

Vol. 5, No. 4 2011

Early Child Development and Mental Health



Overview

Laying the foundation for lifelong mental health



Review

ECD programs and children's mental health



Next Issue

Preventing anxiety disorders

Anxiety disorders are the most common mental health problems that children experience. We investigate what can be done to prevent these problems.



Feature

Making kindergarten more engaging



Letters

Carefully counting cases,
Carefully choosing words

WELCOMING NURSE-FAMILY PARTNERSHIP

The CHPC will be conducting a scientific evaluation of the first Nurse-Family Partnership program to be launched province-wide in Canada. [Please see our video.](#)

About the Children's Health Policy Centre

As an interdisciplinary research group in the [Faculty of Health Sciences](#) at [Simon Fraser University](#), we aim to connect research and policy to improve children's social and emotional well-being, or *children's mental health*. We advocate the following public health strategy for children's mental health: addressing the determinants of health; preventing disorders in children at risk; promoting effective treatments for children with disorders; and monitoring outcomes for all children. To learn more about our work, please see www.childhealthpolicy.sfu.ca



**Children's
Health Policy
Centre**

VOL. 5, NO. 4 2011

About the Quarterly

In the *Quarterly*, we present summaries of the best available research evidence on children's mental health topics, using systematic review methods adapted from the [Cochrane Collaboration](#).

Quarterly Team

Scientific Writer

Christine Schwartz, PhD, RPsych

Scientific Editor

Charlotte Waddell, MSc, MD, CCFP, FRCPC

Research Coordinator

Jen Barican, BA

Research Assistants

Orion Garland, MPH
& Larry Nightingale, LibTech

Production Editor

Daphne Gray-Grant, BA (Hon)

Copy Editor

Naomi Pauls, BA, MPub

Contact Us

We hope you enjoy this issue. We welcome your letters and suggestions for future topics. Please email them to chpc_quarterly@sfu.ca or write to the Children's Health Policy Centre, Attn: Jen Barican, Faculty of Health Sciences, Simon Fraser University, Room 2435, 515 West Hastings St., Vancouver, British Columbia V6B 5K3 Telephone (778) 782-7772



SIMON FRASER UNIVERSITY
THINKING OF THE WORLD

Quarterly

This Issue

Overview

3

Laying the foundation for lifelong mental health

Children make remarkable social and emotional gains during their early years. We discuss how children's early experiences can encourage or inhibit positive social and emotional development.

Review

5

ECD programs and children's mental health

Can early childhood development programs enhance children's mental health? We present findings from a systematic review of recent research on this important question.

Feature

9

Making kindergarten more engaging

Teachers in 12 BC kindergartens are being trained to deliver an ECD program called *Tools of the Mind*. We speak with UBC neuroscientist Adele Diamond about the program.

Letters

11

Carefully counting cases, carefully choosing words

We respond to a reader's question about the prevalence of oppositional defiant disorder. We also address a letter about the importance of conveying compassion for families who are struggling.

Appendix

12

Research methods

References

13

We provide the references cited in this issue of the *Quarterly*.

Links to Past Issues

16

How to Cite the Quarterly

We encourage you to share the *Quarterly* with others and we welcome its use as a reference (for example, in preparing educational materials for parents or community groups). Please cite this issue as follows:

Schwartz, C., Waddell, C., Barican, J., Garland, O., Gray-Grant, D., & Nightingale, L. (2011). Early child development and mental health. *Children's Mental Health Research Quarterly*, 5(4), 1–16. Vancouver, BC: Children's Health Policy Centre, Faculty of Health Sciences, Simon Fraser University.

Overview

Laying the foundation for lifelong mental health

Over the last decade, mounting evidence has made it clear that the foundations of mental health are shaped from the earliest days of life.¹

Children undergo tremendous developmental changes during their first six years. In addition to physical and cognitive development, there are numerous social and emotional — or mental health — gains in the early years. Table 1 highlights just a few of the important early mental health milestones. These interconnected developmental gains lay the foundation for subsequent lifelong learning, healthy relationships and contributions to society.²



It is children's cumulative experiences with multiple, interacting risk and protective factors that ultimately influence social and emotional development.

