

**THE IMPACT OF POVERTY ON THE DEVELOPING
CHILD:
A NARRATIVE REVIEW**

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NON-TECHNICAL SUMMARY

Poverty in Australia continues to be an issue of concern, particularly the proportion of adults and children experiencing deep and persistent disadvantage and social exclusion. This narrative review describes key findings from the literature on the impact of poverty in early childhood. Growing up in adversity can significantly harm children’s development, health and educational success both now and into their future. Poverty experienced early in the life course is particularly problematic, due to the sensitivity of children’s rapidly developing brain. For instance, it can contribute to continuous activation of the body’s stress-response system, limiting children’s ability to respond effectively to adversity. The experience of poverty in early childhood can also inhibit the development of their brain’s executive function, a core set of skills that form the foundation for lifelong learning. Poverty can also harm children if it limits parents’ capacity to provide responsive care and low-stress environments. However, evidence suggests that by assisting adults to build the skills necessary for success in parenting and the workplace children can be protected from the adverse impact of poverty in early childhood.



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ABSTRACT

This narrative review provides a synthesis of current research investigating the impact of poverty on early childhood health, development and learning. In Australia, the rising proportion of adults and children experiencing deep and persistent socio-economic disadvantage and the widening gap in economic equality restricts social and economic participation by those experiencing disadvantage. Poverty experienced early in life directly impacts children’s developing brains, placing children at risk of short and long-term detrimental effects on multiple aspects of their development, health and learning. Experiencing adversity, especially in the early years, can contribute to continuous activation of the body’s stress-response system leading to ‘toxic stress’, compromising the development of emerging executive function capabilities. Parents experiencing poverty may have limited capacity to provide responsive care and low-stress environments to mitigate children’s exposure. However, there is evidence to suggest that assisting adults to build their core capabilities and skills to provide optimal support for child development can help protect children against the adverse impact of poverty in early childhood.

Keywords: poverty, early childhood, executive function

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1. Introduction

The experience of poverty early in the life course can have far-reaching impacts on children’s health, development and educational success, both now and well into adulthood. This research synthesis outlines the nature of poverty in Australia and details the health and achievement gaps experienced by socio-economically disadvantaged children compared to their more affluent peers, that emerge in early childhood and persist over the life course. Biological and neurobiological mechanisms that enable poverty to get ‘under the skin’ are discussed, as well as how economic adversity can impact parenting and the family environment to impede child developmental outcomes.

2. Economic inequality and poverty in Australia

Recent times have observed a marked increase in economic inequality in Australia, with a widening gap between the most and least affluent in society (Davidson, Bradbury, Wong, et al., 2020). Unequal distribution of income means that those in the highest income group receive around six times as much income as someone in the lowest income group. Wealth inequality in Australia is even more pronounced, with somebody in the highest wealth group holding around 90 times as much wealth compared to those in the lowest wealth group (Davidson, Saunders et al. 2020). Relative to other Western countries, a higher proportion of the vast economic disparities in Australia arises from an inequality of opportunity, which can undermine social cohesion and perpetuate the vicious cycle of socio-economic disadvantage (Martinez Jr. et al., 2017). Inequality of opportunity occurs when the least affluent are constrained by circumstances they were born into that are beyond their control, limiting their access to resources and constraining their ability to improve their living standards (Martinez Jr. et al., 2017). Rising inequality is unfair, polarizing and divisive, restricting the potential for full social and economic participation among the most socio-economically disadvantaged in society, and threatening the wellbeing of our communities (Australian Council of Social Service et al., 2019).

The deleterious effects of rising inequality are most evident among the proportion of society experiencing poverty. Living in poverty is defined as being unable to afford social perceived necessities, and having an inadequate level of household income, such that it impedes an acceptable standard of living (Davidson, Bradbury, Hill, et al., 2020). As stated by the Committee for Economic Development of Australia, “to be poor is to be denied the resources required to meet basic needs and thus prevented from realising one’s full potential – economically and socially” (Committee for Economic Development of Australia, 2015). The poverty line is the most common method of measuring poverty, which is set at



50% or 60% of the median household disposable income (Davidson, Bradbury, Hill, et al., 2020;CEDA – the Committee for Economic Development of Australia, 2019). The Australian Council of Social Services (ACOSS) highlights an overall trend of persistent and entrenched poverty in Australia over the past decade. In 2017, the child poverty rate was 17.7%, thus affecting over 774,000 children under the age of 15 years (Davidson, Bradbury, Hill, et al., 2020). The COVID-19 pandemic has exacerbated the inequities in income, housing and access to support services between the most and least advantaged (Callis et al., 2020; Pawson et al., 2021; Van Lancker & Parolin, 2020).

