of low SES pupils ^[60].

Interactions between environments

The next layer of influence, outside of the child's immediate environments, are the interactions between these environments, called mesosystems^[1]. A common example is a parent's involvement with their child's preschool; such as, volunteering time, consulting with educators on the child's developmental progress and wellbeing, or taking home reading materials^[1, 6]. Examples from the child's perspective include bringing a friend home from school, spending time with their extended family or participating in extra-curricular activities in the community^[61]. Family involvement in the community and participation in religious activities are other examples of interacting environments^[6]. Environment interaction is also reflected in the transferring of abilities and behaviours across contexts. Conflicts between environments may manifest as developmental problems^[4]. For example, if reading homework is not supported at home the child may drop behind peers at school.

Indirect environmental influences

According to the ecological perspective, environments which do not directly involve the child still have an impact on development. The interactions between these indirect environments and the child's immediate contexts are called exosystems^[1]. Parental work conditions are a common example. Research suggests that when a caregiver is engaged in a non-standard work schedule (such as, night-work, shift-work or fly-in-fly-out) children can display more emotional and behavioural problems, and have poorer cognitive development, less school engagement, less extra-curricular activities and get less sleep^[62]. Ultimately, a caregiver's work conditions impact on the developing child by impairing the quality of the interactions between the child and the caregiver. Parents engaged in a non-standard work schedule are more likely to be depressed, to interact less with their children and have reduced closeness, and provide a less supportive home environments^[62]. Further examples of indirect influences include the impact of peers, the structural and management aspects of the child's ECEC service, the child following a spectator sports team, or the neighbourhood and community in which the child grows up^[61].



Neighbourhoods and communities

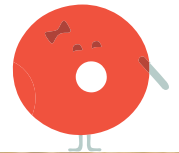
Neighbourhood economic disadvantage is a significant risk factor for poorer outcomes across all developmental domains^[14, 17, 34, 43]. However, it is important to remember that although poverty is correlated with poorer outcomes, it is not the specific cause. Instead, low neighbourhood SES impacts on development in an indirect way by influencing the nature of the child's daily experiences. For example, on the surface we can see that neighbourhood poverty is associated with lower IQ. However, by looking at the child's everyday experiences we see that poverty affects IQ because of its effect on nutrition, sanitation and illness, and school absences^[17]. Children are aware of the physical quality of neighbourhoods, and note factors such as high traffic, poor sanitation or lack of open spaces as limiting their opportunities for play^[17]. Parents may also limit outdoor play if they perceive the neighbourhood as unsafe, further impeding a child's ability to engage in physical exercise and socialisation experiences. Conversely, social cohesion and community prosocial bonding can have a protective effect, improving perceptions of neighbourhood safety and enhancing social development^[8, 14]. Furthermore, the provision of public green spaces is associated with improved academic performance and psychological well-being, increased physical exercise and social cohesion, and a reduction in parental stress^[17]. Local government policy will affect the availability of community resources; such as the provision and maintenance of public spaces, parks, and playgrounds, local libraries, traffic management, and police, lighting and security^[8].



Cultural and political systems

The cultural, political and economic factors which influence development are called macrosystems. Different political ideologies will determine the degree to which governments intervene in family and community life ^[11, 63]. Legislation regarding the provision of welfare, public education, and health care clearly impact on the developing child, as does environmental policy. In Australia, recent reforms in the childcare sector and to parental leave policy reflect evolving cultural attitudes regarding the importance of early childhood experiences ^[8].

● **Childcare sector reform:** In the last decade Federal and State/Territory governments have jointly implemented large-scale reforms to the childcare sector, reflecting an ongoing commitment to providing access to high quality preschool programs for all Australian children ^[64]. Importantly, these reforms also address the nature of the environments in which the children learn by establishing a national standard for service delivery (the National Quality Framework) as well as a national curriculum (the EYLF) [50, 52]. The Government continues to provide assistance for childcare costs through a subsidy paid directly to service providers ^[64]. However, 27% of Australian households still report difficulties with the cost of childcare which can consume up to two-thirds of household income ^[65, 66]. The reforms reflect the empirical evidence regarding the protective effect of high quality ECEC, the need to integrate services, and go some way towards addressing the educational and developmental disparities between disadvantaged and non-disadvantaged children ^[64].



● **Parental leave policy:** Parental leave policy impacts on the developing child through its effect on household dynamics and caregiving practices. Internationally, the provision of paid, job-protected parental leave is associated with reduced infant mortality and morbidity, and increased breastfeeding ^[67, 68]. Australian employees are entitled to 12 months of unpaid, job-protected parental leave ^[69]. We are ranked 13th out of 21 high-income countries but are substantially behind countries such as France and Spain who provide over 2.5 years ^[70]. The Australian Government provides mothers with 18 weeks of paid parental leave, while fathers/partners can access 2 weeks ^[71, 72]. For father-specific paid leave, Australia falls short of the OECD average of 8 weeks, and is significantly behind countries like Korea and Japan who offer up to one year ^[72]. Australia's parental leave policy, which heavily allocates leave to mothers, reflects and reinforces traditional gender roles ^[70]. Only 1 in 50 Australian fathers utilises parental leave as a result of perceived career implications, and wage differentials mean that it is often a more significant financial burden for a father to take parental leave ^[70, 72]. When fathers take parental leave they are more emotionally and practically involved with the infant, and stay more involved in a child's life as they grow up, leading to improved health, and cognitive and emotional development ^[68, 72].