Table 1: Sample Early Mental Health Milestones³

Age	Milestone
1 – 3 months	Identifies mother (or primary parent) by sight, responds more to mother (or primary parent) than to others, coos responsively
3 – 6 months	Smiles responsively, grasps and explores objects, laughs, shows excitement, expresses displeasure when thwarted
6 – 12 months	Begins using “Mama” and “Dada” as names, waves goodbye, expresses a variety of emotions (e.g., affection, anger, anxiety, sadness), begins to show separation anxiety
12 – 18 months	Imitates parents' behaviour, points to wanted objects, returns a hug, likes to please parents, likes to explore (e.g., closets, cabinets)
18 – 24 months	Follows simple directions, recognizes self in mirror, uses words to request things, engages mainly in solitary play
2 – 3 years	Calls self by name, starts engaging in fantasy play, plays at helping (e.g., with household chores), expresses pride in accomplishments
3 – 4 years	Plays with other children, uses words to describe uses for objects, uses objects to represent people in play
4 – 5 years	May attempt to regulate emotions (e.g., crying), follows the rules of simple games, begins showing a sense of values (e.g., what is right, wrong or fair)
5 – 6 years	Tells stories, begins to develop ability to regulate behaviour (e.g., waiting their turn or limiting aggression)

Source: Adapted from Morrison & Anders (2001).

Some of the most profound influences on children's social and emotional development are their early experiences within their families and their communities. Positive early experiences such as nurturing and responsive care promote healthy development.⁴ For example, parental sensitivity during infancy significantly predicts “emotional resilience” or a child's ability to recover and generate positive emotions when faced with adversity.⁵ Greater emotional resilience during the preschool years, in turn, is associated with significantly lower levels of anxiety and depression in later childhood.⁵

In contrast, difficult early experiences, such as exposure to parental substance abuse or to child maltreatment, can be detrimental to development. Being raised in a neighbourhood that is socio-economically disadvantaged can also carry a price. Recent surveys in British Columbia of all children entering kindergarten have found that those from poorer neighbourhoods demonstrate lower social competence and emotional maturity than peers from more affluent neighbourhoods.^{6,7} Similarly, longitudinal Canadian surveys have found that preschoolers from poorer neighbourhoods with less social cohesion have poorer language abilities and more behaviour problems than peers from more affluent neighbourhoods.⁸

Nevertheless, it is children's *cumulative* experiences with *multiple*, interacting risk and protective factors that ultimately influence social and emotional development, rather than exposure to any single factor.⁹ Thus there are numerous opportunities to provide children with experiences that promote positive development and reduce risk in the early years. Many children receive such experiences by participating in early child development (ECD) programs.

The ABCs of ECD

ECD programs often involve providing children with educational experiences at centre-based preschools. Parenting interventions and other forms of assistance for families are often provided as well. While the specific goals may vary, the overarching aim is usually to improve children's school readiness.¹⁰ ECD programs therefore commonly target children from disadvantaged families—who are more likely to enter school with poorer cognitive skills.¹¹ Still, some researchers suggest that ECD programs should be provided universally, to all children, given that many children from more advantaged families also have developmental vulnerabilities.⁷

Over the 50 years since researchers began measuring the impact of ECD programs on early learning,¹¹ compelling evidence has been amassed showing that targeted ECD programs lead to fewer developmental delays, better language capabilities and better overall school readiness for disadvantaged children.^{12, 13} These programs have also yielded far greater returns than interventions provided later in the lifespan, such as improving teacher-student ratios, providing job training or enhancing policing.¹⁴

Having documented the early learning benefits of ECD programs, particularly for disadvantaged children, researchers are now investigating the potential benefits for other aspects of child development, namely mental health. In the following review article, we examine the mental health outcomes of ECD programs and the implications of this research. 🖐

“There are numerous opportunities to provide children with experiences that promote positive development and reduce risk in the early years.”