Focusing on poverty as a matter of access to income and economic resources limits a comprehensive understanding of the issue, which is often multidimensional in nature. Specifically, the experience of economic adversity is often compounded by the multiple types of poverty that the least affluent are subjected to, including deprivation of social support, health and material resources (Martinez & Perales, 2014). Indeed, the ‘impoverished lives’ of those experiencing deep and persistent socio-economic disadvantage extend beyond the issue of low income and access to material resources, to encompass deprivation of opportunities, diminished capabilities and social exclusion (McLachlan et al., 2013). Among those most likely to experience deep and persistent socio-economic disadvantage are lone parent families, those with a long-term health condition or disability, people with low educational attainment, and Indigenous Australians (McLachlan et al., 2013).

While the multi-faceted nature of inequality is becoming increasingly recognised, the amount of income remains the predominant measure of resource access and facilitates more straightforward comparison between cohorts of people and different countries (Martinez Jr. et al., 2017). Despite record economic growth the rate of poverty in Australia is higher than the average of Organisation for Economic Co-operation and Development (OECD) countries (Davidson, Bradbury, Wong, et al., 2020). Employment is often considered to be one of the primary routes out of poverty for those of working age (McLachlan et al., 2013). However, 7.1% of those relying on wages as their main source of income live below the poverty line, clearly demonstrating that a job does not necessarily guarantee an adequate level of income (Davidson, Bradbury, Hill, et al., 2020). The majority of people who live below the poverty line rely on social security payments as their main form of income, thus indicating how such payments often fail to provide an adequate level of income support for those most in need (Davidson, Bradbury, Hill, et al., 2020). Poverty can also be a transient state with some people moving in and out of socio-economic disadvantage (e.g. following short-term periods of unemployment) (CEDA – the Committee for Economic Development of Australia, 2019). For example, Australian government efforts to mitigate short-term



socio-economic hardship provoked by the COVID-19 pandemic via the Coronavirus supplement, resulted in improved quality of life and reduced financial stress during the payment period (Callis et al., 2020). More concerning, however, is the proportion of people who experience ongoing and deep disadvantage, particularly given research that shows the longer individuals are living in income poverty, the less likely they will escape their circumstances of adversity (McLachlan et al., 2013). Additionally, those who have lived in poverty in the past are more likely to re-enter poverty, compared to those who have not experienced poverty at all (CEDA – the Committee for Economic Development of Australia, 2019).

3. Childhood poverty and life-course outcomes

The experience of poverty in the early years can significantly compromise children's life chances (Australian Government Department of Social Services., 2017; Duncan et al., 2012; National Scientific Council on the Developing Child, 2020). Economic deprivation in early childhood hinders the development of important capacities for learning, and the socioeconomic-related disparities that first appear in early childhood can widen over the course of childhood to adversely affect academic success (Cunha et al., 2006; Tough, 2016). Children in poverty are often exposed to multiple risk factors, and these multiple disadvantages can further compound the influence of economic deprivation to impede cognitive development (Ayoub et al., 2009). For low-income children, the environmental chaos of growing up poor can include housing disorder, neighbourhood disorder, and relationship instability; all of which can influence children's physical and mental health (Coley et al., 2015).

Children growing up in adversity show considerably poorer developmental outcomes compared to their more affluent peers, with a widening gap emerging in the earliest years of life, prior to school entry. As reported in the 2018 Australian Early Development Census, children living in the most socio-economically disadvantaged areas were twice as likely to be developmentally vulnerable than those children residing in the least socio-economically disadvantaged areas in Australia (Australian Early Development Census, 2019). Socio-economic status (SES) is also a major factor determining the mobility of a child's developmental performance over time. That is, despite poor school readiness, children of medium-high SES can catch up within the first few years of starting school, but children of low SES do not demonstrate this same level of developmental mobility, and continue on a poor educational trajectory (Australian Early Development Census, 2014). However, if a low-SES child starts school with a good level of school readiness (high scores on the AEDC) then this appears to act as a protective factor,



and they continue to achieve at an average level of academic achievement throughout school (Australian Early Development Census, 2014).

The timing of childhood poverty matters considerably, with deprivation experienced in the first 5 years of life recognised as a particularly robust predictor of poorer outcomes later in life. Specifically, poverty in early childhood is a stronger predictor of adult attainment, including earnings and work hours, compared to economic deprivation experienced later in childhood or during adolescence (Duncan et al., 2016). The lifetime experience of poverty can also form a cycle within families described as an intergenerational transmission of disadvantage (Centre For Community Child Health, 2009; Perales et al., 2014). This can arise because of poor children's greater risk of adverse development and their parents' limited ability to counteract these risks, as well as children's reduced aspirations as a consequence of growing up in adversity (i.e. 'learning to be poor') (Cassio et al., 2021). Similarly, children who are raised in welfare-dependent homes can also have a restricted ability to move out of socio-economic disadvantage because of intergenerational transmission of attitudes to work and welfare, parent mental health issues, geographical location and lack of educational attainment (Perales et al., 2014).

