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CoLab EVIDENCE REPORT

The impact of poverty on the
developing child



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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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The impact of poverty on the developing child



HIGHLIGHTS

- **Over 730,000 children** in Australia are living in poverty, with children in single parent families **three times more likely** to be at risk compared to children in couple families.



- Children growing up in poverty can experience developmental delays that affect their **future academic success** and **life chances as an adult**.



- Poverty can also get **'under the skin'** in the early years to shape lifelong **physical and mental health** outcomes.

- Poverty experienced **in the first five years of life** is especially harmful to children's development.



- It is not economic hardship per se but the accompanying **poverty of relationships and experiences** that dramatically shapes young children's health and developmental outcomes.



- Intervening in the early years is crucial to help **break the cycle** of disadvantage. This includes assisting adults to cope effectively with adversity and provide the **consistent and responsive care** that is essential to healthy child development.



Introduction

The experience of poverty early in the life course can have far-reaching impacts on children's health, development and educational success, well into adulthood. This Evidence Report outlines the nature of poverty in Australia, and details the health and achievement gaps among disadvantaged children and their more affluent peers that emerge in early childhood, and continue to 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 on parenting and the family environment to influence child development.

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 ^[1]. Unequal distribution of income means that those in the highest income group receive around five 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 70 times as much wealth as those in the lowest wealth group ^[1]. Relative to other Western countries, a higher proportion of economic disparities in Australia arise from an inequality of opportunity ^[2]. Unfair 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 ^[2]. Rising inequality undermines social cohesion and perpetuates the vicious cycle of disadvantage ^[2]. It also limits the potential for full social and economic participation among the most disadvantaged in society ^[1].

The harmful effects of rising inequality are most evident among those persons forced into poverty. Poverty is defined as being unable to afford social perceived necessities, and having an inadequate level of household income to meet an acceptable standard of living ^[3]. Essentially, "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" ^[4]. The Australian Council of Social Services (ACOSS) highlights an overall trend of



persistent and entrenched poverty in Australia over the past decade. In 2014, the child poverty rate was 17.4%, thus affecting over 730,000 children^[3]. Children in lone parent families are three times more likely to be living in poverty compared to those children in couple families, with a reported poverty rate of 40.6%^[3].

Despite record economic growth and our prosperity as a nation, the rate of poverty in Australia is higher than the average of OECD countries^[3]. Importantly, the longer individuals are living in income poverty, the lower the probability they will escape these circumstances of adversity^[5]. 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^[4]. Poverty can be a transient state with a number of people moving in and out of disadvantage (e.g. following short-term periods of unemployment)^[4]. However, a smaller proportion of people who are living in poverty experience ongoing and deep disadvantage^[5]. The 'impoverished lives' of those experiencing deep and persistent disadvantage extend beyond economic adversity, to encompass deprivation of opportunities, social support, health and material resources^[5, 6]. Among those most likely to experience deep and persistent disadvantage are lone parent families, those with a long-term health condition or disability, people with low educational attainment, and Indigenous Australians^[5].

Childhood poverty and life-course outcomes

The experience of poverty in the early years can significantly compromise children's life chances^[7]. For instance, 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^[8, 9]. 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^[10]. 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^[11].

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 2015 Australian Early Development Census, children living in the most socioeconomically disadvantaged areas were over 4 times more likely to be developmentally vulnerable than those children residing in the least disadvantaged areas in Australia^[12]. 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 med-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^[13]. 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^[13].

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 ^[14]. The lifetime experience of poverty can also form a cycle within families described as an intergenerational transmission of disadvantage ^[15, 16]. 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 for the future ^[15]. Similarly, children who are raised in welfare-dependent homes can also have a restricted ability to move out of disadvantage because of intergenerational transmission of attitudes to work and welfare, parent mental health issues, geographical location and lack of educational attainment ^[16].

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 ^[17]. 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 ^[17]. The overall functioning of the body's multiple physiological regulatory systems (i.e. allostatic load) is also impaired by children's experiences of poverty ^[17]. Additionally, 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 ^[18, 19]. Notably, the persistent effects of disadvantage have been found to adversely impact on adult health outcomes independent of social mobility and adult SES ^[17, 18].

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, or an accumulation of reoccurring risk exposures related to low SES that result in altered health trajectories over the life course ^[17]. 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 ^[19].

One of the central mechanisms through which economic deprivation in early childhood shapes long-term outcomes, is through the sensitivity of developing brain function in the formative years ^[7]. 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 ^[20, 21]. 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 ^[20, 22]. 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 ^[22, 23]. As such, poverty contributes to a 'cascade' of negative outcomes that results in further hardship and vulnerability, including poor educational outcomes, social and emotional difficulties, criminal activity and unemployment ^[22].

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' ^[24-26]. 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 ^[26-28]. The development of executive function skills also enable children to adjust their goals, prioritise, and direct, focus and sustain their attention, effectively self-regulate their emotions and behaviour and switch between tasks ^[28-30]. In this way, executive function skills are likened to an "air traffic control system" for the brain ^[26].