ECD programs and children's mental health

Can early child development programs improve children's mental health? To answer this question, D'Onise and colleagues¹⁰ conducted a systematic review of original studies published between 1980 and 2008 that met the following criteria:ⁱ

- Described evaluations of centre-based preschool ECD programs
- Measured outcomes in both intervention and comparison groups
- Reported outcomes at one year (or longer) following the start of the intervention

Based on these criteria, D'Onise and colleagues accepted 37 original studies for their review, including five randomized controlled trials (RCTs), 12 quasi-experimental studies and 20 studies of other designs.

D'Onise's group then carefully evaluated the methods used in all 37 studies according to accepted critical appraisal standards.¹⁵ They determined that eight studies were "higher" quality, while 29 were "moderate" or "lower" quality. Significant methods problems in the weaker 29 studies included high dropout rates and unreliable or unvalidated outcome measures. Given these reported weaknesses, we chose to focus on the eight strongest studies, which described evaluations of these four programs:

- *Better Beginnings, Better Futures (BBBF)*
- *Chicago Child Parent Center (CCPC)*
- *Mauritius*
- *Perry Preschool*

While these four ECD programs were all targeted, the methods for identifying populations at risk varied. Evaluators for *CCPC* and *Perry Preschool* identified children on the basis of living in socio-economically disadvantaged families.^{16,17} Meanwhile researchers for *Mauritius* identified children on the basis of risk for developing mental disorders.¹⁸ In contrast, for *BBBF*, communities were identified as being socio-economically disadvantaged, then the program was provided universally to all children within those communities.¹⁹ Table 2 describes other characteristics of these four programs.



All four featured early child development programs provided comprehensive services to families.

i Please see the Appendix for information on how we selected this review.

Table 2: Targeted ECD Programs and Mental Health Benefits^{10, 16–20}

Program (Country)	Intervention(s)	Age at Start	Program Duration
<i>Better Beginnings, Better Futures</i> * (Canada)	<ul style="list-style-type: none"> • <i>Preschool children</i>: Academic programs, food + toy libraries • <i>School-age children</i>: Academic enrichment + food • <i>Parents</i>: Support programs, home visits + child care • <i>Community</i>: Collective kitchens + gardens 	4 years	4 years
<i>Chicago Child Parent Center</i> (US)	<ul style="list-style-type: none"> • <i>Preschool children</i>: Academic programs, food + health screening • <i>School-age children</i>: Academic programs, food + health screening • <i>Parents</i>: Support programs, home visits + high-school courses 	3 – 4 years	Up to 6 years
<i>Mauritius</i> (Mauritius)	<ul style="list-style-type: none"> • <i>Preschool children</i>: Academic programs, food, exercise programs, health screening + referrals • <i>Parents</i>: Home visits + engagement in preschools 	3 – 4 years	2 years
<i>Perry Preschool</i> (US)	<ul style="list-style-type: none"> • <i>Preschool children</i>: Academic programs • <i>Parents</i>: Support programs + home visits 	3 – 4 years	Up to 1 year, 2 months

* Community members participated in developing/implementing the program so content varied across sites.

In their review, D’Onise and colleagues¹⁰ then identified short-term child mental (and physical) health outcomes for each of the four programs. They also conducted a separate systematic review in which they examined long-term outcomes — at 18 years and beyond. This companion review detailed outcomes from *CCPC*, *Mauritius* and *Perry Preschool* but not *BBBF* because adult outcomes were not yet available. To capture both child and adult outcomes, we report all significant findings identified in both systematic reviews in Table 3.