4. The biology and neurobiology of adversity

A myriad of SES-related health disparities are first evident in early childhood and persist throughout adulthood, impacting across many of the body's regulatory systems (Misiak et al., 2022). Children of low-SES can experience elevated cortisol levels, high blood pressure, increased stress reactivity, and the metabolic dysregulation implicated in the development of obesity. Additionally, disturbed immune function among low-SES children can result in exaggerated inflammatory responses underlying a range of childhood diseases such as asthma (Evans et al., 2012; Oh et al., 2018). The overall functioning of the body's multiple physiological regulatory systems (i.e. allostatic load) is also impaired by children's experiences of poverty (Misiak et al., 2022). The far-reaching effects of poverty are demonstrated through a higher risk of adverse health outcomes for poor children later in adulthood, including cardiovascular disease, respiratory disease, diabetes, obesity, certain cancers, disease of the digestive system and mental health disorders (Cohen et al., 2010; Wise, 2016). Notably, the persistent effects of socio-economic disadvantage have been found to impede adult health outcomes independent of social mobility and adult SES, with even short episodes of childhood poverty linked to increased adult mortality risk (Cohen et al., 2010; Evans et al., 2012; Rod et al., 2020).



Key biological processes have been posited to explain how disadvantage gets ‘under the skin’ to shape lifelong health trajectories. For instance, there may be an early embedding or programming of biological changes in childhood, an accumulation of recurring risk exposures related to low SES including adverse childhood events that result in altered health trajectories over the life course (Evans et al., 2012; Misiak et al., 2022). However, childhood influences on adult health and disease can also operate through the development of adverse health behaviours established in childhood (e.g. patterns of physical activity and dietary preferences), as well as inadequate access to effective health care interventions in childhood (Wise, 2016).

One of the central mechanisms through which economic deprivation in early childhood shapes long-term health outcomes, is through the sensitivity of developing brain function in the formative years (Duncan et al., 2012; Lawson et al., 2018; Moriguchi & Shinohara, 2019). Experiences of significant adversity, in which children are deprived of consistent, responsive care and sufficient opportunities for learning and skill development, prevent the brain from optimising the neural connections that are the foundation of future learning, health and wellbeing (Bernier et al., 2010; Blair & Raver, 2016; Muscatell, 2018; Ursache et al., 2012). Growing up in environments characterised by chaotic, unpredictable or adverse conditions (i.e. “toxic stress”) can also lead to continual activation of physiological stress responses designed to ensure survival (Babcock, 2014; McEwen & McEwen, 2017; Ursache et al., 2012). These effects of stress and adversity on brain development contribute to the lower levels of school-readiness and social and cognitive competencies among children from low-income families (Babcock, 2014; McEwen & McEwen, 2017; Oh et al., 2018; Welsh et al., 2010). As such, poverty contributes to a ‘cascade’ of negative outcomes that can result in further hardship and vulnerability, including poor educational outcomes, social and emotional difficulties, criminal activity and unemployment (Babcock, 2014; Mills-Koonce et al., 2016).

5. The role of executive function skills

Experiences of adversity can inhibit the development of higher-order capacities of the brain such as the functions of the pre-frontal cortex that are key for the development of a group of core skills termed ‘executive function’ (Brooke Stafford-Brizard, 2016; Center on the Developing Child at Harvard University, 2011; Hackman & Farah, 2009; Lawson et al., 2018; Little, 2017; McEwen & McEwen, 2017; Rakesh & Whittle, 2021; Sulik et al., 2015). These group of skills (also termed ‘non-cognitive skills’) form the basis of children’s developing ability to remember and follow instructions, solve problems, learn from mistakes, and revise their beliefs and actions (Monks & Barnes, 2018). The development of



executive function skills also enables children to adjust their goals, prioritise, and direct, focus and sustain their attention, effectively self-regulate their emotions and behaviour and switch between tasks (Center on the Developing Child at Harvard University, 2016a; Clark et al., 2014; Hughes, 2011). In this way, executive function skills are likened to an “air traffic control system” for the brain (Center on the Developing Child at Harvard University, 2011).

When children’s executive function has been compromised by exposure to ‘toxic stress’ in the earliest years of life, they can experience much difficulty responding to the demands of formal schooling (McEwen & McEwen, 2017; Little, 2017). Dysregulation of the stress-response system can put children’s brains in a state of constant vigilance, prepared to respond to any immediate threats in the environment. As they encounter challenges at school, such as receiving critical feedback from teachers or experiencing difficult social interactions with peers, they can easily feel threatened, escalate conflict and react impulsively (Tough, 2016). When children’s brains and nervous systems are overloaded with distressing emotions and anxieties, they are likely to experience considerable difficulty concentrating on complex academic tasks, managing behaviour and emotions, delaying gratification, and working with others (Babcock, 2014; Hughes, 2011; Tough, 2016). They also demonstrate difficulty with following directions, completing tasks, and engaging in cooperative play, and have an increased likelihood of antisocial behaviour and risk-taking (Center on the Developing Child at Harvard University, 2011; Fox et al., 2010; Hughes, 2011; Little, 2017; Wass, 2015). Hence, delays in the development of executive function skills create social and learning disparities between children that can widen over time and lead to poor social and economic outcomes (Welsh et al., 2010).

