

24 Implementation of an Early Childhood Prevention Program from a Health Care to Community-Based Setting in Singapore: Lessons from "Mission: I'm Possible"

Wan Har Chong, Hui Nee Tang, Patricia A. L. Koh & Sylvia H. T. Choo

In countries throughout the developed world, increasing proportions of children and young people have been shown to display various patterns of health and developmental problems. These include a range of learning and behavior problems such as attention deficit disorder, hyperactivity and dyslexia, aggression and antisocial behaviors, and child abuse and neglect (Gettinger, Ball, Mulford, & Hoffman, 2010). Additionally, these problems associated with development appear to be occurring at younger ages and with more severity and complexity (Moore, 2006). Some may begin subtly. Poor developmental trajectories of very young children have been commonly associated with health and social problems in later life (Shonkoff & Bales, 2011). In Singapore, the Child Development Program under the Ministry of Health has observed about a twofold increase of new referrals from 2004 to 2011 (SingHealth, 2011). Although this may not be indicative of the prevalence rate, the increased number could be suggestive of the interplay of a number of factors such as better community and parental awareness and community resource availability.

From a health care perspective, primary prevention is crucial to address these problems early. With changing patterns of health and illness, however, health care interventions in Singapore can no longer center on major causes of child and adolescent morbidity and mortality of diseases and need to move beyond a predominantly medical perspective (Ho, 2009; Lantos & Ward, 2013). There is a need to focus on interventions related to potentially preventable behaviors that are socially situated (such as within the family). One way of providing a more encompassing service delivery model is to increase service accessibility to

National Institute of Education, Nanyang Technological University, Singapore.
Department of Child Development, KK Women's and Children's Hospital, Singapore.
Department of Child Development, KK Women's and Children's Hospital, Singapore.
Department of Child Development, KK Women's and Children's Hospital, Singapore.

more specialized populations that are in need of specific preventive services. This can be achieved by engaging the community at sites where such problems are most likely to be presented, thus making these easier to detect. In this chapter, we present an example of an innovative service delivery model in Singapore to meet the learning needs of young children who are potentially at risk in their growth and development.

The chapter begins with introducing the "Mission: I'm Possible" (MIP) project, which strives to facilitate young children's poor attendance of therapeutic services from a major health care center. We provide an overview of the Singapore context to place the problem in perspective, outline the development of the project, and delineate factors that relate to its implementation. We also highlight critical components of the program that differ from other early intervention programs and the challenges posed during its implementation. We reason that this discussion of implementation factors provides important learning points in prevention science, particularly in the field of early childhood intervention.

Understanding the Development of MIP in the Singapore Context

Singapore is an island city-state situated at the southern tip of the Malay Peninsula. About 700 square kilometer in size, it has a population of just over 5 million people of which about 18 percent are below the age of fourteen years. Its diverse multiracial make-up consists of three major ethnic groups: ethnic Chinese, who comprise about 77 percent; Malays 14 percent; Indians 7.6 percent; and other ethnic groups 1.4 percent. A highly urbanized country, its major economic activities are diversified to include international banking and finance, as well as capital-intensive, high-wage, and high-technology activities that provide the infrastructures for manufacturing, financial, and communications facilities for multinational firms. Singapore has very limited natural resources except for its people. The economy is, therefore, highly sensitive and dependent on the world economic environment. Education is seen as a critical pathway through which the nation may maximize its advantage in the global economy.

Educators in Singapore, a small nation with a colonial past, tend to look west for successful tested models and ideas from which to adapt many of its educational initiatives and child psychological services. Singapore's education system provides a strong academic-focused curriculum. Nevertheless, as is the case with many developed nations in the West and East, it has increasingly recognize that an education based on a traditional rationalist, subject-based curriculum with expected academic standards to be achieved is no longer adequate to give school children the added advantage in today's technological age (Chong & Lee, 2014). To prepare children and young people for successful learning and living in the twenty-first century, the Singapore education system has therefore

developed a diversified and flexible program for students with different interests and ways of learning. However, even with this diversification in educational structure, there will remain children who continue to experience difficulties in school, some as early as in the preschool years. Early interventions aimed at addressing these difficulties would be pertinent if these young ones are to have a good head start.

In Singapore, preschool education is not compulsory and preschool centers are largely operated by private and voluntary sectors. The government maintains both an administrative and regulatory role. A government estimate that about 99 percent of children in grade one at six years of age attended “at least one year of pre-school” (Ministry of Education, 2012). For young children under the age of six years and diagnosed with a broad range of disabilities, most are referred by doctors during medical follow-up to the Early Intervention Programs for Infants and Young Children (EIPIC) run by voluntary welfare organizations (VWOs). These children have developmental challenges, and current regular preschools may not be able to cater to their needs adequately. Many eventually enroll in special needs schools run by VWOs with partial funding from the government. Inclusive education whereby children with special needs attend preschool alongside typical peers (i.e., mainstreaming) is relatively new and slowly expanding in Singapore. Young children with mild and/or emerging learning difficulties are often identified when they start attending preschool and/or about to enter into mainstream schools at seven years of age. Their struggles are often overlooked and deemed transitory by parents and early childhood teachers. These difficulties can predispose many to learning challenges when they begin elementary school without the skills necessary in school. The current range of early intervention programs is therefore not designed to address kindergarten children with special needs. This gap is also exacerbated by a lack of trained early child educators and allied health professionals to screen, diagnose, and provide additional support, instruction, or therapy in the community.

Importance and Rationale for Early Childhood Intervention

Aptly termed “the formative years,” the first years of life have been regarded as a critical period of development in a child’s life. This is a period of rapid growth and development within the cognitive, socioemotional, and physical domains of functioning in which the quality of brain architecture constructed through this early and ongoing process of development will either establish a firm or fragile foundation for all of the individual’s capabilities and behaviors that follow. This contention is backed by a wealth of research in contemporary science (e.g., Fox, Levitt, & Nelson, 2010; Shonkoff & Bales, 2011). In particular, advances in neuroscience have provided substantial evidence that rapid maturation of the brain structure and functionality occurs during the first few years of life (Shonkoff & Bales, 2011). Of significance is that

this window of opportunity for optimal development is crucial to a child's long-term adaptation and adjustment as brain plasticity and the ability to change behaviors have been shown to decrease over time. Consequently, problems arising from a poor early foundation would be more difficult to circumvent and costly to fix in later years.