Table 3: Mental Health Benefits of Targeted ECD Programs*^{10, 21}

Program	Age at Follow-Up	Significant Outcomes
<i>Better Beginnings, Better Futures</i>	8 years	<ul style="list-style-type: none"> ↓ Anxiety symptoms ↑ Self-control
<i>Chicago Child Parent Center</i>	20 years	<ul style="list-style-type: none"> ↓ Violent arrests ↓ Non-violent arrests
	22 – 24 years	<ul style="list-style-type: none"> ↓ Depressive symptoms
<i>Mauritius</i>	17 years	<ul style="list-style-type: none"> ↓ Conduct symptoms ↓ Cognitive disorganization ↓ Psychotic behaviour ↓ Unusual perceptual experiences
<i>Perry Preschool</i>	15 years	<ul style="list-style-type: none"> ↑ Positive classroom behaviours
	40 years	<ul style="list-style-type: none"> ↓ Likelihood of marijuana use in last 15 years ↓ Likelihood of heroin use in last 15 years

* Programs may have had beneficial outcomes not presented in these reviews.

ECD programs improve children's mental health

As Table 3 shows, all four ECD programs led to statistically and clinically significant mental health benefits — both short-term and long-term. At age eight, *BBBF* children had fewer anxiety symptoms and more self-control. By age 20, *CCPC* children had fewer arrests for violent and non-violent crimes, then by their mid-20s, fewer depressive symptoms. At age 17, *Mauritius* children had fewer mental health symptoms, including problems with conduct and psychosis. Meanwhile, *Perry Preschool* children demonstrated more positive behaviours early on, followed by a reduced likelihood of using marijuana or heroin in adulthood.

Three of the four featured ECD programs (*BBBF*, *CCPC* and *Perry Preschool*) also assessed related physical health outcomes, including tobacco use, exercise, health services use and overall health status. *CCPC* children did not show significant physical health gains. However, by age eight, *BBBF* children had significantly better general health.¹⁰ By adulthood, *Perry Preschool* participants were significantly more likely to engage in healthy behaviours.²¹

D'Onise and colleagues' adult outcomes review¹⁰ did omit some important findings — namely criminal offending. For example, by the time *Mauritius* participants reached their mid-20s, they reported engaging in significantly less criminal offending than comparison participants.²² By age 37, *Perry Preschool* participants also had significantly higher employment earnings and significantly less criminal activity.²³

Common elements of successful ECD programs

The four featured ECD programs had important common elements that likely contributed to their success. Most notably, all four were delivered to children living in socio-economically disadvantaged circumstances. (Although participants in the *Mauritius* study were not chosen based on socio-economic disadvantage, the country experienced high levels of poverty in general during the early 1970s, when the program was delivered.) It is perhaps unsurprising then that many of the gains were found for variables strongly associated with socio-economic disadvantage, such as behaviour problems including substance use.²¹ These findings suggest that from the perspective of children's mental health, targeted ECD investments should be the priority.

A better future for parents too?

The evaluators of *Better Beginnings, Better Futures (BBBF)* found that the program helped not only the children but also their parents. Participating parents, from three disadvantaged Ontario neighbourhoods, showed significant improvements in their relationships with their child's teachers as well as significantly increased involvement with their child's school.¹⁹ Strikingly, parents also made gains independent of their roles as caregivers. *BBBF* parents had improved satisfaction in their intimate-partner relationships along with reduced stress and reduced smoking. Parents' satisfaction with the condition of their home even increased. This Canadian community-based ECD program was therefore a success story for families.

When spending makes sense

The long-term gains with *Perry Preschool* extended beyond the participating children and families. An economic evaluation found that every dollar spent on the program saved Americans between \$6.87 and \$16.14 because of reduced criminal activity.²³ For more information on the economic evaluation of *Perry Preschool*, please see our previous *Quarterly* at www.childhealthpolicy.sfu.ca/research_quarterly_08/rq-pdf/RQ-1-09-Winter.pdf.

All four featured ECD programs also provided comprehensive services to families. Children participated in well-resourced centre-based preschools, and parents received home visiting and concrete supports such as child care and high-school courses. Additionally, CCCP provided health screening services, and Mauritius provided both health screening and referrals for children.

Program duration was another crucial element. In these programs, children and families received the interventions over long periods — ranging from 14 months for *Perry Preschool* to six years for CCCP.

The four featured ECD programs were implemented and evaluated in three different countries (the US, Mauritius and Canada) over three different decades (from the 1960s to the 1990s). Therefore, their applicability to Canadian children warrants careful examination. Only BBBF was delivered in Canada, making its outcomes potentially more relevant.