While poverty in early childhood undermines the development of executive function, there is still much that can be done to assist children to develop these critical skills that set the foundation for lifelong learning. This entails conscious and careful attention to the environment of relationships that they grow up in. Essentially, “when poor children grow up in an environment marked by stable, responsive parenting; by schools that make them feel a sense of belonging and purpose; and by classroom teachers who challenge and support them, they thrive, and their opportunities for a successful life increase exponentially” (Tough, 2016).

6. Poverty, family functioning and parenting

Early childhood socio-economic disadvantage can exert detrimental effects through its influence on family functioning and parents’ capacity to provide consistent and responsive care, and a stimulating



learning environment for their child (Duncan et al., 2012). In early childhood, the family context is the dominant environment in young children's lives (rather than the peer or school contexts) (Duncan et al., 2012). However, families in poverty are more likely to have limited capacity and resources to provide a safe and enriching home learning environment for their children (Centre For Community Child Health, 2009; Duncan et al., 2012). For instance, low family income is a barrier to the parent-child book-reading that is crucial for young children's literacy development and lifelong learning (Taylor et al., 2016). Low-income parents also typically speak less to their children and use less complex language and fewer positive affirmations. Accordingly, the spoken vocabularies of children from low-income families are markedly less than those of their more affluent peers; a distinctive 'word gap' between these groups may be present as early as 18 months, shaping children's outcomes over time (Brushe et al., 2021; Hart & Risley, 1995; Hart & Risley, 2003).

Socio-economically disadvantaged families experience a multitude of challenges, including difficulty accessing stable and affordable housing, high-quality healthcare, childcare and schooling (Babcock, 2014; Clark et al., 2014). During lockdowns associated with the COVID-19 pandemic, for example, socio-economically disadvantaged families reported difficulty in accessing tele-health services (Callis et al., 2020). They are also more likely to experience food insecurity, mental health problems, unemployment and prejudice, and less likely to achieve goals due to resource constraints (Babcock, 2014; Clark et al., 2014; Seivwright et al., 2020). The chronic stress of poverty and the associated hardships can strain parents' "bandwidth", limiting their capacity to ensure low-stress environments and engage in the interactions and activities that support their children's development (Centre For Community Child Health, 2009; Tough, 2016; Volmert et al., 2016). For instance, increased maternal psychological distress is one of the pathways through which the environmental chaos of growing up in poverty can influence children's physical and mental health outcomes (Coley et al., 2015). In particular, they may also have less time or capacity for crucial 'serve and return' activities, in which adults respond to and encourage infants' efforts to interact through language, gestures and emotional expression (Babcock, 2014; Center on the Developing Child at Harvard University, 2016a).

The provision of responsive care is essential for healthy child development and when there is a persistent absence of responsive care, as in situations of neglect, child wellbeing can be seriously compromised. Research suggests it is not economic hardship per se but the accompanying poverty of relationships and experiences in early childhood that dramatically shapes health and developmental outcomes (Centre For Community Child Health, 2009; Hackman et al., 2015; Lexmond & Reeves, 2009).



While occasional inattention in an otherwise responsive care environment may be growth promoting under certain conditions, chronic under-stimulation can result in developmental delays and severe neglect can lead to significant developmental impairments and may even pose an immediate threat to health and survival (Centre on the Developing Child at Harvard University, 2012). Children experiencing chronic neglect are also at risk for emotional and behavioural difficulties, deficits in cognitive and executive function, as well as impaired immune system responses and abnormal physical development (Centre on the Developing Child at Harvard University, 2012; Lund et al., 2020; Moreno-Manso et al., 2020).

Importantly, there exists considerable opportunity to help adults build their core capabilities to cope with adversity and manage parenting effectively to provide optimal support for their child's development (Center on the Developing Child at Harvard University, 2016b, 2016a; Morris et al., 2017; Shonkoff, 2016). For instance, neuroscience research indicates that support from caregivers can help protect against harmful effects of poverty on brain development in early childhood (Luby et al., 2013). Similarly, the experience of at least one stable and responsive relationship with a parent or caregiver has been found to help buffer against the detrimental impacts of poverty on child development (Center on the Developing Child at Harvard University, 2016c). Research also demonstrates that a positive and engaging home learning environment is stronger than a parent's education and social class in creating good outcomes for children (Melhuish, 2016; Ryan, 2017; Sylva et al., 2004). Fully integrated, two-generation programs can address the needs of both children and their caregivers, and assist adults to develop the core capabilities necessary for success in parenting and the workplace (Center on the Developing Child at Harvard University, 2016b; Shonkoff & Fisher, 2013).