Genetic factors, of course, exert an important influence on the developmental trajectories of young children, but environmental factors have the potential to alter this biological influence. However, research has indicated that the interaction between adverse environment and genetic factors can increase a child's risk for long-term negative developmental trajectories (Shonkoff & Bales, 2011). In particular, children from economically disadvantaged homes can face significant challenges in learning because of a lack of supportive resources, and those with developmental and learning concerns and/or interfering behaviors have been shown to be significantly compromised developmentally when they enter preschools (Arnold & Doctoroff, 2003; Gettinger et al., 2010). Additive risk factors resulting from an accumulation of multiple factors can further increase the susceptibility of children to poor developmental outcomes. Extant research has already indicated the effects of such risks on language and literacy development, self-regulatory behaviors, social competence, and positive learning behaviors. These factors undermine the child's readiness for school and may continue to work in concert to produce poor academic and social outcomes (Cadima, McWilliam, & Leal, 2010; Reynolds, Ou, & Topitzes, 2004; Rouse & Fantuzzo, 2009). In the same way, protective and growth-enhancing mechanisms in the child's environment have the potential to modify the developmental outcomes of young children in positive directions. The preschool provides such a protective context if early detection and intervention are implemented.

Early identification of children who are at risk is therefore critical in early prevention and remediation. Early childhood interventions refer to the array of services that incorporate these goals in education, health care, and therapy services for young children between birth and school age, with developmental disabilities or delays. The primary aim of these interventions is to remediate existing developmental problems or to minimize later developmental problems from occurring (Ramey & Ramey, 2006). Despite methodological limitations, evaluation of large-scale early childhood programs shows that intensive and high-quality early intervention consistently brings about impressive short-term effects in cognitive, emotional, and social development. Two-generation programs in the United States such as the Abecedarian Project (Ramey & Ramey, 1999) and Perry Preschool project (Barnett, 1992) have shown long-term effects for disadvantaged preschoolers in a range of cognitive, language, and social-emotional functioning (Arnold & Doctoroff, 2003; Odom et al., 2010), with continuing positive outcomes sustained to age thirty (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Ramey & Ramey, 1998, 1999). Furthermore, these U.S.-based early childhood interventions seem to show them to contribute toward two of the most important long-term outcomes: higher educational attainment and lower rate of delinquency (Reynolds et al., 2004).

International research has shown that successful programs require that the program considers an ecological perspective that integrates child, family, school, and community factors into the intervention package (e.g., Guralnick, 1999; Guralnick, Neville, Hammond, & Connor, 2008). That is, they should best occur in the child's natural learning environment and involve significant people in the child's daily life to enable learning to continue with these people. Such community-based programs work to exploit the interventions' potentiality by ensuring that gains are sustained over time (Lloyd, Steinberg, & Wilhelm-Chapin, 1999; Willson & Hughes, 2009). For sustainability, effective early childhood programs also seek to address the "whole child" in preparing children for transition to schools (Shonkoff & Bales, 2011). After all, school success necessarily involves more than academic skills, and a combination of social-emotional, health, language, motivational, and other cognitive factors are equally important in contributing to school engagement (Moore, 2006).

Early intervention programs are, however, not a "one-size-fits-all" approach. Ramey and Ramey (2006) highlighted that some children show greater benefits from participation in early educational interventions than do others. These individual differences appear to relate to various aspects of the children's risk condition. It could also be related to the extent to which the early intervention program meets the child's needs, as well as the nature of services the child receives in order to prevent the negative consequences of those risk conditions over time (Barnett, 1992). The approach proposed by Guralnick et al. (2008) calls for maximized inclusion of children and families as the core principle in any community-based early intervention program or system.

In summary, a wealth of empirical evidence attests to the effectiveness of early childhood interventions in major programs undertaken in the West and suggests that they can make a difference to the long-term developmental trajectories of children at risk. Considerable evidence indicates too that effective implementation of prevention programs must pay attention to the contextual conditions under which the program is introduced (e.g., Berkel, Mauricio, Schoenfelder, & Sandler, 2011). Cultural assumptions and beliefs underpinning these perspectives may differ from those that operate in non-Western settings. As such, in designing MIP, the developers were mindful that their conceptualization of a workable program should be guided by sound theoretical underpinnings but remain flexible in critical aspects of the program to allow for responsiveness to the context of implementation.

The MIP Model: An Ecological Perspective

MIP is aimed at addressing the initial concern with parents' persistent failure to bring their young children, who have seemingly mild problems associated with developmental delays, to the needed psychoeducational sessions at the Department of Child Development, KK Women's and Children's Hospital, in Singapore (Chong et al., 2014). Allied health professionals have identified many of these emerging concerns to be keystone competencies necessary to prepare

young children for learning in school (Gettinger et al., 2010). They are, however, often disregarded or may not be recognized by parents to warrant early attention. Also, a significant number of these children come from low socioeconomic families that may not be aware of the need and/or have the financial resources to obtain services. Making a commitment to attend psychoeducational sessions can be cumbersome for many of these parents who need to work, are unable to find alternate care arrangements for other children, and/or live far away from the hospital. In attempting to address these issues, MIP reasoned that the hospital can address these children's learning needs by moving its hospital-based therapeutic services to the contexts where the child and family live. By bringing the psychoeducational services to the community, the program seeks to extend children's learning beyond the traditional therapeutic model and situate such support within the children's contexts of development.

Conceptually, this project rests on an extensive body of family and early childhood research that has demonstrated the importance of early development of family processes, early childhood quality, and the adequacy of social and economic resources to meet children's basic physical and social needs and their psychological need for responsive care and nurturance (Barbarin et al., 2006). Additionally, MIP recognizes that children live in complex environments involving multiple caregiving systems, and MIP therefore works at developing a program that is responsive to changing demands of the environment. To respond appropriately and in a timely manner, MIP adopts an ecological perspective that is probably best characterized by the work of Bronfenbrenner (1977; Landry, Zucker, Solari, Crawford, & Williams, 2012). Bronfenbrenner argued that to understand how the environment affects children's social and cognitive outcomes, it is crucial to look beyond single predictors into the more comprehensive interrelationships between factors that might affect the child's development over time (Hirsh-Pasek & Burchinal, 2006). Specifically, child development is seen within the context of five structures of relationship, namely the *microsystem*, *mesosystem*, *exosystem*, *macrosystem*, and *chronosystem*. The family, school, teachers, peers, workplace, community, and influence of time on development are examples of these respective systems. Each system present factors, experiences, and challenges that come to influence and be shaped by other levels of the system to affect the developmental trajectories of the child.

This perspective recognizes individual differences and proposes that an effective program needs to stay responsive by remaining flexible and adaptable and not adopting a "one-size-fits-all" approach to resolving the developmental problems experienced by young children. Its multidisciplinary approach with built-in support to facilitate transitions across various contexts is a response to meet these demands and the needs of the growing child. The ecological model encapsulates many of the central ideas in successful early intervention programs described in Western early intervention models. However, it needs to be adapted to the cultural demands of the Singapore context so that families can be appropriately supported in their efforts to engage their children.