Beyond the issue of baseline health care and social services being arguably better in Canada, BBBF was delivered in three Ontario communities with diverse demographics, languages and cultures,¹⁹ making results generalizable to the many other Canadian communities that are diverse in these ways. As well, with BBBF, each community played an active role in defining specific program activities according to local needs, suggesting a flexibility that could make the program portable to other Canadian communities.¹⁹

This review highlights the considerable potential of targeted ECD programs to improve children's mental health. While these programs may not always be designed with mental health in mind, they clearly *can* promote positive social and emotional development, particularly for disadvantaged children. This means that targeted ECD programs should be regarded as a crucial component of a public health strategy for improving children's mental health.²⁴ 🖐️

“ Targeted early childhood development programs should be regarded as a crucial component of a public health strategy for improving children's mental health. ”

Making kindergarten more engaging

Here's a question from neuroscientist Adele Diamond: "Put a driver and a passenger in the same car, give them a destination, and who do you think will learn the route better?"

The correct answer — the driver — is obvious because that person has the advantage of making all the decisions, visualizing the process and achieving the result. The passenger, quite literally, is just along for the ride.

"So why do we send our kids to school and have them simply be passengers?" asks Diamond, who is the Canada Research Chair in Developmental Cognitive Neuroscience at the University of British Columbia. "We've known for decades that hands-on is the best way to learn. Still, a vast amount of what happens in schools is lecturing."

A firm believer in investing in early childhood, Diamond believes ECD programs help make kids *drivers*. She says economists put the return on investment for early years education at between 15 and 17%. But she's concerned that British Columbia — home to numerous world leaders on the subject — is slow in showing much commitment to such early training.

One notable exception: In September 2011 the provincial government began funding an early childhood development pilot program in 12 kindergartens, four each in Surrey, Vancouver and Coquitlam. Known as *Tools of the Mind*, the program was developed by two educational psychologists, Elena Bodrova and Deborah Leong, and is based on the theories of Russian psychologist Lev Vygotsky.

Helping build better brains

Tools of the Mind, which is delivered by teachers and fully integrated into all aspects of the kindergarten program, aims to develop "executive functioning." This is a collection of brain processes that activate, organize, integrate and manage other functions. Kids with good executive functioning have robust working memories, excellent inhibitory control and strong cognitive flexibility.

In everyday language, kids with good executive functioning are able to do things such as

- Wait their turn and resist grabbing other children's toys
- Ignore distractions and keep their attention focused on what they're supposed to be doing
- Follow multi-step instructions such as "Let's get ready for bed now. So take off your clothes and put on your pyjamas. Then brush your teeth."



Adele Diamond, Canada Research Chair in Developmental Cognitive Neuroscience.

“We've known for decades that hands-on is the best way to learn.”

Putting the *fun* in fundamental

For Diamond, the secret to working with kids in these areas is to make the process *fun* — as *Tools of the Mind* aims to. “Vygotsky felt that the best way to improve self-regulation [executive functioning] in little children is to do social dramatic play,” she says. “[In such play] children have to use working memory to remember what role they picked and what role their friends picked.” As well, they have to inhibit acting out of character (thereby exercising self-control) and adjust to wherever their friends go with the story (thus learning to exercise cognitive flexibility).

When *Tools of the Mind* focuses on a subject such as arithmetic — by having children count teddy bears — one child will count and another child will check. “A three-year-old can check a five-year-old,” Diamond says. This process echoes one of the core principles of the program: that children learn self-regulation by regulating *others* first. It naturally follows that children then start to correct themselves, by talking to themselves.

Program to be evaluated in BC

Teachers in the 12 randomly selected BC kindergartens will begin training this year in how to use the program. Next fall, one year later, Diamond hopes to begin studying children in those classes compared with children in matched classes randomly selected not to receive the program. She then hopes to follow the children longitudinally. Anyone wanting more information on Diamond’s research can contact her via her webpage: www.devcogneuro.com/AdeleDiamond.html.