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 ^[8]. 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 ^[8]. 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 ^[8, 22, 30].



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 ^[26, 27, 30, 31]. Hence, delays in the development of executive function skills create social and learning disparities between children that widen over time and lead to poor social and economic outcomes ^[23].

While poverty in early childhood undermines executive function skill development, there is still much that can be done to assist children to advance these critical skills that set the foundation for lifelong learning. Specifically, conscious and careful attention to the environment of relationships that children grow up in is fundamental to the development of executive function skills. 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" ^[8].



Poverty, family functioning and parenting

Early childhood disadvantage can exert damaging effects through its influence on family functioning and parents' capacity to provide consistent and responsive care, and a stimulating learning environment for their child [7]. In early childhood, the family context is the dominant environment in young children's lives (rather than the peer or school contexts) [7]. 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 [7, 15]. 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 [32]. Low-income parents also 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 that is evident at age 3, and which shapes children's outcomes over time [33, 34].



Disadvantaged families experience a multitude of challenges, including difficulty accessing stable and affordable housing, high-quality healthcare, childcare and schooling [22, 28]. 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 [22, 28]. 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 [8, 15, 35]. 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 [11]. 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 [22, 29].

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 [15, 36]. 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 [37]. 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 [37].

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 [29, 38, 39]. For instance, neuroscience research indicates that support from caregivers can help protect against harmful effects of poverty on brain development in early childhood [40]. 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 [41]. Research also demonstrates that a positive and engaging home learning environment is stronger than a parent's education and class in creating good outcomes for children [42, 43]. Fully integrated, two-generation programs, which provide services to both parents and children, 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 [39, 44].



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 disadvantage [3-5]. Poverty in early childhood is detrimental to lifelong health and wellbeing, and can severely limit opportunities for full social and economic participation in society [17-19]. Intervening in the early years to improve educational outcomes for children is crucial to help break the cycle of disadvantage [4, 16]. This represents a significant opportunity with the potential to protect against the adverse impact of poverty and disadvantage, creating enduring positive effects on a child's later outcomes [45-48]. Furthermore, early intervention is considered a wise economic investment, delivering substantial impacts on savings for governments [48, 49]. 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. We all have 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 harmful effects throughout the life course [3, 4, 50].

References

1. Australian Council of Social Service. (2015). Inequality in Australia 2015. Retrieved from <https://www.acoss.org.au>
2. Martinez, A., Western, M., Tomaszewski, W., & Rampino, T. (2015). Should we be concerned about income inequality in Australia? an empirical investigation of inequality of opportunities. Retrieved from www.lifecoursecentre.org.au/
3. Australian Council of Social Service. (2016). Poverty in Australia 2016. Retrieved from <https://www.acoss.org.au>
4. Committee for Economic Development of Australia. (2015). Addressing entrenched disadvantage in Australia. Retrieved from <http://www.ceda.com.au/>
5. McLachlan, R., Gilfillan, G., & Gordon, J. (2013). Deep and persistent disadvantage in Australia. Retrieved from <http://www.pc.gov.au/research/supporting/deep-persistent-disadvantage>
6. Martinez, A., & Perales, F. (2017). The dynamics of multidimensional poverty in contemporary Australia. *Social Indicators Research*, 130(2), 479–496. doi:10.1007/s11205-015-1185-1
7. Duncan, G. J., Magnuson, K., Kalil, A., & Ziol-Guest, K. (2012). The importance of early childhood poverty. *Social Indicators Research*, 108(1), 87–98. doi:10.1007/s11205-011-9867-9
8. Tough, P. (2016). Helping children succeed: what works and why. Retrieved from <http://paultough.com/helping/>
9. Cunha, F., Heckman, J. J., Lochner, L., & Masterov, D. V. (2006). Interpreting the evidence on life cycle skill formation. *Handbook of the Economics of Education*, 1(6), 697–812. doi:10.1016/S1574-0692(06)01012-9
10. 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(3), 289–305. doi:10.1016/j.ecresq.2009.04.001
11. 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. doi:10.1016/j.ecresq.2015.03.001
12. Australian Early Development Census. (2016). Australian Early Development Census National Report 2015. Retrieved from <https://www.aedc.gov.au/>
13. Australian Early Development Census. (2014). The impact of socio-economics and school readiness for life course educational trajectories. Retrieved from <https://www.aedc.gov.au>
14. Duncan, G. J., Ziol-Guest, K. M., & Kalil, A. (2016). Early childhood poverty and adult attainment, behavior and health. *Society for Research in Child Development*, 81(1), 306–325.
15. Centre For Community Child Health. (2009). The impact of poverty on early childhood development. Retrieved from <http://www.rch.org.au/ccch/policybrief/>
16. Perales, F., Higginson, A., Baxter, J., Western, M., Zubrick, S., & Mitrou, F. (2014). Intergenerational welfare dependency in Australia: a review of the literature. Retrieved from <http://www.lifecoursecentre.org.au/>
17. 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). New York: Oxford University Press.
18. 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, 37–55. doi:10.1111/j.1749-6632.2009.05334.x
19. Wise, P. H. (2016). Child poverty and the promise of human capacity: childhood as a foundation for healthy aging. *Academic Pediatrics*, 16(3), S37–S45. doi:10.1016/j.acap.2016.01.014
20. 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. doi:10.1111/j.1750-8606.2011.00209.x
21. 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.
22. Babcock, E. (2014). Using brain science to design new pathways out of poverty. Boston, MA.
23. 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. doi:10.1037/a0016738
24. Stafford-Brizard, K. B. (2016). Building blocks for learning: a framework for comprehensive student development. New York. Retrieved from <https://www.turnaroundusa.org/>
25. Hackman, D., & Farah, M. (2009). Socioeconomic status and the developing brain. *Trends in Cognitive Sciences*, 13(2), 65–73. doi:10.1016/j.tics.2008.11.003.Socioeconomic
26. 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. Retrieved from <http://developingchild.harvard.edu/>
27. Wass, S. V. (2015). Applying cognitive training to target executive functions during early development. *Child Neuropsychology*, 21(2), 150–66. doi:10.1080/09297049.2014.882888
28. 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 C. L. Cooper & S. H. Landry (Eds.), *Wellbeing in children and families* (Vol. I, pp. 7–36). West Sussex, UK: Wiley-Blackwell. doi:10.1002/9781118539415.wbwell02
29. Center on the Developing Child at Harvard University. (2016). Applying the science of child development in child welfare systems. Retrieved from <http://developingchild.harvard.edu/>