Figure 1. An ecological model of risk and protective factors in early childhood

Development over time

As this Evidence Report has outlined, early childhood development can be influenced by an array of risk and protective factors present in: the prenatal environment, the family and home environment, as well as the contexts of early childhood education and care, neighbourhoods and communities, and cultural and political systems (see Figure 1). Importantly, development occurs within contexts of both place and time. The factors influencing the child and his/her environments over time are called chronosystems^[1]. These factors include the experience of normative life events (i.e. occurring typically in the life course, such as the birth of a sibling or preschool) and non-normative life events (i.e. occurring unexpectedly, such as, divorce, maltreatment or illness), as well as the timing, regularity and duration of events.^[1, 61, 73] These events also include transitions (e.g. starting school) and the establishment of routine and consistency in the child's life. Given the rapid development that occurs in early childhood, time is critical factor. In the early years of life a child goes through several biological 'critical periods' during which he or she becomes particularly sensitive to certain environmental stimuli, such as during language acquisition^[74]. Appropriate environmental experiences at these times is crucial because of the 'cascading' nature of development in which earlier capabilities provide a platform on which to build further skills^[75]. Throughout childhood, chronological age is often also used as a benchmark for developmental progress^[74]. As a child ages, the way they interact with their environments will change; for example, through increasing independence, or developing more sophisticated cognitive strategies^[74]. Similarly, adults will adjust their expectations of children as they grow up^[73, 74]. Acknowledging the role of time in development accounts for the accumulation of positive and negative experiences throughout the life-span, and the unfolding of developmental trajectories^[8, 13, 75]. Finally, we must consider the impact of political and economic cycles, socio-cultural trends and significant historical events on a child's development^[8, 73, 74]. The online environment, for instance, can exert its influence across multiple socio-ecological levels in an interdependent way^[74]. In particular, potential contributors to children's level of developmental risk include: parents' monitoring of, and involvement in, their child's use of technology, parental use of mobile devices, normative use of technology among same-age peers, institutional policies on screen use, as well as increased access to and greater dependency on technology in society more broadly^[76-80].

An ecological approach to early childhood interventions

A notable strength of the ecological perspective is that it can help to inform large-scale but cost-effective interventions. Children are not generally exposed to single risks in isolation, but rather experience clusters of risk factors which comprise developmental trajectories^[81]. Using a risk factor approach, public health initiatives can target resources towards preventative interventions, addressing problems at a child, family, and community level before they manifest^[3]. Effective early childhood interventions need to address the impact that wider reaching systems have on a child's development. Collaboration amongst service providers across ecological levels is critical^[2, 4, 5, 31, 49], and services need to focus on family and community engagement^[18, 49]. Interventions can also build on existing delivery platforms such as incorporating resiliency into existing school and ECEC curricula^[14, 31].

Research design

It is important to note that much of the research on risk and protective factors in early childhood is primarily correlational in nature. As such, the findings cited in this overview should be interpreted

with some caution. Cross-sectional studies, where data are collected at one point in time, can establish a correlation or association between variables but not a cause-effect relationship. For example, cross-sectional research cannot determine if difficult temperament in infants is a precursor to or a consequence of poor parenting practices ^[12]. Longitudinal designs, where data are collected at multiple points over a period, address this weakness by establishing a temporal relationship between variables. However, both cross-sectional and longitudinal designs need to address the possibility that other factors may be responsible for the observed correlation, either completely or to some degree. Often researchers will use statistical methods to 'control for' the influence of confounding variables, but unforeseen factors can never be completely ruled out. Finally, readers should be aware that when interpreting correlational findings, we must not make assumptions or predictions outside of the scope of the data.

Conclusion

Positive experiences in early childhood help a child to develop skills and abilities which are crucial for supporting healthy outcomes, and ameliorating the adverse influence of risk factors on their development. The ecological perspective allows us to look beyond individual characteristics and identify the broader factors affecting development in early childhood ^[4]. At a microsystem level, this Evidence Report has discussed the impact of the immediate family environment and a child's experiences of ECEC. Within these environments, high quality interactions between the child and the caregiver are a crucial protective factor ^[14, 50, 52]. At a broader level, the impact of neighbourhoods and communities, as well as cultural and political influences, also have a profound impact on children's development. Finally, the ecological perspective highlights the need for holistic, collaborative and preventative interventions to enhance protective factors and mitigate risk factors in the early years of life ^[2, 3, 75].



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