Building executive functioning at home

For parents who want to help boost their children’s executive functioning at home, Diamond suggests engaging them in any activity — from tae kwon do to music lessons to yoga — that requires practice, effort and concentration. “It’s the time the children spend and the pushing of themselves to improve that really matters,” she says. “There’s no substitute for time and sustained practice.”

And for parents who need to settle excited, noisy children, Diamond recommends a game of follow the leader with bells. Each person is given a bell and is to walk single file following the leader (any family member). The goal is that no one should make a sound with their bell. “It’s really a walking meditation exercise, but of course you don’t call it that,” Diamond says.

According to Diamond, education at *any* level “should be *fun*, rather than torture.” This is for a simple reason. “We know that if you’re happy, your executive functioning works better,” she says. 🖐️

Measuring early learning

Given the positive results of evaluations of *Tools of the Mind* in the United States, there are good reasons to be optimistic that BC children may benefit from this program. When the program was evaluated in a low-income school district, children who received it did significantly better than those receiving a more traditional curriculum, according to two measures of executive functioning.²⁵ Three- and four-year-olds who received the program also showed significantly fewer behavioural problems than children who received a standard curriculum.²⁶ By evaluating this program in BC, researchers will be able to determine whether these positive results can be replicated in Canada.

Carefully counting cases, Carefully choosing words

To the Editors:

In a previous issue of the *Quarterly* focused on children's behavioural wellbeing, you provide prevalence information for conduct disorder but not for oppositional defiant disorder (ODD). How common is ODD?

Allison McLeod, Victoria, BC

As you are likely aware, the term ODD refers to a persistent pattern of negative and defiant behaviours, while conduct disorder (CD) refers to a more serious and persistent pattern of behaviour that violates others' basic rights or serious age-appropriate rules.²⁷ ODD has been less well conceptualized than CD for measurement purposes. Nevertheless, we found two studies assessing ODD's prevalence in the general population. One American survey of children ages 9 to 16 found that 2.7% met diagnostic criteria for ODD.²⁸ Similarly, one British survey of children ages 5 to 16 found that 3.0% had ODD.²⁹ In comparison, multiple rigorous epidemiologic surveys have found that an estimated 4.2% of children ages 4 to 17 meet diagnostic criteria for CD at any given time.²⁴

To the Editors:

I'm really excited to hear about the Canadian trial of the Nurse-Family Partnership program. [Eds.—See announcement on the CHPC website, available at <http://bit.ly/ryP7wy>.] Congratulations on taking this next step after years of advocating for this approach based on the scientific evidence. I was discouraged, however, to see the phrase “family environment is dysfunctional” in the last issue of the *Quarterly* [Overview, p. 5]. It concerns me that we continue to use the antiquated term “dysfunctional,” which stems from years of blaming families for their children's problems. In contrast, terms such as “family adversity” or “family conflict” are more accurate and more likely to promote families' engagement in interventions.

Sue Ward, Victoria, BC

We greatly appreciate you raising this concern. We agree that “family adversity” or “family conflict” would have been much better terms for describing the circumstances that many families experience, and for conveying compassion for families who are facing adversity. 🙌



■ It is important to use terms that convey compassion for families who are facing adversity.

We welcome your questions

If you have a question relating to children's mental health, please email it to chpc_quarterly@sfu.ca or write to the Children's Health Policy Centre, Attn: Jen Barican, Faculty of Health Sciences, Simon Fraser University, Room 2435, 515 West Hastings St., Vancouver, BC V6B 5K3.

Research methods

To identify the best systematic reviews on the topic of whether early child development (ECD) interventions can improve children’s mental health outcomes, we adapted methods from the *Cochrane Collaboration*.³⁰ We first applied the following search strategy

Literature Sources	Cochrane Database of Systematic Reviews, Campbell Collaboration Library, Medline and PsycINFO
Search Terms	<i>ECD (intervention), early intervention (education), child development (education or intervention)</i> OR <i>preschool (education or intervention)</i>
Limits	English-language, peer-reviewed journal articles using systematic review methods and assessing interventions delivered to children in the preschool years

Using this approach, we identified 10 systematic reviews that were retrieved and assessed. We then applied the following inclusion criteria. For acceptance, reviews had to meet all criteria.