An Overview of the Development of the MIP Project

The MIP project is the brainchild of the Department of Child Development at the KK Women's and Children's Hospital, a major children's hospital in Singapore. The project's intent is to bring hospital-based psychoeducational services to young preschool children attending ordinary kindergartens. The department offers consult and therapeutic services to children below ten years of age with a wide range of developmental and learning issues (such as emergent literacy, language delays, and gross and fine motor skills) through a multidisciplinary team consisting of various allied health professionals (psychologists, speech language therapists, and occupational therapists, and learning support facilitators). Initiated in 2010, the project began as a pilot community-based project that represented a collaborative attempt with PAP Community Foundation (PCF), a major public preschool operator in Singapore, and the Lien Foundation, a philanthropic organization. The stakeholders agreed that early detection and intervention are crucial for such children's development in pursuit of minimizing their future referrals for support and healing services.

Preschool children with learning issues are first identified and screened by their class teachers. A learning support educator (LSEd) from MIP makes classroom observations to verify the teacher's assessment of the problem. The team then meets to discuss whether the emergent problem relates to development in language, speech, or gross or fine motor skills – the three different psychoeducational interventions offered by MIP. These intervention packages are undertaken by the learning support facilitator for literacy, a speech language therapist for those with speech problems, and an occupational therapist for those with fine and gross motor problems. An LSEd is also assigned to work alongside the specialist and oversee the work with each child. In 2011, LSEds themselves offered four support packages – literacy support, language development, social skill support, and motor skills (handwriting) – for those children whose identified learning problems were assessed to be readily amendable without specialized support.

Intervention by therapists primarily consists of ten individual forty-five-minute sessions at the preschool. Instruction is carried out in English, the medium of instruction in the Singapore education system. The LSEd sits in at the sessions to observe the interactions and follows up on the learning issues during five in-class support sessions that take place immediately after one-on-one sessions end. During in-class support, the LSEd works in the class of the target child for between half an hour and an hour per week for five consecutive weeks. The intent is to work with both the child and class teacher to facilitate opportunities for the child to use and extend what were learned in the individual sessions to typical classroom interactions. Parents are invited to observe their children in the weekly sessions and encouraged to carry out homework activities with them.

From a systemic perspective, the MIP service model recognizes and pays attention to the importance of creating pathways to enable the learning gained

in the sessions to be extended and supported in the contexts where the children live. A pivotal and integral component of the MIP model is the strategic deployment of the LSEd to support the child and teacher to ensure sustainability of learning gains outside of the intervention context. In addition, they form the critical link to parents to enable and support their efforts with the child in learning-related matters at home. This is a new component created from a conceptual framework that departs from the traditional special education models in Western countries that incorporate teacher aides or support the teacher in an inclusive classroom. This also differs from hospital-based models whereby therapeutic interventions are predominantly carried out by allied health professionals with the child and/or parents in the medical facility, and collaboration and consultation with the preschool to integrate the child's learning in real-life contexts are often limited and can pose challenges.

The Role of Learning Support Educators

The LSEd is a new breed of senior early childhood educators with recognized qualifications in early childhood education and who have been principals or senior teachers in PCF preschools or other preschools. They have been specifically recruited to serve as LSEds for the duration of the MIP project. These educators have extensive experience working with children having special needs and have an in-depth understanding and appreciation of the idea of inclusive education. They therefore have the capability to work in preschools and to use collaborative problem-solving processes to facilitate change for children and families and in preschool with teachers. Although LSEds share many similar functions with itinerant special education teachers in the United States in enabling atypical children to benefit from community early childhood programs (Sadler, 2003), their role is multifaceted and they are expected to come with more skills that allow them to work collaboratively and consultatively with various stakeholders to support the child's learning in the classroom.

Indeed, their role is similar to that of resource teachers in learning and behavior (RTLb) in New Zealand elementary schools (Thomson et al, 2003). LSEds are seen as enablers of change for the children they support. Essentially, they provide the critical scaffolds for generalization of learning by the targeted children from one-on-one sessions to the classroom setting. They are resource teachers with the capacity to facilitate structural changes in the classroom. Their role is further extended to working with parents to support home efforts. LSEds' training and experience in working with preschools make them cognizant of the myriad influences on the teaching-learning process: the sociocultural background of the children; policies, regulations, and management systems; and the preschool teachers themselves (Thomson et al, 2003). This strengthens their ability to negotiate, facilitate, and coordinate changes in school and in routine. Indeed, the MIP project presents a different perspective on the nature of community service delivery, and this requires the LSEd, as key support

worker, to remain highly flexible and versatile to the changing demands of classroom situations, the teacher, and the individual child. This role versatility has made it difficult to set down a list of prescriptive tasks undertaken by them and consequently for the program to isolate and evaluate their specific contributions to the learning outcomes of the children.

Teacher support and professional development. MIP recognizes that effective program implementation must provide preschool teachers intensive training and establish in them the competencies that are needed for supporting the children. Strengthening teacher competencies would also give them the confidence to work with new or unfamiliar learning problems in the future, thus reducing the need for external intervention. Indeed, Gettinger et al. (2010), in a review of the extant international literature, have identified professional development and support as keys to prevention program success.

Two important aspects of professional development were specifically highlighted. First, the training should align preschool teachers' learning with their classroom experiences. Additionally, the development program should be ongoing with opportunities offered for collaborative learning, mentoring, and feedback (Gregoire, 2003; Hochberg & Desimone, 2010). In this regard, MIP schedules regular workshops focusing on children development in physical, literacy, and language development. Furthermore, LSEs provide ongoing support and consultation to teachers to foster these theory-practice linkages. For instance, they work with teachers in rearranging classroom contingencies to ensure learning opportunities are embedded in the curricular activities to benefit not just the child but other children in the class as well.

A three-tiered pyramid intervention model. In 2011, the role of LSEs was reviewed with the view to optimize their competencies in meeting the increasing number of referrals for MIP support. To improve service efficiency, MIP broadly adopted principles underpinning the Response to Intervention (R/I) framework. Such a framework has been widely embraced in Western schools and child and family support models as a basis for delivery of evidence-based interventions (Ball & Trammell, 2011). The R/I framework represents a comprehensive model for the prevention of delays in learning and behavior, in promoting young children's academic and social competence, and in ameliorating behavior problems. Working within this framework, the MIP team pitches instructional intensity and therapeutic support to match the level of children's needs. The approach optimally exploits the capabilities of the LSEs by leveraging their work scope in the following ways:

- At the universal prevention level, LSEs continue to provide expert resources and consultation to preschool teachers. They work with the aim of ensuring an inclusive and more effective classroom environment and to minimize barriers to learning.
- At the selective prevention level, where problems emerge, LSEs work to support children with minimal intervention at the class level. These interventions are largely group-based and delivered within classrooms. With their

experience with preschool teachers and parents, much of their work involves seeking collaboration from these people to facilitate and sustain the child's learning in the classroom environment and provide appropriate support from the home.

- At the indicated level of prevention, LSEs continue to identify, screen, and monitor the class for children who experience difficulty in keeping pace in class. Where screening suggests a need for specialist help or when the problem persists despite selective and indicated levels of intervention, the child is referred for more specialized intervention by the therapist(s).