7. Conclusion

Despite our overall economic prosperity as a nation, a substantial number of people in Australia are being 'left behind', with children in lone parent families particularly at risk of experiencing deep and persistent socio-economic disadvantage (Australian Council of Social Service & University of New South Wales Sydney (2018); CEDA - the Committee for Economic Development of Australia, 2019). The insidious effects of poverty in early childhood are unfair and detrimental to lifelong health and wellbeing, and can severely limit opportunities for full social and economic participation in society (Cohen et al., 2010; Evans et al., 2012; Wise, 2016). Intervening in the early years to improve educational outcomes for children is crucial to help break the cycle of disadvantage (CEDA - the Committee for Economic Development of Australia, 2019; Perales et al., 2014). This represents a



significant opportunity with the potential to ameliorate the adverse impact of poverty, creating enduring positive effects on a child's later outcomes (Jha, 2016; Schindler et al., 2015; Shonkoff, 2010; Tayler et al., 2016). Furthermore, early intervention is considered a wise economic investment, delivering substantial impacts on savings for governments (Francesconi & Heckman, 2016; Geelhoed et al., 2021; Jha, 2016; Teager et al., 2019). For instance, the societal benefits from early intervention can far exceed program costs, through reducing welfare dependency and lessening the burden on the health care system and justice systems, as well as aiding children's later work productivity and future earnings in adulthood. Still, it should be recognised that improving health and developmental outcomes for children is an important and worthwhile objective in its own right. There exists a critical moral responsibility to work together on behalf of Australia's young children and their families to help eradicate poverty and protect against its insidious effects throughout the life course (Australian Council of Social Service & University of New South Wales Sydney (2018); Center on the Developing Child at Harvard University, 2007; CEDA - the Committee for Economic Development of Australia, 2019).



References

- Australian Council of Social Service & University of New South Wales Sydney (2018). *Inequality in Australia 2018*. <https://povertyandinequality.acoss.org.au/inequality/>
- Australian Early Development Census. (2014). *The impact of socio-economics and school readiness for life course educational trajectories*. <https://www.aedc.gov.au/resources/detail/the-impact-of-socio-economics-and-school-readiness-for-life-course-educational-trajectories>
- Australian Early Development Census. (2019). *Australian Early Development Census National Report 2018: A Snapshot of early childhood development in Australia*. <https://www.aedc.gov.au/resources/detail/2018-aedc-national-report>
- Australian Government Department of Social Services. (2017). *Low income and poverty dynamics - Implications for child outcomes*. Social Policy Research Paper Number 47. https://www.dss.gov.au/sites/default/files/documents/11_2017/sprp47_low_income_web.pdf
- Ayoub, C., O'Connor, E., Rappolt-Schlichtmann, G., Vallotton, C., Raikes, H., & Chazan-Cohen, R. (2009). Cognitive skill performance among young children living in poverty: Risk, change, and the promotive effects of Early Head Start. *Early Childhood Research Quarterly*, 24, 289–305. <https://doi.org/10.1016/j.ecresq.2009.04.001>
- Babcock, E. (2014). *Using brain science to design new pathways out of poverty*.
- Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development*, 81(1), 326–339.
- Blair, C., & Raver, C. (2016). *Poverty, Stress, and Brain Development: New Directions for Prevention and Intervention*. <https://doi.org/10.1016/j.acap.2016.01.010>
- Brooke Stafford-Brizard, K. (2016). *Building blocks for learning: A framework for comprehensive student development*.



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- Brushe, M. E., Lynch, J., Reilly, S., Melhuish, E., Mittinty, M. N., & Brinkman, S. A. (2021). The education word gap emerges by 18 months: Findings from an Australian prospective study. *BMC Pediatrics*, *21*(1), 1–9. <https://doi.org/10.1186/s12887-021-02712-1>
- Callis, Z., Seivwright, A., Orr, C., & Flatau, P. (2020). *The impact of COVID-19 on families in hardship in Western Australia: The 100 Families WA project*. <https://doi.org/10.25916/5f3b2a5e4bb42>
- Cassio, L., Blasko, Z., & Szczepanikova, A. (2021). *Poverty and mindsets — How poverty and exclusion over generations affect aspirations, hope and decisions, and how to address it*. Publications Office of the European Union. <https://doi.org/10.2760/453340>
- CEDA – the Committee for Economic Development of Australia. (2019). *Disrupting disadvantage: Setting the scene*. <https://www.ceda.com.au/ResearchAndPolicies/Research/Population/Disrupting-disadvantage-setting-the-scene>
- Center on the Developing Child at Harvard University. (2007). *A science-based framework for early childhood policy: Using evidence to improve outcomes in learning, behavior, and health for vulnerable children*. <https://developingchild.harvard.edu/>
- Center on the Developing Child at Harvard University. (2011). *Building the brain’s “air traffic control” system: How early experiences shape the development of executive function*. <http://www.developingchild.harvard.edu>
- Centre on the Developing Child at Harvard University. (2012). *The science of neglect: The persistent absence of responsive care disrupts the developing brain* (No. 12). <http://www.developingchild.harvard.edu>
- Center on the Developing Child at Harvard University. (2016a). *Applying the science of child development in child welfare systems*. <http://www.developingchild.harvard.edu>
- Center on the Developing Child at Harvard University. (2016b). *Building core capabilities for life: The science behind the skills adults need to succeed in parenting and in the workplace*. <http://www.developingchild.harvard.edu>