1) *For systematic reviews*

- Methods clearly described, including database sources and inclusion criteria
- Methodologic quality of included individual studies reported and assessed

2) *For individual studies reported within systematic reviews*

- Interventions were primarily focused on early child development
- At least two included studies used randomized controlled trial methods
- At least two included studies were published within the past five years
- Detailed information reported on children’s social and emotional outcomes
- Levels of statistical significance reported for primary outcomes
- Effect sizes reported for primary outcomes

One team member assessed each retrieved review and prepared a short list of the best reviews for assessment by a second team member. We then reached consensus on selecting the final included review and its companion review on long-term follow-up outcomes. 🖐

References

BC government staff can access original articles from [BC's Health and Human Services Library](http://www.health.gov.bc.ca/library/) (www.health.gov.bc.ca/library/).

1. Cohen, N. J., Kiefer, H., & Pape, B. (2004). *Handle with care: Strategies for promoting the mental health of young children in community-based child care*. Toronto, ON: Hincks-Dellcrest Centre/Gail Appel Institute & Canadian Mental Health Association.
2. Klein, S., & Harden, B. J. (2011). Building the evidence-base regarding infants/toddlers in the child welfare system: Introduction. *Children and Youth Services Review*, 33, 1333–1336.
3. Morrison, J., & Anders, T. F. (2001). *Interviewing children and adolescents: Skills and strategies for effective DSM-IV diagnosis*. New York, NY: Guilford Press.
4. Shonkoff, J. P. (2010). Building a new biodevelopmental framework to guide the future of early childhood policy. *Child Development*, 81, 357–367.
5. Conway, A. M., & McDonough, S. C. (2006). Emotional resilience in early childhood: Developmental antecedents and relations to behavior problems. *Annals of the New York Academy of Sciences*, 1094, 272–277.
6. Kershaw, P., Irwin, L. G., Trafford, K., & Hertzman, C. (2005). *The British Columbia atlas of child development*. Victoria, BC: Human Early Learning Partnership (HELP).
7. Kershaw, P., Anderson, L., Warburton, B., & Hertzman, C. (2009). *15 by 15: A comprehensive policy framework for early human capital investment in BC*. Vancouver, BC: University of British Columbia, Human Early Learning Partnership (HELP).
8. Willms, J. D. (Ed.). (2002). *Vulnerable children: Findings from Canada's National Longitudinal Study of Children and Youth*. Edmonton, AB: University of Alberta Press.
9. Rutter, M. (2005). Environmentally mediated risks for psychopathology: Research strategies and findings. *Journal of the American Academy of Child and Adolescent Psychiatry*, 44, 3–18.
10. D'Onise, K., Lynch, J. W., Sawyer, M. G., & McDermott, R. A. (2010). Can preschool improve child health outcomes? A systematic review. *Social Science and Medicine*, 70, 1423–1440.
11. Burger, K. (2010). How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Childhood Research Quarterly*, 25, 140–165.