The LSEs increased their involvement at the selective preventive level of the R/I pyramid model of care to intervene in the classrooms and to support teachers with children who have emerging learning and behavior problems. They received supervisory support from the therapists. In addition, they continue to work with parents on home activities that they can later carry out to support their children. This revised model worked to reduce delays arising from the referral process by one to two months and enables LSEs to intervene early, during class time and/or in partnership with the preschool teachers. As such, they start to work with identified children earlier than the therapy packages.

Relatively few models have highlighted the contribution of how this personnel resource can make a difference to service outcomes. Western models emphasize the provision of itinerant support within an inclusive learning environment that is natural and least restrictive and preclude pull-out interventions (Dinnebeil, McInerney, Roth, & Ramaswamy, 2001; Sadler, 2003). However, we reason that a key difference between MIP and many of these established models may be with the former's attempt to move the focus of intervention from a hospital-based and therapist-centered approach to one that is ecological and inclusive in outlook by targeting primary caregivers with the capacity to influence the developmental trajectories of disadvantaged children in their everyday life. As pull-out sessions are perceived to be disruptive to classroom routines for the target child, the decision to do so is carefully evaluated by the team and in consultation with the preschool personnel and parents. The sessions are deemed necessary to remediate the learning needs of targeted children only when teachers do not have the capacity and ability to support them in their large classes where the teacher-student ratio is about 1:20. The LSEd therefore functions as the "bridging liaison" to provide the scaffolds of change for the child and teacher.

Engaging parents and families. The literature has highlighted the importance of enriching home experiences in influencing the development of school readiness competencies in children (Chazan-Cohen et al., 2009; van Steensel, McElvany, Kurvers, & Herppich, 2010). In particular, parents' sensitive interactions with their children are an important developmental "input" to the growth of preacademic as well as social behavioral competencies (Duncan & Magnusson, 2005; Hindman, Skibbe, Miller, & Zimmerman, 2010; Hirsh-Pasek & Burchinal, 2006). Of note is that where young children are found to be better

supported at home by their parents, there are associated increased levels of cooperation, conformity, peer sociability, and confidence, with the strongest effect demonstrated on cognitive development. Parents who afford their children varied opportunities and enriching experiences in the early years are likely to prepare them well for school. Those with fewer economic or educational resources are often less likely to provide a home environment that supports their children's development. Indeed, such differential exposures to learning experiences from home have been shown to be associated with large individual differences in a range of important cognitive, language, and social development of the growing child by the age of three (Morrison & Connor, 2010).

Children from low SES backgrounds do not begin preschool and kindergarten with differing levels in their self-confidence and school attitudes compared with their peers from better-resourced backgrounds (Arnold & Doctoroff, 2003). Multiple factors work to decrease their competence beliefs and school interest over the course of their early school years. One important contributing factor is their increasing recognition and understanding that they are deficient in skills to handle preschool learning effectively (Arnold & Doctoroff, 2003). As demands of the tasks increase, the challenges resulting from these early skill deficits can be more difficult to remediate, suggesting the importance for prevention and early intervention. As such, for early intervention programs to be impactful and sustained over time, parent engagement to enhance the positive early experiences of children at home must be built in to strengthen positive child outcomes. This should require parent and family involvement to take place in all phases of the program.

MIP Parent Literacy Program

MIP similarly aims to capitalize on these early years of development to equalize the learning opportunities of the children who may either have some specific challenges with emergent literacy or come from disadvantaged families. Although MIP intervention is available to children with other learning issues, it targeted emergent literacy for a parent education program as part of MIP because reading difficulties were more prevalent among children identified by their teachers. Many of the children come from low socioeconomic backgrounds where parents are not strong readers. Furthermore, the other specialized programs (that is, speech language and occupational therapy programs) require expert knowledge and skills that do not lend themselves well to parent training. This focus on the parent education component of the program sits well with the large body of research on early literacy and its relationship to school readiness, particularly in the United States (e.g., National Early Literacy Panel Report, 2010). In particular, longitudinal studies showed that typical children who remain poor readers by the end of the first grade will almost never acquire average-level reading skills by the end of elementary school (Lonigan & Shanahan, 2010). Early intervention for children from low-income families,

on the other hand, had helped them to attain better school progress up to middle school years. In these families, household composition (e.g., single-parent families) and low income, and low maternal education and occupation, have been shown to assert a poor influence on preschool skills and subsequent first-grade literacy skills (Cadima et al., 2010). MIP reasoned that for children at risk for reading failure and whose parents do not have supportive resources, reading engagement will very much reside with the preschool. However, this will remain insufficient if the home environment does not provide the reinforcing support.

In designing the parenting program, the approach has two foci. The first is on teaching specific activities that parents can do with their children at home to support and reinforce their learning in the classroom. Parents are provided with the knowledge base to further their children's learning around these "school readiness" skills that form the basis of the parenting education curriculum goals. The second focus looks to support parents in their learning participation that would lead to specific and increased competencies in oral language, vocabulary and background knowledge, emerging literacy skills, comprehension, fluency and interest in literacy, and motivation to read. Teachers of the children's respective classes are expected to support these parents with teaching them both *how* to best contribute to their children's literacy development and *what* developing competencies they can intentionally reinforce in their interactions with their children.

In developing the literacy package, key team members and a reading expert first discuss and map out the core competencies and learning strategies considered to be most helpful to parents. The team then worked on materials for each session as well as the teaching resources and take-home kits designed to cover print and phonological awareness and reading and writing activities. A preliminary run was carried out to ensure that the materials were appropriate for use by parents. Professional development training was undertaken to prepare the teachers for participation in the literacy component of the MIP project. About thirty teachers attended the half-day session. However, when the workshops were rolled out with parents, the response was exceptionally poor, with five parents who signed up. The plan had to be aborted. Instead of using the group-based workshop approach involving parents in developing their children's reading competencies, the materials were redesigned and adapted for more one-on-one coaching with parents and children. Parents were encouraged during their meetings with the MIP team to meet with the teacher and LSEd to work out a feasible take-home plan. This approach was also slow to take off with the parents. The LSEds then began to approach and work with parents on an individual and just-in-time basis. These parents were found to be more comfortable and receptive to this way of engagement.

To summarize, the MIP adopts an R/I framework in which instructional intensity and therapeutic support are pitched at a level to match the target children's learning needs. Intervention packages are undertaken by allied health professionals or the LSEd, depending on the nature and severity of the learning

issue. A pivotal component of MIP in the deployment of the LSEd is to facilitate transition from the individual sessions by engaging the teacher in the classroom so that learning gains made by the child are sustained in class. Additionally, the LSEd works to ensure that parents are supported in their efforts to carry out activities to reinforce the child's learning in the home.