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- Center on the Developing Child at Harvard University. (2016c). *From best practices to breakthrough impacts: A science-based approach to building a more promising future for young children and families*. www.developingchild.harvard.edu
- Centre For Community Child Health. (2009). *The impact of poverty on early childhood development* (Issue 14). www.rch.org.au/ccch/policybriefs.cfm
- Clark, C. A. C., Martinez, M. M., Nelson, J. M., Wiebe, S. A., & Espy, K. A. (2014). Children's self-regulation and executive control: Critical for later years. In *Wellbeing in Children and Families: Wellbeing: A Complete Reference Guide: Vol. 1* (Issue 2014, pp. 7–36). <https://doi.org/10.1002/9781118539415.wbwell02>
- Cohen, S., Janicki-Deverts, D., Chen, E., & Matthews, K. A. (2010). Childhood socioeconomic status and adult health. *Annals of the New York Academy of Sciences*, 1186(The Biology of Disadvantage), 37–55. <https://doi.org/10.1111/j.1749-6632.2009.05334.x>
- Coley, R. L., Lynch, A. D., & Kull, M. (2015). Early exposure to environmental chaos and children's physical and mental health. *Early Childhood Research Quarterly*, 32, 94–104. <https://doi.org/10.1016/j.ecresq.2015.03.001>
- Cunha, F., Heckman, J. J., Lochner, L., & Masterov, D. V. (2006). Chapter 12 Interpreting the Evidence on Life Cycle Skill Formation. *Handbook of the Economics of Education*, 1, 697–812. [https://doi.org/10.1016/S1574-0692\(06\)01012-9](https://doi.org/10.1016/S1574-0692(06)01012-9)
- Davidson, P., Bradbury, B., Hill, T., & Wong, M. (2020). *Poverty in Australia 2020: Part 2, Who is affected?*
- Davidson, P., Bradbury, B., Wong, M., & Hill, T. (2020). *Inequality in Australia, Part 1: Overview*. www.acoss.org.au
- Davidson, P., Saunders, P., Bradbury, B. and Wong, M. (2020), Poverty in Australia 2020: Part 1, Overview. ACOSS/UNSW Poverty and Inequality Partnership Report No. 3, Sydney: ACOSS.
- Duncan, G. J., Magnuson, K., Kalil, A., & Ziol-Guest, K. (2012). The importance of early childhood poverty. *Social Indicators Research*, 108(1), 87–98. <https://doi.org/10.1007/s11205-011-9867-9>



-
- Duncan, G. J., Ziol-Guest, K., & Kalil, A. (2016). Early childhood poverty and adult attainment, behavior and health. *Society for Research in Child Development*, 81(1), 306–325.
- Evans, G. W., Chen, E., Miller, G., & Seeman, T. (2012). How poverty gets under the skin: A life course perspective. In V. Maholmes & R. B. King (Eds.), *The Oxford Handbook of Poverty and Child Development* (pp. 13–36). Oxford University Press.
- Fox, S. E., Levitt, P., & Nelson, C. A. (2010). How the timing and quality of early experiences influence the development of brain architecture. *Child Development*, 81(1), 28–40. <https://doi.org/10.1111/j.1467-8624.2009.01380.x>.How
- Francesconi, M., & Heckman, J. J. (2016). Child development and parental investment: Introduction. *The Economic Journal*, 126(596), F1–F27. <https://doi.org/10.1111/eoj.12388>
- Geelhoed, E., Bloom, D., Bock, C., Flatau, P., Mandzufas, J., Li, I., & Cross, D. (2021). Informing resource allocation for investment in early childhood: A review of the international peer-reviewed evidence. *The Australian Economic Review*, In Publication.
- Hackman, D. A., & Farah, M. J. (2009). Socioeconomic status and the developing brain. *Trends in Cognitive Sciences*, 13(2), 65–73. <https://doi.org/10.1016/j.tics.2008.11.003>.Socioeconomic
- Hackman, D., Gallop R., Evans, G., Farah, M. (2015). Socioeconomic status and executive function: Developmental trajectories and mediation. *Developmental science* 18(5), 686
- Hart, B., & Risley, T. (1995). *Meaningful Differences in the Everyday Experience of Young American Children*. Brookes.
- Hart, Betty, & Risley, T. R. (2003). The Early Catastrophe: The 30 Million Word Gap by Age 3. In *American Educator* (Vol. 27, Issue 1, pp. 1–6). <https://doi.org/ISSN-0148-432X>
- Hughes, C. (2011). Changes and challenges in 20 years of research into the development of executive functions. *Infant and Child Development*, 20, 251–271. <https://doi.org/10.1002/icd>