12. Benzies, K., Tough, S., Edwards, N., Mychasiuk, R., & Donnelly, C. (2011). Aboriginal children and their caregivers living with low income: Outcomes from a two-generation preschool program. *Journal of Child and Family Studies, 20*, 311–318.
13. 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*, 28–40.
14. Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science, 312*, 1900–1902.
15. Effective Public Health Practice Project (EPHPP). (2008). *Quality assessment tool for quantitative studies*. Hamilton, ON: McMaster University, School of Nursing.
16. Reynolds, A. J. (1994). Effects of a preschool plus follow-on intervention for children at risk. *Developmental Psychology, 30*, 787–804.
17. Schweinhart, L. J., & Weikart, D. P. (1989). The High/Scope Perry Preschool study: Implications for early childhood care and education. *Prevention in Human Services, 7*, 109–132.
18. Raine, A., Venables, P. H., Dalais, C., Mellingen, K., Reynolds, C., & Mednick, S. A. (2001). Early educational and health enrichment at age 3–5 years is associated with increased autonomic and central nervous system arousal and orienting at age 11 years: Evidence from the Mauritius Child Health Project. *Psychophysiology, 38*, 254–266.
19. Peters, R. D., Petrunka, K., & Arnold, R. (2003). The Better Beginnings, Better Futures Project: A universal, comprehensive, community-based prevention approach for primary school children and their families. *Journal of Clinical Child and Adolescent Psychology, 32*, 215–227.
20. Reynolds, A. J. (1998). Resilience among black urban youth: Prevalence, intervention effects, and mechanisms of influence. *American Journal of Orthopsychiatry, 68*, 84–100.
21. D'Onise, K., McDermott, R. A., & Lynch, J. W. (2010). Does attendance at preschool affect adult health? A systematic review. *Public Health, 124*, 500–511.
22. Raine, A., Mellingen, K., Liu, J., Venables, P., & Mednick, S. A. (2003). Effects of environmental enrichment at ages 3–5 years on schizotypal personality and antisocial behavior at ages 17 and 23 years. *American Journal of Psychiatry, 160*, 1627–1635.
23. Nores, M., Belfield, C. R., Barnett, W. S., & Schweinhart, L. (2005). Updating the economic impacts of the High/Scope Perry Preschool Program. *Educational Evaluation and Policy Analysis, 27*, 245–261.

24. Waddell, C., McEwan, K., Shepherd, C. A., Offord, D. R., & Hua, J. M. (2005). A public health strategy to improve the mental health of Canadian children. *Canadian Journal of Psychiatry*, 50, 226–233.
25. Diamond, A., Barnett, W. S., Thomas, J., & Munro, S. (2007). Preschool program improves cognitive control. *Science*, 318, 1387–1388.
26. Barnett, W. S., Jung, K., Yarosz, D. J., Thomas, J., Hornbeck, A., Stechuk, R., et al. (2008). Educational effects of the Tools of the Mind curriculum: A randomized trial. *Early Childhood Research Quarterly*, 23, 299–313.
27. American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th ed.). Washington, DC: American Psychiatric Association.
28. Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, 60, 837–844.
29. Green, H., McGinnity, A., Meltzer, H., Ford, T., & Goodman, R. (2005). *Mental health of children and young people in Great Britain, 2004*. Newport, UK: Office for National Statistics (ONS).
30. Higgins, J. P. T., & Green, S. (Eds.). (2009). *Cochrane handbook for systematic reviews of interventions version 5.0.2 [updated September 2009]*. Chichester, UK: John Wiley & Sons.

Links to Past Issues

2011/ Volume 5

- 3 - [Helping Children Overcome Trauma](#)
- 2 - [Preventing Prenatal Alcohol Exposure](#)
- 1 - [Nurse-Family Partnership and Children's Mental Health](#)

2010/ Volume 4

- 4 - [Addressing Parental Depression](#)
- 3 - [Treating Substance Abuse in Children and Youth](#)
- 2 - [Preventing Substance Abuse in Children and Youth](#)
- 1 - [The Mental Health Implications of Childhood Obesity](#)

2009/ Volume 3

- 4 - [Preventing Suicide in Children and Youth](#)
- 3 - [Understanding and Treating Psychosis in Young People](#)
- 2 - [Preventing and Treating Child Maltreatment](#)
- 1 - [The Economics of Children's Mental Health](#)

2008/ Volume 2

- 4 - [Addressing Bullying Behaviour in Children](#)
- 3 - [Diagnosing and Treating Childhood Bipolar Disorder](#)
- 2 - [Preventing and Treating Childhood Depression](#)
- 1 - [Building Children's Resilience](#)

2007/ Volume 1

- 4 - [Addressing Attention Problems in Children](#)
- 3 - [Children's Emotional Wellbeing](#)
- 2 - [Children's Behavioural Wellbeing](#)
- 1 - [Prevention of Mental Disorders](#)