Evaluation of MIP Program

MIP was implemented between 2010 and 2012, involving thirty-three preschool centers and about two hundred preschool children. The team consisted of three allied professionals for each of the specialist packages and four LSEds. A feasibility study was undertaken in 2008 and 2009 to map out the implementation plan. An evaluation of the program was also planned at the time of the program implementation. The intent of the evaluation was to generate information on the profiles of the children and families involved, review the program effectiveness, and identify barriers and challenges encountered in the process. Although two hundred children participated in MIP, complete information on both the profiles of parents and their children were obtained from only 149 of them and 281 other children who were attending the same classes as those identified for the program. This latter group of children serves as a comparison group, and those children are typical in their development.

Children and family profiles. The preliminary profiles of the children and their families suggested that they were in many ways different from the comparison group, indicating that there were developmental issues and concerns that place them at risk for successful school outcome(s). Children with the MIP Project ($n = 149$) and their peers ($n = 281$) in the respective classrooms were evaluated on various measures: *Peabody Picture Vocabulary Test, Fourth Edition* (PPVT-4; Dunn & Dunn, 2007); *Woodcock-Johnson III Tests of Achievement, Third Edition* (WJ-III; Woodcock, McGrew, Mather, & Schrank, 2001); *The Strengths and Difficulties Questionnaire* (SDQ; Goodman, 2001); and *The Behavior Assessment System for Children* (BASC-2; Reynolds & Kamphaus, 2004). Children in the MIP program obtained 'borderline' scores in various aspects of social, interpersonal, and behavioral competence on teacher-rated scales. Specifically, these children were comparably less prosocial and adaptable, and displayed less adequate social skills than their peers in the comparison group. Furthermore, they were reported to display significantly more behavioral and attention problems. They did not differ significantly from their peers with respect to any display of emotional symptoms.

Parents of children attending MIP and those of their peers also completed a take-home parent questionnaire at the beginning of the program implementation with the following composite scales: *Family Environment Scale* (FES; Moos & Moos, 2002); *Parenting Sense of Competence Scale* (PSOC; Johnston & Mash, 1989); *Parental Warmth and Hostility Scale* (PWHS; Melby et al., 1991); and *Parent-Teacher Involvement Questionnaire* (PTIQ; Corrigan, 2002).

The following profile was obtained of these families at the time of the children's enrollment in the program:

- MIP families were comparably lower in social-economic and educational statuses according to various indicators. These parents attained lower educational qualifications and family income as compared to the other group of parents.
- The home environment appeared to have fewer resources to promote the child's learning and educational development. A lower proportion of their parents spoke English at home. Fewer books were available in these homes and the children tended to spend less time being engaged in reading or literacy-related activities.
- The parents have comparably lower educational expectations of their children compared to the other group of parents. However, they did not differ significantly in the family orientation toward achievement or competitiveness, the level of interest in intellectual and cultural activities, and the amount of participation in social and recreational activities.
- Both groups of parents perceived themselves to be adequate as parents, although more parents whose children are in the comparison group felt they were doing better than average. However, it was noted that parents whose children were attending MIP reported less consistency in the management of their children's behavior and tended to display more hostile behaviors when provoked by the latter. They did not differ significantly in the reported frequency of displayed affectionate behavior toward their children.
- Both groups of parents did not differ significantly in the extent of their involvement in preschool. They had high confidence in the adequacy of the preschool to prepare their children for the future. They were also reasonably positive about their relationship with teachers, perceiving the latter to have an interest in them and their children. Both groups, however, reported low levels of interest in initiating contact with the school and in involving themselves with various school activities.

MIP outcomes and effectiveness. The MIP program has brought about improvement in the specific areas of developmental deficits identified by preschool teachers and LSEds. As occupational and speech language therapies addressed problems that were highly individualized and required specialist input, it was not feasible to obtain objective measures to evaluate child outcomes. Neither was it possible to obtain comparable control group measures since presenting problems vary with each child. Similarly, the LSEd support packages were not amendable to objective evaluation considering the variability of each package with each child.

In overcoming this challenge, common benchmarks were used to evaluate the extent to which the children's identified learning issues were adequately addressed. Individual Educational Plans (IEP) and the Goal Attainment Score (GAS) (Turner-Stokes, 2009) were used to evaluate the extent to which the children achieved their developmental goals in these interventions. Interviews

with parents, together with survey and focus group feedback from teachers and the principals, provided additional social validity to the program effectiveness.

The findings from the IEPs and GAS suggested that specialized therapists, in general, set modest goals that can be realistically achieved within a fifteen-week intervention time frame and that children in the program made good progress in attaining them. The baseline scores obtained across the preschools for the individual sessions and LSEd support packages suggested that children identified for MIP were performing below expectations in the respective skill areas evaluated at the time of goal development for IEP. After all the respective interventions were completed, the children obtained scores indicating that they were able to achieve the goals as expected in the respective packages.

The psychoeducational packages were designed to resolve targeted learning issues, and the IEP goals were developed with this purpose in mind. Once the identified issue was resolved, there was no necessity to develop further goals in the specific areas. Also, the fifteen-week time frame may have made it difficult to identify and work on new goals pitched at the next developmental level (as in speech development) that can be achieved within this period of time. For those children on the literacy package, there were more accomplished goals that exceeded the expectations of the therapists, suggesting that the children may have preexisting or foundational skills to support their learning of more advanced reading skills. The LSEds identified and helped the children attain comparably more goals compared to the specialized therapy packages. Compared to the two specialized therapy packages, they were somewhat conservative in identifying challenging goals for the children's accomplishment.

Although the LSEd packages were intended to maximize the expert resources of the MIP team, the specialized programs offered by allied health professionals remained critical in serving those children whose delays cannot be ameliorated through LSEd support packages. The findings arising from IEP goal development in the LSEd support packages suggested that LSEds may not have sufficient specialized skills to enable more pertinent assessment of children's physical, speech, and language competencies and skill levels. Further coaching and supervision from the therapists were found necessary to support their emerging competencies in these areas.

Effectiveness of the MIP literacy therapy program for children. We evaluated the literacy program to establish whether there were positive shifts in aspects of literacy among children who underwent the program as compared to a comparison group comprised of their peers in the same class (Chong et al., 2014). A nonequivalent group design was used to evaluate the impact of the program on those children identified with early reading difficulties. Pre- and posttests measures on the PPVT-4 and WJ-III showed that significant gains in aspects of literacy were indeed made with the intervention group ($n = 35$). At pretest, children in the program obtained significantly lower scores for age norms in comparison with their peers ($n = 39$). At posttest, within- and between-group analyses indicated the most significant gains were made by the MIP group in the following areas: vocabulary based on PPPVT-4 (11 months gain), passage

comprehension (12.7 months gain), understanding directions (8.8 months gain), and letter-word Identification (6.9 months gain). Their performances on letter-word identification, spelling, and passage comprehension approximated the age norms at posttest. On the average, the children in the MIP program made a mean gain of about 6.5 months within 10 weeks of intervention followed by 5 sessions of graduated in-class support, compared to 2.9 month for their peers who did not receive extra support. Effect sizes obtained on the various tests ranged from 0.65 to 0.85 for the MIP group, compared to between 0.31 and 0.63 for the comparison group.