-
- Jha, T. (2016). *Early childhood intervention: Assessing the evidence*. <https://www.cis.org.au/publications/research-reports/early-childhood-intervention-assessing-the-evidence>
- Lawson, G. M., Hook, C. J., & Farah, M. J. (2018). A meta-analysis of the relationship between socioeconomic status and executive function performance among children. *Developmental Science*, 21(2), e12529.
- Lexmond, J., & Reeves, R. (2009). *"Parents are the principal architects of a fairer society...": Building Character*. DEMOS.
- Little, M. (2017). Racial and socioeconomic gaps in executive function skills in early elementary school: Nationally representative evidence from the ECLS-K:2011. *Educational researcher* 46(2), 103.
- Luby, J., Belden, A., Botteron, K., Marrus, N., Harms, M. P., Babb, C., Nishino, T., & Barch, D. (2013). The Effects of Poverty on Childhood Brain Development: The Mediating Effect of Caregiving and Stressful Life Events. *JAMA Pediatrics*, 167(12), 1135–1142. <https://doi.org/10.1001/jamapediatrics.2013.3139>
- Lund, J., Toombs, E., Radford, A., Boles, K., & Mushquash, C. (2020). Adverse Childhood Experiences and Executive Function Difficulties in Children: A Systematic Review. *Child Abuse & Neglect* 106, 104485.
- Martinez, A., & Perales, F. (2014). The dynamics of multidimensional poverty in contemporary Australia. In *Social Indicators Research*. <https://doi.org/10.1007/s11205-015-1185-1>
- Martinez Jr., A., Rampino, T., Western, M., Tomaszewski, W., & Roque, J. D. (2017). Estimating the contribution of circumstances that reflect inequality of opportunities. *Economic Papers: A Journal of Applied Economics and Policy*, 36(4), 380–400. <https://doi.org/https://doi.org/10.1111/1759-3441.12184>
- McEwen, C. & McEwen, B. (2017). Social Structure, Adversity, Toxic Stress, and Intergenerational Poverty: An Early Childhood Model, *Annual Review of Sociology*, 43(1), 445.
- McLachlan, R., Gilfillan, G., & Gordon, J. (2013). *Deep and persistent disadvantage in Australia*.



-
- Melhuish, E. (2016). Longitudinal research and early years policy development in the UK. *International Journal of Child Care and Education Policy*, 10(1), 1–18. <https://doi.org/10.1186/s40723-016-0019-1>
- Mills-Koonce, W., Willoughby, M., Garrett-Peters, P., Wagner, N., & Vernon-Feagans, L. (2016). The interplay among socioeconomic status, household chaos, and parenting in the prediction of child conduct problems and callous-unemotional behaviors. *Developmental Psychopathology*, 28(3), 757–771. <https://doi.org/10.1017/S0954579416000298>
- Misiak, B., Stańczykiewicz, B., Pawlak, A., Szewczuk-Bogusławska, M., Samochowiec, J., Samochowiec, A., Tyburski, E., & Juster, R. (2022). Adverse Childhood Experiences and Low Socioeconomic Status with Respect to Allostatic Load in Adulthood: A Systematic Review. *Psychoneuroendocrinology*, 136, 105602.
- Monks, H., & Barnes, A. (2018). *Executive function and self-regulation in early childhood [CoLab Evidence Report]*. <https://www.telethonkids.org.au/projects/HPER/executive-function/>
- Moreno-Manso, J., Garcia-Baamonde, M., de la Rosa Murillo, M., Blazquez-Alonso, M., Guerrero-Barona, E., & Garcia-Gomez, A. (2020). Differences in Executive Functions in Minors Suffering Physical Abuse and Neglect. *Journal of Interpersonal Violence*, 88626052094452.
- Moriguchi, Y., & Shinohara, I. (2019). Socioeconomic disparity in prefrontal development during early childhood. *Scientific Reports*, 9(1), 2585. <https://doi.org/10.1038/s41598-019-39255-6>
- Morris, A. S., Robinson, L. R., Hays-Grudo, J., Claussen, A. H., Hartwig, S. A., & Treat, A. E. (2017). Targeting parenting in early childhood: A public health approach to improve outcomes for children living in poverty. *Child Development*, 88(2), 388–397. <https://doi.org/10.1111/cdev.12743>
- Muscatell, K. A. (2018). Socioeconomic influences on brain function: Implications for health. *Annals of the New York Academy of Sciences*, 1428(1), 14.