30. Hughes, C. (2011). Changes and challenges in 20 years of research into the development of executive functions. *Infant and Child Development*, 20, 251–271. doi:10.1002/icd
31. Fox, S. E., Levitt, P., & Nelson, C. (2010). How the timing and quality of early experiences influence the development of brain architecture. *Child Development*, 81(1), 28–40. doi:10.1111/j.1467-8624.2009.01380.x
32. 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. doi:10.1007/s13158-016-0172-2
33. Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap by age 3. *American Educator*, 27(1), 1–6. doi:ISSN-0148-432X
34. Hart, B., & Risley, T. (1995). *Meaningful differences in the everyday experience of young american children*. Baltimore: Brookes.
35. 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. Retrieved from <http://www.parentingrc.org.au/>
36. Lexmond, J., & Reeves, R. (2009). "Parents are the principal architects of a fairer society...": building character. London: DEMOS.
37. Center on the Developing Child at Harvard University. (2012). The science of neglect: the persistent absence of responsive care disrupts the developing brain. Retrieved from <http://developingchild.harvard.edu/>
38. Shonkoff, J. P. (2016). Capitalizing on advances in science to reduce the health consequences of early childhood adversity. *JAMA Pediatrics*, 301(21), 2252–2259. doi:10.1001/jamapediatrics.2016.1559
39. Center on the Developing Child at Harvard University. (2016). Building core capabilities for life: the science behind the skills adults need to succeed in parenting and in the workplace. Retrieved from <http://developingchild.harvard.edu/>
40. Luby, J., Belden, A., Botteron, K., Marrus, N., Harms, M. P., Babb, C., ... Barch, D. (2013). The effects of poverty on childhood brain development: the mediating effect of caregiving and stressful life events. *JAMA Pediatrics*, 167(12), 1135–42. doi:10.1001/jamapediatrics.2013.3139
41. Center on the Developing Child at Harvard University. (2016). From best practices to breakthrough impacts: a science-based approach to building a more promising future for young children and families. Retrieved from <http://developingchild.harvard.edu/>
42. 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. doi:10.1186/s40723-016-0019-1
43. 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*. Nottingham, United Kingdom. Retrieved from <http://ro.uow.edu.au/>
44. 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(4), 1635–53. doi:10.1017/S0954579413000813
45. Tayler, 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. doi:10.1186/s12889-016-2985-1
46. 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. doi:10.1016/j.jsp.2015.04.001
47. Shonkoff, J. P. (2010). Building a new biodevelopment framework to guide the future of early childhood policy. *Child Development*, 81(1), 357–367. doi:10.1111/j.1467-8624.2009.01399.x
48. Jha, T. (2016). Early childhood intervention: assessing the evidence. Retrieved from <https://www.cis.org.au/>
49. Francesconi, M., & Heckman, J. J. (2016). Child development and parental investment: introduction. *The Economic Journal*, 126, F1–F27. doi:10.1111/eoj.12388
50. Center on the Developing Child at Harvard University. (2007). A science-based framework for early childhood policy: using evidence to improve outcomes in learning, behaviour, and health for vulnerable children. Retrieved from <http://developingchild.harvard.edu/>