Preexisting differences in the pretest scores of the SDQ and BASC-2 were noted between the two groups, with children in the comparison group obtaining significantly lower scores on the scales measuring emotional, attentional, and behavioral problems. Paired-sample tests showed a significant positive shift from pre- to posttest in the MIP group on the SDQ score for prosocial behavior, with an effect size of 0.35. Social validity measures were also obtained from parents on their perceptions of the children's social, interpersonal, and behavioral functioning after MIP intervention. Anecdotal feedback from both parents and teachers suggested positive shifts in the children's prosocial behaviors during and after the intervention. We hypothesize that while there is a strong possibility that the children normally develop and mature over time, the specificity in the positive shift in prosocial behavior is related to the intervention. As the children acquired more skills, it is possible that they grew more confident in making friends, interacting with peers, and participating in social exchanges.

Program Challenges

As a pioneering effort, MIP faces challenges that are not unlike those faced in other interventions as they work to translate a conceptual model into practice. In identifying effective pathways underpinning program implementation, Berkel et al. (2011) have singled out participant responsiveness as a key moderator or mediator in determining the quality of program outcomes. With MIP, parent and teacher engagement have been identified as key components that are crucial in contributing to the sustenance of the intervention after it has ended. Finding collaborative platforms to work with these stakeholders has been a challenging undertaking but must be resolved so as not to temper program effectiveness.

Working with parents. Soliciting parental support and involvement poses considerable challenges. Parental engagement began with procuring their consent for the child's participation in MIP. The failure of parents to recognize the child's developmental concerns, their difficulty with appreciating the magnitude of the problem, parent work commitments, and/or fear of stigmatization were commonly encountered by the team. Additionally, it was difficult getting parents to cooperate and work with their child at home in the assigned activities. Feedback from the preschools involved and various team members

suggested that some parents may not have the competencies to support their children, particularly for those in the literacy and speech language programs. Although we do not have empirical evidence, anecdotal accounts suggest that this lack of parental response may also have to do with the Asian mindset in the view toward education. In Asian societies where education is highly valued, it is largely perceived as the school's domain of responsibility, and parents often deem the expert knowledge and skills of these "educational" tasks to reside in the teachers and educators. Many Asian parents do not have a sense of shared responsibility for education with the school. This perception has similarly been noted by Willson and Hughes (2009) when they evaluated the role of home environment of preschool children in first grade retention in the United States.

Although MIP planned to capitalize on the family as a primary context of intervention to promote literacy skills in the long run, the various encounters in engaging parents draw important learning points for MIP to reconsider other ways to foster parent involvement. In retrospection, MIP recognizes the need for greater sensitivity to the social and cultural conditions of child development, which are important when the family and MIP and preschool cultures differ. MIP may have presupposed skills and knowledge that are not necessarily present in the parents and that cannot be developed simply by their participation in training. Also, MIP may not have paid sufficient attention to parent characteristics that can hinder the transfer of the training content. First of all, many parents may have left school early or not have significant positive schooling experiences. Second, busy work schedules of the families often make it difficult for them to carry out activities at home. As such, MIP recognizes the importance of ensuring cultural congruence, particularly to those features that emanate from a different socioeconomic perspective.

In redesigning this component of parent intervention, MIP repositioned the LSEd as an advocate for the child in a different way. Instead of approaching parent involvement from an instructional perspective and as a group for training, LSEds now focus on strengthening their interactions and relationships with parents on an individual basis to build trust first. This way of intervening appeared to have given some parents greater confidence in that they were more forthcoming in seeking help with challenges faced at home. A just-in-time model rather than an anticipatory approach to parent collaboration and problem solving seems to suggest this approach to be a more amenable platform to engage parents productively. We need to explore this avenue further to obtain a better understanding of how parent training can be translated in practical and acceptable ways (van Steensel et al, 2010).

Engaging preschool teachers. Preschool teachers often lack core skills and knowledge necessary to enable their incorporation of developmentally appropriate practices in working with children with somewhat atypical development. One of the ways to circumvent this problem in MIP was to create opportunities for just-in-time sessions to dialogue with teachers. Therapists came in for the pullout sessions with the children once a week and were on the lookout for opportunities between sessions with the children to monitor the children's

progress and to assess teacher support for practice of the new learned skills in class. However, teachers, preoccupied with the demands of ongoing classroom activities, were often not able to avail themselves for discussion or consultation. Anecdotal accounts suggest that many teachers and some preschools continued to assume that it is the responsibility of MIP to "see" the child through and failed to appreciate the school's contributions to the success of the child. This suggests that a set of organizational supports has to be in place for teachers and preschools to implement new ideas adequately from the project and ensure effective partnerships (Landry et al., 2012; Odom, 2009).

Another key area identified by MIP as critical for program effectiveness is the ability of the teachers to identify learning issues as accurately and as early as possible. This calls for better training in the way initial screening is to be carried out by them. Additionally, the team recognizes that professional development activities must also attend to "core" or essential elements of teacher practice to facilitate the teachers' productive engagement of the children after intervention has ended (Odom, 2009). Professional development workshops were organized in response to these needs and were well received, indicating that MIP was able to identify and meet a real training need. As identified in the literature (Gregoire, 2003; Hochberg & Desimone, 2010), short bursts of training may not be sufficient to ensure new teaching practices are in place. Mentoring and/or coaching have been identified as necessary ongoing activities for teachers to bridge the theory–practice gap. Access to the specialist support, though needed, had proven to be difficult as the therapists are hospital-based and not as readily available for consultations. Thus, the LSEs, as community-based workers, have proven to be crucial in bridging this gap to initiate teachers into the processes critical to the program's effectiveness.

Program Limitations and Implications

From a research perspective, methodological problems pose significant challenges to establish unequivocal evidence regarding the effectiveness of interventions (Gettinger et al., 2010). Evaluation of MIP has, however, provided evidence to suggest that it has been successful in reducing the disparity in preschool children's developmental needs by promoting skills they will need for school. Specifically, it demonstrated the malleability of young children's learning capacities despite mild delays and indicated the efficacy of a short-term pullout program when efforts to promote skill development were intentional and strategic and must necessarily solicit the collaboration of teachers and peers in the classroom. These improvements were not specific to the problems identified by teachers, therapists, and/or LSEs. Positive effects on other aspects of their development and functioning have also been documented as summarized previously. The MIP findings reiterated those established in Western countries by demonstrating the effectiveness of early childhood interventions in mitigating the risk factors that some children face in their learning and development.