-
- National Scientific Council on the Developing Child. (2020). *Connecting the brain to the rest of the body: Early childhood development and lifelong health are deeply intertwined*.
www.developingchild.harvard.edu
- Oh, D., Jerman, P., Silvério Marques, S., Koita, K., Purewal Boparai, S., Burke Harris, N., Bucci, M. (2018). Systematic review of pediatric health outcomes associated with childhood adversity. *BMC Pediatrics*, 18(1), 83.
- Pawson, H., Martin, C., Thompson, S., & Aminpour, F. (2021). *COVID-19: Rental housing and homelessness policy impacts*.
- Perales, F., Higginson, A., Baxter, J., Western, M., Zubrick, S. R., & Mitrou, F. (2014). *Intergenerational welfare dependency in Australia: A review of the literature*. www.lifecoursecentre.org.au
- Rakesh, D., & Whittle, S. (2021). Socioeconomic status and the developing brain – A systematic review of neuroimaging findings in youth. *Neuroscience and Biobehavioral Reviews*, 130, 379–407.
- Rod, N. H., Bengtsson, J., Budtz-Jørgensen, E., Clipet-Jense, C., Taylor-Robinson, D., Andersen, A.-M. N., Dich, N., & Rieckmann, A. (2020). Trajectories of childhood adversity and mortality in early adulthood: a population-based cohort study 489-497. *The Lancet*, 396(10249).
- Ryan, C. (2017). Social disadvantage and education. *Australian Economic Review*, 50(3), 338.
- Schindler, H. S., Kholoptseva, J., Oh, S. S., Yoshikawa, H., Duncan, G. J., Magnuson, K. A., & Shonkoff, J. P. (2015). Maximizing the potential of early childhood education to prevent externalizing behavior problems: A meta-analysis. *Journal of School Psychology*, 53(3), 243–263.
<https://doi.org/10.1016/j.jsp.2015.04.001>
- Seivwright, A. N., Callis, Z., & Flatau, P. (2020). Food insecurity and socioeconomic disadvantage in Australia. *International Journal of Environmental Research and Public Health*, 17(2), 559.
- Shonkoff, J. P. (2016). Capitalizing on advances in science to reduce the health consequences of early childhood adversity. *JAMA Pediatrics*, 170(10), 1003–1007.
<https://doi.org/10.1001/jamapediatrics.2016.1559>



-
- Shonkoff, J. P., & Fisher, P. A. (2013). Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Development and Psychopathology, 25*, 1635–1653. <https://doi.org/10.1017/S0954579413000813>
- Shonkoff, Jack P. (2010). Building a new biodevelopment framework to guide the future of early childhood policy. *Child Development, 81*(1), 357–367. <https://doi.org/10.1111/j.1467-8624.2009.01399.x>
- Sulik, M. J., Blair, C., Mills-Koonce, R., Berry, D., & Greenberg, M. (2015). Early parenting and the development of externalizing behavior problems: Longitudinal mediation through children’s executive function. *Child Development, 86*(5), 1588.
- Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2004). *The Effective Provision of Pre-School Education (EPPE) project: Findings from pre-school to end of key stage 1*.
- Taylor, C., Cloney, D., Adams, R., Ishimine, K., Thorpe, K., & Nguyen, T. K. C. (2016). Assessing the effectiveness of Australian early childhood education and care experiences: study protocol. *BMC Public Health, 16*, 352. <https://doi.org/10.1186/s12889-016-2985-1>
- Taylor, C. L., Zubrick, S. R., & Christensen, D. (2016). Barriers to parent-child book reading in early childhood. *International Journal of Early Childhood, 48*(3), 295–309. <https://doi.org/10.1007/s13158-016-0172-2>
- Teager, W., Fox, S., & Stafford, N. (2019). *How Australia can invest early and return more: A new look at the \$15b cost and opportunity*. <https://colab.telethonkids.org.au/areas-of-research-focus/how-aus-can-invest-in-children-and-return-more/>
- Tough, P. (2016). *Helping Children Succeed What Works and Why*. paultough.com/helping
- Ursache, A., Blair, C., & Raver, C. C. (2012). The promotion of self-regulation as a means of enhancing school readiness and early achievement in children at risk for school failure. *Child Development Perspectives, 6*(2), 122–128. <https://doi.org/10.1111/j.1750-8606.2011.00209.x>



-
- Van Lancker, W., & Parolin, Z. (2020). COVID-19, school closures, and child poverty: A social crisis in the making. *The Lancet Public Health*, 5(5), e243–e244. [https://doi.org/10.1016/S2468-2667\(20\)30084-0](https://doi.org/10.1016/S2468-2667(20)30084-0)
- Volmert, A., Kendall-Taylor, N., Cosh, I., & Lindland, E. (2016). *Perceptions of Parenting: Mapping the gaps between expert and public understandings of effective parenting in Australia*. Parenting Research Centre. <http://www.parentingrc.org.au/index.php/perceptions>
- Wass, S. V. (2015). Applying cognitive training to target executive functions during early development. *Child Neuropsychology*, 21(2), 150–166. <https://doi.org/10.1080/09297049.2014.882888>
- Welsh, J. A., Nix, R. L., Blair, C., Bierman, K. L., & Nelson, K. E. (2010). The development of cognitive skills and gains in academic school readiness for children from low-income families. *Journal of Educational Psychology*, 102(1), 43–53. <https://doi.org/10.1037/a0016738>
- Wise, P. H. (2016). Child Poverty and the Promise of Human Capacity: Childhood as a Foundation for Healthy Aging. *Academic Pediatrics*, 16. <https://doi.org/10.1016/j.acap.2016.01.014>