Despite the impressive gains made in the course of literacy intervention, children in the MIP program continued to lag marginally behind their peers in literacy-related skills. This suggests that MIP may need to reexamine whether specific intervention intensity parameters such as program frequency, duration and dosage, and level of parent engagement have been adequately addressed (Justice & McGinty, 2012). This notwithstanding, Arnold and Doctoroff (2003) and Gettinger et al. (2010) have cautioned that even though children do benefit from such programs, it may be unrealistic to expect the positive effects to continue over time without restructuring their contextual experiences following the early intervention program. Empirical evidence suggests that positive effects arising from early intervention will diminish over time, as the result of experiences following the program (Gettinger et al., 2010). In particular, classroom, school, and home factors have been identified to play increasingly significant roles in predicting the developmental trajectories of children after intervention has ended (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002). It appears that if learning gains are to continue over time, more strategic involvement from the preschool and home must be incorporated. Additionally, although the MIP evaluation indicates a need to strengthen the channels through which to engage parents and the existing preschool structure to support these children, it may not be realistic to expect a preschool intervention to have a long-lasting impact on children's academic, behavioural, and social functioning without extending intervention through the elementary school years. The literature identifies this to be an inherent problem with many early childhood interventions when their impact may become apparent only in the later school years (Gettinger et al., 2010).

To our understanding, no local study in Singapore has been undertaken to examine the impact of an intervention program for preschool children with mild developmental delays. The MIP project represents an important milestone in the development of early childhood intervention programs in Singapore, considering that most of the others focus interventions on special needs populations (Goh, Chong, Chan, & Tang, 2010). MIP shows how best to make use of empirical evidence to develop a service model that is culturally relevant to children and families in an Asian context. In particular, it has articulated a cogent conceptual framework by shifting intervention from a clinical hospital-based to a community-based model where young children gain access to support in their natural learning environment. In adapting an ecological perspective in this service model, MIP has worked to address this problem by introducing well-trained early childhood personnel – the LSEd – to engineer the child's environment to ensure sustainable gains. Specifically, MIP highlighted a key ingredient that is crucial to provide supportive and consultative services to the children, their teachers and families. This “facilitator behaviour” (Berkel et al., 2011, p. 25) has been seen as a critical component when attempting to establish quality outcome(s) in program implementation.

As with any pioneering program, continuing fine-tuning is essential to ensure quality program implementation and delivery (Landry et al., 2012). We have

learned from critical feedback of the need to determine the pathways in strengthening parent engagement and teacher capacity to sustain implementation. For the field of prevention science in early intervention programs in Singapore to move forward, these are critical to address. This notwithstanding, the success of MIP has attracted the attention of the government ministry, and in the year 2013, it secured state funding support for a nationwide scale-up. The program has since been renamed the Developmental Support Program. As it undertakes this new venture, the diverse preschool landscape in the country will potentially challenge the program's fidelity and integrity. To ensure that program outcomes are not compromised, yet meet the demands of educational realities, MIP will need to strike a balance with adaptation and reinvention so as to remain responsive to the needs of those children it first set out to address (Berkel et al., 2011). This would essentially require MIP to focus its efforts in strengthening the capability and capacity of the program's linchpin – the LSEd – as the liaison bridge between the child, family, and the preschool.

Reference

- Arnold, D. H., & Doctoroff, G. L. (2003). The early education of socioeconomically disadvantaged children. *Annual Review of Psychology* 54: 517–45.
- Ball, C. R., & Trammell, B. A. (2011). Response-to-intervention in high-risk preschools: critical issues for implementation. *Psychology in the Schools* 48: 502–12.
- Barbarin, O., Bryant, D., McCandies, T., Burchinal, M., Early, D., Clifford, R., & Pianta, R. (2006). Children enrolled in public pre-K: the relation of family life, neighborhood quality, and socioeconomic resources to early competence. *American Journal of Orthopsychiatry* 76: 265–76.
- Barnett, M. A. (2008). Economic disadvantage in complex family systems: expansion of family stress models. *Clinical Child and Family Psychology Review* 11(3): 145–61.
- Barnett, S. W. (1992). Benefits of compensatory preschool education. *Journal of Human Resources* 27: 279–312.
- Berkel, C., Mauricio, A. M., Schoenfelder, E., & Sandler, I. N. (2011). Putting the pieces together: an integrated model of program implementation. *Prevention Science* 12: 23–33.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist* 32: 513–31.
- Burchinal, M. R., Peisner-Feinberg, E., Pianta, R., & Howes, C. (2002). Development of academic skills from preschool through second grade: family and classroom predictors of developmental trajectories. *Journal of School Psychology* 40: 415–36.
- Cadima, J., McWilliam, R. A., & Leal, T. (2010). Environmental risk factors and children's literacy skills during the transition to elementary school. *International Journal of Behavioral Development* 34: 24–33.
- Campbell, F. A., Ramey, C. T., Pungello, E. P., Sparling, J. J., & Miller-Johnson, S. (2002). Early childhood education: young adult outcomes from the Abecedarian Project. *Applied Developmental Science* 6: 42–57.

- Chazan-Cohen, R., Raikes, H., Brooks-Gunn, J., Ayoub, C., Alexander Pan, B., Kisker, E. E., Roggman, R., & Fuligni, A. S. (2009). Low-income children's school readiness: parent contributions over the first five years. *Early Education and Development* 20: 958–77 doi: 10.1080/10409280903362402
- Chong, W. H., & Lee, B. O. (2014). Social-emotional learning: promotion of youth wellbeing in Singapore schools. In Wright, K., & McLeod, J. (eds.). *Rethinking Youth Wellbeing: Critical Perspectives*. Melbourne: Springer, pp. 161–77.
- Chong, W. H., Moore, D., Nonis, K. P., Tang, H. N., Koh, P., & Wee, S. (2014). Mission I'm Possible (MIP): effects of a community-based project on the basic literacy skills of at-risk kindergarteners. *Infants and Young Children* 27: 60–73.
- Corrigan, A. (2002). *Fast Track Project Technical Report*. September 26. www.fasttrackproject.org
- Dinnebeil, L. A., McInerney, W. F., Roth, J., & Ramaswamy, V. (2001). Itinerant early childhood special education services: service delivery in one state. *Journal of Early Intervention* 24: 35–44.
- Duncan, G. J., & Magnusson, K. (2005). Can family socioeconomic resources account for racial and ethnic test score gaps? *Future of Children* 15(1): 35–54.
- Dunn, L. M., & Dunn, L. M. (2007). *The Peabody Picture Vocabulary Test*, 4th ed. Bloomington, MN: NCS Pearson.
- Fox, S. E., Levitt, P., & Nelson III, C. A. (2010). How the timing and quality of early experiences influence the development of brain architecture. *Child Development* 81: 28–40.
- Gettinger, M., Ball, C., Mulford, L., & Hoffman, A. (2010). Prevention and early intervention for preschool children at risk for learning and behavior problems. In Doll, B., Pfohl, W., & Yoon, J. (eds.). *Handbook of Youth Prevention Science*. New York: Routledge.
- Goh, W., Chong, W. H., Chan, W. P., & Tang, H. N. (2010). *Baseline Study of the Early Intervention Programme for Infants and Young Children (EIPIC)*. Singapore: National Council of Social Service and KKH.
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire (SDQ). *Journal of the American Academy of Child and Adolescent Psychiatry* 40: 1337–45.
- Gregoire, M. (2003). Is it a challenge or a threat? A dual-process model of teachers' cognition and appraisal processes during conceptual change. *Educational Psychology Review* 15: 147–79.
- Guralnick, M. J. (1999). The nature and meaning of social integration for young children with mild developmental delays in inclusive settings. *Journal of Early Intervention* 22: 70–86.
- Guralnick, M. J., Neville, B., Hammond, M. A., & Connor, R. T. (2008). Continuity and change from full-inclusion early childhood programs through the early elementary period. *Journal of Early Intervention* 30: 237–50.
- Hindman, A. H., Skibbe, L. E., Miller, A., & Zimmerman, M. (2010). Ecological contexts and early learning: contributions of child, family, and classroom factors during Head Start, to literacy and mathematics growth through first grade. *Early Childhood Research Quarterly* 25: 235–50.
- Hirsh-Pasek, K., & Burchinal, M. (2006). Mother and caregiver sensitivity over time: predicting language and academic outcomes with variable- and person-centered approaches. *Merrill-Palmer Quarterly* 52: 449–85.

- Ho, L. Y. (2009). Raising children in Singapore: a paediatrician's perspective. *Annals Academy of Medicine* 2: 158–62.
- Hochberg, E. D., & Desimone, L. M. (2010). Professional development in the accountability context: building capacity to achieve standards. *Educational Psychologist* 45: 89–106.
- Johnston, C., & Mash, E. J. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology* 18: 167–75.
- Justice, L. M., & McGinty, A. S. (2012). Early literacy intervention intensity and its relation to child outcomes. In Howes, C., Hamre, B. K., & Pianta, R. C. (eds.). *Effective Early Childhood Professional Development: Improving Teacher Practice and Child Outcomes*. Baltimore, MD: P. H. Brookes.
- Landry, S. H., Zucker, T. A., Solari, E., Crawford, A. D., & Williams, J. M. (2012). In Howes, C., Hamre, B. K., & Pianta, R. C. (eds.). *Effective Early Childhood Professional Development: Improving Teacher Practice and Child Outcomes*. Baltimore, MD: P. H. Brookes.
- Lantos, J. D., & Ward, N. A. (2013). A new pediatrics for a new century. *Pediatrics* 131 (Supplement 2): S121–S126.
- Lloyd, J. W., Steinberg, D. R., & Wilhelm-Chapin, M. K. (1999). Research on the transition to kindergarten. In Pianta, R. C., & Cox, M. J. (eds.). *The Transition to Kindergarten*. National Center for Early Development & Learning. Baltimore, MD: Paul H. Brookes.
- Lonigan, C. J., & Shanahan, T. (2010). Developing early literacy skills: things we know we know and things we know we don't know. *Educational Researcher* 39: 340–6.
- Melby, J., Conger, R. D., Book, R., Rueter, M., Lucy, L., Rapinski, D., et al. (1991). *The Iowa Family Interaction Rating Scales*. Ames: Iowa State University.
- Ministry of Education (2012). List of MOE-Registered Kindergartens. www.moe.gov.sg/education/preschool/find-a-kindergarten
- Moore, T. (2006). *Early Childhood and Long Term Development*. Perth: Australian Research Alliance for Children and Youth.
- Morrison, F. J., & Connor, C. M. (2010). Literacy development in the transition to school. In Meece, J. L., & Eccles, J. S. (eds.). *Handbook of Research on Schools, Schooling, and Human Development*. New York: Routledge.
- Moos, R., & Moos, B. (2002). *The Family Environment Scale*, 3rd ed. Menlo Park, CA: Mind Garden.
- National Early Literacy Panel Report (2010). Summary, commentary, and reflections on policies and practices to improve children's early literacy. *Educational Researcher* 39 (Special Issue).
- Odom, S. L. (2009). The tie that binds: evidence-based practice, implementation science, and outcomes for children. *Topics in Early Childhood Special Education* 29: 53–61.
- Odom, S. L., Hanson, M., Lieber, J., Diamond, K., Palmer, S., Butera, G., & Horn, E. (2010). Prevention, early childhood intervention, and implementation science. In Doll, B., Pfohl, W., & Yoon, J. (eds.). *Handbook of Youth Prevention Science*. New York: Routledge.
- Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist* 53: 109–20.
- Ramey, C. T., & Ramey, S. L. (1999). Beginning school for children at risk. In Pianta, R. C., & Cox, M. J. (eds.). *The Transition to Kindergarten*. National Center for Early Development & Learning. Baltimore, MD: Paul H. Brookes.

- Ramey, S. L. and Ramey, C. T. (2006). Early educational interventions: principles of effective and sustained benefits from targeted early education programs. In Dickinson, D. K., & Neuman, S. B. (eds.). *Handbook of Early Literacy Research*, vol. 2. New York: Guilford Press, pp. 445–59.
- Reynolds, A. J., Ou, S., & Topitzes, J. W. (2004). Path effects of early childhood intervention on educational attainment and delinquency: a confirmatory analysis of the Chicago child–parent centers. *Child Development* 75: 1299–1328.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *BASC-2: Behavior Assessment System for Children*, 2nd ed. Circle Pines, MN: American Guidance Service.
- Rouse, H. L., & Fantuzzo, J. W. (2009). Multiple risks and educational well being: a population-based investigation of threats to early school success. *Early Childhood Research Quarterly* 24: 1–14.
- Sadler, F. H. (2003). The itinerant special education teacher in the early childhood classroom. *Teaching Exceptional Children* 3: 8–15.
- Shonkoff, J. P., & Bales, S. N. (2011). Science does not speak for itself: translating child development research for the public and its policymakers. *Child Development* 82: 17–32.
- SingHealth (2011). More children diagnosed with special needs. www.healthxchange.com.sg/News/Pages/More-Children-Diagnosed-With-Special-Needs.aspx
- Thomson, C., Brown, D., Jones, L., Walker, J., Moore, D. W. . . ., & Glynn, T. L. (2003). Resource teachers learning and behavior: collaborative problem solving to support inclusion. *Journal of Positive Behavior Interventions* 5: 101–11.
- Turner-Stokes, L. (2009). Goal attainment scaling (GAS) in rehabilitation: a practical guide. *Clinical Rehabilitation* 23: 362–70.
- Van Steensel, R., McElvany, N., Kurvers, J., & Herppich, S. (2010). How effective are family literacy programs? Results of a meta-analysis. *Review of Educational Research* 81: 69–96.
- Willson, V. L., & Hughes, J. N. (2009). Who is retained in first grade? A psychosocial perspective. *Elementary School Journal* 109: 251–66.
- Woodcock, R. W., McGrew, K. S., Mather, N., & Schrank, F. A. (2001). *Woodcock-Johnson III*. Itasca, IL: Riverside.